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## Discharge planning from hospital (Review)

Gonçalves-Bradley DC, Lannin NA, Clemson LM, Cameron ID, Shepperd S

Gonçalves-Bradley DC, Lannin NA, Clemson LM, Cameron ID, Shepperd S.  
Discharge planning from hospital.  
*Cochrane Database of Systematic Reviews* 2016, Issue 1. Art. No.: CD000313.  
DOI: [10.1002/14651858.CD000313.pub5](https://doi.org/10.1002/14651858.CD000313.pub5).

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**Discharge planning from hospital (Review)**

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[Intervention Review]

# Discharge planning from hospital

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[sasha.shepperd@ndph.ox.ac.uk](mailto:sasha.shepperd@ndph.ox.ac.uk).**Editorial group:** Cochrane Effective Practice and Organisation of Care Group**Publication status and date:** New search for studies and content updated (no change to conclusions), published in Issue 1, 2016.**Citation:** Gonçalves-Bradley DC, Lannin NA, Clemson LM, Cameron ID, Shepperd S. Discharge planning from hospital. *Cochrane Database of Systematic Reviews* 2016, Issue 1. Art. No.: CD000313. DOI: [10.1002/14651858.CD000313.pub5](https://doi.org/10.1002/14651858.CD000313.pub5).

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## ABSTRACT

### Background

Discharge planning is a routine feature of health systems in many countries. The aim of discharge planning is to reduce hospital length of stay and unplanned readmission to hospital, and to improve the co-ordination of services following discharge from hospital. This is the third update of the original review.

### Objectives

To assess the effectiveness of planning the discharge of individual patients moving from hospital.

### Search methods

We updated the review using the Cochrane Central Register of Controlled Trials (CENTRAL) (2015, Issue 9), MEDLINE, EMBASE, CINAHL, the Social Science Citation Index (last searched in October 2015), and the US National Institutes of Health trial register (ClinicalTrials.gov).

### Selection criteria

Randomised controlled trials (RCTs) that compared an individualised discharge plan with routine discharge care that was not tailored to individual participants. Participants were hospital inpatients.

### Data collection and analysis

Two authors independently undertook data analysis and quality assessment using a pre-designed data extraction sheet. We grouped studies according to patient groups (elderly medical patients, patients recovering from surgery, and those with a mix of conditions) and by outcome. We performed our statistical analysis according to the intention-to-treat principle, calculating risk ratios (RRs) for dichotomous outcomes and mean differences (MDs) for continuous data using fixed-effect meta-analysis. When combining outcome data was not possible because of differences in the reporting of outcomes, we summarised the reported data in the text.

### Main results

We included 30 trials (11,964 participants), including six identified in this update. Twenty-one trials recruited older participants with a medical condition, five recruited participants with a mix of medical and surgical conditions, one recruited participants from a psychiatric hospital, one from both a psychiatric hospital and from a general hospital, and two trials recruited participants admitted to hospital following a fall. Hospital length of stay and readmissions to hospital were reduced for participants admitted to hospital with a medical diagnosis and who were allocated to discharge planning (length of stay MD - 0.73, 95% CI - 1.33 to - 0.12, 12 trials, moderate certainty evidence; readmission rates RR 0.87, 95% CI 0.79 to 0.97, 15 trials, moderate certainty evidence). It is uncertain whether discharge planning reduces readmission rates for patients admitted to hospital following a fall (RR 1.36, 95% CI 0.46 to 4.01, 2 trials, very low certainty

### Discharge planning from hospital (Review)

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evidence). For elderly patients with a medical condition, there was little or no difference between groups for mortality (RR 0.99, 95% CI 0.79 to 1.24, moderate certainty). There was also little evidence regarding mortality for participants recovering from surgery or who had a mix of medical and surgical conditions. Discharge planning may lead to increased satisfaction for patients and healthcare professionals (low certainty evidence, six trials). It is uncertain whether there is any difference in the cost of care when discharge planning is implemented with patients who have a medical condition (very low certainty evidence, five trials).

### Authors' conclusions

A discharge plan tailored to the individual patient probably brings about a small reduction in hospital length of stay and reduces the risk of readmission to hospital at three months follow-up for older people with a medical condition. Discharge planning may lead to increased satisfaction with healthcare for patients and professionals. There is little evidence that discharge planning reduces costs to the health service.

## PLAIN LANGUAGE SUMMARY

### Discharge planning from hospital

#### Background

Discharge planning is the development of a personalised plan for each patient who is leaving hospital, with the aim of containing costs and improving patient outcomes. Discharge planning should ensure that patients leave hospital at an appropriate time in their care and that, with adequate notice, the provision of postdischarge services will be organised.

#### Objectives

We systematically searched for trials to see the effect of developing personalised plans for patients leaving the hospital. This is the third update of the original review.

#### Main results

We found 30 trials that compared personalised discharge plans versus standard discharge care. Twenty of those studies included older adults.

#### Authors' conclusions

This review indicates that a personalised discharge plan probably brings about a small reduction in hospital length of stay (mean difference – 0.73 days) and readmission rates for elderly patients who were admitted to hospital with a medical condition, and may increase patient satisfaction. It may also increase professionals' satisfaction, though there is little evidence to support this. It is not clear if discharge planning reduces costs to the health services.

## SUMMARY OF FINDINGS

### Summary of findings for the main comparison. Effect of discharge planning on readmission and hospital length of stay

#### Effect of discharge planning on patients admitted to hospital with a medical condition

**Patient or population:** patients admitted to hospital

**Settings:** hospital

**Intervention:** discharge planning

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No. of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Without discharge planning	With discharge planning				
Unscheduled readmission within 3 months of discharge from hospital	<b>Study population admitted with a medical condition</b>		<b>RR 0.87</b> (0.79 to 0.97)	4743 (15)	⊕⊕⊕⊙ <b>moderate<sup>a</sup></b>	—
	<b>254 per 1000</b>	<b>221 per 1000</b> (200 to 246)				
	<b>Moderate risk population</b>					
	<b>285 per 1000</b>	<b>248 per 1000</b> (225 to 276)	RR 1.36 (0.46 to 4.01)	110 (2)	⊕⊙⊙⊙ <b>very low<sup>b</sup></b>	—
	<b>Study population admitted following a fall</b>					
	<b>93 per 1000</b>	<b>126 per 1000</b> (43 to 371)				
<b>Moderate risk population</b>		92 per 1000	125 per 1000 (42 to 369)			
<b>Hospital length of stay</b>	<b>Study population admitted with a medical condition</b>		—	2193 (12 studies)	⊕⊕⊕⊙ <b>moderate<sup>d</sup></b>	—

Follow-up: 3 to 6 months	The mean hospital length of stay ranged across control groups from <b>5.2 to 12.4 days<sup>c</sup></b>	The mean hospital length of stay in the intervention groups was <b>0.73 lower</b> (95% CI 1.33 to 0.12 lower)		
<b>Satisfaction</b>	Discharge planning may lead to increased satisfaction for patients and healthcare professionals.	6 studies	⊕⊕○○ <b>low</b>	Patient satisfaction was measured in different ways, and findings were not consistent across studies. Only 6/30 studies reported data for this outcome.
<b>Costs</b>	A lower readmission rate for those receiving discharge planning may be associated with lower health service costs in the short term. Differences in use of primary care varied.	5 studies	⊕○○○ <b>very low</b>	Findings were inconsistent. Healthcare resources that were assessed varied among studies, e.g., primary care visits, readmission, length of stay, laboratory services, medication, diagnostic imaging. The charges used to cost the healthcare resources also varied.

\*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

**CI:** Confidence interval; **RR:** Risk ratio.

GRADE Working Group grades of evidence

**High:** This research provides a very good indication of the likely effect. The likelihood that the effect will be substantially different (i.e., large enough to affect a decision) is low.

**Moderate:** This research provides a good indication of the likely effect. The likelihood that the effect will be substantially different is moderate.

**Low:** This research provides some indication of the likely effect. However, the likelihood that it will be substantially different is high.

**Very low:** This research does not provide a reliable indication of the likely effect. The likelihood that the effect will be substantially different is very high.

<sup>a</sup>The evidence was downgraded to moderate as allocation concealment was unclear for 5 of the 15 trials.

<sup>b</sup>The evidence was downgraded because of imprecision in the results due to 2 small trials.

<sup>c</sup>The range excludes length of stay of 45 days reported by Sulch, as this was an outlier.

<sup>d</sup>The evidence was downgraded to moderate as concealment of random allocation was unclear for 6 of the 11 trials.

## BACKGROUND

Cost containment strategies that aim to limit healthcare-related costs while still promoting quality are a feature of all healthcare systems, especially for acute hospital services (Bodenheimer 2005). Recent trends include specifically targeting those patients who incur greater healthcare expenditures, decreasing the length of stay for inpatient care, reducing the number of long-stay beds, moving care into the community, increasing the use of day surgery, providing increased levels of acute care at home ('hospital at home') and implementing policies such as discharge planning.

There is evidence to suggest that discharge planning (i.e. an individualised plan for a patient prior to them leaving hospital for home) combined with additional postdischarge support can reduce unplanned readmission to hospital for patients with congestive heart failure (Phillips 2004). A reduction in readmissions will decrease inpatient costs; however, this reduction in costs may be offset by an increase in the provision of community services as a result of planning. In the United States, unplanned hospitalisations accounted for 17% of all Medicare hospital payments in 2004, and one quarter of all hospital admissions were 30-day readmissions (Jencks 2009). Even a small reduction in readmission rates could have a substantial financial impact (Burgess 2014).

### Description of the condition

It has been estimated that one-fifth of all hospital discharges are delayed for non-medical reasons (McDonagh 2000). Despite recent advances in electronic records, patient pathways and technology-assisted decision support, the following three factors, identified over 30 years ago (Barker 1985), remain causes of delayed discharge from hospital (Dept of Health 2003): inadequate patient assessment by health professionals, resulting in problems such as poor knowledge of the patient's social circumstances and poor organisation of postdischarge health and social care; the late booking of transport services to take a patient home, which prevents timely discharge from hospital; and poor communication between the hospital, follow-up care and community service providers. Organisational factors, including the number of times a patient is moved while in hospital and the discharge arrangements, are more strongly associated with delayed discharge than patient factors such as functional limitations or cognitive function (Challis 2014). The transition of patients from hospital to postdischarge healthcare, residential or the home setting has the potential to disrupt continuity of care and may increase the risk of an adverse event due to an inadequate planning of a patient's discharge (Kripalani 2007). Poor communication between the secondary care and the postdischarge setting can result in key clinical information not reaching primary care providers, with patients remaining unaware of information that might help them manage their condition and prepare for discharge from hospital.

### Description of the intervention

Discharge planning is the development of an individualised discharge plan for a patient prior to them leaving hospital for home. The discharge plan can be a stand-alone intervention or may be embedded within another intervention, for example, as a component of stroke unit care or as part of the comprehensive geriatric assessment process (Ellis 2011; Langhorne 2002; Rubenstein 1984). Discharge planning may also extend across

healthcare settings and include postdischarge support (Parker 2002; Phillips 2004).

### How the intervention might work

The aim of discharge planning is to improve the efficiency and quality of healthcare delivery by reducing delayed discharge from hospital, facilitating the transition of patients from a hospital to a postdischarge setting, providing patients with information about their condition and, if required, postdischarge healthcare. Discharge planning may contain costs and improve patient outcomes. For example, discharge planning may influence both the hospital length of stay and the pattern of care within the community, including the follow-up rate and outpatient assessment, by bridging the gap between hospital and home (Balaban 2008).

### Why it is important to do this review

The emphasis placed on discharge planning varies between countries. In the USA, discharge planning is mandatory for hospitals participating in the Medicare and Medicaid programmes. In the UK, the Department of Health has published guidance on discharge practice for health and social care (Dept of Health 2010). Clinical guidance issued by professional bodies in the UK (Future Hospital Commission 2013), the USA (Dept Health Human Services 2013), Australia (Aus NZ Soc Geriat Med 2008) and Canada (Health Qual Ontario 2013), all highlight the importance of planning discharge as soon as the patient is admitted, involving a multidisciplinary team to provide a thorough assessment, establishing continuous communication with the patient and the care givers, working towards shared decision-making and self-management, and liaising with health and social services in the community—particularly primary care. However, procedures may vary between specialities and healthcare professionals in the same hospital (Ubbink 2014). We have conducted a systematic review of discharge planning to categorise the different types of study populations and discharge plans being implemented, and to assess the effectiveness of organising services in this way. The focus of this review is the effectiveness of discharge planning implemented in an acute hospital setting. This is the third update of the original review.

## OBJECTIVES

The main objective was to assess the effectiveness of planning the discharge of individual patients moving from hospital.

The specific objectives were as follow:

### Does discharge planning improve the appropriate use of acute care

1. Effect of discharge planning on length of stay in hospital compared to usual care.
2. Effect of discharge planning on unscheduled readmission rates compared to usual care
3. Effect of discharge planning on other process variables: patients' place of discharge.

### Does discharge planning improve or (at least) have no adverse effect on patient outcome?

1. Effect of discharge planning on mortality rate compared to usual care.



2. Effect of discharge planning on patient health outcomes compared to usual care.
3. Effect of discharge planning on the incidence of complications related to the initial admission compared to usual care.
4. Effect of discharge planning on the satisfaction of patient, care givers and healthcare professionals compared to usual care.

### Does discharge planning reduce overall costs of healthcare?

1. Effect of discharge planning on hospital care costs compared to usual care.
2. Effect of discharge planning on community care costs compared to usual care.
3. Effect of discharge planning on overall costs of healthcare compared to usual care.
4. Effect of discharge planning on the use of medication.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

Randomised controlled trials.

#### Types of participants

All patients in hospital (acute, rehabilitation or community) irrespective of age, gender or condition.

#### Types of interventions

We defined discharge planning as the development of an individualised discharge plan for a patient prior to them leaving hospital for home or residential care. Where possible, we divided the process of discharge planning according to the steps identified by Marks 1994:

- pre-admission assessment (where possible);
- case finding on admission;
- inpatient assessment and preparation of a discharge plan based on individual patient needs, for example a multidisciplinary assessment involving the patient and their family, and communication between relevant professionals within the hospital;
- implementation of the discharge plan, which should be consistent with the assessment and requires documentation of the discharge process;
- monitoring in the form of an audit to assess if the discharge plan was implemented.

We excluded studies from the review if they did not include an assessment or implementation phase in discharge planning; if it was not possible to separate the effects of discharge planning from the other components of a multifaceted intervention or if discharge planning appeared to be a minor part of a multifaceted intervention; or if the focus was on the provision of care after discharge from hospital. We excluded interventions where the focus was on the provision of care after discharge from hospital, and those in which discharge planning was part of a larger package of care but the process and components were poorly described.

The control group had to receive standard care with no individualised discharge plan.

### Types of outcome measures

We addressed the effect of discharge planning across several areas: the use of acute care, patient outcomes and healthcare costs.

### Main outcomes

1. Length of stay in hospital
2. Readmission rate to hospital

### Other outcomes

1. Complications related to the initial admission
2. Place of discharge
3. Mortality rate
4. Patient health status, including psychological health
5. Patient satisfaction
6. Care giver and healthcare professional satisfaction
7. Psychological health of care givers
8. Healthcare costs of discharge planning
  - a. Hospital care costs and use
  - b. Primary and community care cost
9. The use of medication for trials evaluating a pharmacy discharge plan

### Search methods for identification of studies

#### Electronic searches

We searched the following databases: the Cochrane Central Register of Controlled Trials (CENTRAL) (2015, Issue 9), the Cochrane Effective Practice and Organisation of Care (EPOC) Group Register (March 2009), MEDLINE via OvidSP (1946 to October 2015), EMBASE via OvidSP (1974 to October 2015), CINAHL via EbscoHOST (1980 to October 2015), Social Science Citation Index via ISI Web of Knowledge (1975 to October 2015), EconLit (1969 to 1996), SIGLE (grey literature) (1980 to 1996), PsycLIT (1974 to 1996) and PsycINFO (2012 to October 2015). We detail the search strategies for this update in [Appendix 1](#).

#### Searching other resources

We checked the reference lists of included studies and related systematic reviews using PDQ-Evidence ([PDQ-Evidence 2015](#)). We handsearched the US National Institutes of Health trial register ([ClinicalTrials.gov 2015](#)) and reviewed the reference lists of all included studies. When necessary, we contacted individual trialists to clarify issues and to identify unpublished data.

### Data collection and analysis

For this update we followed the same methods defined in the protocol and used in previous versions of this systematic review. Risk of bias of each included study was assessed using the Cochrane Risk of Bias criteria. We created a summary of findings table using the following outcomes: unscheduled hospital readmission, hospital length of stay, satisfaction and costs. We used the five GRADE considerations (study limitations, consistency of effect, imprecision, indirectness, and risk of bias) to assess the certainty of the evidence as it relates to the main outcomes ([Guyatt 2008](#)). We used methods and recommendations described in Section 8.5

and Chapter 12 of the Cochrane Handbook (Higgins 2011). We justified all decisions to down- or up-grade the certainty of evidence using footnotes to aid readers' understanding of the review where necessary.

### Selection of studies

For this update, two authors (of DCGB, IC, NL and LC) read all the abstracts in the records retrieved by the electronic searches to identify publications that appeared to be eligible for this review. Two authors (of DCGB, IC, NL and LC) then independently assessed the full text of all potentially relevant papers in order to select studies for inclusion. We settled any disagreements by discussion, or by liaising with SS.

We excluded trials when discharge planning was part of a broader package of inpatient care. We made a post hoc decision to exclude any studies that did not describe the study design or did not report results for the control group. We report details of why we excluded studies in the 'Characteristics of excluded studies' table.

### Data extraction and management

For this update, two authors working independently (of DCGB, IC, NL and LC) extracted data from each article. For the original review and two subsequent updates, we used a data extraction form developed by EPOC, modified and amended for the purposes of this review. For the current version of the review we used an adapted version of the Cochrane good practice extraction form (EPOC 2015). We extracted information on study characteristics (first author, year of publication, aim, setting, design, unit of allocation, duration, ethical approval, funding sources), participant characteristics (method of recruitment, inclusion/exclusion criteria, total number, withdrawals and drop-outs, socio-demographic indicators, subgroups), intervention (setting, pre-admission assessment, case finding on admission, inpatient assessment and preparation of discharge plan, implementation of discharge plan, monitoring phase, and comparison), and outcomes.

### Assessment of risk of bias in included studies

We assessed the quality of the selected trials using the criteria presented in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011): random sequence generation, allocation concealment, blinding, incomplete outcome data, selective reporting, and baseline data. For this update, two reviewers (of DCGB, IC, NL and LC) independently assessed the risk of bias. We resolved disagreements by discussing each case with a third reviewer (SS).

### Unit of analysis issues

All the included studies were parallel RCTs, where participants were individually allocated to the treatment or control groups.

### Dealing with missing data

We contacted investigators for missing data; for this update two provided unpublished data (Goldman 2014; Lainscak 2013).

### Assessment of heterogeneity

We quantified heterogeneity among trials using the  $I^2$  statistic and Cochrane's Q test (Cochrane 1954). The  $I^2$  statistic quantifies the percentage of the total variation across studies that is

due to heterogeneity rather than chance (Higgins 2003); smaller percentages suggest less observed heterogeneity.

### Data synthesis

The primary analysis was a comparison of discharge planning versus routine discharge care for each outcome listed in *Types of outcome measures*. We calculated risk ratios (RR) for the dichotomous outcomes mortality, unscheduled readmission and discharge destination, with 95% confidence intervals (CI) for all point estimates; and combined data using the fixed effects model. Values under 1 indicated outcomes favouring discharge planning. We calculated mean differences (MD) for the hospital length of stay. We judged combining data from the included studies inappropriate for the other outcomes, including patient health outcomes, satisfaction, medication, healthcare costs, and use of other postdischarge healthcare services (primary care, outpatient, and emergency room), due to the different methods of measuring and reporting these outcomes. We created a 'Summary of findings' table for the main outcomes of hospital length of stay and unscheduled readmission, and for the secondary outcomes of satisfaction and cost. We used GRADE worksheets to assess the certainty of the evidence (GRADEpro GDT 2015).

### Subgroup analysis and investigation of heterogeneity

In order to reduce differences between trials, we grouped trial results by participants' condition (patients with a medical condition, a surgical condition, or patients recruited to a trial with a mix of conditions), as the discharge planning needs for patients admitted to hospital for surgery might differ from those for patients admitted with an acute medical condition or with multiple medical conditions. We performed post hoc subgroup analyses for participants admitted to hospital following a fall and participants admitted to a mental health setting, as we found more than one study for each subgroup and considered that these participant groups, as well as their discharge needs, might differ from both surgical and medical patients.

### Sensitivity analysis

We performed a post hoc sensitivity analysis by imputing a missing standard deviation for one trial (Kennedy 1987).

## RESULTS

### Description of studies

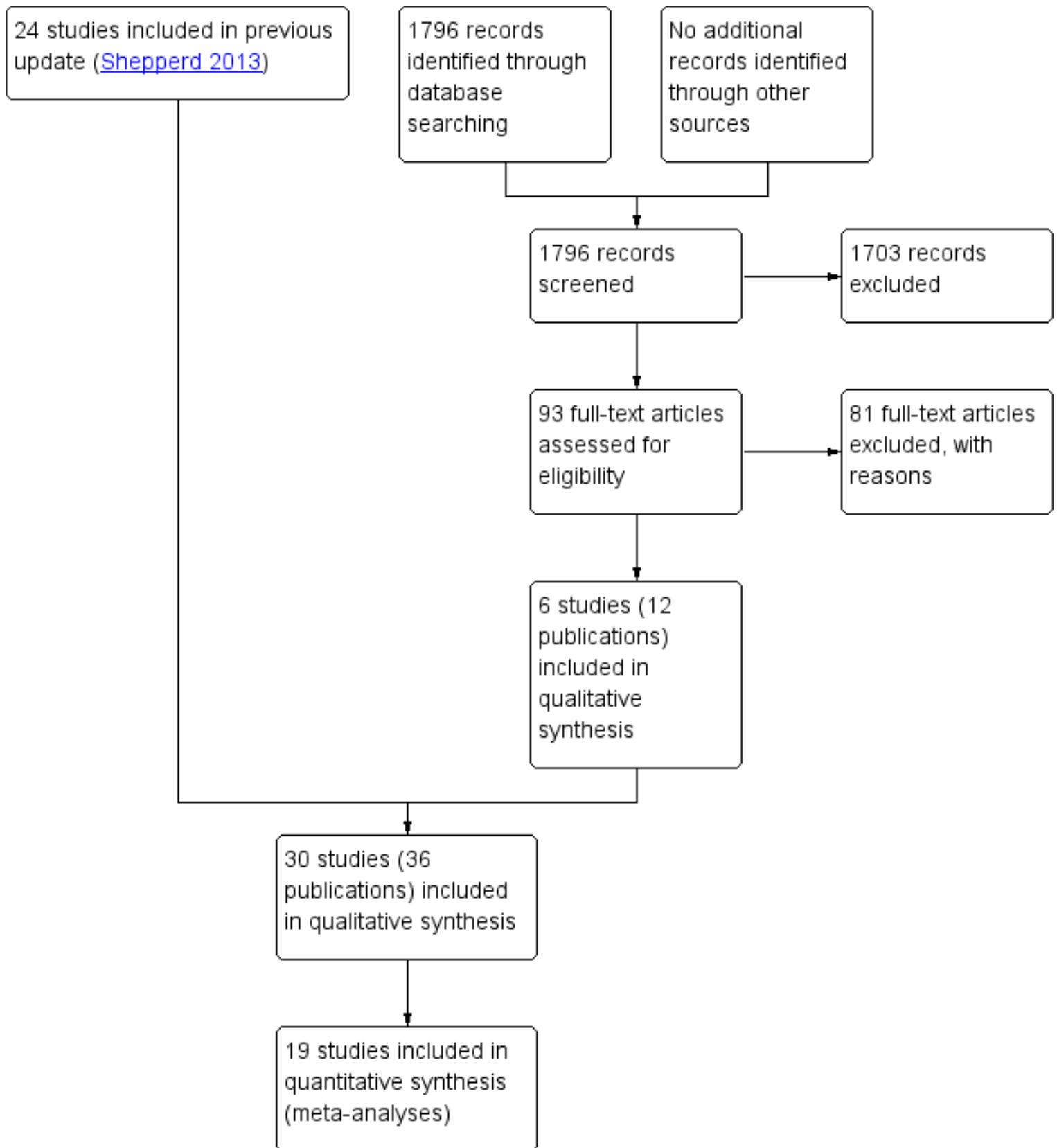
#### Results of the search

Previous versions of the review identified 4676 records, of which we excluded 4526 after screening the title and abstract. The main reasons for exclusion were ineligible study design, intervention or both. Of the 150 full-text records assessed, we excluded 126 and included 24 (Balaban 2008; Bolas 2004; Eggink 2010; Evans 1993; Harrison 2002; Hendriksen 1990; Jack 2009; Kennedy 1987; Laramée 2003; Legrain 2011; Lin 2009; Moher 1992; Naji 1999; Naughton 1994; Naylor 1994; Nazareth 2001; Pardessus 2002; Parfrey 1994; Preen 2005; Rich 1993a; Rich 1995a; Shaw 2000; Sulch 2000; Weinberger 1996). For this review update, we identified 1796 records, of which we excluded 1703 after screening the title and abstract. After retrieving the full text of the remaining 93 studies, we identified six eligible trials (12 publications), which we included in this update (Farris 2014; Gillespie 2009; Goldman 2014; Kripalani 2012; Lainscak 2013; Lindpaintner 2013) (Figure 1). These 30 trials

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recruited a total of 11,964 participants. One of the trials included in the review was translated from Danish to English ([Hendriksen 1990](#)). Follow-up times varied from five days to 12 months.

**Figure 1. PRISMA flow diagram**



## Included studies

The trials included in the review evaluated broadly similar discharge planning interventions, which included assessment, planning, implementation and monitoring phases, although seven trials did not describe a monitoring phase (Eggink 2010; Evans 1993; Moher 1992; Naji 1999; Parfrey 1994; Shaw 2000; Sulch 2000); see [Characteristics of included studies](#). The intervention was implemented at varying times during a participant's stay in hospital, from admission to three days prior to discharge. For one trial it was not clear when the intervention, which consisted of liaising with the community healthcare providers about the patient's specific needs, was implemented (Lainscak 2013). Another trial conducted a needs assessment and implementation of the discharge plan in two separate encounters, but if discharge occurred the same day as enrolment, then both phases occurred in one session (Kripalani 2012). Seven trials evaluated a pharmacy discharge plan implemented by a hospital pharmacy. For six of those trials the participants' medication was rationalised and prescriptions checked for errors by the hospital consultant, GP, community pharmacist or all of those. These professionals also received a pharmacy discharge plan, and participants received information about their medication (Bolas 2004; Eggink 2010; Farris 2014; Gillespie 2009; Nazareth 2001; Shaw 2000). For the seventh trial, the research team contacted the physicians treating the participant, both in the hospital and in the community, but only if they had identified medication-related problems during the monitoring phase of the intervention (Kripalani 2012). In all but two trials a named healthcare professional coordinated the discharge plan. Of the 30 included trials, 12 provided a postdischarge phone call, four a visit, and two a phone call and a visit.

The study population differed between the trials. Twenty-one trials recruited participants with a medical condition (Balaban 2008; Bolas 2004; Eggink 2010; Farris 2014; Gillespie 2009; Goldman 2014; Harrison 2002; Jack 2009; Kennedy 1987; Kripalani 2012; Lainscak 2013; Laramée 2003; Legrain 2011; Moher 1992; Naughton 1994; Nazareth 2001; Preen 2005; Rich 1993a; Rich 1995a; Sulch 2000; Weinberger 1996), with six of these recruiting participants with heart failure (Eggink 2010; Harrison 2002; Kripalani 2012; Laramée 2003; Rich 1993a; Rich 1995a). Two trials recruited older people (> 65 years) admitted to hospital following a fall (Lin 2009; Pardessus 2002), five recruited participants with a mix of medical and surgical conditions (Evans 1993; Farris 2014; Hendriksen 1990; Naylor 1994; Parfrey 1994), and two recruited participants from an acute psychiatric ward (Naji 1999; Shaw 2000), one of which also recruited participants from the elderly care ward (Shaw 2000). Two trials used a questionnaire designed to identify participants likely to require discharge planning (Evans 1993; Parfrey 1994). The majority of trials included a patient education component, and two trials included the participant's care giver in the formal assessment process (Lainscak 2013; Naylor 1994). The average age of participants recruited to 10 of the trials was > 75 years; in seven trials, between 70 and 75 years, and in the remaining trials, < 70

years. In two trials, both recruiting participants from a psychiatric hospital, the participants were under 50 years of age.

The description of the type of care the control group received varied. Two trials did not describe the care that the control group received (Kennedy 1987; Shaw 2000) and another reported it only as best usual care (Lindpaintner 2013). Twenty-one trials described the control group as receiving usual care with some discharge planning but without a formal link through a coordinator to other departments and services, although other services were available on request from nursing or medical staff (Balaban 2008; Eggink 2010; Evans 1993; Gillespie 2009; Goldman 2014; Harrison 2002; Hendriksen 1990; Jack 2009; Laramée 2003; Legrain 2011; Lin 2009; Moher 1992; Naji 1999; Naylor 1994; Naughton 1994; Pardessus 2002; Parfrey 1994; Preen 2005; Rich 1993a; Rich 1995a; Weinberger 1996). The control groups in seven trials that evaluated the effectiveness of a pharmacy discharge plan did not have access to a review and discharge plan by a pharmacist (Bolas 2004; Eggink 2010; Farris 2014; Gillespie 2009; Kripalani 2012; Nazareth 2001; Shaw 2000). In one trial, the control group received multidisciplinary care that was not defined in advance but was determined by the participants' progress (Sulch 2000). Two trials considered the potential influence of language fluency (Balaban 2008; Goldman 2014), while two looked at health literacy (Jack 2009; Kripalani 2012).

## Excluded studies

The main reason for excluding trials was due to multifaceted interventions, of which discharge planning was only a minor part. Some trials reported interventions of postdischarge care, whereas for others the control group also received some component of the discharge planning intervention. We excluded a small number of trials that did not include an assessment phase ([Characteristics of excluded studies](#)).

## Risk of bias in included studies

Eighteen trials reported adequate allocation concealment (Farris 2014; Gillespie 2009; Goldman 2014; Harrison 2002; Jack 2009; Kennedy 1987; Kripalani 2012; Lainscak 2013; Legrain 2011; Naji 1999; Naughton 1994; Nazareth 2001; Preen 2005; Parfrey 1994; Rich 1995a; Shaw 2000; Sulch 2000; Weinberger 1996). All but two trials collected data at baseline (Balaban 2008; Pardessus 2002), and we assessed 21 trials as having a low risk of bias for measurement of the primary outcomes (readmission and length of stay), as investigators used routinely collected data to measure these outcomes (Balaban 2008; Eggink 2010; Evans 1993; Farris 2014; Gillespie 2009; Goldman 2014; Hendriksen 1990; Jack 2009; Kennedy 1987; Lainscak 2013; Laramée 2003; Legrain 2011; Moher 1992; Naji 1999; Naughton 1994; Nazareth 2001; Pardessus 2002; Parfrey 1994; Rich 1993a; Rich 1995a; Weinberger 1996). We assessed one pilot trial as having a high risk of bias for the outcome readmission, which was ascertained by interview rather than through routine data collection (Lindpaintner 2013) ([Figure 2](#)).

**Figure 2. Methodological quality summary: review authors' judgements about each methodological quality item for each included study.**

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding (performance bias and detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Baseline data
Balaban 2008	?	?	+	+	?	-
Bolas 2004	+	?	-	-	?	+
Eggink 2010	+	?	+	+	?	+
Evans 1993	?	?	+	+	?	+
Farris 2014	+	+	?	+	?	+
Gillespie 2009	+	+	+	+	+	+
Goldman 2014	+	+	+	+	+	+
Harrison 2002	+	+	-	+	?	+
Hendriksen 1990	?	?	+	?	?	+
Jack 2009	+	+	+	+	?	+
Kennedy 1987	+	+	+	+	?	+
Krinalani 2017	+	+	+	+	+	+

Figure 2. (Continued)

Kripalani 2012	+	+	+	+	+	+
Lainscak 2013	+	+	+	+	+	+
Laramée 2003	?	?	+	+	?	+
Legrain 2011	+	+	+	+	?	+
Lin 2009	?	?	?	+	?	+
Lindpaintner 2013	+	?	-	+	?	-
Moher 1992	+	?	+	+	?	+
Naji 1999	+	+	+	?	?	+
Naughton 1994	+	+	+	+	?	+
Naylor 1994	?	?	+	+	?	+
Nazareth 2001	+	+	+	+	?	+
Pardessus 2002	+	?	+	+	?	?
Parfrey 1994	?	+	+	+	?	+
Preen 2005	?	+	-	+	?	+
Rich 1993a	+	?	+	+	?	+
Rich 1995a	+	+	+	+	?	+
Shaw 2000	+	+	-	?	?	+
Sulch 2000	+	+	+	+	?	+
Weinberger 1996	+	+	+	+	?	+

**Effects of interventions**

See: [Summary of findings for the main comparison](#) Effect of discharge planning on readmission and hospital length of stay



## Does discharge planning improve the appropriate use of acute care?

### Hospital length of stay

There was a small reduction in hospital length of stay for those allocated to discharge planning in trials recruiting older people following a medical admission (mean difference (MD) – 0.73, 95% confidence interval (CI) – 1.33 to – 0.12; 12 trials, moderate certainty evidence, [Analysis 1.1](#); [Harrison 2002](#); [Gillespie 2009](#); [Kennedy 1987](#); [Laramée 2003](#); [Lindpaintner 2013](#); [Moher 1992](#); [Naughton 1994](#); [Naylor 1994](#); [Preen 2005](#); [Rich 1993a](#); [Rich 1995a](#); [Sulch 2000](#)). This reduction increased slightly in a sensitivity analysis imputing a missing standard deviation for [Kennedy 1987](#) (MD – 0.98, 95% CI – 1.57 to – 0.38; [Analysis 1.2](#)). There was no evidence of statistical heterogeneity. Two trials recruiting participants recovering from surgery reported a difference of – 0.06 day (95% CI – 1.23 to 1.11) ([Analysis 1.3](#); [Lin 2009](#); [Naylor 1994](#)); and two trials recruiting a combination of participants recovering from surgery and those with a medical condition a mean difference of – 0.60 (95% CI – 2.38 to 1.18) ([Analysis 1.4](#); [Evans 1993](#); [Hendriksen 1990](#)). We did not include these four trials in the pooled analysis as they recruited participants from different settings. [Parfrey 1994](#) recruited participants from two hospitals and reported a reduction in length of stay for those receiving discharge planning in one hospital only (median difference – 0.80 days,  $P = 0.03$ ).

### Readmission rates

For elderly participants with a medical condition, there was a lower readmission rate in the discharge planning group at three months of discharge (RR 0.87, 95% CI 0.79 to 0.97; 15 trials, moderate certainty evidence, [Analysis 2.1.1](#); [Balaban 2008](#); [Farris 2014](#); [Goldman 2014](#); [Harrison 2002](#); [Jack 2009](#); [Kennedy 1987](#); [Lainscak 2013](#); [Laramée 2003](#); [Legrain 2011](#); [Moher 1992](#); [Naylor 1994](#); [Nazareth 2001](#); [Rich 1993a](#); [Rich 1995a](#); [Shaw 2000](#)), with no evidence of statistical heterogeneity. It is uncertain whether discharge planning reduces readmission rates for participants admitted to hospital following a fall (RR 1.36, 95% CI 0.46 to 4.01, very low certainty evidence, two trials, [Analysis 2.1.2](#)).

[Evans 1993](#) recruited a mix of participants, reporting a reduction in readmissions for those receiving discharge planning (difference – 11%, 95% CI – 17% to – 4%) at four weeks follow-up, but not at nine months follow-up (difference – 6%, 95% CI – 12.5% to 0.84%;  $P = 0.08$ ). One small pilot trial reported similar readmission rates for both groups at 5 and 30 days but did not provide enough data to be included in the pooled analysis ([Lindpaintner 2013](#); [Analysis 2.3](#)). One trial recruiting people recovering from surgery reported the difference in readmission rates + 3% (95% CI – 7% to 13%; [Analysis 2.4](#); [Naylor 1994](#)), and a trial recruiting participants admitted to acute psychiatric wards reported a difference +7% (95% CI – 1% to 17%; [Analysis 2.5](#); [Naji 1999](#)).

### Days in hospital due to unscheduled readmission

We are uncertain whether discharge planning has an effect on days in hospital due to an unscheduled readmission, for patients with a medical condition ([Analysis 3.1](#)) or surgical patients ([Analysis 3.3](#)). For participants with a mix of medical and surgical conditions, [Evans 1993](#) reported that patients receiving discharge planning spent fewer days in hospital at 9-month follow-up (MD – 2.00; 95% CI – 3.18 to – 0.82), but there was little to no difference for the

participants recruited by [Hendriksen 1990](#) and [Rich 1993a](#) ([Analysis 3.2](#)).

### Place of discharge

Seven trials reported the place of discharge. Discharge planning may not affect the proportion of patients discharged to home rather than to residential care (RR 1.03, 95% CI 0.93 to 1.14; [Analysis 4.1](#); [Moher 1992](#); [Sulch 2000](#), low certainty evidence) or to a nursing home ([Hendriksen 1990](#); [Naughton 1994](#)). One other trial reported that there were no differences between treatment and control groups regarding the likelihood of being discharged into an institutional setting ([Analysis 4.2](#); [Goldman 2014](#)). One trial reported that all participants allocated to the control group were discharged home and 83% of participants in the treatment group were discharged home (difference 17%; 95% CI 2% to 34%; [Analysis 4.2](#); [Lindpaintner 2013](#)). These trials were not included in the pooled analysis as they excluded patients with a high likelihood of being discharged to an institutional setting. [Evans 1993](#) recruited both medical and surgical patients, reporting that a greater proportion of participants allocated to discharge planning went home compared with those receiving no formal discharge planning (difference 6%, 95% CI 0.4% to 12%; [Analysis 4.3](#)). For patients admitted to hospital after a fall, it is uncertain if discharge planning had an effect on place of discharge (OR 0.46, 95% CI 0.15 to 1.40; [Analysis 4.4](#)).

## Does discharge planning improve or (at least) have no adverse effect on patient outcome?

### Mortality rate

For elderly participants with a medical condition (usually heart failure), and those admitted to hospital following a fall, it is uncertain if discharge planning has an effect on mortality at 4- to 6-month follow-up (RR 1.02, 95% CI 0.83 to 1.27; [Analysis 5.1.1](#); [Goldman 2014](#); [Lainscak 2013](#); [Laramée 2003](#); [Legrain 2011](#); [Nazareth 2001](#); [Rich 1995a](#); [Sulch 2000](#)) (RR 1.33, 95% CI 0.33 to 5.45; [Analysis 5.1.2](#); [Pardessus 2002](#)).

[Evans 1993](#) recruited a mix of surgical and medical patients, reporting data for mortality at 9-month follow-up (treatment: 66/417 (15.8%), control: 67/418 (16%); difference – 0.2%, 95% CI – 0.04% to 0.5%; [Analysis 5.2](#)). [Gillespie 2009](#) recruited participants with a medical condition, reporting the number of participants in the treatment and control groups that died during the 12-month follow-up (treatment: 57/182 (31%), control: 61/186 (33%); difference – 2%, 95% CI – 11% to 8%; [Analysis 5.3](#)).

### Complication rate

No trials reported on the effect of discharge planning on the incidence of complications related to the initial admission.

### Patient health status

Thirteen trials measured patient-assessed outcomes, including functional status, mental well-being, perception of health, self-esteem, and affect. Information about the scoring systems for patient-assessed health outcomes are provided in the notes of [Analysis 6.1](#), [Analysis 6.2](#) and [Analysis 6.3](#). We are uncertain whether discharge planning improves patient-assessed health outcomes. Three trials did not publish follow-up data ([Kennedy 1987](#); [Naylor 1994](#); [Weinberger 1996](#)), and for five trials there was little to no difference in mean scores between groups ([Evans 1993](#); [Harrison](#)



2002; Lainscak 2013; Nazareth 2001; Preen 2005; Analysis 6.1). Rich 1995a recruited participants with heart failure, reporting an improvement on the total score for the Chronic Heart Failure Questionnaire (MD 22.1 (SD 20.8);  $P = 0.001$ ; a lower score indicates poor quality of life). Sulch 2000 recruited participants recovering from a stroke, reporting an improvement in function between weeks 4 and 12 for those allocated to the control group, and similar scores for the remaining mean point estimates on the Barthel index. Quality of life, as measured by the EuroQol, showed between-group differences at 26 weeks, favouring the control group (72 points for the control group versus 63 points for the treatment group;  $P < 0.005$ ), but the same point estimates were reported for the Rankin score and the Hospital Anxiety and Depression scale (HADS) (Sulch 2000). Lindpaintner 2013, recruiting participants with a mixed medical background, reported that there were no differences for patient health-related quality of life or care giver burden at 5 or 30 days (no data reported, other than describing no difference).

Lin 2009, recruiting participants recovering from a hip fracture, measured patient-reported health status with the 36-item Short Form Health Survey (SF-36); investigators reported improvements at 3-month follow-up for the treatment group for the mental health aspects of social functioning (MD 15.18 (SD 43.67);  $P = 0.03$ ), vitality (MD 12.59 (SD 36.66);  $P = 0.004$ ), the physical aspects of bodily pain (MD 16.58 (SD 48.7);  $P = 0.009$ ), and general health perceptions (MD 12.76 (SD 36.31);  $P = 0.03$ ); see Analysis 6.2. Pardessus 2002 recruited participants admitted for a fall and reported a reduction of autonomy in daily living activities in the control group measured by the Functional Autonomy Measurement System, whereas the treatment group maintained their baseline function at 6 months and had a small reduction at 12 months (6-month MD - 8.18 (SD 4.94),  $P < 0.001$ ; 12-month MD - 9.73 (SD 5.43),  $P < 0.001$ ; see Analysis 6.3). Pardessus 2002 reported the number of falls at 12-month follow-up (RR 0.87, 95% CI 0.50 to 1.49; Pardessus 2002; Analysis 6.4). Naji 1999 recruited participants admitted to a psychiatric unit and reported that at 1-month postdischarge those who received discharge planning had a higher median score on the HADS depression scale (treatment: median: 9.5, IQR: 5.0, 13.3; control: median: 7.0, IQR: 3.0, 11.0,  $P = 0.016$ ; Analysis 6.5). There was little to no difference between groups for anxiety and behavioural symptoms (Analysis 6.5).

### **Satisfaction of patients, care givers and healthcare professionals**

Discharge planning may lead to increased satisfaction for patients and healthcare professionals (six trials, low certainty evidence due to inconsistent findings and few studies reporting data for this outcome). Two trials, recruiting participants with a medical condition, reported increased patient satisfaction for those allocated to discharge planning. In one trial follow-up was at 1 and 6 months, with the greatest improvement reported for participants' perceptions of continuity of care and non-financial access to medical care (no data reported) (Weinberger 1996). In the second trial, participants reported increased satisfaction with hospital care, hospital discharge and home recovery (no data reported; Laramée 2003; Analysis 7.1.1). In two trials evaluating a pharmacy discharge plan, Nazareth 2001 reported patient satisfaction to be the same in both groups (6-month MD 0.20 (SD 1.19), 95% CI - 0.01 to 0.4), and Bolas 2004 reported that the pharmacy discharge letter improved the standard of information exchange at discharge, as assessed by primary care practitioners (PCP) and community pharmacists (57% and 95% agreed, respectively;

Analysis 7.1.2). In Lindpaintner 2013, PCPs and visiting nurses providing care to participants in the treatment group reported similar 5-day satisfaction with the discharge process as PCPs and visiting nurses whose patients were in the control group (PCP: treatment: median = 1, interquartile range (IQR) = 1 to 2; control: median = 2, IQR = 1 to 3; nurses: treatment: median = 1, IQR = 1-2; control: 2, IQR = 1 to 4). The same study reported that at 30-day follow-up, care givers for participants in the treatment group were more satisfied (treatment: median = 1, IQR = 1 to 2; control: median = 2, IQR = 1 to 3). In Moher 1992, a subgroup of 40 participants admitted to general medical units, mainly for circulatory, respiratory or digestive problems, completed a satisfaction questionnaire, reporting increased satisfaction with discharge planning (difference 27%,  $P < 0.001$ , 95% CI 2% to 52%).

### **Does discharge planning reduce overall costs of healthcare?**

#### **Healthcare costs**

##### **Hospital care costs and use**

It is uncertain whether there is any difference in hospital care cost when discharge planning is implemented with patients with a medical condition (very low certainty evidence, five trials). A lower readmission rate for those receiving discharge planning may be associated with lower health service costs in the short term, but findings were inconsistent. In Naylor 1994, recruiting participants with a medical condition, both groups incurred similar costs for their initial hospital stay. A difference was reported for hospital charges, which included readmission costs, at two weeks follow-up (difference - USD 170,247, 95% CI - USD 253,000 to - USD 87,000, 276 participants, savings per participant not reported) and at two to six weeks follow-up (difference - USD 137,508, 95% CI - USD 210,000 to - USD 67,000), with participants receiving discharge planning incurring lower costs (Analysis 8.1). Naughton 1994 reported lower costs for laboratory services for participants receiving discharge planning (MD per participant - GBP 295, 95% CI - GBP 564 to - GBP 26), but not for diagnostic imaging, pharmacy, rehabilitation or total costs (Analysis 8.1). In Jack 2009, the difference between study groups in total cost for the health service (combining actual hospital utilisation cost and estimated outpatient cost) for 738 participants was USD 149,995, an average of USD 412 per person who received the intervention. In Gillespie 2009, hospital costs were reported (difference: - USD 400, 95% CI - USD 4000 to USD 3200; Analysis 8.1). Difference in costs were not reported in studies recruiting participants with surgical conditions (Analysis 8.2), admitted to a psychiatric unit (Analysis 8.3) or to a general medical service (Analysis 8.4).

Naughton 1994 reported that the overall health service costs were lower for the treatment group, but with a high level of uncertainty (MD - USD 1949, 95% CI - USD 4204 to USD 306). Jack 2009 reported a difference between study groups in total cost (combining actual hospital utilisation cost and estimated outpatient cost) of USD 149,995 for 738 participants, which translated to an average of USD 412 per person who received the intervention; this represents a 33.9% lower observed cost for the treatment group. The cost savings balanced against the cost of the intervention were reported to be EUR 519 per participant in one trial based in Paris (Legrain 2011), and - USD 460 in a trial based in the US (Rich 1995a) (RR 0.80, 95% CI 0.61 to 1.07).

One trial reported the number of hospital outpatient visits (RR 1.07, 95% CI 0.74 to 1.56; Nazareth 2001; Analysis 8.5). Two trials (Farris

2014; Harrison 2002) assessed the effect of discharge planning on the number of days from discharge until the first visit to the emergency department, reporting little to no difference for those receiving discharge planning or usual care (RR 0.80, 95% CI 0.61 to 1.07; Analysis 8.6).

### Primary and community care costs

It is uncertain if discharge planning impacts on primary and community care costs. Weinberger 1996 measured the use of primary care and reported an increase in the use of primary care by those allocated to discharge planning (median time from hospital discharge to first primary care consultation, treatment = seven days, control = 13 days;  $P < 0.001$ ; mean number of visits to general medical clinic for treatment group was 3.7 days, control group 2.2 days;  $P < 0.001$ ). Nazareth 2001 reported that the same proportion of participants in both groups consulted with their general practitioner at three months (MD 2.7%, 95% CI - 7.4% to 12.7%) and six months (MD 0.3%, 95% CI - 11.6% to 12.3%). Farris 2014 assessed unscheduled office visits, reporting a difference of 0% (95% CI - 5% to 5%) at 30-days and 4% (95% CI - 2% to 9%) at 90-days. Goldman 2014 reported an MD of 4%, 95% CI - 3.7% to 11.5%, at 30 days. See Analysis 9.1.

### Medication use

Trials evaluating the effectiveness of a pharmacy discharge plan measured different outcomes related to medication, including the mean number of problems (e.g., difficulty obtaining a prescription from the general practitioner) (Analysis 10.1), adherence to medicines (Analysis 10.2), and knowledge about the prescribed medication (Analysis 10.3). Nazareth 2001 reported data related to adherence to medication regimen, knowledge about medicines and hoarding of medicines (Analysis 10.2, Analysis 10.3, Analysis 10.4). In Eggink 2010, data on medication errors were reported following a review of medication by a pharmacist; 68% in the control group had at least one discrepancy or medication error compared to 39% in the treatment group (RR 0.57, 95% CI 0.37 to 0.88; Analysis 10.5). Kripalani 2012 assessed clinically important medication errors, reporting similar results for both groups at 30 days (RR = 0.92, 95% CI 0.77 to 1.10; Analysis 10.5). Farris 2014 compared medication appropriateness at 30 and 90 days (Analysis 10.6).

## DISCUSSION

### Summary of main results

This review assessed the effectiveness of discharge planning in hospital. Thirty randomised controlled trials met the pre-specified criteria for inclusion. We were able to pool the data from trials recruiting older participants with a medical condition and found that discharge planning probably results in a small reduction in hospital length of stay (just under a day; moderate certainty evidence, 12 trials) and unscheduled readmission (approximately three fewer readmissions per 100 participants; moderate certainty evidence, 15 trials). It is uncertain whether discharge planning reduces readmission rates for patients admitted to hospital following a fall (very low certainty evidence, two trials). Discharge planning may lead to increased satisfaction for patients and healthcare professionals (low certainty evidence, six trials). It is uncertain whether there is any difference in the cost of care when discharge planning is implemented with patients who have a medical condition (very low certainty evidence, five trials). A lower

readmission rate for those receiving discharge planning may be associated with lower health service costs in the short term, but findings were inconsistent.

### Overall completeness and applicability of evidence

A key issue in interpreting the evidence is the definition of the intervention and the subsequent understanding of the relative contribution of each element. While authors of all of the trials provided some description of the intervention, it was not possible to assess how some components of the process compared between trials. For example, Naylor 1994 and Lainscak 2013 formalised the inclusion of the participants' care givers into the assessment process and the discharge plan. Although some of the other trials mentioned this aspect, the degree to which this was done was not always apparent (Evans 1993; Hendriksen 1990; Kennedy 1987; Laramée 2003; Naughton 1994). The majority of the trials also included a patient education component within the discharge planning process. In one trial, which recruited participants admitted to hospital following a fall, the discharge plan included a pre-discharge home visit that was specific to this group of patients, by an occupational therapist and rehabilitation doctor (Pardessus 2002). In another trial, hospital and community nurses worked together on the discharge plan (Harrison 2002). Two of the trials used an assessment tool to find cases eligible for discharge planning (Evans 1993; Parfrey 1994). The monitoring of discharge planning also differed. For example, in one trial this was done primarily by telephone, while in Weinberger 1996 participants were given appointments to attend a primary care clinic. Seven trials evaluated the effectiveness of a pharmacy discharge plan (Bolas 2004; Eggink 2010; Farris 2014; Gillespie 2009; Kripalani 2012; Nazareth 2001; Shaw 2000). Of those seven trials, four reported data for readmission, with no differences between treatment and control groups (Farris 2014; Gillespie 2009; Nazareth 2001; Shaw 2000). The evidence was mixed for the use of medication: three trials reported improvements with medication use between groups (Bolas 2004; Eggink 2010; Shaw 2000), and three trials did not (Farris 2014; Kripalani 2012; Nazareth 2001). However, the interpretation of these data is limited by the heterogeneity of the outcomes measured. An additional problem, common to other trials, was the difficulty in assessing if contamination between the treatment and control groups occurred. Four trials considered equity, assessing the potentially disadvantageous effect of language and health literacy by performing subgroup analyses of participants whose first language was not English (Balaban 2008; Goldman 2014) and who had low health literacy, respectively (Jack 2009; Kripalani 2012). There was mixed evidence for non-English speakers, and the evidence does not seem to support an increased or decreased effect of discharge planning for patients with low health literacy.

The context in which an intervention such as discharge planning is delivered may also play a role, not only in the way the intervention is delivered but in the way services are configured for the control group. Thirteen of the trials included in this review were based in the USA, five in the UK, three in Canada, two in France, one in Australia, one in Sweden, one in Denmark, one in the Netherlands, one in Taipei, one in Slovenia, and one in Switzerland. In each country the orientation of primary care services differs, which may affect communication between services. Different perceptions of care by professionals of alternative care settings and country-specific funding arrangements may also influence timely discharge. The point in a patient's hospital admission when

discharge planning was implemented also varied across studies. Two trials reported discharge planning commencing from the time a patient was admitted to hospital (Parfrey 1994; Sulch 2000), and another stated that discharge planning was implemented three days prior to discharge (Weinberger 1996). The timing of delivery of an intervention such as discharge planning, which depends on organising other services, will have some bearing on how quickly these services can begin providing care. The patient population may also impact on outcome. For example, 99 patients recruited to the trial by Weinberger were experiencing major complications from their chronic disease and this, combined with an intervention also designed to increase the intensity of primary care services, may explain the observed increase in readmission days for those receiving the intervention. Similarly, Goldman postulates that educating patients in the treatment group about medication and side effects might have made them more likely to visit the emergency department (Goldman 2014).

### Quality of the evidence

All studies included in this review were randomised controlled trials, and we considered most of them to have a low risk of bias. There was consistency among trials recruiting patients with a medical condition for the main outcomes of readmission and length of stay, and a moderate level of certainty for these outcomes. A small number of studies reported data on cost to the health service and potential cost savings; the findings from these studies are less certain due to different mechanisms for costing and charging (very low certainty evidence, five trials). Similarly few studies assessed patient satisfaction, and of those that did there is some evidence of increased satisfaction in patients experiencing discharge planning. However, this evidence base is small and the effects of discharge planning on patient satisfaction are uncertain (low certainty evidence, six trials).

### Agreements and disagreements with other studies or reviews

Systematic reviews have been published in related areas, for example, Stuck 1993 and Ellis 2011 evaluated geriatric assessment that included discharge planning as part of a broader package of care, and Kwan 2004 looked at integrated care pathways for stroke. This latter review concluded that this type of care may be associated with both positive and negative effects on the organisation of care and clinical outcomes. Parker 2002 included discharge planning interventions that were implemented in a hospital setting, comprehensive geriatric assessment, discharge support arrangements and educational interventions, concluding that interventions providing an educational component had an effect on reducing readmission rates. The interventions evaluated by the majority of trials included in this review had an element of patient education. Leppin 2014 reviewed interventions aimed at reducing early hospital readmissions (< 30 days) for adults discharged home versus any other comparator. Their results indicated that those interventions that were more complex, promoted patient self-care and were conducted less recently were more likely to be effective. The authors speculate that an increased standard of care, along with a shift on the interventions being tested, might explain their finding of more recent interventions being less effective.

## AUTHORS' CONCLUSIONS

### Implications for practice

This review indicates that a structured discharge plan tailored to the individual probably brings about a small reduction in hospital length of stay and unscheduled readmission for elderly patients with a medical condition. The impact on health outcomes is uncertain. Even a small reduction in length of stay could free up capacity for subsequent admissions in a system where there is a shortage of acute hospital beds and indicates that discharge planning does not delay discharge from hospital. This is reassuring, as interventions comprised of several components may delay discharge if the components are implemented sequentially. However, increasing capacity by reducing length of stay is likely to increase costs, as acute hospitals will admit more patients who require acute hospital care. It is not clear if costs are reduced or shifted from secondary to primary care or to patients and care givers as a result of discharge planning.

### Implications for research

Surprisingly, some of the stated policy aims of discharge planning, for instance bridging the gap between hospital and home, were not reflected in the trials included in this review. An important element of discharge planning is the effectiveness of communication between hospital and community, yet the trials included in this review did not report on the quality of communication. The expectation is that discharge planning will ensure that patients are discharged from hospital at an appropriate time in their care and, with adequate notice, will facilitate the organisation and provision of other services. A high level of communication between the discharge planner and the service providers outside the hospital setting is clearly important. Future well-conducted studies should continue to collect data on readmissions and hospital length of stay and promote the application of the results by providing details of the intervention and the context in which it was delivered. Investigators should develop safeguards against contamination of the control group, for example by appropriately designing cluster-randomised trials or documenting the adoption of discharge planning by the control group. Conducting research on the impact of a delayed discharge on overall bed utilisation and cost-effectiveness to the health service, and of increasing capacity by a reduction in hospital length of stay would improve the evidence base of interventions, such as discharge planning, that are designed to improve the efficiency of healthcare services (Hawkes 2015).

## ACKNOWLEDGEMENTS

Diana Harwood for assisting in scanning abstracts retrieved from electronic searches for the original review; Andy Oxman for commenting on all versions of this review; Jeremy Grimshaw and Darryl Wieland for helpful comments on earlier drafts and Luciana Ballini, Tomas Pantoja, Craig Ramsey, Darryl Weiland and Kirsten Woodend for comments on the previous update; Nia Roberts for conducting the literature searches; and Julie Parkes, Christopher Phillips, Jacqueline McClaran, Sarah Barras, and Annie McCluskey for contributing to previous versions of this review (Parkes 2000; Shepperd 2010, Shepperd 2013).



## REFERENCES

### References to studies included in this review

#### Balaban 2008 {published data only}

Balaban RB, Weissman JS, Samuel PA, Woolhandler S. Redefining and redesigning hospital discharge to enhance patient care: a randomized controlled study. *Journal of General Internal Medicine* 2008;**23**(8):1228-33.

#### Bolas 2004 {published data only}

Bolas H, Brookes K, Scott M, McElnay J. Evaluation of a hospital-based community liaison pharmacy service in Northern Ireland. *Pharmacy World & Science* 2004;**26**(2):114-20.

#### Eggink 2010 {published data only}

Eggink RN, Lenderink AW, Widdershoven JWMG, Van den Bemt PLMA. The effect of a clinical pharmacist discharge service on medication discrepancies in patients with heart failure. *Pharmacy World & Science* 2010;**32**(6):759-66.

#### Evans 1993 {published data only}

Evans RL, Hendricks RD. Evaluating hospital discharge planning: a randomised controlled trial. *Medical Care* 1993;**31**(4):358-70.

#### Farris 2014 {published data only}

Carter BL, Farris, KB, Abramowitz PW, Weetman DB, Kaboli PJ, Dawson JD, et al. The Iowa Continuity of Care Study: background and methods. *American Journal of Health-System Pharmacy* 2008;**65**(17):1631-42.

Farley TM, Shelsky C, Powell S, Farris KB, Carter BL. Effect of clinical pharmacist intervention on medication discrepancies following hospital discharge. *International Journal of Clinical Pharmacy* 2014;**36**(2):430-7.

\* Farris KB, Carter BL, Xu J, Dawson JD, Shelsky C, Weetman DB, et al. Effect of a care transition intervention by pharmacists: an RCT. *BMC Health Services Research* 2014;**14**:406.

Israel EN, Farley TM, Farris KB, Carter BL. Underutilization of cardiovascular medications: effect of a continuity-of-care program. *American Journal of Health-System Pharmacy* 2013;**70**(18):1592-1600.

#### Gillespie 2009 {published data only}

Gillespie U, Alassaad A, Henrohn D, Garmo H, Hammarlund-Udenaes M, Toss H, et al. A comprehensive pharmacist intervention to reduce morbidity in patients 80 years or older: a randomized controlled trial. *Archives of Internal Medicine* 2009;**169**(9):849-900.

#### Goldman 2014 {published and unpublished data}

Goldman. Request of extra data for Support From Hospital to Home for Elders [personal communication]. Email to D Gonçalves-Bradley 10 April 2015.

Goldman LE, Sarkar U, Kessell E, Critchfield J, Schneidermann M, Pierluissi E, et al. Support for hospital to home for elders: a randomized control trial of an in-patient discharge intervention among a diverse elderly population.

*Journal of General Internal Medicine* 2013; Vol. 28, issue Supplement 1:S189-S190.

\* Goldman LE, Sarkar U, Kessell E, Guzman D, Schneidermann M, Pierluissi E, et al. Support from hospital to home for elders: a randomized trial. *Annals of Internal Medicine* 2014;**161**(7):472-81.

Greysen SR, Hoi-Cheung D, Garcia V, Kessell E, Sarkar U, Goldman L, et al. "Missing pieces"--functional, social, and environmental barriers to recovery for vulnerable older adults transitioning from hospital to home. *Journal of the American Geriatrics Society* 2014;**62**(8):1556-61. [DOI: [10.1111/jgs.12928](https://doi.org/10.1111/jgs.12928)]

#### Harrison 2002 {published data only}

Harrison MB, Browne GB, Roberts J, Tugwell P, Gafni A, Graham I. Quality of life of the effectiveness of two models of hospital-to-home transition. *Medical Care* 2002;**40**(4):271-82.

#### Hendriksen 1990 {published data only}

Hendriksen C, Stromgard E, Sorensen K. Current cooperation concerning admission to and discharge from geriatric hospitals [Nyt samarbejde om gamle menneskers sygehusindlæggelse og -udskrivelse]. *Nordisk Medicin* 1990;**105**(2):58-60.

Hendriksen C, Strømgaard E, Sørensen KH. Cooperation concerning admission to and discharge of elderly people from the hospital. 1. The coordinated contributions of home care personnel [Samarbejde om gamle menneskers sygehusindlæggelse og -udskrivelse. 1. Hjemmesygeplejerskens koordinerende indsats på sygehuset]. *Ugeskrift For Laeger* 1989;**151**(24):1531-4.

#### Jack 2009 {published data only}

Jack BW, Chetty VK, Anthony D, Greenwald JL, Sanchez GM, Johnson AE, et al. A reengineered hospital discharge program to decrease rehospitalization. *Annals of Internal Medicine* 2009;**150**(3):178-87.

#### Kennedy 1987 {published data only}

Kennedy L, Neidlinger S, Scroggins K. Effective comprehensive discharge planning. *Gerontologist* 1987;**27**(5):577-80.

#### Kripalani 2012 {published data only}

Bell SP, Schnipper JL, Goggins KM, Bian A, Shintani A, Roumie CL, et al. Effect of a pharmacist counseling intervention on healthcare utilization after hospital discharge: a randomized controlled trial. *Journal of General Internal Medicine* 2015;**30**(Supplement 2):S55.

\* Kripalani S, Roumie CL, Dalal AK, Cawthon C, Businger A, Eden SK, et al. PILL-CVD (Pharmacist Intervention for Low Literacy in Cardiovascular Disease) Study Group. Effect of a pharmacist intervention on clinically important medication errors after hospital discharge: a randomized trial. *Annals of Internal Medicine* 2012;**157**(1):1-10.

Schnipper JL, Roumie CL, Cawthon C, Businger A, Dalal AK, Mugalla I, et al. PILL-CVD Study Group. Rationale and design of the Pharmacist Intervention for Low Literacy in Cardiovascular

Disease (PILL-CVD) study. *Circulation: Cardiovascular Quality and Outcomes* 2010;**3**(2):212-19.

**Lainscak 2013** {published and unpublished data}

Farkas J, Kadivec S, Kosnik M, Lainscak M. Effectiveness of discharge-coordinator intervention in patients with chronic obstructive pulmonary disease: study protocol of a randomized controlled clinical trial. *Respiratory Medicine* 2011;**105**(Suppl 1):S26-S30.

Lainscak M. Request of extra data for "Discharge Coordinator intervention" [personal communication]. Email sent to D Gonçalves-Bradley 15 April 2015.

Lainscak M, Kadivec S, Kosnik M, Benedik B, Bratkovic M, Jakhel T, et al. Discharge coordinator intervention prevents hospitalisations in patients with COPD: a randomized controlled trial. *European Respiratory Journal* 2012;**40**(S56):P2895.

\* Lainscak M, Kadivec S, Kosnik M, Benedik B, Bratkovic M, Jakhel T, et al. Discharge coordinator intervention prevents hospitalizations in patients with COPD: a randomized controlled trial. *Journal of the American Medical Directors Association* 2013;**14**(6):450.e1-6.

**Laramee 2003** {published data only}

Laramee AS, Levinsky SK, Sargent J, Ross R, Callas P. Case management in a heterogeneous congestive heart failure population. *Archives of Internal Medicine* 2003;**163**:809-17.

**Legrain 2011** {published data only}

Bonnet-Zamponi D, D'Arailh L, Konrat C, Delpierre S, Lieberherr D, Lemaire A, et al. Optimization of Medication in AGEd study group. Drug-related readmissions to medical units of older adults discharged from acute geriatric units: results of the Optimization of Medication in AGEd multicenter randomized controlled trial. *Journal of the American Geriatrics Society* 2013;**61**(1):113-21.

Legrain S, Tubach F, Bonnet-Zamponi D, Lemaire A, Aquino J, Paillaud E, et al. A new multimodal geriatric discharge planning intervention to prevent emergency visits and rehospitalizations of older adults: the optimization of medication in AGEd multicentre randomised controlled trial. *Journal of the American Geriatric Society* 2011;**59**(11):2017-28.

**Lin 2009** {published data only}

Lin PC, Wang CH, Chen CS, Liao LP, Kao SF, Wu HF. To evaluate the effectiveness of a discharge planning programme for hip fracture patients. *Journal of Clinical Nursing* 2009;**18**(11):1632-9.

**Lindpaintner 2013** {published data only}

Lindpaintner LS, Gasser JT, Schramm MS, Cina-Tschumi B, Müller B, Beer JH. Discharge intervention pilot improves satisfaction for patients and professionals. *European Journal of Internal Medicine* 2013;**24**(8):756-62.

**Moher 1992** {published data only}

Moher D, Weinberg A, Hanlon R, Runnalls K. Effects of a medical team coordinator on length of hospital stay. *Canadian Medical Association Journal* 1992;**146**(4):511-5.

**Naji 1999** {published data only}

Naji SA, Howie FL, Cameron IM, Walker SA, Andrew J, Eagles JM. Discharging psychiatric in-patients back to primary care: a pragmatic randomized controlled trial of a novel discharge protocol. *Primary Care Psychiatry* 1999;**5**(3):109-15.

**Naughton 1994** {published data only}

Naughton B, Moran M, Feinglass J, Falconer J. Reducing hospital costs for the geriatric patient admitted from the emergency department: a randomised trial. *Journal of the American Geriatrics Society* 1994;**42**(10):1045-9.

**Naylor 1994** {published data only}

Naylor M, Brooten D, Jones R, Lavizzo-Mourey R, Mezey M, Pauly M. Comprehensive discharge planning for the hospitalized elderly. A randomized clinical trial. *Annals of Internal Medicine* 1994;**120**(12):999-1006.

**Nazareth 2001** {published data only}

Nazareth I, Burton A, Shulman S, Smith P, Haines A, Timberal H. A pharmacy discharge plan for hospitalized elderly patients - a randomized controlled trial. *Age and Ageing* 2001;**30**(1):33-40.

**Pardessus 2002** {published data only}

Pardessus V, Puisieux F, Di Pompeo C, Gaudefroy C, Thevenon A, Dewailly P. Benefits of home visits for falls and autonomy in the elderly: a randomized trial study. *American Journal of Physical Medicine & Rehabilitation* 2002;**81**(4):247-52.

**Parfrey 1994** {published data only}

Parfrey PS, Gardner E, Vavasour H, Harnett JD, McManamon C, McDonald J, et al. The feasibility and efficacy of early discharge planning initiated by the admitting department in two acute care hospitals. *Clinical and Investigative Medicine* 1994;**17**(2):88-96.

**Preen 2005** {published data only}

Preen DB, Preen DB, Bailey BES, Wright A, Kendall P, Phillips M, et al. Effects of a multidisciplinary, post discharge continuance of care intervention on quality of life, discharge satisfaction, and hospital length of stay: a randomized controlled trial. *International Journal for Quality in Health Care* 2005;**17**(1):43-51.

**Rich 1993a** {published data only}

Rich MW, Vinson JM, Sperry JC, Shah AS, Spinner LR, Chung M, et al. Prevention of readmission in elderly patients with congestive heart failure: results of a prospective randomised pilot study. *Journal of General Internal Medicine* 1993;**8**(11):585-90.

**Rich 1995a** {published data only}

Rich MW, Beckham V, Wittenberg C, Leven C, Freedland KE, Carney RM. A multidisciplinary intervention to prevent the readmission of elderly patients with congestive heart failure. *New England Journal of Medicine* 1995;**333**(18):1190-5.

**Shaw 2000** {published data only}

Shaw H, Mackie CA, Sharkie I. Evaluation of effect of pharmacy discharge planning on medication problems experienced by discharged acute admission mental health patients. *International Journal of Pharmacy Practice* 2000;**8**(2):144-53.

**Sulch 2000** {published data only}

Sulch D, Perez I, Melbourn A, Kalra L. Randomized controlled trial of integrated (managed) care pathway for stroke rehabilitation. *Stroke* 2000;**31**(8):1929-34.

**Weinberger 1996** {published data only}

Weinberger M, Oddone EZ, Henderson WG. Does increased access to primary care reduce hospital admissions? Veterans Affairs Cooperative Study Group on Primary Care and Hospital Readmissions. *New England Journal of Medicine* 1996;**334**(22):1441-7.

**References to studies excluded from this review**
**Applegate 1990** {published data only}

Applegate WB, Miller ST, Graney MJ, Elam JT, Akins DE. A randomized controlled trial of a geriatric assessment unit in a community rehabilitation hospital. *New England Journal of Medicine* 1990;**322**(22):1572-8.

**Brooten 1987** {published data only}

Brooten D, Kumar S, Brown LP, Butts P, Finkler SA, Bakewell-Sachs S, et al. A randomized clinical trial of early hospital discharge and home follow-up of very-low-birth-weight infants. *NLN Publications* 1987;**21-2194**:95-106.

**Brooten 1994** {published data only}

Brooten D, Roncoli M, Finkler S, Arnold L, Cohen A, Mennuti M. A randomized trial of early hospital discharge and home follow-up of women having cesarean birth. *Obstetrics and Gynecology* 1994;**84**(5):832-8.

**Carty 1990** {published data only}

Carty EM, Bradley CF. A randomized, controlled evaluation of early postpartum hospital discharge. *Birth* 1990;**17**(4):199-204.

**Casiro 1993** {published data only}

Casiro OG, McKenzie ME, McFadyen L, Shapiro C, Seshia MM, MacDonald N, et al. Earlier discharge with community-based intervention for low birth weight infants: a randomized trial. *Pediatrics* 1993;**92**(1):128-34.

**Choong 2000** {published data only}

Choong PFM, Langford AK, Dowsey MM, Santamaria NM. Clinical pathway for fractured neck of femur: a prospective controlled study. *Medical Journal of Australia* 2000;**172**(9):423-6.

**Cossette 2015** {published data only}

Cossette S, Frasure-Smith N, Vadeboncoeur A, McCusker J, Guertin MC. The impact of an emergency department nursing intervention on continuity of care, self-care capacities and psychological symptoms: secondary outcomes of a randomized controlled trial. *International Journal of Nursing Studies* 2015;**52**(3):666-76. [DOI: [10.1016/j.ijnurstu.2014.12.007](https://doi.org/10.1016/j.ijnurstu.2014.12.007)]

**Donahue 1994** {published data only}

Donahue D, Brooten D, Roncoli M, Arnold L, Knapp H, Borucki L, et al. Acute care visits and rehospitalization in women and infants after cesarean birth. *Journal of Perinatology* 1994;**14**(1):36-40.

**Dudas 2001** {published data only}

Dudas V, Bookwalter T, Kerr KM, Pantilat SZ. The impact of follow-up telephone calls to patients after hospitalization. *American Journal of Medicine* 2001;**111**(9b):26s-30s.

**Englander 2014** {published data only}

Englander H, Michaels L, Chan B, Kansagara D. The care transitions innovation (C-Train) for socioeconomically disadvantaged adults: results of a cluster randomized controlled trial. *Journal of General Internal Medicine* 2014;**29**(11):460-7.

**Epstein 1990** {published data only}

Epstein AM, Hall JA, Fretwell M, Feldstein M, DeCiantis ML, Tognetti J, et al. Consultative geriatric assessment for ambulatory patients. A randomized trial in a health maintenance organization. *JAMA* 1990;**263**(4):538-44.

**Fretwell 1990** {published data only}

Fretwell MD, Raymond PM, McGarvey ST, Owens N, Trainee M, Silliman RA, et al. The Senior Care Study. A controlled trial of a consultative/unit-based geriatric assessment program in acute care. *Journal of the American Geriatrics Society* 1990;**38**(10):1073-81.

**Gayton 1987** {published data only}

Gayton D, Wood-Dauphinee S, De Lorimer M, Tousignant P, Hanley J. Trial of a geriatric consultation team in an acute care hospital. *Journal of the American Geriatrics Society* 1987;**35**(8):726-36.

**Germain 1995** {published data only}

Germain M, Knoeffel F, Wieland D, Rubenstein LZ. A geriatric assessment and intervention team for hospital inpatients awaiting transfer to a geriatric unit: a randomized trial. *Ageing (Milan, Italy)* 1995;**7**(1):55-60.

**Gillette 1991** {published data only}

Gillette Y, Hansen NB, Robinson JL, Kirkpatrick K, Grywalski R. Hospital-based case management for medically fragile infants: results of a randomized trial. *Patient Education and Counseling* 1991;**17**(1):59-70.

**González-Guerrero 2014** {published data only}

González-Guerrero JL, Alonso-Fernández T, García-Mayolín N, Gusi N, Ribera-Casado JM. Effectiveness of a follow-up program for elderly heart failure patients after hospital discharge. A randomized controlled trial. *European Geriatric Medicine* 2014;**5**(4):252-7.

**Haggmark 1997** {published data only}

Häggmark C, Nilsson B. Effects of an intervention programme for improved discharge planning. *Nordic Journal of Nursing Research* 1997;**17**(2):4-8.

**Hansen 1992** {published data only}

Hansen FR, Spedtsberg K, Schroll M. Geriatric follow-up by home visits after discharge from hospital: a randomized controlled trial. *Age and Ageing* 1992;**21**(6):445-50.

**Hickey 2000** {published data only}

Hickey ML, Cook FE, Rossi LR, Connor J, Dutkiewicz C, McCabe Hassan S, et al. Effect of case managers with a general medical patient population. *Journal of Evaluation in Clinical Practice* 2000;**6**(1):23-9.

**Hogan 1990** {published data only}

Hogan DB, Fox RA. A prospective controlled trial of a geriatric consultation team in an acute-care hospital. *Age and Ageing* 1990;**19**(2):107-13.

**Jenkins 1996** {published data only}

Jenkins HM, Blank V, Miller K, Turner J, Stanwick RS. A randomized single-blind evaluation of a discharge teaching book for pediatric patients with burns. *Journal of Burn Care & Rehabilitation* 1996;**17**(1):49-61.

**Karppi 1995** {published data only}

Karppi P, Tilvis R. Effectiveness of a Finnish geriatric inpatient assessment. Two-year follow up of a randomized clinical trial on community-dwelling patients. *Scandinavian Journal of Primary Health Care* 1995;**13**(2):93-8.

**Kleinpell 2004** {published data only}

Kleinpell RM. Randomized trial of an intensive care unit-based early discharge planning intervention for critically ill elderly patients. *American Journal of Critical Care* 2004;**13**(4):335-45.

**Kravitz 1994** {published data only}

Kravitz RL, Reuben DB, Davis JW, Mitchell A, Hemmerling K, Kington RS, et al. Geriatric home assessment after hospital discharge. *Journal of the American Geriatrics Society* 1994;**42**(12):1229-34.

**Landefeld 1995** {published data only}

Landefeld CS, Palmer RM, Kresevic DM, Fortinsky RH, Kowal J. A randomized controlled trial of care in a hospital medical unit especially designed to improve functional outcomes of acutely ill older patients. *New England Journal of Medicine* 1995;**332**(20):1338-44.

**Linden 2014** {published data only}

Linden A, Butterworth S. A comprehensive hospital-based intervention to reduce readmissions for chronically ill patients: a randomized controlled trial. *American Journal of Managed Care* 2014;**20**(10):783-92.

**Loffler 2014** {published data only}

Löffler C, Drewelow E, Paschka SD, Frankenstein M, Eger L, Jatsch L, et al. Optimizing polypharmacy among elderly hospital patients with chronic diseases—study protocol of the cluster randomized controlled POLITE-RCT trial. *Implementation Science* 2014;**9**:151.

**Martin 1994** {published data only}

Martin F, Oyewole A, Moloney A. A randomized controlled trial of a high support hospital discharge team for elderly people. *Age and Ageing* 1994;**23**(3):228-34.

**Marusic 2013** {published data only}

Marusic S, Gojo-Tomic N, Erdeljic V, Bacic-Vrca V, Franic M, Kirin M, et al. The effect of pharmacotherapeutic counseling on readmissions and emergency department visits. *International Journal of Clinical Pharmacy* 2013;**35**(1):37-44.

**McGrory 1994** {published data only}

McGrory A, Assmann S. A study investigating primary nursing, discharge teaching, and patient satisfaction of ambulatory cataract patients. *Insight* 1994;**19**(2):8-13, 29.

**McInnes 1999** {published data only}

McInnes E, Mira M, Atkin N, Kennedy P, Cullen J. Can GP input into discharge planning result in better outcomes for the frail aged: results from a randomized controlled trial. *Family Practice* 1999;**16**(3):289-93.

**Melin 1993** {published data only}

Melin AL, Hakansson S, Bygren LO. The cost-effectiveness of rehabilitation in the home: a study of Swedish elderly. *American Journal of Public Health* 1993;**83**:356-62.

**Melin 1995a** {published data only}

Melin AL. A randomized trial of multidisciplinary in-home care for frail elderly patients awaiting hospital discharge. *Aging* 1995;**7**(3):247-50.

**Melin 1995b** {published data only}

Melin AL, Wieland D, Harker JO, Bygren LO. Health outcomes of a post-hospital in-home team care: secondary analysis of a Swedish trial. *Journal of the American Geriatrics Society* 1995;**43**(3):301-7.

**Murray 1995** {published data only}

Murray SK, Garraway WM, Akhtar AJ, Prescott RJ. Communication between home and hospital in the management of acute stroke in the elderly: results from a controlled trial. *Health Bulletin* 1995;**40**(5):214-9.

**Naylor 1999** {published data only}

Naylor MD, Brooten D, Campbell R, Jacobsen BS, Mezey MD, Pauly MV, et al. Comprehensive discharge planning and home follow-up of hospitalized elders: a randomized controlled trial. *JAMA* 1999;**281**(7):613-20.

**Naylor 2004** {published data only}

Naylor MD, Brooten DA, Campbell RL, Maislin G, McCauley KM, Sanford Schwartz J. Transitional care of older adults hospitalized with heart failure: a randomised controlled trial. *Journal of the American Geriatrics Society* 2004;**52**(5):675-84.

**Nickerson 2005** {published data only}

Nickerson A, McKinnon NJ, Roberst N, Saulnier L. Drug therapy problems, inconsistencies and omissions identified during a medication reconciliation and seamless care service. *Healthcare Quarterly* 2005;**8**(Spec No):65-72.

**Nikolaus 1995** {published data only}

Nikolaus T, Specht-Leible N, Bach M, Wittmann-Jennwein C, Oster P, Schlierf G. Effectiveness of hospital-based geriatric evaluation and management and home intervention team



(GEM-HIT): rationale and design of a 5-year randomized trial. *Zeitschrift für Gerontologie und Geriatrie* 1995;**28**(1):47-53.

**Reuben 1995** {published data only}

Reuben DB, Borok GM, Wolde-Tsodik G, Ershoff DH, Fishman LK, Ambrosini VL, et al. A randomized trial of comprehensive geriatric assessment in the care of hospitalized patients. *New England Journal of Medicine* 1995;**332**(20):1345-50.

**Rich 1993b** {published data only}

Rich MW, Vinson JM, Sperry JC, Shah AS, Spinner LR, Chung MK, et al. Prevention of readmission in elderly patients with congestive heart failure: results of a prospective, randomized pilot study. *Journal of General Internal Medicine* 1993;**8**(11):585-90.

**Rich 1995b** {published data only}

Rich MW, Beckham V, Wittenberg C, Leven CL, Freedland KE, Carney RM. A multidisciplinary intervention to prevent the readmission of elderly patients with congestive heart failure. *New England Journal of Medicine* 1995;**333**(18):1190-5.

**Rubenstein 1984** {published data only}

Rubenstein LZ, Josephson KR, Wieland GD, English PA, Sayre JA, Kane RL. Effectiveness of a geriatric evaluation unit. A randomized clinical trial. *New England Journal of Medicine* 1984;**311**(26):1664-70.

**Saleh 2012** {published data only}

Saleh SS, Freire C, Morris-Dickinson G, Shannon T. An effectiveness and cost-benefit analysis of a hospital-based discharge transition program for elderly Medicare recipients. *Journal of the American Geriatrics Society* 2012;**60**(6):1051-6.

**Saltz 1988** {published data only}

Saltz CC, McVey LJ, Becker PM, Feussner JR, Cohen HJ. Impact of a geriatric consultation team on discharge placement and repeat hospitalization. *Gerontologist* 1988;**28**(3):344-50.

**Shah 2013** {published data only}

Shah M, Norwood CA, Farias S, Ibrahim S, Chong PH, Fogelfeld L. Diabetes transitional care from inpatient to outpatient setting: pharmacist discharge counseling. *Journal of Pharmacy Practice* 2013;**26**(2):120-4.

**Sharif 2014** {published data only}

Sharif F, Moshkelgosha F, Molazem Z, Najafi Kalyani M, Vossughi M. The effects of discharge plan on stress, anxiety and depression in patients undergoing percutaneous transluminal coronary angioplasty: a randomized controlled trial. *International Journal of Community Based Nursing & Midwifery* 2014;**2**(2):60-8.

**Shyu 2010** {published data only}

Shyu YI, Liang J, Wu CC, Su JY, Cheng HS, Chou SW, et al. Two-year effects of interdisciplinary intervention for hip fracture in older Taiwanese. *Journal of the American Geriatrics Society* 2010;**58**(6):1081-9.

**Siu 1996** {published data only}

Siu AL, Kravitz RL, Keeler E, Hemmerling K, Kington R, Davis JW, et al. Postdischarge geriatric assessment of hospitalized frail elderly patients. *Archives of Internal Medicine* 1996;**156**(1):76-81.

**Smith 1988** {published data only}

Smith DM, Weinberger M, Katz BP, Moore PS. Postdischarge care and readmissions. *Medical Care* 1988;**26**(7):699-708.

**Thomas 1993** {published data only}

Thomas DR, Brahan R, Haywood BP. Inpatient community-based geriatric assessment reduces subsequent mortality. *Journal of the American Geriatrics Society* 1993;**41**(2):101-4.

**Townsend 1988** {published data only}

Townsend J, Piper M, Frank AO, Dyer S, North WR, Meade TW. Reduction in hospital readmission stay of elderly patients by a community based hospital discharge scheme: a randomized controlled trial. *BMJ* 1988;**297**(6647):544-7.

**Tseng 2012** {published data only}

Tseng MY, Shyu YI, Liang J. Functional recovery of older hip-fracture patients after interdisciplinary intervention follows three distinct trajectories. *The Gerontologist* 2012;**52**(6):833-42.

**Victor 1988** {published data only}

Victor CR, Vetter NJ. Rearranging the deckchairs on the Titanic: failure of an augmented home help scheme after discharge to reduce the length of stay in hospital. *Archives of Gerontology and Geriatrics* 1988;**7**(1):83-91.

**Voirol 2004** {published data only}

Voirol P, Kayser SR, Chang CY, Chang QL, Youmans SL. Impact of pharmacists' interventions on the pediatric discharge medication process. *Annals of Pharmacotherapy* 2004;**38**(10):1597-602.

**Winograd 1993** {published data only}

Winograd CH, Gerety MB, Lai NA. A negative trial of inpatient geriatric consultation. Lessons learned and recommendations for future research. *Archives of Internal Medicine* 1993;**153**(17):2017-23.

**Yeung 2012** {published data only}

Yeung, SM. The effects of a transitional care programme using holistic care interventions for Chinese stroke survivors and their care providers: A randomized controlled trial. The Effects of a Transitional Care Programme Using Holistic Care Interventions for Chinese Stroke Survivors and Their Care Providers: A Randomized Controlled Trial. Hong Kong: Hong Kong Polytechnic University, 2012.

**References to ongoing studies**

**NCT02112227** {published data only}

NCT02112227. Patient-centered Care Transitions in Heart Failure (PACT-HF). [clinicaltrials.gov/ct2/show/NCT02112227](http://clinicaltrials.gov/ct2/show/NCT02112227) (accessed 2 June 2015).



**NCT02202096** {published data only}

NCT02202096. A pilot randomized trial of a comprehensive transitional care program for colorectal cancer patients. [clinicaltrials.gov/ct2/show/NCT02202096](http://clinicaltrials.gov/ct2/show/NCT02202096) (accessed 2 June 2015).

**NCT02295319** {published data only}

NCT02295319. The impact of individual-based discharges from acute admission units to home. [clinicaltrials.gov/ct2/show/NCT02295319](http://clinicaltrials.gov/ct2/show/NCT02295319) (accessed 2 June 2015).

**NCT02351648** {published data only}

NCT02351648. A randomised control trial of a transitional care model in Singapore General Hospital. [clinicaltrials.gov/ct2/show/NCT02351648](http://clinicaltrials.gov/ct2/show/NCT02351648) (accessed 2 June 2015).

**NCT02388711** {published data only}

NCT02388711. A trial of the C-TraC intervention for dementia patients. [clinicaltrials.gov/ct2/show/NCT02388711](http://clinicaltrials.gov/ct2/show/NCT02388711) (accessed 2 June 2015).

**NCT02421133** {published data only}

NCT02421133. Impact of a transitional care program on 30-day hospital readmissions for elderly patients discharged from a short stay geriatric ward (PROUST). [clinicaltrials.gov/ct2/show/NCT02421133](http://clinicaltrials.gov/ct2/show/NCT02421133) (accessed 2 June 2015).

**Additional references**
**Aus NZ Soc Geriat Med 2008**

Australia and New Zealand Society for Geriatric Medicine. Position statement No. 15: Discharge planning. Australia and New Zealand Society for Geriatric Medicine, 2008.

**Barker 1985**

Barker WH, Williams TF, Zimmer JG, Van Buren C, Vincent SJ, Pickrel SG. Geriatric consultation teams in acute hospitals: impact on back-up of elderly patients. *Journal of the American Geriatrics Society* 1985;**33**(6):422-8.

**Bodenheimer 2005**

Bodenheimer T, Fernandez A. High and rising health care costs. Part 4: Can costs be controlled while preserving quality?. *Annals of Internal Medicine* 2005;**143**(1):26-31.

**Burgess 2014**

Burgess JF, Hockenberry JM. Can all cause readmission policy improve quality or lower expenditures? A historical perspective on current initiatives. *Health Economics, Policy and Law* 2014;**9**(2):193-213.

**Challis 2014**

Challis D, Hughes J, Xie C, Jolley D. An examination of factors influencing delayed discharge of older people from hospital. *International Journal of Geriatric Psychiatry* 2014;**29**(2):160-8.

**ClinicalTrials.gov 2015**

ClinicalTrials.gov. ClinicalTrials.gov. Retrieved from <https://clinicaltrials.gov/> (accessed 12/10/15).

**Cochrane 1954**

Cochran WG. The combination of estimates from different experiments. *Biometrics* 1954;**10**:101-29.

**Dept Health Human Services 2013**

Department of Health and Human Services. Discharge Planning. Washington D.C.: Department of Health and Human Services, Centers for Medicare and Medicaid Services, 2013.

**Dept of Health 2003**

Department of Health. Discharge from Hospital: Pathway, Process and Practice. A Manual of Discharge Practice for Health and Social Care Commissioners, Managers and Practitioners. London: Department of Health, 2003.

**Dept of Health 2010**

Department of Health. Ready to Go? Planning the Discharge and the Transfer of Patients from Hospital and Intermediate Care. London: Department of Health, 2010.

**Ellis 2011**

Ellis G, Whitehead MA, O'Neill D, Langhorne P, Robinson D. Comprehensive geriatric assessment for older adults admitted to hospital. *Cochrane Database of Systematic Reviews* 2011, Issue 7. [DOI: [10.1002/14651858.CD006211.pub2](https://doi.org/10.1002/14651858.CD006211.pub2)]

**EPOC 2015**

Effective Practice, Organisation of Care (EPOC). Data extraction and management. EPOC Resources for review authors. Oslo: Norwegian Knowledge Centre for the Health Services; 2013. Available at: <http://epoc.cochrane.org/epoc-specific-resources-review-authors>.

**Future Hospital Commission 2013**

Future Hospital Commission. Future hospital: Caring for medical patients. A report from the Future Hospital Commission to the Royal College of Physicians. Royal College of Physicians (ISBN 9781860165184), 2013.

**GRADEpro GDT 2015 [Computer program]**

McMaster University (developed by Evidence Prime, Inc.). GRADEpro Guideline Development Tool. Available from [www.gradepr.org](http://www.gradepr.org); McMaster University (developed by Evidence Prime, Inc.), 2015.

**Guyatt 2008**

Guyatt GH, Oxman AD, Vist G, Kunz R, Falck-Ytter Y, Alonso-Coello P, Schünemann HJ, for the GRADE Working Group. Rating quality of evidence and strength of recommendations GRADE: An emerging consensus on rating quality of evidence and strength of recommendations. *BMJ* 2008;**336**:924-926.

**Hawkes 2015**

Hawkes N. Providing care at home will not save money for NHS in next five year, Monitor says. *BMJ* 2015;**351**:h889.

**Health Qual Ontario 2013**

Health Quality Ontario. Adopting a Common Approach to Transitional Care Planning: Helping Health Links Improve Transitions and Coordination of Care. Health Quality Ontario, 2013.

**Higgins 2003**

Higgins JPT, Thompson SG, Deeks JJ, Altman DG. Measuring inconsistency in meta-analysis. *BMJ* 2003;**327**:557-60.

**Higgins 2011**

Higgins JPT, Green S (editors). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1.0 [updated March 2011]. The Cochrane Collaboration, 2011. Available from [www.cochrane-handbook.org](http://www.cochrane-handbook.org), 2011.

**Jencks 2009**

Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare Fee-for-Service Program. *New England Journal of Medicine* 2009;**360**(14):1418-28.

**Kripalani 2007**

Kripalani S, LeFevre F, Phillips CO, Williams MV, Basaviah P, Baker DW. Deficits in communication and information transfer between hospital-based and primary care physicians: implications for patient safety and continuity of care. *JAMA* 2007;**297**(8):831-41.

**Kwan 2004**

Kwan J, Sandercock P. In hospital care pathways for stroke. *Cochrane Database of Systematic Reviews* 2004, Issue 4. [DOI: [10.1002/14651858.CD002924.pub2](https://doi.org/10.1002/14651858.CD002924.pub2)]

**Langhorne 2002**

Langhorne P, Pollock A with the Stroke Unit Trialists Collaboration. What are the components of effective stroke unit care?. *Age and Ageing* 2002;**31**(5):365-71.

**Leppin 2014**

Leppin AL, Gionfriddo MR, Kessler M, Brito JP, Mair FS, Gallacher K, et al. Preventing 30-day hospital readmissions: A systematic review and meta-analysis of randomized trials. *JAMA Internal Medicine* 2014;**174**(7):1095-107.

**Marks 1994**

Marks L. *Seamless Care or Patchwork Quilt? Discharging Patients from Acute Hospital Care*. London: Kings Fund, 1994.

**McDonagh 2000**

McDonagh MS, Smith DH, Goddard M. Measuring appropriate use of acute beds - a systematic review of methods and results. *Health Policy* 2000;**53**(3):157-84.

**Parker 2002**

Parker SG, Peet SM, McPherson A, Cannaby AM, Abrams K, Baker R, et al. A systematic review of discharge arrangements for older people. *Health Technology Assessment* 2002;**6**(4):1-183.

**PDQ-Evidence 2015**

PDQ-Evidence. PDQ-Evidence. Retrieved from <http://www.pdq-evidence.org/en/> (accessed 14 April 2015).

**Phillips 2004**

Phillips CO, Wright SM, Kern DE, Singa RM, Shepperd S, Rubin HR. Comprehensive discharge planning with post discharge support for older patients with congestive heart failure: a meta-analysis. *JAMA* 2004;**291**(11):358-67.

**Stuck 1993**

Stuck AE, Sui AL, Wieland GD, Adams J, Rubenstein LS. Comprehensive geriatric assessment: a meta analysis of controlled trials. *The Lancet* 1993;**342**(8878):1032-6.

**Ubbink 2014**

Ubbink DT, Tump E, Koenders JA, Kleiterp S, Goslings JC, Brölmann FE. Which reasons do doctors, nurses, and patients have for hospital discharge? A mixed-methods study. *PLoS One* 2014;**9**(3):e91333.

**References to other published versions of this review**
**Parkes 2000**

Parkes J, Shepperd S. Discharge planning from hospital to home. *Cochrane Database of Systematic Reviews* 2000, Issue 4:CD000313. [DOI: [10.1002/14651858.CD000313](https://doi.org/10.1002/14651858.CD000313)]

**Shepperd 2004**

Shepperd S, Parkes J, McClaren J, Phillips C. Discharge planning from hospital to home. *Cochrane Database of Systematic Reviews* 2004, Issue 1:CD000313. [DOI: [10.1002/14651858.CD000313.pub2](https://doi.org/10.1002/14651858.CD000313.pub2)]

**Shepperd 2010**

Shepperd S, McClaran J, Phillips CO, Lannin NA, Clemson LM, McCluskey A, et al. Discharge planning from hospital to home. *Cochrane Database of Systematic Reviews* 2010, Issue 1. [DOI: [10.1002/14651858.CD000313.pub3](https://doi.org/10.1002/14651858.CD000313.pub3)]

**Shepperd 2013**

Shepperd S, Lannin NA, Clemson LM, McCluskey A, Cameron ID, Barras SL. Discharge planning from hospital to home. *Cochrane Database of Systematic Reviews* 2013, Issue 1. [DOI: [10.1002/14651858.CD000313.pub4](https://doi.org/10.1002/14651858.CD000313.pub4)]

\* Indicates the major publication for the study

**CHARACTERISTICS OF STUDIES**
**Characteristics of included studies** [ordered by study ID]

**Balaban 2008**

Methods	RCT
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**Discharge planning from hospital (Review)**

**Balaban 2008** (Continued)

Participants	<p>A culturally and linguistically diverse group of patients who were admitted to hospital as an emergency, and had to have a 'medical home' defined as having an established primary care provider to be discharged to; patients were excluded if previously enrolled in the study, discharged to another institution or residing in long-term care facility.</p> <p>Number of patients recruited: T = 47, C = 49</p> <p>Number with diabetes: T = 12/47, C = 18/49</p> <p>Number with heart failure: T = 5/47, C = 5/49</p> <p>Number with COPD: T = 6/47, C = 6/49</p> <p>Number with depression: T = 23/47, C = 19/49</p> <p>Number of patients recruited: T = 47, C = 49</p> <p>Mean age: T = 58 years, C = 54 years</p> <p>Sex (female): T = 27/47 (57.4%), C = 30/49 (61%)</p> <p>Non-English-speaking: T = 19/47 (40%), C = 9/49 (18.4%)</p>	
Interventions	<p><b>Setting:</b> a safety net 100 bed community teaching hospital affiliated with Harvard Medical School, USA</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> not clear</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> A comprehensive Patient Discharge Form was provided to patients in one of 3 languages (English, Spanish and Portuguese). The form sought to identify communication problems that occur during the transition of care, including patients' lack of knowledge about their condition and any gaps in outpatient follow-up care or follow-up of test results.</p> <p><b>Implementation of the discharge plan:</b> the Discharge Form was electronically transferred to the RN at the patient's primary care facility, a primary care RN contacted the patient and reviewed the Discharge Form and the medication included in the discharge-transfer plan</p> <p><b>Monitoring phase:</b> by primary care RN who telephoned the patient to assess their medical status, review the Patient Discharge Form, assess patient concerns and confirm scheduled follow-up appointments. Immediate interventions were arranged as needed, and the discharge form and telephone notes were forwarded electronically to the primary care provider who reviewed the form.</p> <p><b>Control:</b> discharged according to existing hospital practice, which consisted of receiving discharge instructions handwritten in English. Communication between the discharge physician and primary care physician was done on an as-needed basis.</p>	
Outcomes	<p>Hospital length of stay and readmission rates</p> <p>Follow-up: at 21 and 31 d</p>	
Notes	<p>24/120 patients were excluded after randomisation.</p>	
<b>Risk of bias</b>		
<b>Bias</b>	<b>Authors' judgement</b>	<b>Support for judgement</b>
Random sequence generation (selection bias)	Unclear risk	Not described

**Balaban 2008** (Continued)

Allocation concealment (selection bias)	Unclear risk	Not described
Blinding (performance bias and detection bias) All outcomes	Low risk	Main outcome measure was readmission rates
Incomplete outcome data (attrition bias) All outcomes	Low risk	Follow-up data for > 80%
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	High risk	Comparison at end of treatment only

**Bolas 2004**

Methods	RCT
Participants	<p>Patients recruited within 48 h of an emergency or unplanned admission to the medical admissions unit, aged <math>\geq 55</math> years and taking 3 regular drugs or more. Patients were excluded if transferred to another hospital, admitted or transferred to a nursing home, if patient or care giver was unable to communicate with pharmacist, had mental illness or alcohol-related admission, or if home visit or follow-up was declined on admission.</p> <p>Number of patients recruited: T = 119, C = 124</p> <p>Mean age: T = 73 years, C = 75 years</p> <p>Sex (female): T = 41/119 (34%), C = 42/124 (34%)</p> <p>Living alone: T = 27/119, C = 34/124</p>
Interventions	<p><b>Setting:</b> Antrim Hospital, a 426-bed district general hospital in Northern Ireland</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> not described</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> use of a comprehensive medication history service, provision of an intensive clinical pharmacy service including management of patients' own drugs brought to hospital, personalised medicines record and patient counselling to explain changes at discharge.</p> <p><b>Implementation of the discharge plan:</b> discharge letter outlining complete drug history on admission and explanation of changes to medication during hospital and variances to discharge prescription. This was faxed to GP and community pharmacist. Personalised medicine card, discharge counselling, labelling of dispensed medications under the same headings for follow-up</p> <p><b>Monitoring:</b> medicines helpline</p> <p><b>Control:</b> standard clinical pharmacy service</p>
Outcomes	<p>Patient satisfaction, knowledge of medicines, hoarding of medicines</p> <p>Readmissions and length of stay data not reported</p>

**Discharge planning from hospital (Review)**

**Bolas 2004** (Continued)

Notes —

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated random number
Allocation concealment (selection bias)	Unclear risk	Allocation concealment was not described
Blinding (performance bias and detection bias) All outcomes	High risk	Low risk for readmission data and high risk for knowledge of medicines and GP and community pharmacists' views.
Incomplete outcome data (attrition bias) All outcomes	High risk	Follow-up of patients: 67% (162/243)  Low response rate in survey of GPs (55% response rate) and community pharmacists (56% response rate)
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Eggink 2010**

Methods	RCT
Participants	<p>Patients aged <math>\geq 18</math> years, with heart failure who were prescribed <math>\geq 5</math> medicines at discharge; patients were excluded if living in a nursing home or unable to provide informed consent.</p> <p>Number of patients recruited: T = 41, C = 44</p> <p>Mean age (SD): T = 74 (12), C = 72 (10)</p> <p>Sex (female): T = 14/41 (41%), C = 11/44 (25%)</p>
Interventions	<p><b>Setting:</b> Department of Cardiology in a teaching hospital in Tilburg, Netherlands</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> not described</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> the clinical pharmacist identified potential prescription errors in the discharge medication, developed a discharge medication list and discussed with the cardiologist.</p> <p><b>Implementation of the discharge plan:</b> patients received verbal and written information about side effects and changes in their hospital drug therapy from a clinical pharmacist at discharge. A discharge medication list was faxed to the community pharmacy and given as written information to the patient; this contained information on dose adjustments and discontinued medications.</p> <p><b>Monitoring:</b> not described</p> <p><b>Control:</b> regular care, verbal and written information about their drug therapy from a nurse at hospital discharge, the prescription was made by the physician and given to the patient to give to the GP</p>

**Discharge planning from hospital (Review)**

**Eggink 2010** (Continued)

Outcomes	Adherence to medication, prescribing errors (an error in the process of prescribing) and discrepancies (a restart of a discontinued medication, discontinuation of prescribed discharge medication, use of higher or lower dose, more or less frequent use than prescribed and incorrect time of taking medication)
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**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Random number table
Allocation concealment (selection bias)	Unclear risk	Not described
Blinding (performance bias and detection bias) All outcomes	Low risk	Low risk for count of prescribing errors, unclear risk for adherence
Incomplete outcome data (attrition bias) All outcomes	Low risk	Loss to follow-up = 2/89
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Majority of characteristics similar at baseline

**Evans 1993**

Methods	RCT
Participants	<p>Patients aged <math>\geq 70</math> years and admitted with a medical condition, neurological condition, or recovering from surgery, were screened for risk factors that would prolong their hospital length of stay</p> <p>Number of patients recruited: T = 417, C = 418</p> <p>Mean age: T = 66.6 years, C = 67.9 years</p>
Interventions	<p><b>Setting:</b> Veterans Affairs Hospital, Seattle, USA</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> patients screened for risk factors that may prolong length of stay, increase risk of readmission, or discharge to a nursing home</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> during discharge planning, information on support systems, living situation, finances and areas of need were obtained from the medical notes; interviews with the patient and family, and consulting with the physician and nurse</p> <p><b>Implementation of the discharge plan:</b> discharge planning initiated on day 3 of hospital admission, and these patients were referred to a social worker. Plans were implemented with measurable goals using goal attainment scaling.</p> <p><b>Monitoring:</b> not reported</p>

**Discharge planning from hospital (Review)**

**Evans 1993** (Continued)

**Control:** received discharge planning only if referred by medical staff and usually on the 9<sup>th</sup> day of hospital admission, or not at all

Outcomes	Hospital length of stay, readmission to hospital, discharge destination, health status Follow-up at 3 months
Notes	Also validated an instrument to assess high-risk patients Intervention implemented on day 3 of hospital admission

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not described
Allocation concealment (selection bias)	Unclear risk	Not described
Blinding (performance bias and detection bias) All outcomes	Low risk	Yes, for objective measures
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients randomised accounted for at follow-up
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Farris 2014**

Methods	RCT
Participants	<p>Patients aged <math>\geq 18</math> years, English- or Spanish- speaking, admitted with diagnosis of hypertension, hyperlipidaemia, HF, coronary artery disease, MI, stroke, TIA, asthma, COPD or receiving oral anticoagulation, with life expectancy of <math>\geq 6</math> months and without cognitive impairment, dementia or severe psychiatric diagnosis</p> <p>Number of patients recruited: enhanced T = 314, minimum T = 315, C = 316</p> <p>Mean age (SD): 61.0 (12.2)</p>
Interventions	<p><b>Setting:</b> Academic health centre, Iowa, US</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> electronic medical records screened for eligibility, followed by patient screening</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> patients in Minimum and Enhanced Intervention received admission medication reconciliation and pharmacist visits every 2-3 d during inpatient stay for education</p>

**Discharge planning from hospital (Review)**

**Farris 2014** (Continued)

**Implementation of the discharge plan:** patients in Minimum and Enhanced Intervention received counselling and discharge medication list; PCP and community pharmacist of patients in Enhanced Intervention received copy of care plan (6-24 h postdischarge) with medication list and patient-specific concerns, among others

**Monitoring:** patients in Enhanced Intervention received call 3-5 d postdischarge

**Control:** medication reconciliation at admission as per hospital policy, nurse discharge counselling and discharge medication list. The discharge summary was transcribed and received in the mail by the PCP several days or weeks after discharge

Outcomes	Medication appropriateness, adverse events, preventable adverse events, composite variable of combined hospital readmission, emergency department visit or unscheduled office visit. Follow-up at 30 and 90 d postdischarge
Notes	Fidelity assessment conducted to assess which intervention components were delivered

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Statistician-generated blinded randomisation scheme, sequentially numbered envelopes
Allocation concealment (selection bias)	Low risk	Unit of allocation by patient, with sealed opaque envelope
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Pharmacists unaware of patients allocation to Minimum Intervention or Enhanced Intervention until discharge; status of RAs who assessed baseline and follow-up unclear
Incomplete outcome data (attrition bias) All outcomes	Low risk	9 patients lost to follow-up (3 per group: Enhanced Intervention = 311/314; Minimum Intervention = 312/315; Control = 313/316)
Selective reporting (reporting bias)	Unclear risk	Some of the secondary outcomes were analysed in aggregate; however, they were also reported separately and it was possible to extract sufficient information
Baseline data	Low risk	Baseline data reported, similar characteristics; control group less likely to forget medication but not related with main outcome

**Gillespie 2009**

Methods	RCT
Participants	<p>Patients aged <math>\geq 80</math> years, admitted to 2 internal medicine wards; excluded if admitted previously to the study wards during the study period or had scheduled admissions</p> <p>Number of patients recruited: T = 182, C = 186</p> <p>Mean age (SD): T = 86.6 (4.2), C = 87.1 (14.1)</p> <p>Sex (female): T = 105 (57.7%), C = 111 (59.7%)</p>
Interventions	<p><b>Setting:</b> teaching hospital, Upsalla, Sweden</p> <p><b>Pre-admission assessment:</b> no</p>

**Discharge planning from hospital (Review)**



**Gillespie 2009** (Continued)

**Case finding on admission:** no

**Inpatient assessment and preparation of a discharge plan based on individual patient needs:**

study pharmacists compiled a comprehensive list of current medications, after which they reviewed the drugs. Advice on drug selection, dosages, and monitoring needs was given to the patient's physician, who was responsible for the final decision. Patients were educated and monitored throughout the admission process

**Implementation of discharge plan:** PCP contacted and given discharge medications, which included rationale for changes and monitoring needs for newly commenced drugs. All information was approved by ward physicians

**Monitoring:** follow-up telephone call to patients 2 months after discharge

**Control:** standard care without pharmacists' involvement in the healthcare team at the ward level

Outcomes	Frequency of hospital visits 12 months after (last included patient) discharge from hospital; number of readmissions, ED visits, and costs
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Notes	—
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**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomisation was performed in blocks of 20 (each block contained 10 intervention and 10 control allocations)
Allocation concealment (selection bias)	Low risk	Block randomisation with a closed-envelope technique. The randomisation process was performed by the clinical trials group at the Hospital Pharmacy.
Blinding (performance bias and detection bias) All outcomes	Low risk	Objective measures of outcome using routine data.
Incomplete outcome data (attrition bias) All outcomes	Low risk	T: 13 died before discharge and 4 withdrew; C: 14 died and 1 withdrew (< 8%)
Selective reporting (reporting bias)	Low risk	Main outcome is the same as reported for the trial registry ( <a href="https://clinicaltrials.gov/show/NCT00661310">https://clinicaltrials.gov/show/NCT00661310</a> )
Baseline data	Low risk	Baseline data reported

**Goldman 2014**

Methods	RCT
Participants	<p>Patients aged <math>\geq 60</math> years (later lowered to 55 to improve recruitment), admitted unexpectedly to the internal or family medicine, cardiology, or neurology departments; English-, Spanish- or Mandarin-speaking, likely to be discharged home and able to consent</p> <p>Number of patients recruited: T = 347, C = 352</p> <p>Mean age (SD): T = 66.5 years (9.0), C = 66.0 years (9.0)</p> <p>Sex (female): T = 159/347 (46%), C = 145/352 (41%)</p>

**Discharge planning from hospital (Review)**

**Goldman 2014** (Continued)

## Interventions

**Setting:** safety-net hospital, San Francisco, USA

**Pre-admission assessment:** no

**Case finding on admission:** electronic medical records screened for eligibility, followed by meeting with attending physician

**Inpatient assessment and preparation of a discharge plan based on individual patient needs:** RN provided disease-specific patient education either in the patient's preferred language or via a trained interpreter; motivational interviewing and coaching for engagement; written materials provided

**Implementation of discharge plan:** from admission to discharge, with outreach visit by RN within 24 h of discharge; PCP contacted and given inpatient physicians' contact.

**Monitoring:** NP called patients 1-3 and 6-10 d after discharge to assess adherence to medication, provide further education if required, help solve barriers to attending follow-up appointments, among others

**Control:** bedside RN's review of the discharge instructions, received by all patients. If requested by the medical team, the hospital pharmacy provided a 10 d medication supply and a social worker assisted with discharge. The admitting team was responsible for liaising with the patients' PCP

Outcomes	ED visits or readmissions (30, 90 and 180 d), non-ED ambulatory care visits, mortality (180 d)
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Notes	<p>Fidelity assessment conducted to measure which intervention components were delivered.</p> <p>Age criterion was changed halfway from <math>\geq 60</math> to <math>\geq 55</math> years to increase the number of eligible participants.</p> <p>Authors provided supplementary data (readmissions and ED visits were presented as an aggregated outcome, access provided to separate outcomes)</p>
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**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Statistician-generated randomised tables of treatment assignment in blocks of 50 for each language
Allocation concealment (selection bias)	Low risk	Pairs of envelopes containing the treatment assignment and labelled with the study identification number
Blinding (performance bias and detection bias) All outcomes	Low risk	Blinded outcome assessment and objective primary outcome
Incomplete outcome data (attrition bias) All outcomes	Low risk	Follow-up at 180 d = 90% All drop-outs accounted for
Selective reporting (reporting bias)	Low risk	Trial registration provides same primary outcomes as reported here
Baseline data	Low risk	Baseline data reported

**Harrison 2002**

Methods	RCT
Participants	<p>Patients admitted with CHF, who lived within the regional home care radius (60 km), were expected to be discharged to home nursing care and were not cognitively impaired</p> <p>Number of patients recruited: T = 92, C = 100</p> <p>Mean age (SD): T = 75.5 years (10.4), C = 75.7 years (9.7)</p> <p>Sex (female): T = 43/92 (47%), C = 44/100 (44%)</p>
Interventions	<p><b>Setting:</b> large urban teaching hospital, Ottawa, Canada</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> patients' notes were flagged as a signal to the primary nurse to follow a checklist for Transitional Care</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> comprehensive discharge planning, which included hospital and community nurses working together to smooth transition from hospital to home (Transitional Care intervention); a structured evidence based protocol was used for counselling and education for heart failure self-management (Partners in Care for Congestive Heart Failure). The protocol followed AHCPR guidelines. Home nursing visits - the same number as the control group.</p> <p><b>Implementation of discharge plan:</b> from admission to discharge, with telephone outreach within 24 h of discharge</p> <p><b>Monitoring:</b> not reported</p> <p><b>Control:</b> received usual care for hospital-to-home transfer, which involved completion of a medical history, nursing assessment form and a multidisciplinary plan. Discharge planning meetings took place weekly. A regional home care coordinator consulted with the hospital team as required. Patients received the same number of home nurse visits as the intervention group.</p>
Outcomes	Health-related quality of life, symptom distress and functioning. Emergency room visits and readmissions at 12 weeks.
Notes	—

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated schedule of random numbers
Allocation concealment (selection bias)	Low risk	Random allocation by a research co-ordinator
Blinding (performance bias and detection bias) All outcomes	High risk	High risk for patient assessed outcomes Low risk for objective measure of readmission
Incomplete outcome data (attrition bias) All outcomes	Low risk	157/200 (81%) completed the study
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information

**Discharge planning from hospital (Review)**

**Harrison 2002** (Continued)

Baseline data	Low risk	Baseline data reported
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**Hendriksen 1990**

Methods	RCT
Participants	<p>Patients aged <math>\geq 65</math> years admitted to 4 wards, including surgical</p> <p>Number of patients recruited: T = 135, C = 138</p> <p>Mean age: T = 76.5 years, C = 76.6 years</p>
Interventions	<p><b>Setting:</b> hospital in suburb of Copenhagen, Denmark</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> not reported</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> patients had daily contact with the project nurse who discussed their illness with them and discharge arrangements</p> <p><b>Implementation of the discharge plan:</b> there was liaison between hospital and primary care staff. Project nurse visited patients at home after discharge and could make one repeat visit.</p> <p><b>Monitoring:</b> not reported</p> <p><b>Control:</b> described as usual care</p>
Outcomes	Hospital length of stay, readmission to hospital, discharge destination
Notes	Details of measures of outcome not provided. Translated from Danish. Intervention implemented at time of admission.

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not described
Allocation concealment (selection bias)	Unclear risk	Not described
Blinding (performance bias and detection bias) All outcomes	Low risk	Yes, for objective outcome measures
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not described
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Discharge planning from hospital (Review)**

**Jack 2009**

Methods	RCT
Participants	<p>Patients who were emergency admissions to the medical teaching service and who were going to be discharged home. Participants had to have a telephone, comprehend the study details and consent process in English and have plans to be discharged to a US community.</p> <p>Number of participants recruited: T = 373, C = 376</p> <p>Mean age (SD): T: 50.1 (15.1), C: 49.6 (15.3)</p> <p>Sex (female): T = 178/373 (48%), C = 200/376 ( 53%)</p>
Interventions	<p><b>Setting:</b> Large urban safety net hospital with an ethnically diverse patient population; Boston Medical Centre, Massachusetts, USA</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> the nurse discharge advocate (DA) completed the (re-engineered discharge) RED intervention components</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> with information collected from the hospital team and the participant, the DA created the after-hospital care plan (AHCP), which contained medical provider contact information, dates for appointments and tests, an appointment calendar, a colour-coded medication schedule, a list of tests with pending results at discharge, an illustrated description of the discharge diagnosis, and information about what to do if a problem arises. Information for the AHCP was manually entered into a Microsoft Word template, printed, and spiral-bound to produce an individualised, colour booklet</p> <p><b>Implementation of the discharge plan:</b> the DA used scripts from the training manual to review the contents of the AHCP with the participant. On the day of discharge the AHCP and discharge summary were faxed to the primary care provider (PCP).</p> <p><b>Monitoring phase:</b> clinical pharmacist telephoned the participants 2-4 d after the index discharge to reinforce the discharge plan by using a scripted interview. The pharmacist had access to the AHCP and hospital discharge summary and, over several days, made at least 3 attempts to reach each participant. The pharmacist asked participants to bring their medications to the telephone to review them and address medication-related problems; the pharmacist communicated these issues to the PCP or DA</p> <p>Additional information on the intervention available at <a href="http://www.bu.edu/fammed/projectred/index.html">www.bu.edu/fammed/projectred/index.html</a></p> <p><b>Control:</b> usual care</p>
Outcomes	Readmission, patient satisfaction and cost
Notes	Readmission data obtained from the authors
<b>Risk of bias</b>	
<b>Bias</b>	<b>Authors' judgement</b> <b>Support for judgement</b>
Random sequence generation (selection bias)	Low risk                      Index cards in opaque envelopes randomly arranged
Allocation concealment (selection bias)	Low risk                      The authors state that the research assistants could not selectively choose potential participants for enrolment or predict assignment
Blinding (performance bias and detection bias)	Low risk                      Research staff doing follow-up telephone calls and reviewing hospital records were blinded to study group assignment

**Jack 2009** (Continued)

All outcomes

Incomplete outcome data (attrition bias) All outcomes	Low risk	Follow-up at 30 d > 80% Similar proportion in both groups
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data collected at recruitment

**Kennedy 1987**

Methods	RCT	
Participants	Elderly acute care medical patients Number of patients recruited: T = 39, C = 41 Mean age: T = 80.1 years, C = 80.5 years Sex (female): T = 19/39 (49%), C = 23/41 (56%)	
Interventions	<b>Setting:</b> 500-bed, non-profit acute care teaching hospital, Texas, USA <b>Pre-admission assessment:</b> no <b>Case finding on admission:</b> not reported <b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> discharge planning emphasised communication with the patient and family. A primary nurse assessed patients' postdischarge needs. A comprehensive discharge planning protocol was developed, which included an assessment of health status, orientation level, knowledge and perception of health status, pattern of resource use, functional status, skill level, motivation, and demographic data. <b>Implementation of the discharge plan:</b> by the primary nurse and other members of the healthcare team. A follow-up visit was made to assess discharge placement. <b>Monitoring:</b> not reported <b>Control:</b> care not described	
Outcomes	Hospital length of stay, re-admission to hospital, discharge destination, health status	
Notes	Not clear when intervention implemented	

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Random number schedule described
Allocation concealment (selection bias)	Low risk	Allocation provided by the statistics department
Blinding (performance bias and detection bias)	Low risk	For objective measures of outcome

**Discharge planning from hospital (Review)**

**Kennedy 1987** (Continued)

All outcomes

Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients randomised accounted for at follow-up
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Kripalani 2012**

Methods	RCT	
Participants	<p>Patients hospitalised for acute coronary syndrome or acute decompensated HF, English- or Spanish-speaking, expected to stay in hospital for more than 3 h, likely to be discharged home, without dementia, active psychosis, bipolar disorder or delirium, without hearing or vision impairment</p> <p>Number recruited: T = 423, C = 428</p> <p>Mean age (SD): T = 61 years (14.4), C = 59 years (13.8)</p> <p>Sex (female): T = 173/423 (41%), C = 179/428 (42%)</p>	
Interventions	<p><b>Setting:</b> Tertiary care academic hospitals, Nashville and Boston, US</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> not reported</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> at the first meeting, the pharmacist assessed the patient's understanding and needs, communicating with the treating physician if medication discrepancies were identified</p> <p><b>Implementation of the discharge plan:</b> second meeting occurred before discharge and patient was given tailored counselling and low-literacy adherence aids; if discharge occurred same day as enrolment, then single session was conducted for assessment and implementation of discharge plan.</p> <p><b>Monitoring:</b> call 1-4 d after discharge by unblinded research assistant; if outstanding needs identified, pharmacist would perform follow-up call, liaising with in- and outpatient physician if necessary</p> <p><b>Control:</b> physicians and nurses performed medication reconciliation and provided discharge counselling; medication reconciliation was facilitated by electronic records. At one of the sites there were additional features (reminders to complete a preadmission medication list and integration with order entry)</p>	
Outcomes	<p>Number of clinically important medication errors at 30 d (composite measure of preventable or ameliorable ADEs and potential ADEs due to medication discrepancies or non-adherence); preventable or ameliorable ADEs; potential ADEs due to medication discrepancies or non-adherence; preventable or ameliorable ADEs judged to be serious, life-threatening, or fatal.</p>	
Notes	—	
<b>Risk of bias</b>		
<b>Bias</b>	<b>Authors' judgement</b>	<b>Support for judgement</b>

**Kripalani 2012** (Continued)

Random sequence generation (selection bias)	Low risk	Randomisation was stratified by study site and diagnosis, in permuted blocks of 2-6 patients, by a computer programme that maintained allocation concealment
Allocation concealment (selection bias)	Low risk	One unblinded research coordinator at each site administered the randomisation, contacted study pharmacists who then delivered the intervention to eligible patients, and participated in the individualised telephone follow-up
Blinding (performance bias and detection bias) All outcomes	Low risk	Main outcome determined by 2 independent clinicians following standardised validated methodology
Incomplete outcome data (attrition bias) All outcomes	Low risk	Follow-up at 30 d for > 80%; similar % of drop-outs in both groups
Selective reporting (reporting bias)	Low risk	Slight discrepancies between protocol and publication, for secondary outcomes and 1 minor inclusion criterion
Baseline data	Low risk	Intervention group is slightly older, groups similar other than that

**Lainscak 2013**

Methods	RCT
Participants	<p>Patients admitted with COPD exacerbation with reduced pulmonary function, aged <math>\geq 35</math> years, not at terminal stages of disease</p> <p>Number recruited: T = 118, C = 135</p> <p>Mean age (SD): T = 71 years (9), C = 71 years (9)</p> <p>Sex (female): T = 37/118 (31%), C = 34/135 (25%)</p> <p>Living alone: T = 29 (25%), C = 27 (20%)</p>
Interventions	<p><b>Setting:</b> specialised pulmonary hospital, Slovenia</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> not reported</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> the discharge coordinator assessed patient and home care needs, involving both the patient and the care giver.</p> <p><b>Implementation of the discharge plan:</b> the discharge co-ordinator communicated the discharge plan to PCP, community nurses, and other providers of home services, as required by the patient's needs.</p> <p><b>Monitoring:</b> phone call at 48 h postdischarge to assess adjustment process, followed by phone calls scheduled as required until a final home visit at 7-10 d postdischarge</p> <p><b>Control:</b> care as usual, which included routine patient education with written and verbal information about COPD, supervised inhaler use, respiratory physiotherapy as indicated, and disease related communication between medical staff with patients and their care givers.</p>
Outcomes	Number of patients hospitalised due to worsening COPD, time to COPD hospitalisation, all-cause mortality, all-cause hospitalisation, days alive and out of hospital, health-related quality of life.



**Lainscak 2013** (Continued)

Notes

Steering and end-point committee closed enrolment at 83% of the planned sample due to re-hospitalisation of patients already assessed for eligibility and seasonal variation of COPD.

Information about the communication between discharge coordinators and providers of home services, including timing and frequency, was not reported in detail. The authors provided supplementary unpublished data

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Software to generate random numbers/allocation sequence
Allocation concealment (selection bias)	Low risk	Allocation independent of researchers and healthcare providers
Blinding (performance bias and detection bias) All outcomes	Low risk	Objective measure for primary outcome
Incomplete outcome data (attrition bias) All outcomes	Low risk	Follow-up at 180 d for > 80%; similar % of drop-outs in both groups
Selective reporting (reporting bias)	Low risk	One of the secondary outcomes not reported (healthcare costs), all other outcomes reported
Baseline data	Low risk	Baseline data provided, no differences between groups

**Laramee 2003**

Methods	RCT
Participants	<p>Patients with confirmed congestive heart failure (CHF), who also had to be at risk for early readmission as defined by the presence of 1 or more of the following criteria: history of CHF, documented knowledge deficits of treatment plan or disease process, potential or ongoing lack of adherence to treatment plan, previous CHF hospital admission, living alone, and <math>\geq 4</math> hospitalisations in the past 5 years</p> <p>Number recruited: T = 141, C = 146</p> <p>Mean age (SD): T = 70.6 years (11.4), C = 70.8 years (12.2)</p> <p>Sex (female) T = 59/141 (42%), C = 72/146 (50%)</p> <p>Support at home: T = 127/141 (90%), C = 140/146 (96%)</p>
Interventions	<p><b>Setting:</b> 550-bed academic medical centre, which serves the largely rural geographic areas of Vermont and upstate New York, USA</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> no</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> early discharge planning and co-ordination of care and individualised and comprehensive patient and family education</p> <p><b>Implementation of the discharge plan:</b> case manager (CM) assisted in the co-ordination of care by facilitating the discharge plan and obtaining needed consultations from social services, dietary services</p>

**Discharge planning from hospital (Review)**

**Laramée 2003** (Continued)

and physical/occupational therapy. When indicated, arrangements were made for additional services or support once the patient had returned home. The CM also facilitated communication in the hospital among the patient and family, attending physician, cardiology team, and other medical care practitioners through participating in daily rounds, documenting patient needs in the medical record, submitting progress reports to the PCP, involving the patient and family in developing the plan of care, collaborating with the home health agencies and providing informational and emotional support to the patient and family.

**Monitoring:** 12 weeks of enhanced telephone follow-up and surveillance

**Control:** inpatient treatments included social service evaluation (25% for usual care group), dietary consultation (15% usual care), PT/OT (17% usual care), medication and CHF education by staff nurses and any other hospital services. Postdischarge care was conducted by the patient's own local physician. The home care service figures were 44%.

Outcomes	Readmissions, mortality, hospital bed days, resource use and patient satisfaction. Follow-up at 3 months.
Notes	—

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not described
Allocation concealment (selection bias)	Unclear risk	Not described
Blinding (performance bias and detection bias) All outcomes	Low risk	Objective measure of the primary outcome readmission, and the secondary outcome length of stay
Incomplete outcome data (attrition bias) All outcomes	Low risk	Loss to follow-up: 53/287; ≥ 81% retained T = 122/141; C = 112/146
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Legrain 2011**

Methods	RCT  Investigators used the double consent of a Zelen randomised consent design after assessing patients for eligibility; informed consent was obtained following randomisation.
Participants	Medical patients aged ≥ 70 years; patients were excluded if expected to be discharged in less than 5 d, had poor chance of 3-month survival or were receiving palliative care  Mean age (SD): T = 85.8 years (6.0); C = 86.4 years (6.3)  Sex (female): T = 221/317 (70%); C = 218/348 (63%)

**Legrain 2011** (Continued)

Number of patients randomised using Zelen design: T = 528; C = 517 (total 1,045) and of these T = 317 and C = 348 participated in the RCT

**Interventions**

**Setting:** 5 university-affiliated hospitals and 1 private clinic; Paris, France

**Pre-admission assessment:** not possible

**Case finding on admission:** the intervention focused on 3 risk factors: drug related problems, under-diagnosis and untreated depression (screened with the 4-item Geriatric Depression Scale, and if the DSM-IV criteria were positive) and protein energy malnutrition

**Inpatient assessment and preparation of a discharge plan based on individual patient needs:** the intervention was implemented after admission to the acute geriatric unit (AGU) and had 3 components, a comprehensive chronic medication review according to geriatric prescribing principles and which involved the patient and their care giver, education on self-management of disease and detailed transition of care communication with outpatient health professionals and the GP. These were adapted from disease management programmes for inpatients with multiple chronic conditions.

**Implementation of the discharge plan:** the intervention was implemented by a dedicated geriatrician in addition to the care provided by the usual geriatrician of the AGU. The dedicated geriatrician provided recommendations to the AGU geriatrician who made final decisions. GPs were contacted regarding changes in treatment.

**Monitoring:** follow-up by a geriatrician.

**Control:** received standard medical care from the AGU healthcare team without involvement of the intervention-dedicated geriatrician. AGUs are hospital units with their own physical location and structure that are specialised in the care of elderly people with acute medical disorders, including acute exacerbations of chronic diseases. AGUs implement comprehensive geriatric assessment.

**Outcomes**

Emergency hospitalisation, emergency room visit, mortality, cost

Follow-up time: 6 months from discharge

**Notes**

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**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated randomisation scheme in various sized blocks stratified according to centre
Allocation concealment (selection bias)	Low risk	A central randomisation service in the trial organisation centre
Blinding (performance bias and detection bias) All outcomes	Low risk	Objective measure of the primary outcome of readmission and secondary outcome of costs using hospital days. Data on readmission rates were verified by checking administrative databases.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Outcome data reported for all participants recruited
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Majority of baseline characteristics similar between groups

**Lin 2009**

Methods	RCT
Participants	<p>Patients hospitalised with a hip fracture, aged <math>\geq 65</math> years, who had a Barthel score of at least 70 points prior to their hip fracture.</p> <p>Number of patients recruited: T = 26; C = 24</p> <p>Sex (female): 18/50 (36%)</p> <p>Mean age (SD): 78.8 years (7.0)</p>
Interventions	<p><b>Setting:</b> 4 orthopaedic wards in a 2800 bed medical centre in Taipei, Taiwan</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> no</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> structured assessment of discharge planning needs within 48h of admission; systematic individualised nursing instruction based on the individual's needs.</p> <p><b>Implementation of the discharge plan:</b> nurses coordinated resources and arranged referral placements. 2 postdischarge home visits were conducted to provide support and consultation</p> <p><b>Monitoring:</b> nurses monitored services</p> <p><b>Control:</b> non-structured discharge planning provided by nurses who used their professional judgement.</p>
Outcomes	Hospital length of stay, readmission, functional status, quality of life, patient satisfaction at 2 weeks and 3 months postdischarge
Notes	—

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Patients were assigned to 1 of 4 wards: 2 were designated the intervention group and 2 the control. The sequence generation of random assignment was not described.
Allocation concealment (selection bias)	Unclear risk	Patients were assigned to 1 of 4 wards "by doctors who were not aware of the study process."
Blinding (performance bias and detection bias) All outcomes	Unclear risk	Blinding of researchers conducted follow-up assessments is not described.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Data collected on all recruited patients
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Similar characteristics at baseline

**Lindpaintner 2013**

Methods	Pilot RCT
Participants	<p>Patients aged <math>\geq 18</math> years, taking oral anticoagulation or newly ordered insulin or more than 8 regular medicines or new diagnosis requiring at least 4 long-term medicines, expected to live <math>&gt; 1</math> month, German-speaking, no cognitive impairment; excluded if PCP or local visiting nurse association not involved in the study</p> <p>Number of patients recruited: T = 30, C = 30</p> <p>Mean age (SD): T = 75.1 years (9.49), C = 75.2 (12.4)</p> <p>Sex (female): T = 15/30 (50%), C = 19/30 (63%)</p>
Interventions	<p><b>Setting:</b> teaching hospital in Baden, Switzerland</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> all patients admitted to hospital were screened for eligibility</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> the nurse care manager assessed patients with a battery of tests</p> <p><b>Implementation of the discharge plan:</b> the NCM liaised with the ward team and jointly developed a discharge plan, which included self-management techniques; the PCP and community nursing team received a copy of the discharge form, as well as a letter at the end of the intervention, and further contacts were done as needed</p> <p><b>Monitoring:</b> structured call 24 h postdischarge and home visit at the end of the intervention</p> <p><b>Control:</b> best usual care (no additional information provided)</p>
Outcomes	Composite endpoint (death, rehospitalisation, unplanned urgent medical evaluation within 5 d of discharge, and adverse medicine reaction requiring discontinuation of the medicine), satisfaction with discharge process, care giver burden, health-related quality of life
Notes	Pilot study; insufficient data to be included in the pooled analysis, authors contacted but no further data obtained

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Block randomisation
Allocation concealment (selection bias)	Unclear risk	Not reported
Blinding (performance bias and detection bias) All outcomes	High risk	Interview-based data (patients, nurses, and PCP)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Drop-outs accounted for
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information

**Discharge planning from hospital (Review)**

**Lindpaintner 2013** (Continued)

Baseline data	High risk	Baseline data provided; patients in treatment group had higher comorbidity (T = 3.2 ± 2.29, C = 2.5 ± 2.45)
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**Moher 1992**

Methods	RCT
Participants	<p>Patients admitted to a general medical clinic, excluded if admitted to intensive care unit or not expected to survive for more than 48 h</p> <p>Number of patients recruited: T = 136, C = 131</p> <p>Mean age: T = 66.3 years, C = 64.3 years</p> <p>Sex (female): T = 73/136 (54%), C = 72/131 (55%)</p>
Interventions	<p>Setting: 2 clinical teaching units, Ottawa, Canada</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> no</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> a nurse employed as a team co-ordinator acted as a liaison between members of the medical team and collected patient information</p> <p><b>Implementation of the discharge plan:</b> the nurse facilitated discharge planning</p> <p><b>Monitoring:</b> not reported</p> <p><b>Control:</b> standard medical care</p>
Outcomes	Hospital length of stay, readmission to hospital, discharge destination, patient satisfaction
Notes	<p>Baseline data recorded only on age, sex, diagnosis</p> <p>Not clear when intervention implemented</p>

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated blocks
Allocation concealment (selection bias)	Unclear risk	Allocation procedure not described
Blinding (performance bias and detection bias) All outcomes	Low risk	Yes for objective measures of outcome
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients randomised accounted for at follow-up
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information

**Discharge planning from hospital (Review)**

**Moher 1992** (Continued)

Baseline data	Low risk	Baseline data reported
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**Naji 1999**

Methods	RCT
Participants	<p>Patients admitted to an acute psychiatric ward; patients were excluded if previously admitted, too ill, not registered with a GP or had no fixed address.</p> <p>Number of patients recruited: T = 168, C = 175</p> <p>Mean age (SD): T = 40 (12), C = 41 (12.8)</p> <p>Sex (female): T = 83/168 (49%), C = 80/175 (46%)</p>
Interventions	<p><b>Setting:</b> Acute psychiatric wards, Aberdeen, Scotland</p> <p><b>Pre admission assessment:</b> no</p> <p><b>Case finding on admission:</b> no</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient need:</b> not clear</p> <p><b>Implementation of the discharge plan:</b> psychiatrist telephoned GP to discuss patient and make an appointment for the patient to see the GP within 1 week following discharge. A copy of the discharge summary was given to the patient to hand-deliver to the GP. A copy was also sent by post.</p> <p><b>Monitoring:</b> no</p> <p><b>Control:</b> received standard care, patients advised to make an appointment to see their GP and were given a copy of the discharge summary to hand-deliver to the GP</p>
Outcomes	Readmission, mental health status, discharge process, cost. Follow-up at 1 month for patient assessed outcomes, 6 months for readmissions
Notes	—

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Independent computer programme
Allocation concealment (selection bias)	Low risk	Independent to researchers
Blinding (performance bias and detection bias) All outcomes	Low risk	Objective measures used for readmission, consultations and length of stay. Validated standardised patient assessed outcomes also measured.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Less than 80% for patient assessed: 1 month completion T = 106/168 (63%), C = 111/175 (63%)
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information

**Discharge planning from hospital (Review)**

**Naji 1999** (Continued)

Baseline data	Low risk	Baseline data collected on day of discharge: baseline completion T = 132/168 (79%), C = 133/175 (76%)
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**Naughton 1994**

Methods	RCT	
Participants	<p>Patients aged <math>\geq 70</math> years admitted from emergency department who were not receiving regular care from an attending internist on staff; patients were excluded if admitted to intensive care unit or surgical ward.</p> <p>Number of patients recruited: T = 51, C = 60</p> <p>Mean age (SD): T = 80.1 years (6.6), C = 80.1 years (6.4)</p> <p>Sex (female): T = 25/51 (49%), C = 38/60 (63%)</p>	
Interventions	<p><b>Setting:</b> private, non-profit, academic medical centre, Chicago, USA</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> not clear</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> A geriatric evaluation and management team (GEM) assessed the patients' mental and physical health status and psychosocial condition to determine level of rehabilitation required and social needs. A geriatrician and social worker were the core team members.</p> <p><b>Implementation of the discharge plan:</b> team meetings with the GEM and nurse specialist and physical therapist took place twice a week to discuss patients' medical condition, living situation, family and social supports, and patient and family's understanding of the patient's condition. The social worker was responsible for identifying and co-ordinating community resources and ensuring the posthospital treatment place was in place at the time of discharge and 2 weeks later. The nurse specialist co-ordinated the transfer to home healthcare. Patients who did not have a primary care provider received outpatient care at the hospital.</p> <p><b>Monitoring:</b> not reported</p> <p><b>Control:</b> received 'usual care' by medical house staff and an attending physician. Social workers and discharge planners were available on request.</p>	
Outcomes	Hospital length of stay, discharge destination, health service costs	
Notes	Intervention implemented at time of admission	
<b>Risk of bias</b>		
<b>Bias</b>	<b>Authors' judgement</b>	<b>Support for judgement</b>
Random sequence generation (selection bias)	Low risk	Card indicating assignment to the intervention or control group were placed sequentially in opaque sealed envelopes
Allocation concealment (selection bias)	Low risk	Sealed envelopes provided by admitting clerk
Blinding (performance bias and detection bias) All outcomes	Low risk	Yes for objective measures of outcome

**Discharge planning from hospital (Review)**



**Naughton 1994** (Continued)

Incomplete outcome data (attrition bias) All outcomes	Low risk	141 patients initially randomised, of these 25 were ineligible and 5 were transferred to surgical services, leaving 111 to be analysed
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Naylor 1994**

Methods	RCT
Participants	<p>Patients aged <math>\geq 70</math> years, admitted to medical ward and cardiac surgery, English-speaking, alert and orientated at admission, and able to use telephone after discharge</p> <p>Number of patients recruited: T = 140, C = 136</p> <p>Mean age (SD): 76 years</p>
Interventions	<p><b>Setting:</b> Hospital of the University of Pennsylvania, USA</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> not clear</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> the discharge plan included a comprehensive assessment of the needs of the elderly patient and their care giver, an education component for the patient and family and interdisciplinary communication regarding discharge status</p> <p><b>Implementation of the discharge plan:</b> implemented by geriatric nurse specialist and extended from admission to 2 weeks postdischarge with ongoing evaluation of the effectiveness of the discharge plan</p> <p><b>Monitoring:</b> not reported</p> <p><b>Control:</b> received the routine discharge planning available in the hospital</p>
Outcomes	Hospital length of stay, readmission to hospital, health status, health service costs
Notes	Intervention implemented at time of admission

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not described
Allocation concealment (selection bias)	Unclear risk	Not described
Blinding (performance bias and detection bias) All outcomes	Low risk	Yes, for objective measures
Incomplete outcome data (attrition bias)	Low risk	All patients included in the final sample accounted for

**Discharge planning from hospital (Review)**

**Naylor 1994** (Continued)

All outcomes

Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Nazareth 2001**

Methods	RCT
Participants	<p>Patients aged <math>\geq 75</math> years, on 4 or more medicines who were discharged from 3 acute wards and 1 long-stay ward. Each patient had a mean of 3 chronic medical conditions, and was on a mean of 6 drugs (SD 2) at discharge.</p> <p>Number of patients recruited: T = 181, C = 181</p> <p>Mean age (SD): 84 years (5.2)</p> <p>Sex (female): T = 112/181 (62%), C = 119/181 (66%)</p>
Interventions	<p><b>Setting:</b> Three acute and one long-stay hospital, London, UK</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> not clear</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> a hospital pharmacist assessed patients' medication, rationalised the drug treatment, provided information and liaised with care giver and community professionals. An aim was to optimise communication between secondary and primary care professionals.</p> <p>Follow-up visit by community hospital at 7-14 d after discharge to check medication and intervene if necessary. Subsequent visits arranged if appropriate.</p> <p><b>Implementation of the discharge plan:</b> a copy of the discharge plan was given to the patient, care giver, community pharmacist and GP</p> <p><b>Monitoring:</b> follow-up in the community by a pharmacist</p> <p><b>Control:</b> discharged from hospital following standard procedures, which included a letter of discharge to the GP. The pharmacist did not provide a review of medications or follow-up in the community</p>
Outcomes	Hospital readmission, mortality, quality of life, client satisfaction, knowledge and adherence to prescribed drugs, consultation with GP
Notes	—

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer generated random numbers
Allocation concealment (selection bias)	Low risk	Allocation by independent pharmacist at the health authority's central community pharmacy office

**Discharge planning from hospital (Review)**

**Nazareth 2001** (Continued)

Blinding (performance bias and detection bias) All outcomes	Low risk	Blinding of objective outcomes
Incomplete outcome data (attrition bias) All outcomes	Low risk	At each follow-up time the number of deaths and readmissions were accounted for. 2 control patients moved away prior to 6-month follow-up
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Pardessus 2002**

Methods	RCT
Participants	<p>Patients aged <math>\geq 65</math>, hospitalised for falling and able to return home; excluded if cognitively impaired (<math>MM &lt; 24</math>), did not have a phone, lived further away than 30 km, or if the falls were secondary to cardiac, neurologic, vascular, or therapeutic problems.</p> <p>Number recruited: T = 30, C = 30</p> <p>Age (SD): T = 83.5 years (9.1), C = 82.9 years (6.3)</p> <p>Sex (female): T = 23/30 (76%), C = 24/30 (80%)</p>
Interventions	<p><b>Setting:</b> acute geriatric department in les Bateliers Hospital; Lille, France</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> all admitted patients during the trial period were screened for inclusion and exclusion criteria. Baseline information obtained at beginning of hospitalisation.</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> 2 h home visit by occupational therapist and a physical medicine/rehabilitation doctor to evaluate patient abilities in home environment - ADL, IADL, transfers, mobility and environmental hazards. Enabled observation of patient in real conditions of life. Social supports addressed by social worker.</p> <p><b>Implementation of the discharge plan:</b> modification of home hazards and safety advice in home situation, adaptation of recommendations and prescriptions, particularly for physical therapy, speedy evaluation of technical aids and social supports needed</p> <p><b>Monitoring:</b> telephone follow-up was conducted by an occupational therapist to check if the home modifications were completed and assist if necessary</p> <p><b>Control:</b> received physical therapy and were informed of home safety and social assistance if required. No home visit.</p>
Outcomes	Functional status, falls, readmissions, mortality and residential care at 6 and 12 months
Notes	Intervention includes pre-discharge home visits
<b>Risk of bias</b>	
<b>Bias</b>	<b>Authors' judgement    Support for judgement</b>

**Pardessus 2002** (Continued)

Random sequence generation (selection bias)	Low risk	Random number table
Allocation concealment (selection bias)	Unclear risk	Not described
Blinding (performance bias and detection bias) All outcomes	Low risk	For objective measure of outcome only (readmission and mortality)
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients randomised accounted for at follow-up
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Unclear risk	Baseline data reported

**Parfrey 1994**

Methods	RCT
Participants	<p>Medical and surgical patients, excluded if admitted for short stay or into units with their own discharge process, previously enrolled in the study, confused or intoxicated, and <math>\geq 85</math> years.</p> <p>Number of patients recruited: hospital A: T = 421, C = 420; hospital B: T = 375, C = 384</p> <p>Mean age (SD): hospital A: T = 53 years (19), C = 53 years (18); hospital B: T = 56 years (18), C = 56 years (18)</p> <p>Sex (female): hospital A: T = 188/421 (45%), C = 184/420 (44%); hospital B: T = 217/374 (58%), C = 210/384 (55%)</p>
Interventions	<p><b>Setting:</b> 2 academic hospitals, Newfoundland, Canada</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> developed a questionnaire to identify patients requiring discharge planning</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> assessment was based on the questionnaire which covered the patient's social circumstances at home; if the admission was an emergency admission or a readmission; the use of allied health and community services; mobility and activities of daily living; medical or surgical condition</p> <p><b>Implementation of the discharge plan:</b> referrals to allied health professionals following completion of the questionnaire for discharge planning</p> <p><b>Monitoring:</b> not reported</p> <p><b>Control:</b> did not receive the questionnaire; discharge planning occurred if the discharge planning nurses identified a patient or received a referral</p>
Outcomes	Hospital length of stay at 6 and 12 months
Notes	Also validated an instrument to assess high-risk patients

**Parfrey 1994** (Continued)

Intervention implemented at time of admission

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not described
Allocation concealment (selection bias)	Low risk	Sealed envelopes
Blinding (performance bias and detection bias) All outcomes	Low risk	Yes for objective measures of outcome
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients randomised accounted for at follow-up
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Preen 2005**

Methods	RCT
Participants	<p>Patients with chronic obstructive pulmonary disease, cardiovascular disease, or both; patients had to be registered with a PCP and have at least two community care providers.</p> <p>Number of patients recruited: T = 91, C = 98</p> <p>Mean age (SD): T = 74.8years (6.7), C = 75.4 (7.9) years</p> <p>Sex: (female): T = 57/91 (62%), C = 58/98 (59%)</p>
Interventions	<p><b>Setting:</b> 2 tertiary hospitals in Western Australia</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> no</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> Discharge planning was based on the Australian Enhanced Primary Care Initiative and tailored to each patient. The discharge plan was developed 24-48 h prior to discharge. Problems were identified from hospital notes and patient/care giver consultation, goals were developed and agreed upon with the patient/care giver based on personal circumstances, and interventions and community service providers were identified who met patient needs and who were accessible and agreeable to the patient.</p> <p><b>Implementation of the discharge plan:</b> the discharge plan was faxed to the GP and consultation with the GP was scheduled within 7 d postdischarge. Copies faxed to all service providers identified on the care plan.</p> <p><b>Monitoring:</b> research nurse followed up if GP did not respond in 24 h and the GP scheduled a consultation (within 7 d postdischarge) for patient review</p>

**Preen 2005** (Continued)

**Control:** patients were discharged under the hospitals' existing processes following standard practice of Western Australia, where all patients have a discharge summary completed, which is copied to their GP

Outcomes	SF-12, patient satisfaction and views of the discharge process and GP views of the discharge planning process at 7 d postdischarge
Notes	—

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Not described
Allocation concealment (selection bias)	Low risk	Described as an "allocation concealment technique"
Blinding (performance bias and detection bias) All outcomes	High risk	Blinding for objective measures of outcome
Incomplete outcome data (attrition bias) All outcomes	Low risk	61/189 patients did not return surveys (32% drop-out), GP 70.4% response rate at 7 d postdischarge
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	At discharge from hospital

**Rich 1993a**

Methods	RCT
Participants	<p>Patients aged 70 years, with CHF; patients were excluded if at low risk, resided outside the catchment area, discharged to a nursing home or long-term care facility, had other illnesses likely to result in readmission, denied consent, or other logistic reasons.</p> <p>Number of patients recruited: T = 63, C = 35</p> <p>Mean age (SD): T = 80.0 years (6.3), C = 77.3 years (6.1)</p> <p>Sex (female): T = 38/63 (60%), C = 20/35 (57%)</p> <p>Ethnicity: number white T = 29/63, C = 20/35</p>
Interventions	<p><b>Setting:</b> Jewish Hospital at Washington University Medical Centre, USA</p> <p><b>Pre-admission assessment:</b> yes</p> <p><b>Case finding on admission:</b> screened for CHF and stratified into readmission risk categories</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> patients were visited daily by RN to discuss CHF using a booklet developed for the trial and assess and discuss medications, providing a medication card with timing and dosing of all drugs; dietary advice was provided by dietician and study nurse, and patients were given a low-sodium diet.</p>

**Discharge planning from hospital (Review)**



**Rich 1993a** (Continued)

**Implementation of the discharge plan:** a social care worker and member of the home care team met with patient to facilitate discharge planning and ease transition. Economic, social and transport problems were identified and managed. The home care nurse visited the patient at home within 48 h of hospital discharge and then 3 times in the first week and at regular intervals thereafter; at each visit the teaching materials, medication, and diet and activity guidelines were reinforced, and any new problems were discussed.

**Monitoring:** Study nurse contacted patients by phone, and patients were encouraged to call researchers or personal physician with any new problems or questions.

**Control:** all conventional treatments as requested by the patient's attending physician. These included social service evaluation, dietary and medical teaching, home care and all other available hospital services. Control group received study education materials and formal assessment of medications. The social service consultations and home care referrals were lower (29% versus 34%).

Outcomes	Length of stay, readmission to hospital, readmission days quality of life, cost at 3 months follow-up	
Notes	—	
<b>Risk of bias</b>		
<b>Bias</b>	<b>Authors' judgement</b>	<b>Support for judgement</b>
Random sequence generation (selection bias)	Low risk	2:1 treatment:control allocated
Allocation concealment (selection bias)	Unclear risk	Not described
Blinding (performance bias and detection bias) All outcomes	Low risk	For objective measures of outcome (readmission, mortality)
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients randomised accounted for at follow-up
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Rich 1995a**

Methods	RCT
Participants	<p>Patients aged <math>\geq 70</math> years, with confirmed heart failure and at least 1 of the following risk factors for early readmission: prior history of heart failure, 4 or more hospitalisations in the preceding 5 years, congestive heart failure precipitated by acute MI or uncontrolled hypertension. Patients were excluded if resided outside catchment area, planned discharge to a long-term care facility, severe dementia or psychiatric illness, life expectancy of less than 3 months, refused to participate or other logistic reasons.</p> <p>Number recruited: T = 142, C = 140</p> <p>Mean age (SD): T = 80.1 years (5,9), C = 78.4 years (6.1)</p> <p>Sex (female): T = 96/142 (68%), C = 83/140 (59%)</p>

**Rich 1995a** (Continued)

Ethnicity: non-white 55%

Living alone: T = 58/142 (41%), C = 62/140 (44%)

**Interventions**

**Setting:** Jewish Hospital at Washington University Medical Centre, US

**Pre-admission assessment:** no

**Case finding on admission:** yes

**Inpatient assessment and preparation of a discharge plan based on individual patient needs:** included using a teaching booklet, individualised dietary assessment and instruction by a dietician with reinforcement by the cardiovascular research nurse, consultation with social services to facilitate discharge planning and care after discharge, assessment of medications by geriatric cardiologist, intensive follow-up after discharge through the hospital's home care services, plus individualised home visits and telephone contact with the study team.

**Implementation of the discharge plan:** with social services

**Monitoring:** not clear

**Control:** received all standard treatment and services ordered by their primary physicians

**Outcomes**

Mortality, readmission to hospital, quality of life, cost at 3 months follow-up. Quality of life and cost data were collected from a subgroup of patients only: quality of life = 126, cost = 57

**Notes**

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**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated list of random numbers
Allocation concealment (selection bias)	Low risk	Neither patient nor members of the study team were aware of the treatment assignment until after randomisation
Blinding (performance bias and detection bias) All outcomes	Low risk	For objective measures of outcome (mortality, readmissions and death)
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients randomised accounted for at follow-up
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Shaw 2000**
**Methods**

RCT

**Participants**

Patients discharged from a psychiatric hospital or care of the elderly ward; patients were excluded if they were prescribed medication at discharge, received a primary diagnosis of drug or alcohol abuse or dementia, and refused home visits after discharge.

**Discharge planning from hospital (Review)**

**Shaw 2000** (Continued)

Number of patients recruited: T = 51, C = 46

Mean age (SD): 47 (17)

Sex (female): 61 (63%)

Interventions	<p><b>Setting:</b> psychiatric hospital in South Glasgow, Scotland</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> no</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> pre-discharge assessment with a pharmacy checklist which assessed patient's knowledge and identified particular problems, such as therapeutic drug monitoring, compliance aid requirements and side effects</p> <p><b>Implementation of the discharge plan:</b> a pharmacy discharge plan was supplied to the patients' community pharmacist for the intervention group</p> <p><b>Monitoring:</b> not clear</p> <p><b>Control:</b> care not described</p>
Outcomes	Readmission to hospital, readmission due to non-compliance, medication problems after being discharged from hospital
Notes	—

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Table of generated numbers with a randomised permuted block size of 6
Allocation concealment (selection bias)	Low risk	Randomisation by the project pharmacist
Blinding (performance bias and detection bias) All outcomes	High risk	Not possible to blind patients
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	> 30% attrition at 12 weeks
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Sulch 2000**

Methods	RCT
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**Sulch 2000** (Continued)

Participants	<p>Patients admitted to the acute stroke unit and receiving rehabilitation, with persistent impairment and functional limitations. Patients were excluded if they had mild deficits or premorbid physical or cognitive disability</p> <p>Number recruited: integrated care pathway (ICP) = 76, multidisciplinary team (MDT) = 76</p> <p>Mean age (SD): ICP = 75 (11) years, MDT = 74 (10) years</p>	
Interventions	<p><b>Setting:</b> stroke rehabilitation unit at a teaching hospital in London, UK</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> no</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> rehabilitation and discharge planning, with regular review of discharge plan</p> <p><b>Implementation of the discharge plan:</b> senior nurse implemented the ICP. Multidisciplinary training preceded implementation of the ICP. ICP was piloted for 3 months prior to recruitment to the trial.</p> <p><b>Monitoring:</b> not reported</p> <p><b>Control:</b> multidisciplinary model of care in which patients' progress determined goal setting, rather than short term goals being determined in advance. The care received by the control group was reviewed and a 3-month period of implementation was undertaken to exclude bias caused by a placebo effect of undertaking the trial. Groups received comparable amounts of physiotherapy and occupational therapy.</p>	
Outcomes	Hospital length of stay, discharge destination, mortality at 26 weeks, mortality or institutionalisation, activities of daily living index, anxiety and depression, quality of life	
Notes	—	
<b>Risk of bias</b>		
<b>Bias</b>	<b>Authors' judgement</b>	<b>Support for judgement</b>
Random sequence generation (selection bias)	Low risk	Computer-generated list of randomised numbers
Allocation concealment (selection bias)	Low risk	Randomisation office allocated patients to intervention or control
Blinding (performance bias and detection bias) All outcomes	Low risk	Participants and health professionals aware of allocation group; low risk for objective outcomes (readmission, mortality and length of stay)
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients randomised accounted for at follow-up
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
Baseline data	Low risk	Baseline data reported

**Weinberger 1996**

Methods	RCT
Participants	<p>Patients with diabetes mellitus, HF, COPD; patients were excluded if already receiving care at a primary care clinic, residing or being discharged to nursing home, admitted for surgical procedure or cancer diagnosis, if cognitively impaired and had no care giver, and if had no access to a telephone.</p> <p>Number of patients recruited: T = 695, C = 701</p> <p>Mean age (SD): T = 63.0 years (11.1), C = 62.6 years (10.9)</p> <p>Sex (female): T = 7/695 (1%), 14/701 (2%)</p>
Interventions	<p><b>Setting:</b> 9 Veterans Affairs hospitals, USA</p> <p><b>Pre-admission assessment:</b> no</p> <p><b>Case finding on admission:</b> no</p> <p><b>Inpatient assessment and preparation of a discharge plan based on individual patient needs:</b> 3 d before discharge a primary nurse assessed the patient's postdischarge needs. 2 d before discharge the primary care physician visited the patient and discussed patient's discharge plan with the hospital physician and reviewed the patient. Primary nurse made an appointment for the patient to visit the primary care clinic within 1 week of discharge.</p> <p><b>Implementation of the discharge plan:</b> patient provided with education materials and given a card with the names and beeper numbers of the primary care nurse and physician. Primary care nurse telephoned the patient within 2 working days after discharge. Primary care physician and primary nurse reviewed and updated the treatment plan at the 1st postdischarge appointment.</p> <p><b>Monitoring:</b> not reported</p> <p><b>Control:</b> did not have access to the primary care nurse and received no supplementary education or assessment of needs beyond usual care</p>
Outcomes	Readmission to hospital, health status, patient satisfaction, intensity of primary care
Notes	Discharge planning within 3 d of discharge 9 VA hospitals participated in the trial

**Risk of bias**

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Produced by statistical coordinating centre
Allocation concealment (selection bias)	Low risk	Allocation made by telephoning the statistical coordinating centre
Blinding (performance bias and detection bias) All outcomes	Low risk	Objective measures of outcome and telephone interviews
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients randomised accounted for at follow-up
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information

**Discharge planning from hospital (Review)**

**Weinberger 1996** (Continued)

Baseline data                      Low risk                      Baseline data reported

**ADE:** adverse drug event; **ADL:** activities of daily living; **AGU:** acute geriatric unit; **AHCP:** after-hospital care plan; **AHCPR:** Agency for Health Care Policy and Research; **C:** control; **CHF:** congestive heart failure; **CM:** case manager; **COPD:** chronic obstructive pulmonary disease; **DA:** discharge advocate; **DC:** discharge coordinator; **DSM:** Diagnostic and Statistical Manual of Mental Disorders; **ED:** emergency department; **GEM:** geriatric evaluation and management team; **GP:** general practitioner; **HF:** heart failure; **IADL:** instrumental activities of daily living; **ICP:** integrated care pathway; **MDT:** Multidisciplinary team; **MI:** myocardial infarction; **MM:** mini-mental assessment; **NCM:** nurse care manager; **NP:** Nurse practitioner; **OT:** occupational therapist; **PCP:** primary care provider; **PO:** Primary outcome; **PT:** physiotherapist; **RA:** research assistant; **RCT:** randomised controlled trial; **RED:** re-engineered discharge; **RN:** registered nurse; **SD:** standard deviation; **T:** treatment; **TIA:** transient Ischaemic attack.

**Characteristics of excluded studies** [ordered by study ID]

Study	Reason for exclusion
<a href="#">Applegate 1990</a>	RCT: discharge planning plus geriatric assessment unit
<a href="#">Brooten 1987</a>	Discharge planning plus home care package
<a href="#">Brooten 1994</a>	Discharge planning plus home care package plus counselling
<a href="#">Carty 1990</a>	Early postpartum hospital discharge
<a href="#">Casiro 1993</a>	Intervention: discharge planning plus home care package
<a href="#">Choong 2000</a>	Intervention: clinical pathway for patients with a fractured neck of femur, discharge planning is not described
<a href="#">Cossette 2015</a>	Intervention is focused on decreasing the number of emergency room visits, not discharge planning
<a href="#">Donahue 1994</a>	Intervention discharge planning plus postdischarge care package
<a href="#">Dudas 2001</a>	Intervention is focused on telephone follow-up, not discharge planning. Randomised to groups after discharge from hospital.
<a href="#">Englander 2014</a>	Transitional care intervention; the only element of discharge planning was primary care-medical home linkage
<a href="#">Epstein 1990</a>	RCT: consultative geriatric assessment and limited follow-up
<a href="#">Fretwell 1990</a>	RCT: consultative inpatient multidisciplinary team care
<a href="#">Gayton 1987</a>	Controlled trial: inpatient geriatric consultation team
<a href="#">Germain 1995</a>	Geriatric assessment and intervention team
<a href="#">Gillette 1991</a>	Hospital-based case management team for neonatal intensive care
<a href="#">González-Guerrero 2014</a>	Control group given the same manual as intervention group at discharge
<a href="#">Haggmark 1997</a>	Study design not clear
<a href="#">Hansen 1992</a>	RCT: follow-up home visits

**Discharge planning from hospital (Review)**



Study	Reason for exclusion
Hickey 2000	Patients in the intervention group received discharge planning from a nurse case manager, patients in the control group received discharge planning on request
Hogan 1990	Controlled trial of geriatric consultation team and follow-up after discharge
Jenkins 1996	RCT: discharge teaching book
Karppi 1995	Discharge planning plus geriatric assessment unit
Kleinpell 2004	Intervention and control groups received discharge planning, the intervention group also received a discharge planning questionnaire
Kravitz 1994	Nested cohort study of postdischarge follow-up
Landefeld 1995	Special unit plus rehabilitation
Linden 2014	1. Multidimensional intervention, based on the transitional care model 2. Control group also received discharge planning
Loffler 2014	Medication review only, not discharge planning
Martin 1994	RCT of discharge planning plus hospital at home
Marusic 2013	Intervention was standardised to all patients; no individual assessment done
McGrory 1994	Assessed primary nursing and discharge teaching
McInnes 1999	Both groups received discharge planning, intervention group also received GP input to discharge planning process
Melin 1993	Postdischarge care
Melin 1995a	RCT (secondary analysis); in-home primary care
Melin 1995b	Postdischarge care
Murray 1995	Controlled trial; communication between hospital and home
Naylor 1999	RCT. Discharge planning and home follow-up.
Naylor 2004	Complex package of care; main emphasis was not on discharge planning
Nickerson 2005	No results reported for the control group
Nikolaus 1995	Pilot study for comprehensive geriatric assessment
Reuben 1995	RCT of comprehensive geriatric assessment in HMO setting
Rich 1993b	Pilot study of discharge planning plus home care package
Rich 1995b	Discharge planning plus home care package
Rubenstein 1984	Discharge planning plus geriatric assessment unit

Study	Reason for exclusion
<a href="#">Saleh 2012</a>	Postdischarge care
<a href="#">Saltz 1988</a>	RCT: effect of geriatric consultation team on discharge placement
<a href="#">Shah 2013</a>	Intervention was standardised to all patients; no individual assessment done
<a href="#">Sharif 2014</a>	Intervention solely focused on providing education and information
<a href="#">Shyu 2010</a>	Multifaceted intervention which included a home care component
<a href="#">Siu 1996</a>	Geriatric assessment started at hospital and continued at home
<a href="#">Smith 1988</a>	RCT: postdischarge intervention to reduce non-elective readmission
<a href="#">Thomas 1993</a>	RCT: comprehensive geriatric consultation team
<a href="#">Townsend 1988</a>	Postdischarge care
<a href="#">Tseng 2012</a>	Intervention included a large component of rehabilitation that was not available to the control group
<a href="#">Victor 1988</a>	Augmented home help scheme
<a href="#">Voirol 2004</a>	Intervention was standardised to all patients; no individual assessment done
<a href="#">Winograd 1993</a>	RCT: inpatient interdisciplinary geriatric assessment team
<a href="#">Yeung 2012</a>	Multidimensional intervention, based on the transitional care model

**HMO:** health maintenance organisation; **RCT:** randomised controlled trial.

### Characteristics of ongoing studies [ordered by study ID]

#### [NCT02112227](#)

Trial name or title	Patient-centered Care Transitions in Heart Failure (PACT-HF)
Methods	Single blind parallel randomised control trial
Participants	Setting: Canada Inclusion criteria: aged $\geq$ 16 years and hospitalised with HF Main exclusion criterion: transferred to another hospital
Interventions	Intervention: pre-discharge needs assessment; self-care education; comprehensive discharge summary; referral to HF clinic and nurse-led home care Control: care as usual
Outcomes	Main outcomes: all-cause readmission rate at 30d; 6m composite all-cause death, readmission, or emergency room visit
Starting date	July 2014

**NCT02112227** (Continued)

Contact information	—
Notes	Estimated completion date December 2017 ClinicalTrials.gov Identifier: NCT02112227

**NCT02202096**

Trial name or title	Comprehensive Transitional Care Program for Colorectal Cancer Patients
Methods	Parallel randomised control trial (pilot)
Participants	Setting: safety-net hospital, USA  Inclusion criteria: aged $\geq 18$ years, diagnosis of colorectal cancer and undergoing surgery for either palliative cure or palliation  Main exclusion criteria: patients not expected to survive
Interventions	Intervention: pre-discharge needs assessment; medication reconciliation; visit before discharge; comprehensive discharge summary; direct communication with primary care team; co-ordination of follow-up visits; phone call within 24h of discharge  Control: care as usual
Outcomes	Main outcome: readmission and emergency room visits rate at 30 d
Starting date	February 2015
Contact information	—
Notes	Estimated completion date February 2016 ClinicalTrials.gov Identifier: NCT02202096

**NCT02295319**

Trial name or title	The Impact of Individual-based Discharges From Acute Admission Units to Home
Methods	Open label parallel randomised control trial
Participants	Setting: acute admission unit, Denmark  Inclusion criteria: aged $\geq 18$ years, medicine diagnosis, discharged home, $\geq$ admission last year, planned follow-up after discharge (GP, home care, outpatient clinic)  Main exclusion criterion: cognitively impaired, not local
Interventions	Intervention: provision of information and establishment of a discharge plan with the patient; phone interview within 48 h of discharge  Control: care as usual
Outcomes	Main outcome: readmission rate at 30 d

**Discharge planning from hospital (Review)**

**NCT02295319** (Continued)

Starting date	November 2014
Contact information	—
Notes	Estimated completion date December 2015 ClinicalTrials.gov Identifier: NCT02295319

**NCT02351648**

Trial name or title	Randomised Control Trial of a Transitional Care Model
Methods	Single blind parallel randomised control trial
Participants	Setting: general hospital, Singapore  Inclusion criteria: aged $\geq$ 21 years and $>$ 1 admission last 90 d  Main exclusion criteria: not local or discharged to long-term care facility; not able to provide informed consent; requires acute treatment or waiting for surgery; primary team consultant not participating in research.
Interventions	Intervention: pre-discharge needs assessment; comprehensive discharge summary; home/phone visit within 48 h of discharge; subsequent contact as needed; research team available for phone inquiries  Control: care as usual
Outcomes	Main outcome: readmission rate at 30 d
Starting date	October 2012
Contact information	—
Notes	Completed December 2014  ClinicalTrials.gov Identifier: NCT02351648

**NCT02388711**

Trial name or title	Comprehensive Transitional Care Program for Colorectal Cancer Patients
Methods	Single blinded parallel randomised control trial
Participants	Setting: US  Inclusion criteria: aged $\geq$ 65 years, diagnosis of dementia, informal care giver available for regular contact, English-speaking, access to telephone  Main exclusion criteria: discharged to institutional setting, moderate-high alcohol intake, other complex health issues
Interventions	Intervention: nurse case manager; inpatient meeting before discharge; 1-4 postdischarge phone calls

**Discharge planning from hospital (Review)**

**NCT02388711** (Continued)

	Control: care as usual
Outcomes	Change from baseline in rehospitalisation at 14, 30 and 90 d
Starting date	March 2015
Contact information	—
Notes	Estimated completion date March 2019 ClinicalTrials.gov Identifier: NCT02388711

**NCT02421133**

Trial name or title	Transitional Care Program on 30-Day Hospital Readmissions for Elderly Patients Discharged From a Short Stay Geriatric Ward (PROUST)
Methods	Open label parallel stepped wedge randomised control trial
Participants	Setting: acute geriatric service, France Inclusion criteria: aged $\geq$ 75 years, admitted for > 48 h, discharged home, at risk of readmission/ER visit Main exclusion criteria: hospital at home, not local
Interventions	Intervention: pre-discharge needs assessment; medication reconciliation; comprehensive discharge summary with medication review; direct communication with primary care team and scheduling of follow-up appointment within 30 d of discharge; phone call and home visits for 4 weeks postdischarge Control: care as usual
Outcomes	Main outcome: unscheduled readmission and emergency room visits rate at 30 d
Starting date	May 2015
Contact information	—
Notes	Estimated completion date August 2018 ClinicalTrials.gov Identifier: NCT02421133

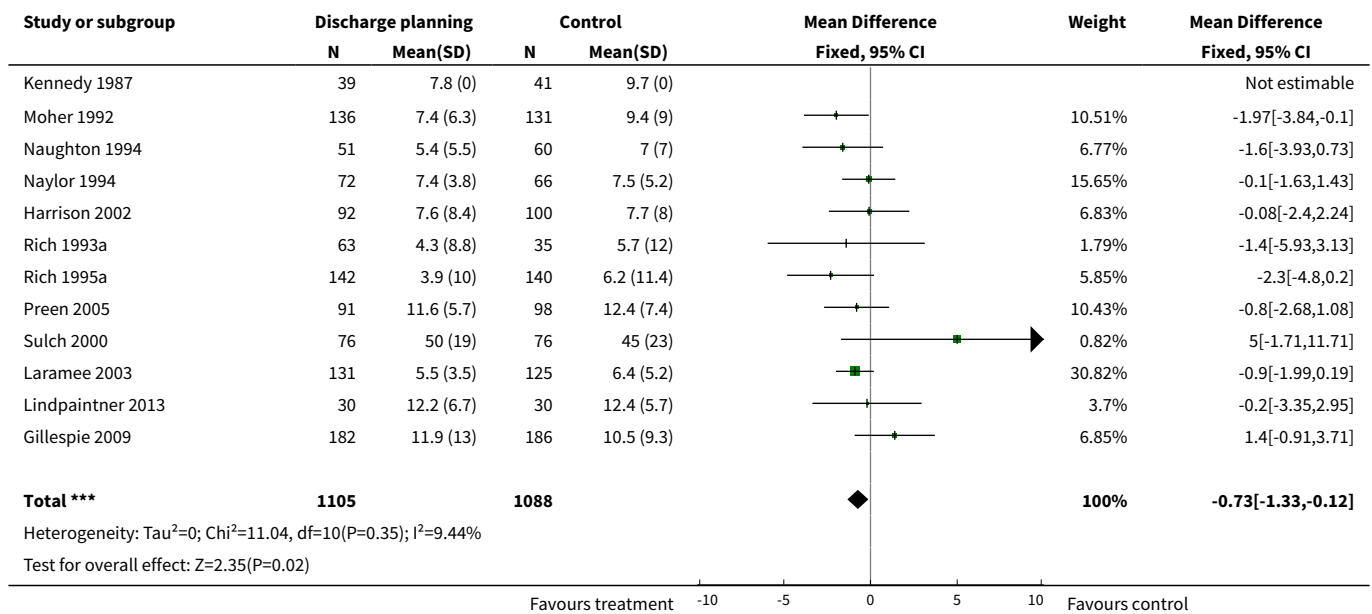
**ER:** emergency room; **HF:** heart failure.

**DATA AND ANALYSES**

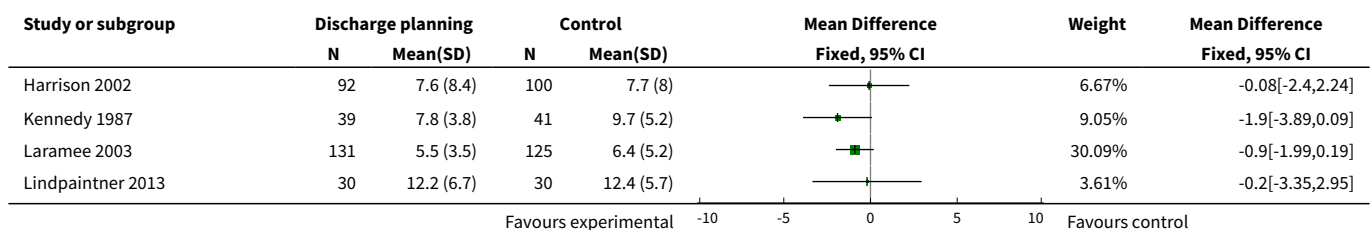
**Comparison 1. Effect of discharge planning on hospital length of stay**

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Hospital length of stay - older patients with a medical condition	12	2193	Mean Difference (IV, Fixed, 95% CI)	-0.73 [-1.33, -0.12]
2 Sensitivity analysis imputing missing SD for Kennedy trial	11	1825	Mean Difference (IV, Fixed, 95% CI)	-0.98 [-1.57, -0.38]
3 Hospital length of stay - older surgical patients	2	184	Mean Difference (IV, Fixed, 95% CI)	-0.06 [-1.23, 1.11]
4 Hospital length of stay - older medical and surgical patients	2	1108	Mean Difference (IV, Fixed, 95% CI)	-0.60 [-2.38, 1.18]

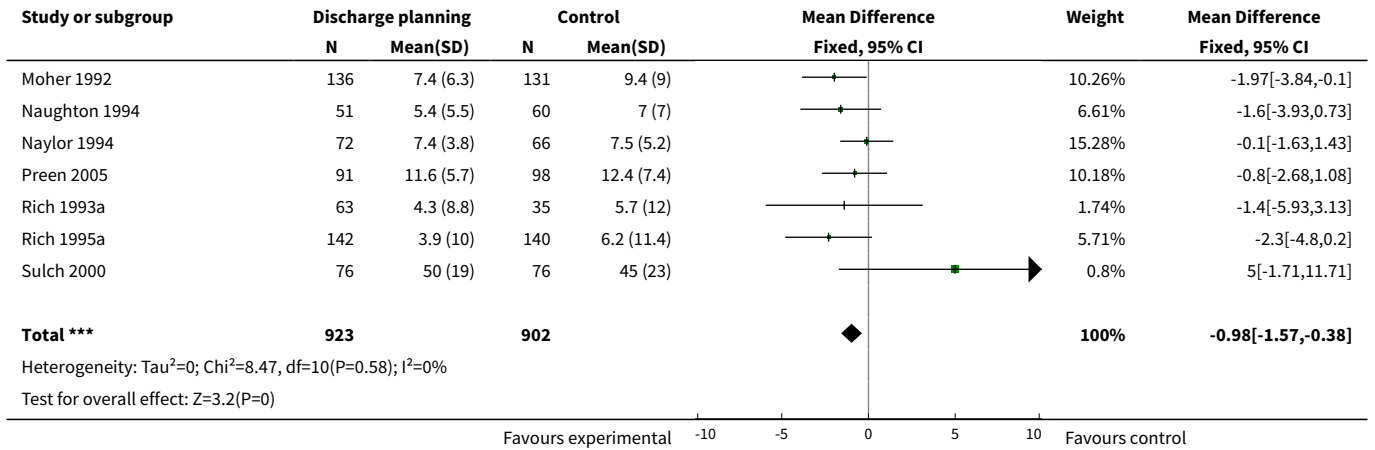
**Analysis 1.1. Comparison 1 Effect of discharge planning on hospital length of stay, Outcome 1 Hospital length of stay - older patients with a medical condition.**



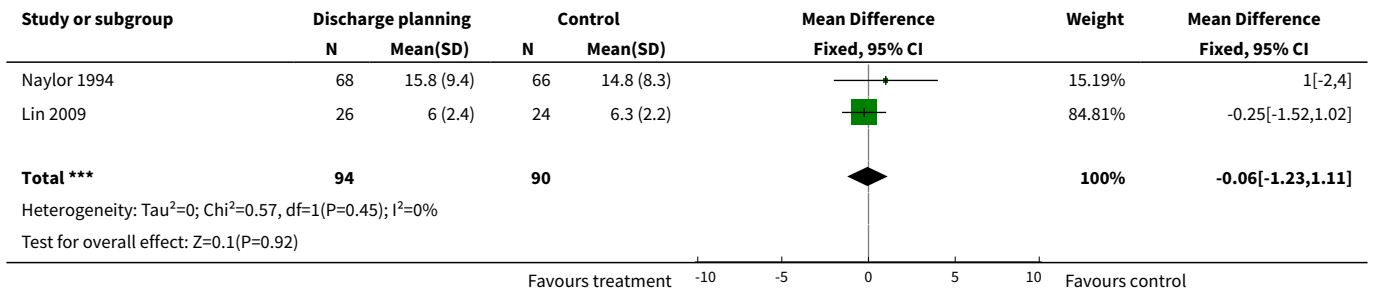
**Analysis 1.2. Comparison 1 Effect of discharge planning on hospital length of stay, Outcome 2 Sensitivity analysis imputing missing SD for Kennedy trial.**



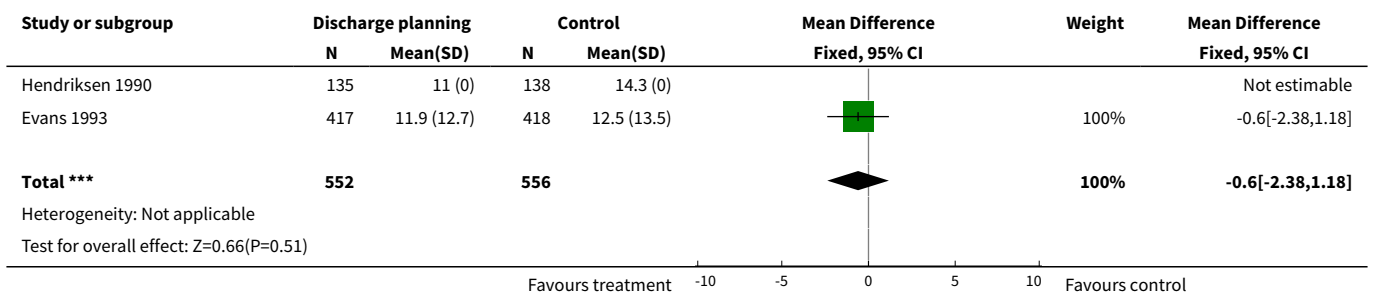




**Analysis 1.3. Comparison 1 Effect of discharge planning on hospital length of stay, Outcome 3 Hospital length of stay - older surgical patients.**



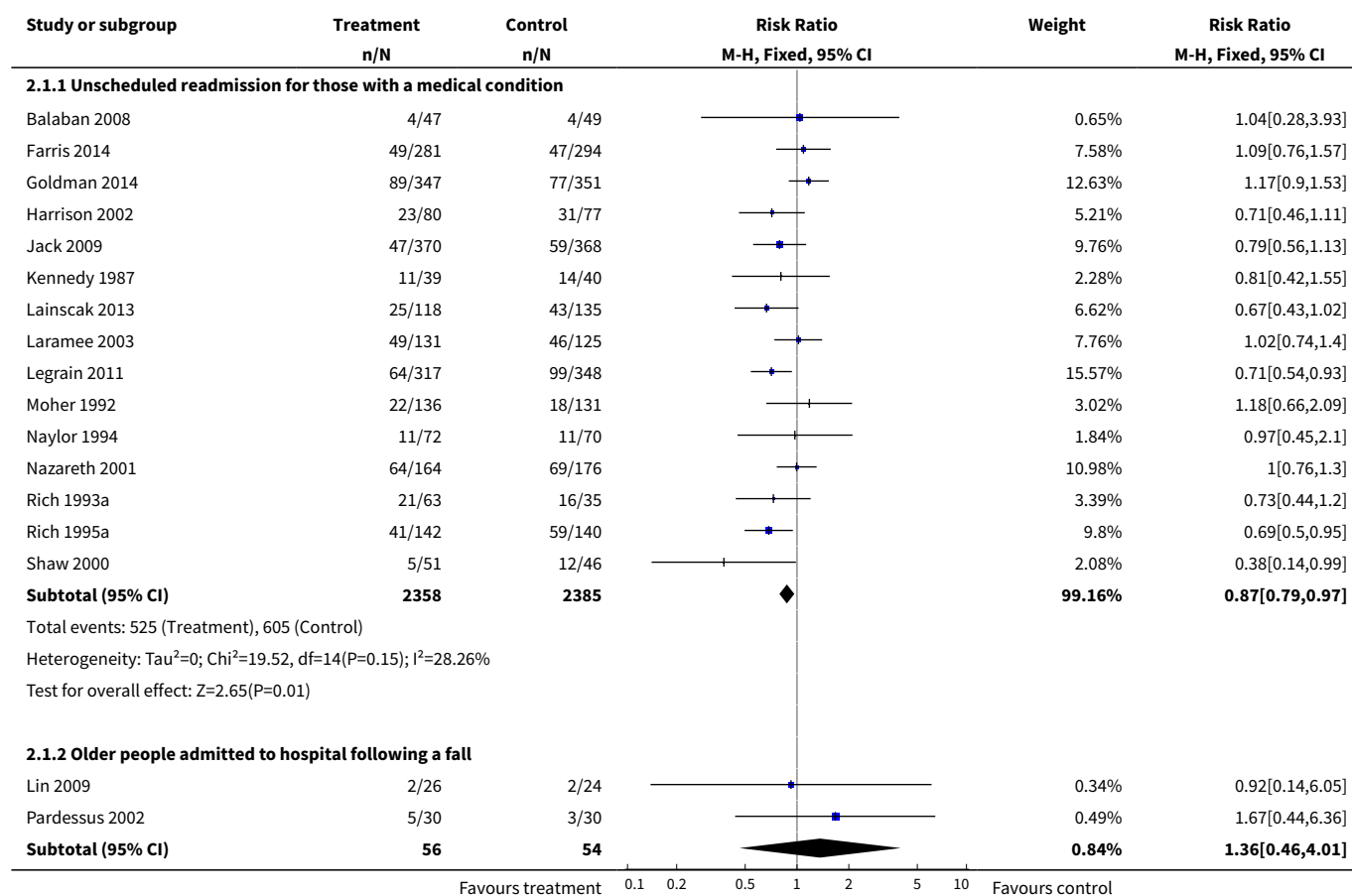
**Analysis 1.4. Comparison 1 Effect of discharge planning on hospital length of stay, Outcome 4 Hospital length of stay - older medical and surgical patients.**

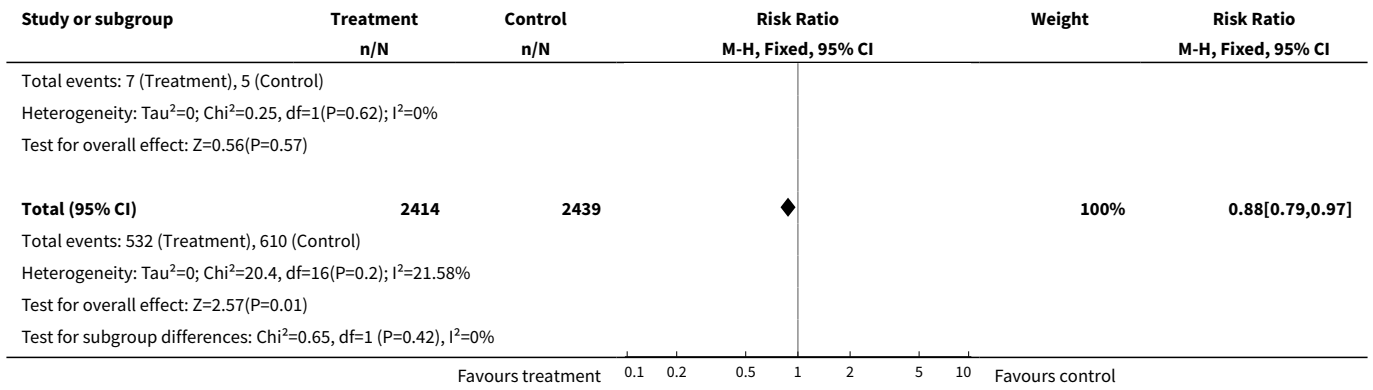


**Comparison 2. Effect of discharge planning on unscheduled readmission rates**

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Within 3 months of discharge from hospital	17	4853	Risk Ratio (M-H, Fixed, 95% CI)	0.88 [0.79, 0.97]
1.1 Unscheduled readmission for those with a medical condition	15	4743	Risk Ratio (M-H, Fixed, 95% CI)	0.87 [0.79, 0.97]
1.2 Older people admitted to hospital following a fall	2	110	Risk Ratio (M-H, Fixed, 95% CI)	1.36 [0.46, 4.01]
2 Patients with medical or surgical condition			Other data	No numeric data
3 Patients with a medical condition			Other data	No numeric data
4 Patients who have had surgery			Other data	No numeric data
5 Patients with a mental health diagnosis			Other data	No numeric data

**Analysis 2.1. Comparison 2 Effect of discharge planning on unscheduled readmission rates, Outcome 1 Within 3 months of discharge from hospital.**





**Analysis 2.2. Comparison 2 Effect of discharge planning on unscheduled readmission rates, Outcome 2 Patients with medical or surgical condition.**

Patients with medical or surgical condition		
Study	Readmission rates	Notes
Evans 1993	At 4 weeks: T = 103/417 (24%), C = 147/418 (35%) Difference - 10.5%; 95% CI - 16.6% to - 4.3%, P < 0.001 At 9 months: T = 229/417 (55%), C = 254/418 (61%) Difference - 5.8%; 95% CI -12.5% to 0.84%, P = 0.08	—

**Analysis 2.3. Comparison 2 Effect of discharge planning on unscheduled readmission rates, Outcome 3 Patients with a medical condition.**

Patients with a medical condition		
Study	Readmission rates	Notes
Farris 2014	At 30 d: I = 47/281 (17%), C = 43/294 (15%) Difference 2%; 95% CI - 0.04% to 0.08% At 90 d: ET = 49/281 (17%), C = 47/294 (16%) Difference 1%; 95% CI - 5% to 8%	—
Gillespie 2009	At 12 months: I = 106/182 (58.2%), C = 110/186 (59.1%) Difference - 0.9%, 95% CI - 10.9% to 9.1%	—
Goldman 2014	At 30 d: I = 50/347 (14%), C = 47/351 (13%) Difference 1%; 95% CI - 4% to 6% At 90 d: I = 89/347 (26%), C = 77/351 (22%) Difference 3.7%; 95% CI - 2.6% to 10%	Data provided by the trialists
Kennedy 1987	At 1 week: I = 2/38 (5%), C = 8/40 (20%) Difference - 15%; 95% CI - 29% to - 0.4% At 8 weeks: I = 11/39 (28%), C = 14/40 (35%) Difference - 7%; 95% CI - 27.2% to 13.6%	—
Lainscak 2013	At 90 d: COPD-related I = 14/118 (12%), C = 33/135 (24%) Difference 12%; 95% CI 3% to 22% All-cause readmission T = 25/118 (21%), C = 43/135 (32%) Difference 11%; 95% CI - 0.3% to 21%	Data provided by the trialists; data also available for 30- and 180- d
Laramee 2003	At 90 d: T = 49/131 (37%), C = 46/125 (37%), P > 0.99	—

Study	Patients with a medical condition	
	Readmission rates	Notes
	Readmission days: T = 6.9 (SD 6.5), C = 9.5 (SD 9.8)	
Moher 1992	At 2 weeks: T = 22/136 (16%), C = 18/131 (14%) Difference 2%; 95% CI - 6% to 11%, P = 0.58	—
Naylor 1994	Within 45-90 d: T = 11/72 (15%), C = 11/70 (16%) Difference 1%; 95% CI - 8% to 12%	Authors also report readmission data for 2-6 weeks follow up
Nazareth 2001	At 90 d: T = 64/164 (39%), C = 69/176 (39.2%) Difference 0.18; 95% CI - 10.6% to 10.2% At 180 d: T = 38/136 (27.9%), C = 43/151 (28.4%) Difference 0.54; 95% CI - 11 to 9.9%	—
Shaw 2000	At 90 d: T = 5/51 (10%), C = 12/46 (26%) OR 3.25; 95% CI 0.94 to 12.76, P = 0.06	Authors also report data for readmission due to non-compliance with medication At 3 months: T = 4/51 (8%), C = 7/46 (15%) Difference - 7%; 95% CI - 0.2 to 0.05
Weinberger 1996	Number of readmissions per month T = 0.19 (+ 0.4) (n = 695), C = 0.14 (+ 0.2), P = 0.005 (n = 701) At 6 months: T = 49%, C = 44%, P = 0.06 Treatment group readmitted 'sooner' (P = 0.07)	Non-parametric test used to calculate P values for monthly readmissions

#### Analysis 2.4. Comparison 2 Effect of discharge planning on unscheduled readmission rates, Outcome 4 Patients who have had surgery.

Study	Patients who have had surgery	
	Readmission rates	Notes
Naylor 1994	Within 6 to 12 weeks: T = 7/68 (10%), C = 5/66 (7%) Difference 3%; 95% CI 7% to 13%	—

#### Analysis 2.5. Comparison 2 Effect of discharge planning on unscheduled readmission rates, Outcome 5 Patients with a mental health diagnosis.

Study	Patients with a mental health diagnosis	
	Readmissions	Mean time to readmission
Naji 1999	At 6 months: T = 33/168 (19.6%), C = 48/175 (27%) Difference 7.4%; 95% CI - 1.1% to 16.7%	Mean time to readmission T = 161 d, C = 153 d

#### Comparison 3. Effect of discharge planning on days in hospital due to unscheduled readmission

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Patients with a medical condition			Other data	No numeric data
2 Patients with a medical or surgical condition			Other data	No numeric data
3 Patients with a surgical condition			Other data	No numeric data

### Analysis 3.1. Comparison 3 Effect of discharge planning on days in hospital due to unscheduled readmission, Outcome 1 Patients with a medical condition.

Study	Patients with a medical condition		Notes
	Days in hospital		
Naylor 1994	Medical readmission days 2 weeks: T = 21 d (n = 72), C = 73 d (n = 70) Difference - 52 d; 95% CI - 78 to - 26 2 to 6 weeks: T = 16 d (n = 72), C = 49 d (n = 70) Difference - 33 d; 95% CI - 53 to - 13 6 to 12 weeks: T = 94 d (n = 72), C = 100 d (n = 70) Difference - 6 d; 95% CI - 83 to 71		
Weinberger 1996	Medical readmission days at 6 months follow up: T = 10.2 (19.8), C = 8.8 (19.7) difference 1.4 d, P = 0.04		

### Analysis 3.2. Comparison 3 Effect of discharge planning on days in hospital due to unscheduled readmission, Outcome 2 Patients with a medical or surgical condition.

Study	Patients with a medical or surgical condition		Notes
	Days in hospital		
Evans 1993	Readmission days at 9 months: T = 10.1 ± 8.3, C = 12.1 ± 9.1, P = 0.001; 95% CI - 3.18 to - 0.82		
Hendriksen 1990	T = 15.5 d per readmission C = 13.5 d per readmission P > 0.05		Not possible to calculate exact P
Rich 1993a	<b>Days to first readmission</b> Overall: T = 31.8 (5.1) (n = 63), C = 42.1 (7.3) (n = 35) Moderate-risk group: T = 35.1 (9.0) (n = 40), C = 28.6 (7.2) (n = 21) High-risk group: T = 27.8 (3.5) (n = 23), C = 50.2 (10.5) (n = 14)		

### Analysis 3.3. Comparison 3 Effect of discharge planning on days in hospital due to unscheduled readmission, Outcome 3 Patients with a surgical condition.

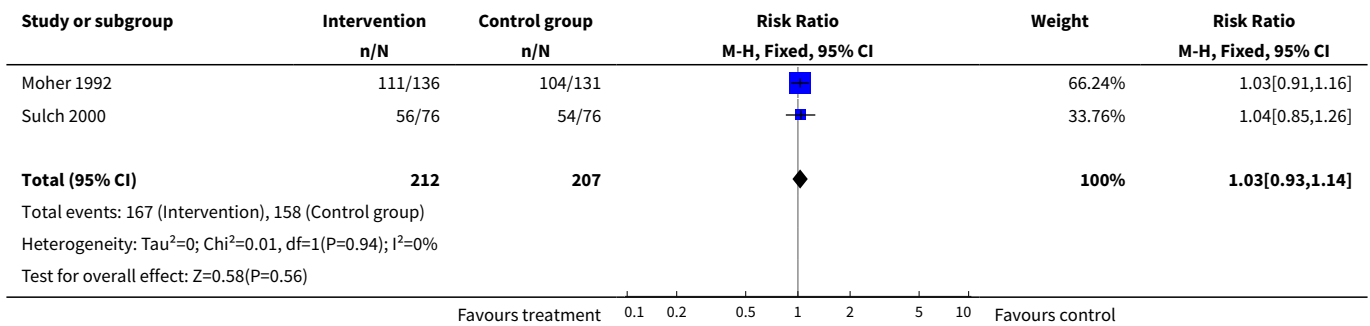
Study	Patients with a surgical condition		Notes
	Days in hospital		
Naylor 1994	Surgical readmission days 2 weeks: T = 34 d (n = 68), C = 32 d (n = 66) Difference 2 d; 95% CI - 13 to 17 2 to 6 weeks: T = 63 (n = 68), C = 52 (n = 66) Difference 11 d; 95% CI - 20 to 52 6 to 12 weeks: T = 52 (n = 68), C = 26 (n = 66) Difference 26 d; 95% CI - 8 to 60		

## Comparison 4. Effect of discharge planning on patients' place of discharge

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Patients discharged from hospital to home	2	419	Risk Ratio (M-H, Fixed, 95% CI)	1.03 [0.93, 1.14]
2 Patients with a medical condition			Other data	No numeric data

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
3 Patients with a medical or surgical condition			Other data	No numeric data
4 Older patients admitted to hospital following a fall in residential care at 1 year	1	60	Odds Ratio (M-H, Fixed, 95% CI)	0.46 [0.15, 1.40]

**Analysis 4.1. Comparison 4 Effect of discharge planning on patients' place of discharge, Outcome 1 Patients discharged from hospital to home.**



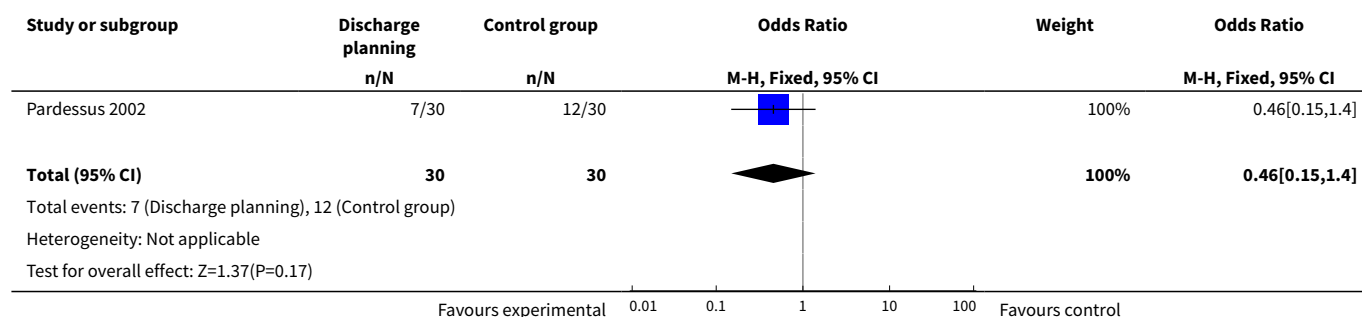
**Analysis 4.2. Comparison 4 Effect of discharge planning on patients' place of discharge, Outcome 2 Patients with a medical condition.**

Study	Patients with a medical condition		Notes
	Place of discharge		
Goldman 2014	Discharged to an institutional setting: T = 19/347 (5.5%), C = 9/352 (2.6%) Difference 2.9%; 95% CI - 0.04% to 6%		—
Kennedy 1987	At 2 weeks: 87% no change in placement from time of discharge to 2-week follow-up time (both groups) At 4 weeks: majority no change (both groups)		No data shown
Legrain 2011	Discharged home or to a nursing home: T = 183/317 C = 191/348		—
Lindpaintner 2013	Discharged home T = 25/30 (83%), C = 30/30 (100%) Difference 17%, 95% CI 2 to 34%		—
Moher 1992	Discharged home: T = 111/136 (82%), C = 104/131 (79%) Difference 2.2%; 95% CI - 7.3% to 11.7%		—
Naughton 1994	Discharged to nursing home: T = 3/51 (5.9%) C = 2/60 (3.3%) Difference 2.5%; 95% CI - 5.3% to 10.4%		—
Sulch 2000	Discharged home: T = 56/76 (74%), C = 54/76 (71%) Discharged to an institution: T = 10/76 (13%), C = 16/76 (21%) OR 1.5; 95% CI 0.5 to 2.8		—

**Analysis 4.3. Comparison 4 Effect of discharge planning on patients' place of discharge, Outcome 3 Patients with a medical or surgical condition.**

Study	Patients with a medical or surgical condition		Notes
	Place of discharge		
Evans 1993	Discharged to home: T = 330/417 (79%), C = 305/418 (73%) P = 0.04 difference 6%; 95% CI 0.39% to 12% Home at 9 months: T = 259/417 (62%), C = 225/418 (54%) P = 0.01 difference 8.3%; 95% CI 1.6% to 15%		—
Hendriksen 1990	Discharged to nursing home: T = 0/135 (0%), C = 3/138 (2%) Difference - 2%; 95% CI - 4.6% to 0.26% At 6 months: admitted to another institution T = 3/135 (2%), C = 14/138 (10%) Difference -8%; 95% CI - 13.5% to -2.3%		—

**Analysis 4.4. Comparison 4 Effect of discharge planning on patients' place of discharge, Outcome 4 Older patients admitted to hospital following a fall in residential care at 1 year.**

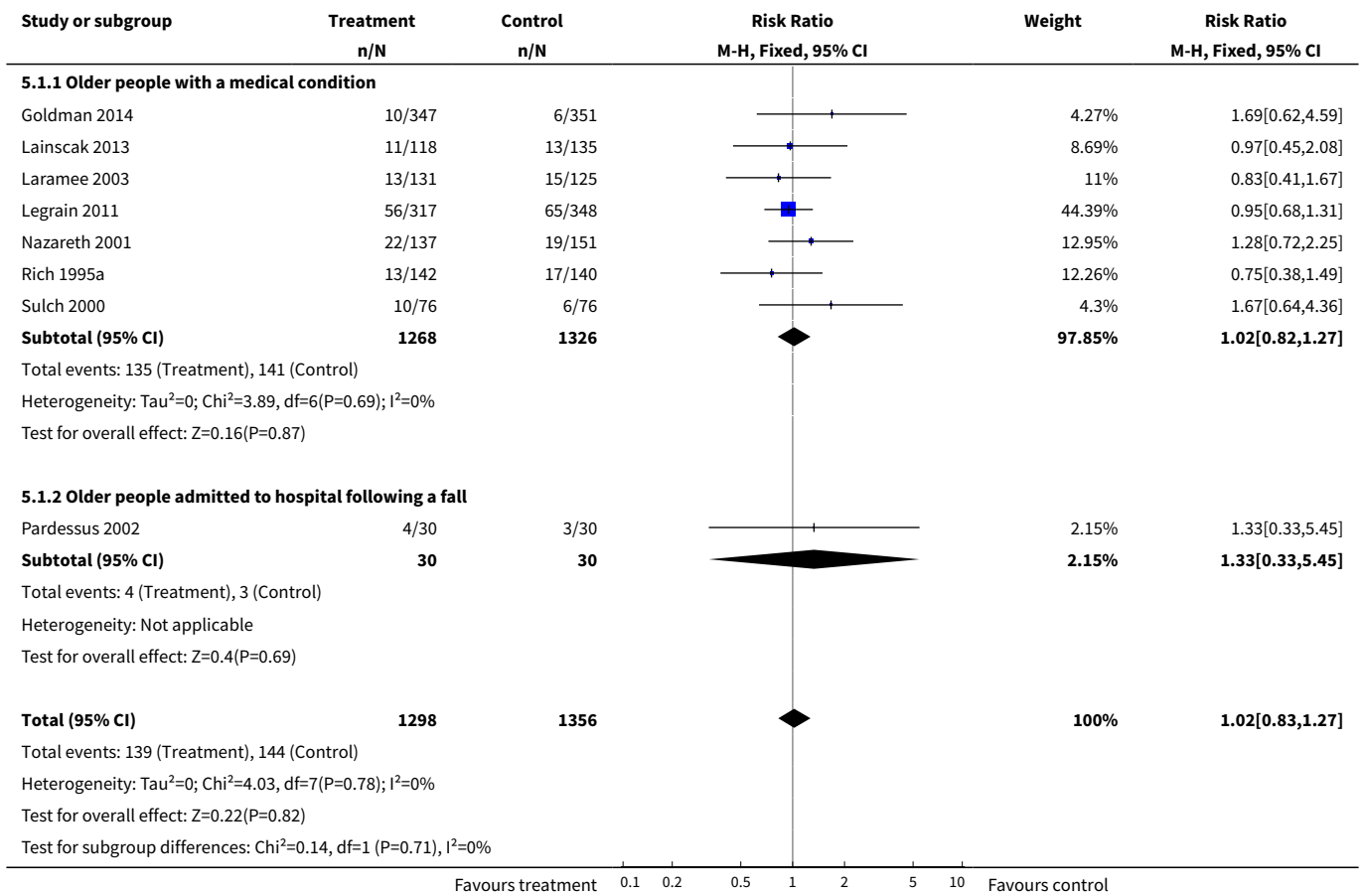


**Comparison 5. Effect of discharge planning on mortality**

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
<b>1 Mortality at 6 to 9 months</b>	8	2654	Risk Ratio (M-H, Fixed, 95% CI)	1.02 [0.83, 1.27]
1.1 Older people with a medical condition	7	2594	Risk Ratio (M-H, Fixed, 95% CI)	1.02 [0.82, 1.27]
1.2 Older people admitted to hospital following a fall	1	60	Risk Ratio (M-H, Fixed, 95% CI)	1.33 [0.33, 5.45]
<b>2 Mortality for trials recruiting both patients with a medical condition and those recovering from surgery</b>			Other data	No numeric data
<b>3 Mortality at 12 months</b>			Other data	No numeric data



**Analysis 5.1. Comparison 5 Effect of discharge planning on mortality, Outcome 1 Mortality at 6 to 9 months.**



**Analysis 5.2. Comparison 5 Effect of discharge planning on mortality, Outcome 2 Mortality for trials recruiting both patients with a medical condition and those recovering from surgery.**

Mortality for trials recruiting both patients with a medical condition and those recovering from surgery		
Study	Mortality at 9 months	Notes
Evans 1993	T = 66/417 (16%) C = 67/418 (16%)	—

**Analysis 5.3. Comparison 5 Effect of discharge planning on mortality, Outcome 3 Mortality at 12 months.**

Study	Mortality at 12 months	Notes
Gillespie 2009	T: 57/182 (31%); C: 61/186 (33%) Difference - 2%, 95% CI - 11% to 8%	

**Comparison 6. Effect of discharge planning on patient health outcomes**

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Patient-reported outcomes: Patients with a medical condition			Other data	No numeric data
2 Patient-reported outcomes: Patients with a surgical condition			Other data	No numeric data
3 Patient-reported outcomes: Patients with a medical or surgical condition			Other data	No numeric data
4 Falls at follow-up: patients admitted to hospital following a fall	1	60	Risk Ratio (M-H, Fixed, 95% CI)	0.87 [0.50, 1.49]
5 Patient-reported outcomes: Patients with a mental health diagnosis			Other data	No numeric data

**Analysis 6.1. Comparison 6 Effect of discharge planning on patient health outcomes, Outcome 1 Patient-reported outcomes: Patients with a medical condition.**

Study	Patient-reported outcomes: Patients with a medical condition Patient health outcomes	Notes
Harrison 2002	<b>SF-36</b> Baseline Physical component T = 28.63 (SD 9.46) N = 78 C = 28.35 (SD 9.11) N = 78 Mental component T = 50.49 (SD 12.45) N = 78 C = 49.81 (SD 11.36) N = 78 At 12 weeks Physical component T = 32.05 (SD 11.81) N = 77 C = 28.31 (SD 10.0) N = 74 Mental component T = 53.94 (SD 12.32) N = 78 C = 51.03 (SD 11.51) N = 78 <b>Minnesota Living with Heart Failure Questionnaire (MLHFQ)</b> At 12 week follow-up (See table 4) n, % Worse: T = 6/79 (8), C = 22/76 (29) Same: T = 7/79 (9), C = 10/76 (13) Better: T = 65/79 (83), C = 44/76 (58)	SF-36 a higher score indicates better health status MLHFQ a lower score indicates less disability from symptoms
Kennedy 1987	Long Term Care Information System (LTCIS)  Health and functional status (also measures services required)	No data reported
Lainscak 2013	<b>St. George's Respiratory Questionnaire (SGRQ)</b> Change from 7 to 180 d after discharge T = 1.06 (95% CI 9.50 to 8.43), C = -0.11 (95% CI -11.34 to 8.12)	Complete data available for only approximately half of the patients. For the SGRQ, higher scores indicate more limitations; minimal clinically important difference estimated as 4 points.
Naylor 1994	Data aggregated for both groups. Mean Enforced Social Dependency Scale increased from 19.6 to 26.3 P < 0.01	No data reported for each group. Decline in functional status reported for all patients. Functional status. Scale measured: <ul style="list-style-type: none"> <li>Mental status</li> <li>Perception of health</li> <li>Self-esteem</li> <li>Affect</li> </ul> Not possible to calculate exact P value
Nazareth 2001	<b>General well-being questionnaire:</b> 1 = ill health, 5 = good health	—

**Patient-reported outcomes: Patients with a medical condition**

Study	Patient health outcomes	Notes
Preen 2005	At 3 months: T = 76, mean 2.4 (SD 0.7) C = 73, mean 2.4 (SD 0.6) At 6 months: T = 62, mean 2.5 (SD 0.6) C = 61, mean 2.4 (SD 0.7) Mean difference 0.10; 95% CI - 0.14 to 0.34	—
Rich 1995a	<b>Chronic Heart Failure Questionnaire</b> Treatment N = 67, Control N = 59 <u>Total score</u> At baseline: T = 72.1 (15.6), C = 74.4 (16.3) At 90 d: T = 94.3 (21.3), C = 85.7 (19.0) Change score = 22.1 (20.8), P = 0.001 <u>Dyspnoea</u> At baseline: T = 9.0 (7.9), C = 8.1 (7.7) At 90 d: T = 15.8 (12.8), C = 11.9 (10.0) Change score 6.8 (7.9) <u>Fatigue</u> At baseline: T = 12.9 (5.3), C = 14.1 (5.6) At 90 d: T = 18.3 (6.3), C = 16.8 (5.5) Change score 5.4 (5.5) <u>Emotional function</u> At baseline: T = 31.9 (8.5), C = 33.3 (8.1) At 90 d: T = 37.4 (7.8), C = 35.2 (8.4) Change score 5.6 (7.1) <u>Environmental mastery</u> At baseline: T = 18.3 (5.8), C = 18.9 (4.8) At 90 d: T = 22.7 (4.9), C = 21.7 (4.6) Change score 4.4 (5.3)	Chronic Heart Failure Questionnaire contains 20 questions that the patient is asked to rate on a scale 1 to 7 with a low score indicating poor quality of life
Sulch 2000	<b>Barthel activities of daily living</b> Median scores At 4 weeks: T = 13, C = 11 At 12 weeks: T = 15, C = 17 At 26 weeks: T = 17, C = 17 Median change from 4 to 12 weeks: P < 0.01 <b>Rankin score</b> Median score At 4 weeks: T = 1, C = 1 At 12 weeks: T = 3, C = 3 At 26 weeks: T = 3, C = 3 <b>Hospital anxiety and depression scale</b> <u>Anxiety</u> Median scores At 4 weeks: T = 5, C = 5	The Barthel ADL Index covers activities of daily living; scores range from 0 to 20, with higher scores indicating better functioning. The Rankin scale assesses activities of daily living in people who have had a stroke; it contains 7 items with scores ranging from 0 to 6. Higher scores indicating more disability. The Hospital Anxiety and Depression Scale is a 14-item Likert scale (0-3); scores range from 0 to 21 for each subscale (anxiety and depression), with higher scores indicating more burden from symptoms. The EuroQol contains 5 items; higher scores indicate better self-perceived health status. Not possible to calculate exact P value

**Patient-reported outcomes: Patients with a medical condition**

Study	Patient health outcomes	Notes
	At 12 weeks: T = 4, C = 4 At 26 weeks T = 4, C = 4 <u>Depression</u> Median scores At 4 weeks: T = 6, C = 5 At 12 weeks: T = 5, C = 5 At 26 weeks: T = 5, C = 5 <b>EuroQol</b> At 4 weeks: T = 41, C = 44 Median scores At 4 weeks: T = 41, C = 44 P = 0.10 At 12 weeks: T = 59, C = 65 P = 0.07 At 26 weeks: T = 63, C = 72 P < 0.005	
Weinberger 1996	At 1 month: no significant differences P = 0.99 At 3 months: no significant differences P = 0.53	SF-36  No data shown

**Analysis 6.2. Comparison 6 Effect of discharge planning on patient health outcomes, Outcome 2 Patient-reported outcomes: Patients with a surgical condition.**
**Patient-reported outcomes: Patients with a surgical condition**

Study	Patient health outcomes	Notes
Lin 2009	<b>OARS Multidimensional Functional Assessment Questionnaire</b> (Chinese version) at 3 months follow-up Mean (SD) T = 16.92 (1.41) C = 16.83 (1.71)	9 components, each component scored 0 to 2 with a total score range 0-18.
Lin 2009	<b>SF 36</b> Mean (SD) <i>Physical aspects</i> Pre-test T: 74.09 (21.05), C: 68.15 (21.62) Post-test T: 49.05 (16.27), C: 39.56 (16.76) Between group difference P = 0.09 <i>Physical functioning</i> Pre-test T: 74.80 (25.15), C: 73.33 (18.04) Post-test T: 55.77 (22.56), C: 51.46 (24.82) Between group difference P = 0.60 <i>Role physical</i> Pre-test T: 66.34 (47.40), C: 65.63 (44.12) Post-test T: 16.34 (34.60), C: 12.50 (33.78) Between group difference P = 0.78 <i>Bodily pain</i> Pre-test T: 88.15 (18.48), C: 77.08 (22.44) Post-test T: 55.16 (23.20), C: 38.58 (27.68) Between group difference p=0.009 <i>General health perceptions</i> Pre-test T: 67.03 (15.31), C: 56.54 (19.96) Post-test T: 68.46 (16.55), C: 55.70 (22.23) Between group differences p=0.03 <i>Mental aspects</i> Pre-test T: 74.49 (16.66), C: 68.24 (15.09) Post-test T: 50.57 (18.72), C: 43.43 (17.28) Between group difference P = 0.09 <i>Mental health</i> Pre-test T: 71.23 (12.18), C: 67.83 (12.28) Post-test T: 22.30 (10.31), C: 20.00 (11.62) Between group difference P = 0.27 <i>Role emotion</i>	—

**Patient-reported outcomes: Patients with a surgical condition**

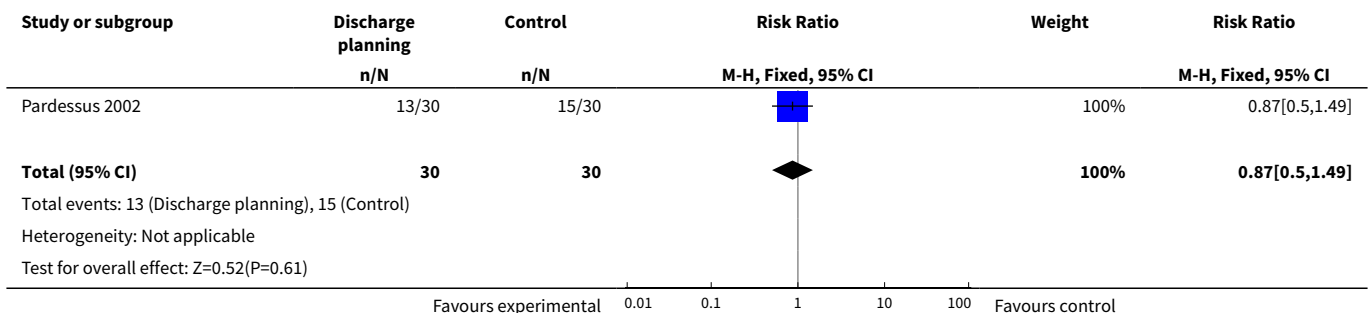
Study	Patient health outcomes	Notes
	Pre-test T: 76.92 (40.84), C: 68.05 (41.10) Post-test T: 52.56 (44.39), C: 54.16 (41.49) Between group difference P = 0.71 <i>Social functioning</i> Pre-test T: 80.76 (15.09), C: 77.08 (15.93) Post test T: 61.01 (24.32), C: 45.83 (20.41) Between group difference P = 0.03 <i>Vitality</i> Pre-test T: 69.03 (12.88), C: 60.00 (11.70) Post-test T: 66.34 (16.94), C: 53.75 (21.93) Between group difference P = 0.004	
Naylor 1994	No differences between groups reported	No data reported
Naylor 1994	—	—

**Analysis 6.3. Comparison 6 Effect of discharge planning on patient health outcomes, Outcome 3 Patient-reported outcomes: Patients with a medical or surgical condition.**

**Patient-reported outcomes: Patients with a medical or surgical condition**

Study	Patient health outcomes	Notes
Evans 1993	At 1 month: mean (SD) T = 85.3 (21.0) n = 417 C = 86.5 (21.0) n = 418 Difference - 1.2; 95% CI - 4.05 to 1.65	Barthel score (scale 1 to 100)
Pardessus 2002	<b>Functional Autonomy Measurement System (SMAF)</b> At 6 months: Mean scores T = 29.55 ± 2.64, C = 37.73 ± 2.40 At 12 months: T = 31.76 ± 3.53, C = 39.25 ± 2.3 <b>Katz ADL</b> At 6 months: Mean scores T = 3.79 ± 0.32, C = 3.11 ± 0.27 At 12 months: Means scores T = 3.84 ± 0.33, C = 2.76 ± 0.29 <b>IADL</b> At 6 months: Mean scores T = 2.41 ± 0.20, C = 2.96 ± 0.18 At 12 months: T = 2.24 ± 0.19, C = 3.14 ± 0.16	The SMAF scale assesses seven fields of activities of daily living. It has 22 items with scores ranging from 0 (total independence) to 87 (total dependence) The Katz ADL scale covers six ADLs, with scores ranging from 0 (totally dependent) to 6 (totally independent).

**Analysis 6.4. Comparison 6 Effect of discharge planning on patient health outcomes, Outcome 4 Falls at follow-up: patients admitted to hospital following a fall.**



### Analysis 6.5. Comparison 6 Effect of discharge planning on patient health outcomes, Outcome 5 Patient-reported outcomes: Patients with a mental health diagnosis.

Study	Patient-reported outcomes: Patients with a mental health diagnosis		Notes
	Patient health outcomes		
Naji 1999	<p><u>Hospital Anxiety Depression Scale</u>                      At 1 month after discharge, median (IQR)                      Anxiety                      T = 11.0 (6.0, 15.0), C = 10.0 (5.0, 14.0)                      Mann Whitney P = 0.413                      Depression                      T = 9.5 (5.0, 13.3), C = 7.0 (3.0, 11.0)                      Mann Whitney P = 0.016  <u>Behavioural and Symptom Identification Scale</u>                      Relation to self/other                      T = 1.8 (1.2, 2.8), C = 1.7 (0.4, 2.7)                      Mann Whitney P = 0.10                      Depression/anxiety                      T = 1.7 (0.8, 2.7), C = 1.5 (0.4, 2.4)                      Mann Whitney P = 0.46                      Daily living/role functioning                      T = 2.0 (0.9, 2.8), C = 1.8 (0.8, 2.8)                      Mann Whitney P = 0.37                      Impulsive/addictive behaviour                      T = 0.7 (0.3, 1.6), C = 0.7 (0.1, 1.5)                      Mann Whitney P = 0.89                      Psychosis                      T = 0.5 (0.2, 0.8), C = 0.7 (0.2, 1.0)                      Mann Whitney P = 0.31                      Total symptom score                      T = 1.4 (0.6, 2.1), C = 1.3 (0.5, 2.1)                      Mann Whitney P = 0.54</p>		—

### Comparison 7. Effect of discharge planning on satisfaction with care process

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Satisfaction			Other data	No numeric data
1.1 Patient and care givers' satisfaction			Other data	No numeric data
1.2 Professional's satisfaction			Other data	No numeric data

### Analysis 7.1. Comparison 7 Effect of discharge planning on satisfaction with care process, Outcome 1 Satisfaction.

Study	Satisfaction		Notes
	Satisfaction		
Patient and care givers' satisfaction			
Laramee 2003	Mean hospital care: T = 4.2 (N = 120), C = 4.0 (N = 100), P = 0.003 Mean hospital discharge: T = 4.3 (N = 120), C = 4.0 (N = 100), P < 0.001 Mean care instructions: T = 4.0 (N = 120), C = 3.4 (N = 100), P < 0.001 Mean recovering at home: T = 4.4 (N = 120), C = 3.9 (N = 100), P < 0.001 Mean total score: T = 4.2 (N = 120), C = 3.8 (N = 100), P < 0.001		—
Lindpaintner 2013	Satisfaction with discharge process At 5 d (median and IQR) Patients: T = 1 (0), C = 1 (1-2) Carers: T = 1 (0), C = 1 (1-2) At 30 d		4-point Likert-scale, lower scores indicate higher satisfaction

Study	Satisfaction Satisfaction	Notes
	Patients: T = 1 (1-2), C = 1 (1-2) Carers: T = 1 (1-2), C = 2 (1-3)	
Moher 1992	Satisfied with medical care: T = 89%, C = 62% Difference 27%; 95% CI 2% to 52%, P < 0.001	"Please rate how satisfied you were with the care you received..." Subgroup of 40 patients, responses from 18 in the treatment group and 21 in the control group
Nazareth 2001	Client satisfaction questionnaire score (1 = dissatisfied, 4 = satisfied) At 3 months: T = 76, mean 3.3 (SD 0.6) C = 73, mean 3.3 (SD 0.6) At 6 months: T = 62, mean 3.4 (SD 0.6) C = 61, mean 3.2 (SD 0.6) Mean difference 0.20; 95% CI - 0.56 to 0.96	
Weinberger 1996	At 1 month: Treatment group more satisfied, P < 0.001 At 6 months: Treatment group more satisfied, P < 0.001 Authors report differences were greatest for patients' perceptions of continuity of care and non-financial access to medical care	Patient Satisfaction Questionnaire, 11 domains with a 5-point scale
<b>Professional's satisfaction</b>		
Bolas 2004	Standard of information at discharge improved GPs: 57% agreed Community pharmacists: 95% agreed	Response rate of 55% (GPs) and 56% (community pharmacists) No information provided about the survey
Lindpaintner 2013	Satisfaction with discharge process At 5 d (median and IQR) Primary care physician: T = 1 (1-2), C = 2 (1-3) Visiting nurse: T = 1 (1-2), C = 2 (1-4) At 30 d (median and IQR) Primary care physician: T = 2 (1-3), C = 1 (1-2)	Number of respondents ranged between 15 (visiting nurse) and 30 (PCP) 4-point Likert scale, lower scores indicate higher satisfaction

### Comparison 8. Effect of discharge planning on hospital care costs

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Patients with a medical condition			Other data	No numeric data
2 Patients with a surgical condition			Other data	No numeric data
3 Patients with a mental health diagnosis			Other data	No numeric data
4 Patients admitted to a general medical service			Other data	No numeric data
5 Hospital outpatient department attendance	1	288	Risk Ratio (M-H, Fixed, 95% CI)	1.07 [0.74, 1.56]
6 First visits to the emergency room	2	740	Risk Ratio (M-H, Fixed, 95% CI)	0.80 [0.61, 1.07]



### Analysis 8.1. Comparison 8 Effect of discharge planning on hospital care costs, Outcome 1 Patients with a medical condition.

Study	Patients with a medical condition	
	Costs	Notes
Gillespie 2009	<p><i>Total</i>                      T: USD 12000; C: USD 12500                      Mean difference: - USD 400 (- USD 4000 to USD 3200)</p> <p><i>Visits to ED</i>                      T: USD 160; C: USD 260                      Mean difference: - USD 100 (- USD 220 to - USD 10)</p> <p><i>Readmissions</i>                      T: USD 12000; C: USD 12300 Mean difference: - USD 300 (- USD 3900 to USD 3300)</p>	Costs calculated for 2008
Laramee 2003	<p><i>Total inpatient and outpatient median costs</i>                      T = USD 15,979                      C = USD 18,662                      P = 0.14</p>	The case manager (CM) kept a log during the first, middle and last 4 weeks of the recruitment period of how much time was spent with each patient during the 12-week study period. Thus, the average cost of the intervention was calculated based on an hourly wage (including benefits) of USD 33.93 for the CM. The average intervention cost per patient was USD 228.52, and the average time spent with each intervention patient was 6.7 h per 12 weeks.
Naughton 1994	—	<p>Number:                      T = 51, C = 60</p> <p>Total cost of hospital care including breakdown of costs for laboratory, diagnostic imaging, pharmacy and rehabilitation services</p>
Naylor 1994	<p><i>Initial stay mean charges (USD):</i>                      T = 24,352 ± 15,920 (n = 72)                      C = 23,810 ± 18,449 (n = 70)                      Difference 542 (CI - 5121 to 6205)</p> <p><i>Medical readmission total charges in USD (CIs are in thousands):</i></p> <p>At 2 weeks:                      T = 68,754                      C = 239,002                      Difference = - 170,247 (CI - 253 to - 87)</p> <p>2-6 weeks:                      T = 52,384                      C = 189,892                      Difference = - 137,508 (CI - 210 to - 67)</p> <p>6-12 weeks:                      T = 471,456                      C = 340,496                      Difference = 130,960 (CI - 205 to 467)</p>	<p>Charge data were used to calculate the cost of the initial hospitalisation</p> <p>Readmission costs were calculated using the mean charge per day of the index hospitalisations times the actual number of days of subsequent hospitalisations, as patients were readmitted to a variety of hospitals with a wide range of charges</p> <p>Total charges including readmission charges (first readmission only if multiple readmissions)</p>
Rich 1995a	<p><i>Intervention cost</i>                      USD 216 per patient</p> <p><i>Caregiver cost</i>                      T = USD 1164, C = USD 828                      Difference USD 336</p> <p><i>Other medical care</i>                      T = USD 1257, C = USD 1211                      Difference USD 46</p> <p><i>Readmission costs</i>                      T = USD 2178, C = USD 3236                      Difference - USD 1058</p> <p><i>All costs</i>                      T = USD 4815, C = USD 5275                      Difference - USD 460</p>	—

### Analysis 8.2. Comparison 8 Effect of discharge planning on hospital care costs, Outcome 2 Patients with a surgical condition.

Study	Patients with a surgical condition	
	Costs	Notes
Naylor 1994	<p>Surgical initial stay mean charges (USD):                      T = 105,936 ± 52,356 (n = 68)                      C = 98,640 ± 52,331 (n = 66)                      Difference 7296 (CI - 5141 to 19,733)</p>	Charge data were used to calculate the cost of the initial hospitalisation

Study	Costs	Notes
	<p><b>Patients with a surgical condition</b></p> <p>Surgical readmission total charges (USD):                      At 2 weeks:                      T = 111,316                      C = 104,768                      Difference = 6548 (CI - 43 to 56)                      2-6 weeks:                      T = 209,536                      C = 170,248                      Difference = 39,288 (CI - 66 to 144)                      6-12 weeks:                      T = 170,248                      C = 85,124                      Difference = 85,124 (CI - 28 to 198)</p>	<p>Total charges including readmission charges (first readmission only if multiple readmissions)</p> <p>Readmission costs were calculated using the mean charge per day of the index hospitalisations times the actual number of T of subsequent hospitalisations, as patients were readmitted to a variety of hospitals with a wide range of charges</p>

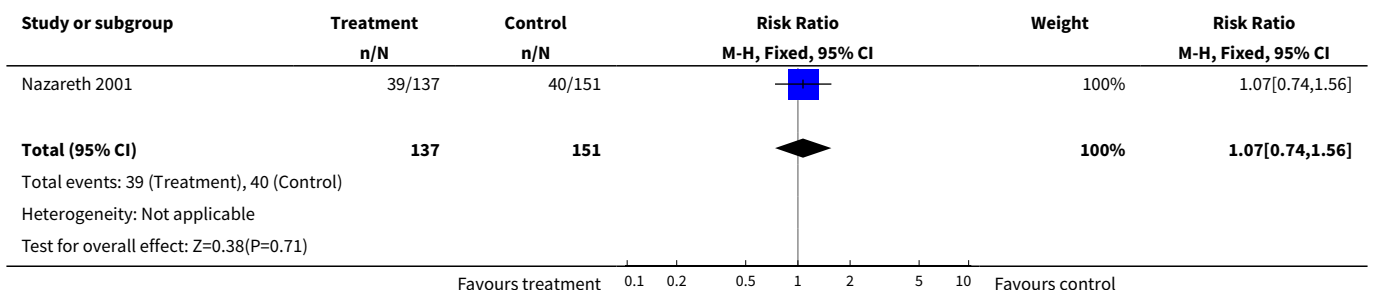
**Analysis 8.3. Comparison 8 Effect of discharge planning on hospital care costs, Outcome 3 Patients with a mental health diagnosis.**

Study	Costs	Notes
Naji 1999	T = an additional GBP 1.14 per patient Intervention can avert 3 outpatient appointments for every 10 patients	Telephone calls: T = 124/168 (86%), C = 19/175 (12%)

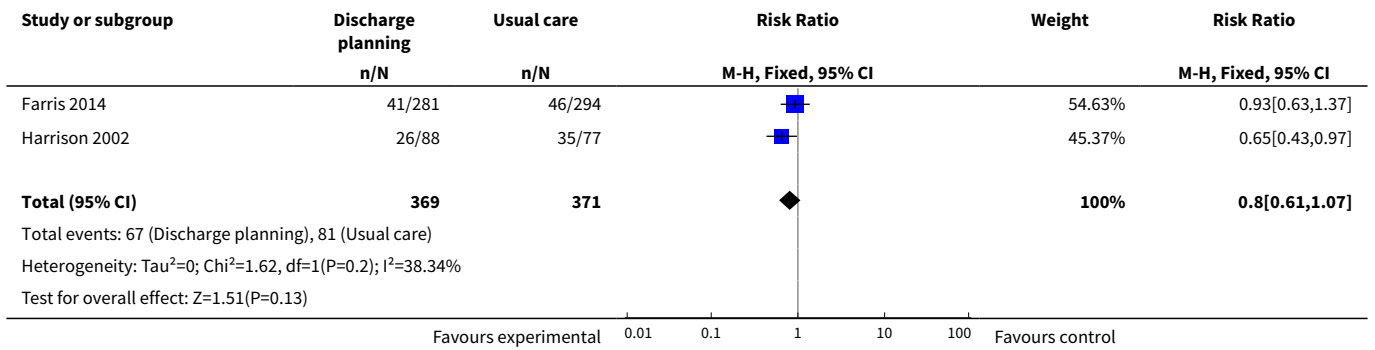
**Analysis 8.4. Comparison 8 Effect of discharge planning on hospital care costs, Outcome 4 Patients admitted to a general medical service.**

Study	Costs	Notes
Jack 2009	—	Follow-up PCP appointments were given an estimated cost of USD 55, on the basis of costs from an average hospital follow-up visit at Boston Medical Center
Legrain 2011	The cost savings balanced against the cost of the intervention reported to be EUR 519/patient	—
Legrain 2011	Total cost of adverse drug reactions-related admissions (180 days follow-up) T = USD 487/participant C = USD 1184/participant P = 0.13	—

**Analysis 8.5. Comparison 8 Effect of discharge planning on hospital care costs, Outcome 5 Hospital outpatient department attendance.**



**Analysis 8.6. Comparison 8 Effect of discharge planning on hospital care costs, Outcome 6 First visits to the emergency room.**



**Comparison 9. Effect of discharge planning on primary and community care costs**

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Patients with a medical condition			Other data	No numeric data

**Analysis 9.1. Comparison 9 Effect of discharge planning on primary and community care costs, Outcome 1 Patients with a medical condition.**

Study	Patients with a medical condition		Notes
	Use of services		
Farris 2014	Unscheduled office visits At 30 d T = 31/281 (11%), C = 32/294 (11%) Difference 0%; 95% CI - 5% to 5% At 90 d T = 42/281 (15%), C = 33/294 (11%) Difference 4%; 95% CI - 2 to 9%		Results for Enhanced vs Control intervention (results for minimal intervention not reported)
Goldman 2014	Primary care visits at 30 d T = 189/301 (62.8%), C = 186/316 (58.9%) Difference 4%; 95% CI - 3.7% to 11.5%		—
Laramee 2003	Visiting Nurse postdischarge: T = 70/141(50%), Control: 64/146 (44%)		—
Nazareth 2001	General practice attendance: At 3 months: T = 101/130 (77.7%) C = 108/144 (75%) Difference 2.7%; 95% CI - 7.4 to 12.7% At 6 months: T = 76/107 (71%) C = 82/116 (70.7%) Difference 0.3%; 95% CI -11.6 to 12.3%		—
Weinberger 1996	Median time from hospital discharge to the first visit: Treatment 7 d Control 13 d P < 0.001 Visit at least one general medicine clinic in 6-month follow up: Treatment 646/695 (93%) Control 540/701 (77%) Difference 16%; 95% CI 12.3% to 19.6%, P < 0.001 Mean number of visits to general medical clinic: Treatment 3.7 Control 2.2		—

Study	Patients with a medical condition		Notes
	Use of services		
	P < 0.001		

### Comparison 10. Effect of discharge planning on medication use

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Medication problems after being discharged from hospital			Other data	No numeric data
2 Adherence to medicines			Other data	No numeric data
3 Knowledge about medicines			Other data	No numeric data
4 Hoarding of medicines			Other data	No numeric data
5 Prescription errors			Other data	No numeric data
6 Medication appropriateness			Other data	No numeric data

#### Analysis 10.1. Comparison 10 Effect of discharge planning on medication use, Outcome 1 Medication problems after being discharged from hospital.

Study	Medication problems after being discharged from hospital		Notes
	Number of problems		
Bolas 2004	Intervention group demonstrated a higher rate of reconciliation of patient's own drugs with the discharge prescription; 90% compared to the 44% in the control group		—
Shaw 2000	Mean number of problems (SD) At 1 week: T = 2.0 (1.3), C = 2.5 (1.6) At 4 weeks: T = 1.9 (1.5), C = 2.9 (1.8) At 12 weeks: T = 1.4 (1.2), C = 2.4 (1.6)		Problems included difficulty obtaining a prescription from the GP; insufficient knowledge about medication; non-compliance

#### Analysis 10.2. Comparison 10 Effect of discharge planning on medication use, Outcome 2 Adherence to medicines.

Study	Adherence to medicines		Notes
	Adherence to medicines		
Nazareth 2001	At 3 months: T = 79, mean 0.75 (SD 0.3), C = 72 mean 0.75 (SD 0.28) At 6 months: T = 60, mean 0.78 (SD 0.30), C = 58 mean 0.78 (SD 0.30)		0 = none 1 = total/highest level
Rich 1995a	Taking 80% or more of prescribed pills at 30 d after discharge T = 117/142 (82.5%), C = 91/140 (64.9%)		—

### Analysis 10.3. Comparison 10 Effect of discharge planning on medication use, Outcome 3 Knowledge about medicines.

Study	Knowledge about medicines	
	Knowledge	Notes
Bolas 2004	Mean error rate in knowledge of drug therapy at 10-14 d follow up Drug name T = 15%, C = 43%, P < 0.001 Drug dose T = 14%, C = 39%, P < 0.001 Frequency T = 15%, C = 39%, P < 0.001 (n for each group not reported)	—
Nazareth 2001	At 3 months: T = 86, mean 0.69 (SD 0.33) C = 83, mean 0.62 (SD 0.34) At 6 months: T = 65, mean 0.69 (SD 0.35) C = 68, mean 0.68 (SD 0.30) Mean difference 0.01; 95% CI - 0.12 to 0.13	0 = none 1 = total/highest level
Shaw 2000	At 1 and 12 weeks post-discharge: Significant improvement in knowledge medication for both groups (no differences between groups)	—

### Analysis 10.4. Comparison 10 Effect of discharge planning on medication use, Outcome 4 Hoarding of medicines.

Study	Hoarding of medicines	
	Hoarding	Notes
Bolas 2004	90% of people who brought drugs to the hospital were returned in the intervention group compared to 50% in the controls	—
Nazareth 2001	At 3 months: T = 87, mean 0.006 (SD 0.04) C = 82 mean 0.005 (SD 0.03) Mean difference 0.001; 95% CI - 0.01 to 0.012 At 6 months T = 70, mean 0.02 (SD 0.13) C = 69 mean 0.013 (SD 0.06) Mean difference 0.007; 95% CI - 0.013 to 0.27	0 = none 1 = total/highest level

### Analysis 10.5. Comparison 10 Effect of discharge planning on medication use, Outcome 5 Prescription errors.

Study	Prescription errors	
Eggink 2010		Following a review of medication by a pharmacist, 68% in the control group had at least one discrepancy or medication error compared to 39% in the intervention group (RR 0.57; 95% CI 0.37 to 0.88). The percent of medications with a discrepancy or error in the intervention group was 6.1% in intervention group and 14.6% in the control group (RR = 0.42; 0.27 to 0.66).
Kripalani 2012		Clinically important medication errors (total number of events; could be more than one per patient) At 30 d T = 370/423, M = 0.87 (SD 1.18) C = 407/428, M = 0.95 (SD 1.36)

### Analysis 10.6. Comparison 10 Effect of discharge planning on medication use, Outcome 6 Medication appropriateness.

Study	Medication appropriateness	
	Medication appropriateness	Notes
Farris 2014	Discharge T = 7.1 (SD 7.0), C = 6.1 (SD 6.6) 30 d post-discharge T = 10.1 (SD 8.9), C = 9.6 (SD 9.5)	As measured by the medication appropriateness index (MAI); summed MAI per participant Results for Enhanced v Control intervention (results for minimal intervention not reported)

Study	Medication appropriateness Medication appropriateness	Notes
	P = 0.78 90 d post-discharge T = 11.6 (SD 10.5), C = 11.1 (11.3) P = 0.94	

## APPENDICES

### Appendix 1. Search strategies 2015

#### CINAHL (EBSCOHost) [1982 – present]

S24 S22 and S23 Limiters - Published Date from: 20121231-20151005  
 S23 ( (MH "Experimental Studies+") OR (MH "Treatment Outcomes+") ) OR TI random\* OR AB random\*  
 S22 S3 or S21  
 S21 S11 and S20  
 S20 S12 or S13 or S14 or S15 or S16 or S17 or S18 or S19  
 S19 TI ( ((hospital or hospitali?ed or bed) n2 days) ) OR AB ( ((hospital or hospitali?ed or bed) n2 days) )  
 S18 TI length n2 hospital stay OR AB length n2 hospital stay  
 S17 TI length n2 stay OR AB length n2 stay  
 S16 TI ( rehospitali?ation\* or re-hospitali?ation\* or rehospitali?ed or re-hospitali?ed ) OR AB ( rehospitali?ation\* or re-hospitali?ation\* or rehospitali?ed or re-hospitali?ed )  
 S15 TI ( readmission or readmitted or re-admission or re-admitted ) OR AB ( readmission or readmitted or re-admission or re-admitted )  
 S14 (MH "Readmission")  
 S13 (MH "Length of Stay")  
 S12 (MM "Continuity of Patient Care")  
 S11 S4 or S5 or S6 or S7 or S8 or S9 or S10  
 S10 TI discharge procedure\* OR AB discharge procedure\*  
 S9 TI discharge program\* OR AB discharge program\*  
 S8 TI discharge service\* OR AB discharge service\*  
 S7 TI discharge\* n2 plan\* OR AB discharge\* n2 plan\*  
 S6 TI hospital n2 discharge\* OR AB hospital n2 discharge\*  
 S5 TI patient\* n2 discharge\* OR AB patient\* n2 discharge\*  
 S4 (MM "Patient Discharge Education") OR (MM "Patient Discharge") OR (MM "Early Patient Discharge")  
 S3 S1 or S2  
 S2 (MH "Discharge Planning")  
 S1 TI (discharge and (plan\* or service? or program\* or intervention?))

#### Cochrane Central Register of Controlled Trials via Cochrane Library (Wiley)[Issue 10, 2014]

Date searched: 05 October 2015

#1 (discharge and (plan\* or service? or program\* or intervention?)):ti  
 #2 MeSH descriptor Patient Discharge explode all trees  
 #3 (patient\* near2 discharge):ti,ab,kw  
 #4 (hospital near2 discharge):ti,ab,kw  
 #5 (discharge near2 plan\*):ti,ab,kw  
 #6 "discharge service\*" OR "discharge program\*" OR "discharge procedure\*":ti,ab,kw  
 #7 (#2 OR #3 OR #4 OR #5 OR #6)  
 #8 MeSH descriptor Patient Readmission explode all trees  
 #9 MeSH descriptor Length of Stay explode all trees  
 #10 MeSH descriptor Continuity of Patient Care, this term only  
 #11 (readmission or readmitted or re-admission or re-admitted):ti,ab,kw  
 #12 (rehospitali?ation\* or re-hospitali?ation\* or rehospitali?ed or re-hospitali?ed):ti,ab,kw  
 #13 "length of stay":ti,ab,kw  
 #14 "length of hospital stay":ti,ab,kw  
 #15 ((hospital or hospitali?ed or bed) near2 days):ti,ab,kw  
 #16 (#8 OR #9 OR #10 OR #11 OR #12 OR #13 OR #14 OR #15)  
 #17 (#2 AND #16)  
 #18 (#1 OR #17), from 2012 to 2015

#### Discharge planning from hospital (Review)

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**Embase** (OvidSP)[1974 to present]

Date Searched: 05 October 2015

1 (discharge and (plan\* or service? or program\* or intervention?)).ti.  
 2 \*Patient Discharge/  
 3 (patient\* adj2 discharge\*).ti,ab.  
 4 (hospital adj2 discharge\*).ti,ab.  
 5 (discharge adj2 plan\*).ti,ab.  
 6 (discharge adj service\*).ti,ab.  
 7 (discharge adj program\*).ti,ab.  
 8 (discharge adj procedure\*).ti,ab.  
 9 2 or 3 or 4 or 5 or 6 or 7 or 8  
 10 \*"Continuity of Patient Care"/  
 11 \*"Length of Stay"/  
 12 Patient Readmission/  
 13 (readmission or readmitted or re-admission or re-admitted).ti,ab.  
 14 (rehospitali?ation\* or re-hospitali?ation\* or rehospitali?ed or re-hospitali?ed).ti,ab. (6918)  
 15 length of stay.ti,ab.  
 16 length of hospital stay.ti,ab.  
 17 ((hospital or hospitali?ed or bed) adj2 days).ti,ab.  
 18 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17  
 19 9 and 18  
 20 1 or 19  
 21 (random\* or factorial\* or crossover\* or cross over\* or cross-over\* or placebo\* or (doubl\* adj blind\*) or (singl\* adj blind\*) or assign\* or allocat\* or volunteer\*).ti,ab. (1404240)  
 22 crossover-procedure/ or double-blind procedure/ or randomized controlled trial/ or single-blind procedure/  
 23 21 or 22  
 24 nonhuman/  
 25 23 not 24  
 26 20 and 25  
 27 (2012\* or 2013\* or 2014\* or 2015\* or 2016\*).em,dp,yr.  
 28 26 and 27

**MEDLINE(R) In-Process & Other Non-Indexed Citations and MEDLINE(R)** (OvidSP) [1946 to Present]

Date searched: 05 October November 2015

1 (discharge and (plan\* or service? or program\* or intervention?)).ti.  
 2 \*Patient Discharge/  
 3 (patient\* adj2 discharge\*).ti,ab.  
 4 (hospital adj2 discharge\*).ti,ab.  
 5 (discharge adj2 plan\*).ti,ab.  
 6 (discharge adj service?).ti,ab.  
 7 (discharge adj program\*).ti,ab.  
 8 (discharge adj procedure\*).ti,ab.  
 9 2 or 3 or 4 or 5 or 6 or 7 or 8  
 10 \*"Continuity of Patient Care"/  
 11 \*"Length of Stay"/  
 12 Patient Readmission/  
 13 (readmission or readmitted or re-admission or re-admitted).ti,ab.  
 14 (rehospitali?ation\* or re-hospitali?ation\* or rehospitali?ed or re-hospitali?ed).ti,ab. (4530)  
 15 length of stay.ti,ab.  
 16 length of hospital stay.ti,ab.  
 17 ((hospital or hospitali?ed or bed) adj2 days).ti,ab.  
 18 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17  
 19 9 and 18  
 20 1 or 19  
 21 randomized controlled trial.pt.  
 22 controlled clinical trial.pt.  
 23 randomized.ab.  
 24 placebo.ab.  
 25 drug therapy.fs.  
 26 randomly.ab.



27 trial.ab.  
28 groups.ab.  
29 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28  
30 exp animals/ not humans.sh.  
31 29 not 30  
32 20 and 31  
33 (2012\* or 2013\* or 2014\* or 2015\* or 2016\*).ed,dp,yr.  
34 32 and 33

### Social Science Citation Index (Web of Knowledge)

Date searched: 05 October 2015

# 7 #6 AND #5  
# 6 TS=(random\* or blind\* or allocat\* or assign\* or trial\* or placebo\* or crossover\* or cross-over\*)  
# 5 #4 OR #1  
# 4 #3 AND #2  
# 3 TS=("hospital discharge" OR "patient discharge")  
# 2 TS=("length of stay" OR "length of hospital stay") OR TS=("hospital days" OR "bed days" OR "days hospitali?ed") OR TS=(rehospitali?ation\* or re-hospitali?ation\* or rehospitali?ed or re-hospitali?ed) OR TS=(readmission or readmitted or re-admission or re-admitted)  
# 1 TS=("discharge plan\*" OR "discharge care" OR "discharge service\*" OR "discharge program\*" OR "discharge procedure\*")

### PsycInfo (OvidSP) [1967 to Present]

Date searched: 05 October 2015

1 (discharge and (plan\* or service? or program\* or intervention?)).ti.  
2 Discharge Planning/  
3 1 or 2  
4 \*Hospital Discharge/  
5 (patient\* adj2 discharge\*).ti,ab.  
6 (hospital adj2 discharge).ti,ab.  
7 (discharge adj2 plan\*).ti,ab.  
8 (discharge adj service\*).ti,ab.  
9 (discharge adj program\*).ti,ab.  
10 (discharge adj procedure\*).ti,ab.  
11 4 or 5 or 6 or 7 or 8 or 9 or 10  
12 Psychiatric Hospital Readmission/  
13 "Length of Stay"/  
14 (readmission or readmitted or re-admission or re-admitted).ti,ab.  
15 (rehospitali?ation\* or re-hospitali?ation\* or rehospitali?ed or re-hospitali?ed).ti,ab.  
16 length of stay.ti,ab.  
17 length of hospital stay.ti,ab.  
18 ((hospital or hospitali?ed or bed) adj2 days).ti,ab.  
19 12 or 13 or 14 or 15 or 16 or 17 or 18  
20 1 or 19  
21 3 or 20  
22 (placebo\* or random\*).tw. or exp treatment/  
23 22 and 22  
24 (2012\* or 2013\* or 2014\* or 2015\*).up,dp,yr.  
25 23 and 24

## FEEDBACK

### Cochrane Highly Sensitive Search Strategy

#### Summary

The Cochrane Highly Sensitive Search Strategy should BE REFERENCED 'Dickersin K, Scherer R, Lefebvre C. Identifying relevant studies for systematic reviews. BMJ 1994;309:1286-91' instead of 'Anonymous. MEDLINE optimally sensitive search strategy (OSS) for SilverPlatter. Workshop on Identifying and Registering Trials. UK Cochrane Centre, 1996'.

#### Reply

This change has now been made.

## Contributors

Mike Clarke

## WHAT'S NEW

Date	Event	Description
23 October 2015	New search has been performed	This is the third update of the original review. A new search was conducted (October 2015) and other content updated, six new studies were added to the review.
23 October 2015	New citation required but conclusions have not changed	Six new studies were included in this update. The total number of studies included in the review is now 30.

## HISTORY

Protocol first published: Issue 3, 1997

Review first published: Issue 4, 2000

Date	Event	Description
12 December 2012	New search has been performed	New search completed March 2012. Three new studies.
7 December 2012	New citation required but conclusions have not changed	New Search March 2012. Three new studies.
10 November 2009	New citation required and conclusions have changed	Authors found 10 new studies, providing evidence about the effect of discharge planning.
23 September 2003	New search has been performed	Search identified additional trials for inclusion

## CONTRIBUTIONS OF AUTHORS

Daniela Gonçalves-Bradley (DCGB) scanned the abstracts and extracted data for this update and took the lead in analysing the data and updating the text of the review. Natasha Lannin (NL), Lindy Clemson (LC) and Ian Cameron (IC) scanned the abstracts and extracted data. Sasha Shepperd (SS) co-authored the protocol for the review with Julie Parkes (no longer an author), extracted and analysed data for previous versions of this review, and led the writing of the review.

## DECLARATIONS OF INTEREST

DCGB: none known.

NL: none known.

LC: none known.

IC: none known.

SS: none known.

## SOURCES OF SUPPORT

### Internal sources

- Anglia and Oxford Regional Research and Development Programme, UK.

### External sources

- NIHR Evidence Synthesis Award to SS and NHS Cochrane Collaboration Programme Grant Scheme, UK.

## Discharge planning from hospital (Review)

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- NIHR Evidence Synthesis Award; and an NIHR Cochrane Programme grant for the last two updates., UK.

## **DIFFERENCES BETWEEN PROTOCOL AND REVIEW**

We performed post hoc subgroup analyses for patients admitted to hospital following a fall and patients admitted to a mental health setting. We performed a post hoc sensitivity analysis by imputing a missing standard deviation for one trial. We made a post hoc decision to exclude studies that were considered to be methodologically weak. We added new analysis to the summary of findings table by including results for the patients admitted to hospital following a fall, patients and healthcare professionals satisfaction, and costs. We merged the outcome "Psychological health of patients" with the outcome "Patient health status".

## **INDEX TERMS**

### **Medical Subject Headings (MeSH)**

\*Patient Discharge; Aftercare [organization & administration]; Controlled Clinical Trials as Topic; Health Care Costs; Intention to Treat Analysis; Length of Stay [statistics & numerical data]; Outcome Assessment, Health Care; Patient Readmission [statistics & numerical data]; Randomized Controlled Trials as Topic

### **MeSH check words**

Humans