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Discharge planning from hospital (Review)

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[Intervention Review]

Discharge planning from hospital

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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 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 FOR THE MAIN COMPARISON [Explanation]

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	**Study population admitted with a medical condition**		**RR 0.87** (0.79 to 0.97)	4743 (15)	⊕⊕⊕◯ **moderate**[a]	-
	254 per 1000	**221 per 1000** (200 to 246)				
	Moderate risk population					
	285 per 1000	**248 per 1000** (225 to 276)				
	Study population admitted following a fall		RR 1.36 (0.46 to 4.01)	110 (2)	⊕◯◯◯ **very low**[b]	-
	93 per 1000	**126 per 1000** (43 to 371)				
	Moderate risk population					
	92 per 1000	125 per 1000 (42 to 369)				

Hospital length of stay Follow-up: 3 to 6 months	**Study population admitted with a medical condition**		-	2193 (12 studies)	⊕⊕⊕○ **moderate**[d]	-
	The mean hospital length of stay ranged across control groups from **5.2 to 12.4 days**[c]	The mean hospital length of stay in the intervention groups was **0.73 lower** (95% CI 1.33 to 0.12 lower)				
Satisfaction	Discharge planning may lead to increased satisfaction for patients and healthcare professionals		6 studies		⊕⊕○○ **low**	Patient satisfaction was measured in different ways, and findings were not consistent across studies. Only 6/30 studies reported data for this outcome
Costs	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		⊕○○○ **very low**	Findings were inconsistent. Healthcare resources that were assessed varied among studies, e.g., primary care visits, readmission, length of stay, laboratory services, medica- tion, 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

[a] The evidence was downgraded to moderate as allocation concealment was unclear for 5 of the 15 trials.

[b] The evidence was downgraded because of imprecision in the results due to 2 small trials.

[c] The range excludes length of stay of 45 days reported by Sulch, as this was an outlier.

[d] 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 Comission 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

i) Hospital care costs and use
ii) 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 post-discharge 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).

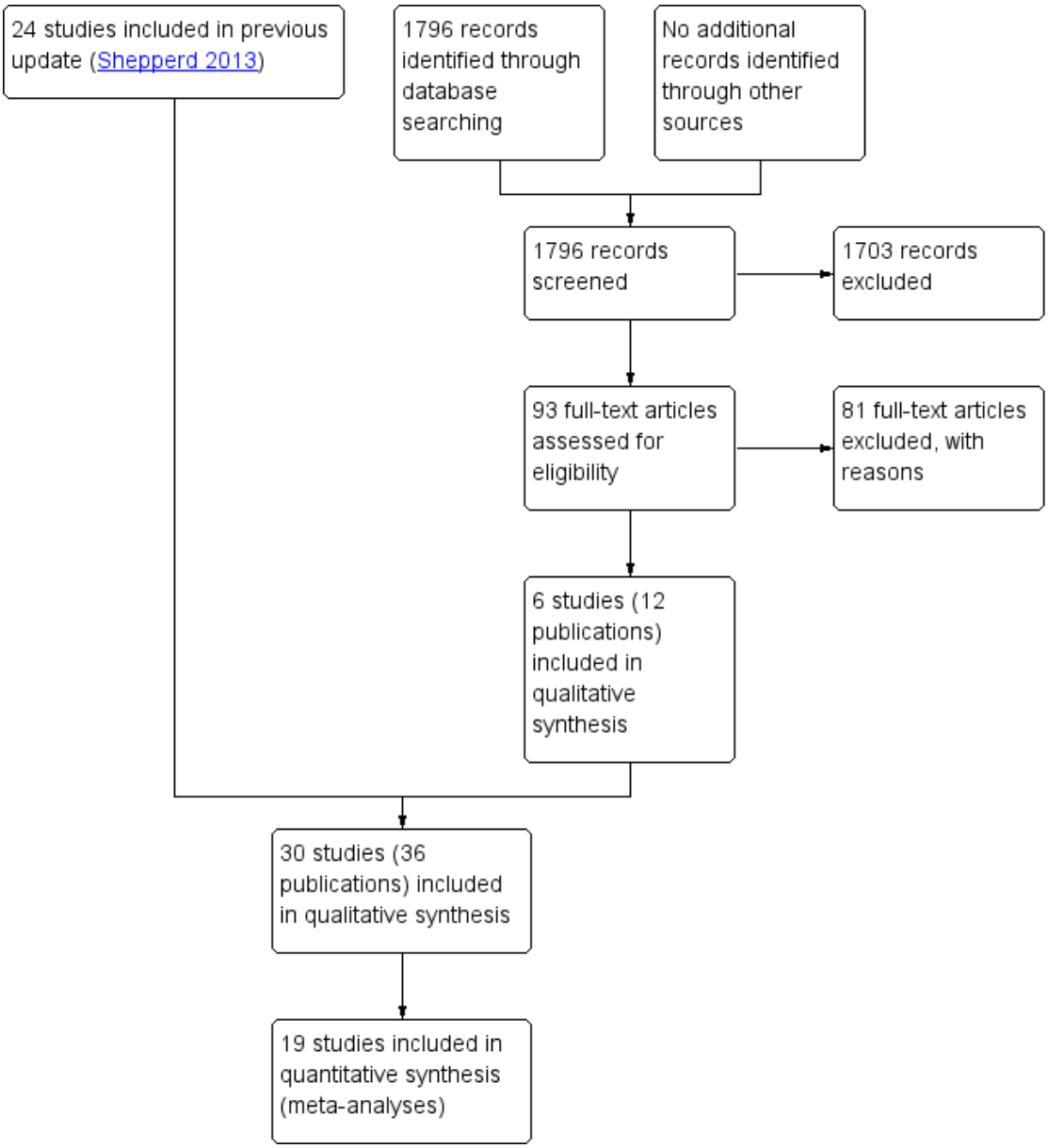
RESULTS

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; Laramee 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 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; Laramee 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; Laramee 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; Laramee 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

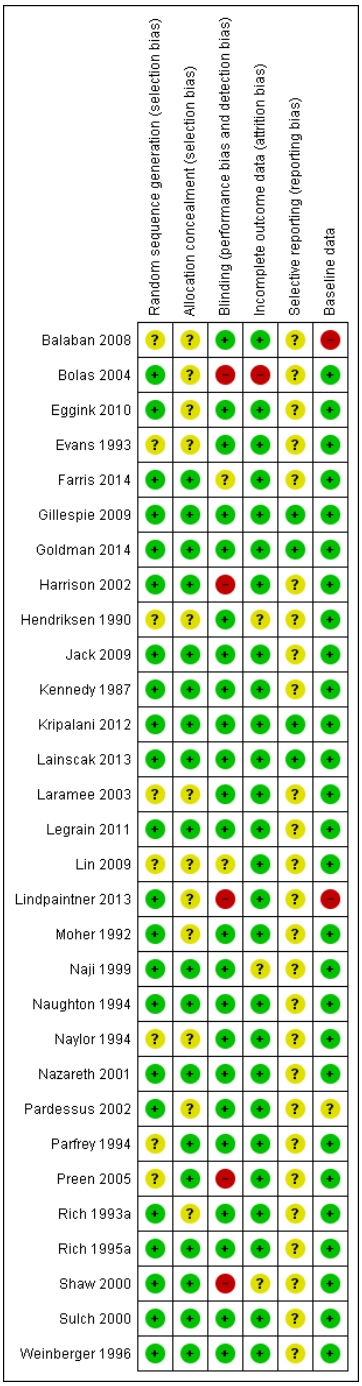
The main reason for excluding trials was due to multifaceted interventions, of which discharge planning was only a minor part. Some trials reported interventions of postdischarge care, whereas for others the control group also received some component of the discharge planning intervention. We excluded 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; Laramee 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.



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; Laramee 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; Laramee 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; Laramee 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; Laramee 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; Laramee 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).

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Balaban 2008

Methods	RCT
Participants	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 Number of patients recruited: T = 47, C = 49 Number with diabetes: T = 12/47, C = 18/49 Number with heart failure: T = 5/47, C = 5/49 Number with COPD: T = 6/47, C = 6/49 Number with depression: T = 23/47, C = 19/49 Number of patients recruited: T = 47, C = 49 Mean age: T = 58 years, C = 54 years Sex (female): T = 27/47 (57.4%), C = 30/49 (61%) Non-English-speaking: T = 19/47 (40%), C = 9/49 (18.4%)
Interventions	**Setting**: a safety net 100 bed community teaching hospital affiliated with Harvard Medical School, USA **Pre-admission assessment**: no **Case finding on admission**: not clear **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 **Implementation of the discharge plan**: 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 **Monitoring phase**: 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 **Control**: 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
Outcomes	Hospital length of stay and readmission rates Follow-up: at 21 and 31 d
Notes	24/120 patients were excluded after randomisation.

Balaban 2008 (*Continued*)

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	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	Patients recruited within 48 h of an emergency or unplanned admission to the medical admissions unit, aged ≥ 55 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 Number of patients recruited: T = 119, C = 124 Mean age: T = 73 years, C = 75 years Sex (female): T = 41/119 (34%), C = 42/124 (34%) Living alone: T = 27/119, C = 34/124
Interventions	**Setting**: Antrim Hospital, a 426-bed district general hospital in Northern Ireland **Pre-admission assessment**: no **Case finding on admission**: not described **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 **Implementation of the discharge plan**: 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 **Monitoring**: medicines helpline

Bolas 2004 (*Continued*)

	Control: standard clinical pharmacy service
Outcomes	Patient satisfaction, knowledge of medicines, hoarding of medicines Readmissions and length of stay data not reported
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	Patients aged ≥ 18 years, with heart failure who were prescribed ≥ 5 medicines at discharge; patients were excluded if living in a nursing home or unable to provide informed consent Number of patients recruited: T = 41, C = 44 Mean age (SD): T = 74 (12), C = 72 (10) Sex (female): T = 14/41 (41%), C = 11/44 (25%)
Interventions	**Setting**: Department of Cardiology in a teaching hospital in Tilburg, Netherlands **Pre-admission assessment**: no **Case finding on admission**: not described **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: the clinical pharmacist identified potential prescription errors in the discharge medication, developed a discharge medication list and discussed with the cardiologist **Implementation of the discharge plan**: patients received verbal and written information about side effects and changes in their hospital drug therapy from a clinical pharmacist at

Eggink 2010 (*Continued*)

	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 **Monitoring:** not described **Control:** 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
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)
Notes	-

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	Patients aged ≥ 70 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 Number of patients recruited: T = 417, C = 418 Mean age: T = 66.6 years, C = 67.9 years
Interventions	**Setting**: Veterans Affairs Hospital, Seattle, USA **Pre-admission assessment**: no **Case finding on admission**: patients screened for risk factors that may prolong length

Evans 1993 (*Continued*)

	of stay, increase risk of readmission, or discharge to a nursing home **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 **Implementation of the discharge plan**: 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. **Monitoring**: not reported **Control**: received discharge planning only if referred by medical staff and usually on the 9^{th} 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	Patients aged ≥ 18 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 ≥ 6 months and without cognitive impairment, dementia or severe psychiatric diagnosis Number of patients recruited: enhanced T = 314, minimum T = 315, C = 316 Mean age (SD): 61.0 (12.2)

Interventions	**Setting**: Academic health centre, Iowa, US **Pre-admission assessment**: no **Case finding on admission:** electronic medical records screened for eligibility, followed by patient screening **Inpatient assessment and preparation of a discharge plan based on individual patient needs:** patients in Minimum and Enhanced Intervention received admission medication reconciliation and pharmacist visits every 2-3 d during inpatient stay for education **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	Patients aged ≥ 80 years, admitted to 2 internal medicine wards; excluded if admitted previously to the study wards during the study period or had scheduled admissions Number of patients recruited: T = 182, C = 186 Mean age (SD): T = 86.6 (4.2), C = 87.1 (14.1) Sex (female): T = 105 (57.7%), C = 111 (59.7%)
Interventions	**Setting**: teaching hospital, Upsalla, Sweden **Pre-admission assessment**: no **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
Notes	-

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 (https://clinicaltrials.gov/show/NCT00661310)

Gillespie 2009 (*Continued*)

Baseline data	Low risk	Baseline data reported

Goldman 2014

Methods	RCT
Participants	Patients aged ≥ 60 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 Number of patients recruited: T = 347, C = 352 Mean age (SD): T = 66.5 years (9.0), C = 66.0 years (9.0) Sex (female): T = 159/347 (46%), C = 145/352 (41%)
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)
Notes	Fidelity assessment conducted to measure which intervention components were delivered Age criterion was changed halfway from ≥ 60 to ≥ 55 years to increase the number of eligible participants Authors provided supplementary data (readmissions and ED visits were presented as an aggregated outcome, access provided to separate outcomes)

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

Goldman 2014 (*Continued*)

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	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 Number of patients recruited: T = 92, C = 100 Mean age (SD): T = 75.5 years (10.4), C = 75.7 years (9.7) Sex (female): T = 43/92 (47%), C = 44/100 (44%)
Interventions	**Setting**: large urban teaching hospital, Ottawa, Canada **Pre-admission assessment**: no **Case finding on admission**: patients' notes were flagged as a signal to the primary nurse to follow a checklist for Transitional Care **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 **Implementation of discharge plan**: from admission to discharge, with telephone outreach within 24 h of discharge **Monitoring**: not reported **Control**: 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
Outcomes	Health-related quality of life, symptom distress and functioning. Emergency room visits and readmissions at 12 weeks

Harrison 2002 (*Continued*)

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
Baseline data	Low risk	Baseline data reported

Hendriksen 1990

Methods	RCT
Participants	Patients aged ≥ 65 years admitted to 4 wards, including surgical Number of patients recruited: T = 135, C = 138 Mean age: T = 76.5 years, C = 76.6 years
Interventions	**Setting**: hospital in suburb of Copenhagen, Denmark **Pre-admission assessment**: no **Case finding on admission**: not reported **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: patients had daily contact with the project nurse who discussed their illness with them and discharge arrangements **Implementation of the discharge plan:** there was liaison between hospital and primary care staff. Project nurse visited patients at home after discharge and could make one repeat visit **Monitoring**: not reported **Control**: described as usual care
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

Hendriksen 1990 (*Continued*)

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

Jack 2009

Methods	RCT
Participants	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 Number of participants recruited: T = 373, C = 376 Mean age (SD): T: 50.1 (15.1), C: 49.6 (15.3) Sex (female): T = 178/373 (48%), C = 200/376 (53%)
Interventions	**Setting**: Large urban safety net hospital with an ethnically diverse patient population; Boston Medical Centre, Massachusetts, USA **Pre-admission assessment**: no **Case finding on admission**: the nurse discharge advocate (DA) completed the (re-engineered discharge) RED intervention components **Inpatient assessment and preparation of a discharge plan based on individual patient needs:** 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 **Implementation of the discharge plan**: 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) **Monitoring phase:** 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 Additional information on the intervention available at www.bu.edu/fammed/projectred/index.html **Control:** usual care
Outcomes	Readmission, patient satisfaction and cost
Notes	Readmission data obtained from the authors

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
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) All outcomes	Low risk	Research staff doing follow-up telephone calls and reviewing hospital records were blinded to study group assignment
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	**Setting**: 500-bed, non-profit acute care teaching hospital, Texas, USA **Pre-admission assessment**: no **Case finding on admission**: not reported **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: discharge planning emphasised communication with the patient and fam-

Kennedy 1987 (*Continued*)

	ily. 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 **Implementation of the discharge plan**: by the primary nurse and other members of the healthcare team. A follow-up visit was made to assess discharge placement **Monitoring**: not reported **Control**: 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) All outcomes	Low risk	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

Kripalani 2012

Methods	RCT
Participants	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 Number recruited: T = 423, C = 428 Mean age (SD): T = 61 years (14.4), C = 59 years (13.8) Sex (female): T = 173/423 (41%), C = 179/428 (42%)
Interventions	**Setting**: Tertiary care academic hospitals, Nashville and Boston, US **Pre-admission assessment**: no **Case finding on admission**: not reported

	Inpatient assessment and preparation of a discharge plan based on individual patient needs: at the first meeting, the pharmacist assessed the patient's understanding and needs, communicating with the treating physician if medication discrepancies were identified **Implementation of the discharge plan**: 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 **Monitoring**: 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 **Control**: 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)
Outcomes	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
Notes	-

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
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	Patients admitted with COPD exacerbation with reduced pulmonary function, aged ≥ 35 years, not at terminal stages of disease Number recruited: T = 118, C = 135 Mean age (SD): T = 71 years (9), C = 71 years (9) Sex (female): T = 37/118 (31%), C = 34/135 (25%) Living alone: T = 29 (25%), C = 27 (20%)
Interventions	**Setting**: specialised pulmonary hospital, Slovenia **Pre-admission assessment**: no **Case finding on admission**: not reported **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: the discharge coordinator assessed patient and home care needs, involving both the patient and the care giver **Implementation of the discharge plan**: 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 **Monitoring:** 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 **Control**: 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
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
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	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 ≥ 4 hospitalisations in the past 5 years Number recruited: T = 141, C = 146 Mean age (SD): T = 70.6 years (11.4), C = 70.8 years (12.2) Sex (female) T = 59/141 (42%), C = 72/146 (50%) Support at home: T = 127/141 (90%), C = 140/146 (96%)
Interventions	**Setting**: 550-bed academic medical centre, which serves the largely rural geographic areas of Vermont and upstate New York, USA **Pre-admission assessment**: no **Case finding on admission**: no **Inpatient assessment and preparation of a discharge plan based on individual patient needs:** early discharge planning and co-ordination of care and individualised and comprehensive patient and family education **Implementation of the discharge plan**: case manager (CM) assisted in the co-ordination of care by facilitating the discharge plan and obtaining needed consultations from social services, dietary services 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

Laramee 2003 (*Continued*)

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%) 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 man-

	agement 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	-

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	Patients hospitalised with a hip fracture, aged ≥ 65 years, who had a Barthel score of at least 70 points prior to their hip fracture Number of patients recruited: T = 26; C = 24 Sex (female): 18/50 (36%) Mean age (SD): 78.8 years (7.0)
Interventions	**Setting**: 4 orthopaedic wards in a 2800 bed medical centre in Taipei, Taiwan **Pre-admission assessment**: no **Case finding on admission**: no **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: structured assessment of discharge planning needs within 48h of admission; systematic individualised nursing instruction based on the individual's needs **Implementation of the discharge plan**: nurses coordinated resources and arranged referral placements. 2 postdischarge home visits were conducted to provide support and consultation **Monitoring**: nurses monitored services **Control**: non-structured discharge planning provided by nurses who used their professional judgement
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	Patients aged ≥ 18 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 > 1 month, German-speaking, no cognitive impairment; excluded if PCP or local visiting nurse association not involved in the study Number of patients recruited: T = 30, C = 30 Mean age (SD): T = 75.1 years (9.49), C = 75.2 (12.4) Sex (female): T = 15/30 (50%), C = 19/30 (63%)
Interventions	**Setting**: teaching hospital in Baden, Switzerland **Pre-admission assessment**: no **Case finding on admission**: all patients admitted to hospital were screened for eligibility **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: the nurse care manager assessed patients with a battery of tests **Implementation of the discharge plan**: 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 **Monitoring**: structured call 24 h postdischarge and home visit at the end of the intervention **Control**: best usual care (no additional information provided)
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

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

Moher 1992

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

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
Baseline data	Low risk	Baseline data reported

Naji 1999

Methods	RCT
Participants	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 Number of patients recruited: T = 168, C = 175 Mean age (SD): T = 40 (12), C = 41 (12.8) Sex (female): T = 83/168 (49%), C = 80/175 (46%)
Interventions	**Setting**: Acute psychiatric wards, Aberdeen, Scotland **Pre admission assessment**: no **Case finding on admission**: no **Inpatient assessment and preparation of a discharge plan based on individual patient need**: not clear **Implementation of the discharge plan**: 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 **Monitoring**: no **Control**: 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
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
Baseline data	Low risk	Baseline data collected on day of discharge: baseline completion T = 132/168 (79%), C = 133/175 (76%)

Naughton 1994

Methods	RCT
Participants	Patients aged ≥ 70 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 Number of patients recruited: T = 51, C = 60 Mean age (SD): T = 80.1 years (6.6), C = 80.1 years (6.4) Sex (female): T = 25/51 (49%), C = 38/60 (63%)
Interventions	**Setting**: private, non-profit, academic medical centre, Chicago, USA **Pre-admission assessment**: no **Case finding on admission**: not clear **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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. **Implementation of the discharge plan**: 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 **Monitoring**: not reported **Control**: received 'usual care' by medical house staff and an attending physician. Social workers and discharge planners were available on request
Outcomes	Hospital length of stay, discharge destination, health service costs
Notes	Intervention implemented at time of admission

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
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
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

Naughton 1994 (*Continued*)

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	Patients aged ≥ 70 years, admitted to medical ward and cardiac surgery, English-speaking, alert and orientated at admission, and able to use telephone after discharge Number of patients recruited: T = 140, C = 136 Mean age (SD): 76 years
Interventions	**Setting**: Hospital of the University of Pennsylvania, USA **Pre-admission assessment**: no **Case finding on admission**: not clear **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 **Implementation of the discharge plan**: implemented by geriatric nurse specialist and extended from admission to 2 weeks postdischarge with ongoing evaluation of the effectiveness of the discharge plan **Monitoring**: not reported **Control**: received the routine discharge planning available in the hospital
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) All outcomes	Low risk	All patients included in the final sample accounted for
Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information

Naylor 1994 (*Continued*)

Baseline data	Low risk	Baseline data reported

Nazareth 2001

Methods	RCT
Participants	Patients aged ≥ 75 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 Number of patients recruited: T = 181, C = 181 Mean age (SD): 84 years (5.2) Sex (female): T = 112/181 (62%), C = 119/181 (66%)
Interventions	**Setting**: Three acute and one long-stay hospital, London, UK **Pre-admission assessment**: no **Case finding on admission**: not clear **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 Follow-up visit by community hospital at 7-14 d after discharge to check medication and intervene if necessary. Subsequent visits arranged if appropriate **Implementation of the discharge plan**: a copy of the discharge plan was given to the patient, care giver, community pharmacist and GP **Monitoring**: follow-up in the community by a pharmacist **Control**: 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
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
Blinding (performance bias and detection bias) All outcomes	Low risk	Blinding of objective outcomes

Nazareth 2001 (*Continued*)

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	Patients aged ≥ 65, hospitalised for falling and able to return home; excluded if cognitively impaired (MM < 24), did not have a phone, lived further away than 30 km, or if the falls were secondary to cardiac, neurologic, vascular, or therapeutic problems Number recruited: T = 30, C = 30 Age (SD): T = 83.5 years (9.1), C = 82.9 years (6.3) Sex (female): T = 23/30 (76%), C = 24/30 (80%)
Interventions	**Setting**: acute geriatric department in les Bateliers Hospital; Lille, France **Pre-admission assessment**: no **Case finding on admission**: all admitted patients during the trial period were screened for inclusion and exclusion criteria. Baseline information obtained at beginning of hospitalisation **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 **Implementation of the discharge plan:** 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 **Monitoring**: telephone follow-up was conducted by an occupational therapist to check if the home modifications were completed and assist if necessary **Control**: received physical therapy and were informed of home safety and social assistance if required. No home visit
Outcomes	Functional status, falls, readmissions, mortality and residential care at 6 and 12 months
Notes	Intervention includes pre-discharge home visits

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Random number table

Pardessus 2002 (*Continued*)

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	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 ≥ 85 years Number of patients recruited: hospital A: T = 421, C = 420; hospital B: T = 375, C = 384 Mean age (SD): hospital A: T = 53 years (19), C = 53 years (18); hospital B: T = 56 years (18), C = 56 years (18) Sex (female): hospital A: T = 188/421 (45%), C = 184/420 (44%); hospital B: T = 217/374 (58%), C = 210/384 (55%)
Interventions	**Setting**: 2 academic hospitals, Newfoundland, Canada **Pre-admission assessment**: no **Case finding on admission**: developed a questionnaire to identify patients requiring discharge planning **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 **Implementation of the discharge plan**: referrals to allied health professionals following completion of the questionnaire for discharge planning **Monitoring**: not reported **Control**: did not receive the questionnaire; discharge planning occurred if the discharge planning nurses identified a patient or received a referral
Outcomes	Hospital length of stay at 6 and 12 months
Notes	Also validated an instrument to assess high-risk patients Intervention implemented at time of admission
Risk of bias	

Parfrey 1994 (*Continued*)

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	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 Number of patients recruited: T = 91, C = 98 Mean age (SD): T = 74.8years (6.7), C = 75.4 (7.9) years Sex: (female): T = 57/91 (62%), C = 58/98 (59%)
Interventions	**Setting**: 2 tertiary hospitals in Western Australia **Pre-admission assessment**: no **Case finding on admission**: no **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 **Implementation of the discharge plan**: 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 **Monitoring**: 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 **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

Preen 2005 (*Continued*)

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	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 Number of patients recruited: T = 63, C = 35 Mean age (SD): T = 80.0 years (6.3), C = 77.3 years (6.1) Sex (female): T = 38/63 (60%), C = 20/35 (57%) Ethnicity: number white T = 29/63, C = 20/35
Interventions	**Setting**: Jewish Hospital at Washington University Medical Centre, USA **Pre-admission assessment**: yes **Case finding on admission**: screened for CHF and stratified into readmission risk categories **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 **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,

Rich 1993a (*Continued*)

	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	-

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
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	Patients aged ≥ 70 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 Number recruited: T = 142, C = 140 Mean age (SD): T = 80.1 years (5,9), C = 78.4 years (6.1)

	Sex (female): T = 96/142 (68%), C = 83/140 (59%) 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 though 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	-

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 Number of patients recruited: T = 51, C = 46 Mean age (SD): 47 (17) Sex (female): 61 (63%)
Interventions	**Setting**: psychiatric hospital in South Glasgow, Scotland **Pre-admission assessment**: no **Case finding on admission**: no **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 **Implementation of the discharge plan**: a pharmacy discharge plan was supplied to the patients' community pharmacist for the intervention group **Monitoring**: not clear **Control**: care not described
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
Participants	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 Number recruited: integrated care pathway (ICP) = 76, multidisciplinary team (MDT) = 76 Mean age (SD): ICP = 75 (11) years, MDT = 74 (10) years
Interventions	**Setting**: stroke rehabilitation unit at a teaching hospital in London, UK **Pre-admission assessment**: no **Case finding on admission**: no **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: rehabilitation and discharge planning, with regular review of discharge plan **Implementation of the discharge plan**: senior nurse implemented the ICP. Multidisciplinary training preceded implementation of the ICP. ICP was piloted for 3 months prior to recruitment to the trial. **Monitoring**: not reported **Control**: 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
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	-

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
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	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 Number of patients recruited: T = 695, C = 701 Mean age (SD): T = 63.0 years (11.1), C = 62.6 years (10.9) Sex (female): T = 7/695 (1%), 14/701 (2%)
Interventions	**Setting**: 9 Veterans Affairs hospitals, USA **Pre-admission assessment**: no **Case finding on admission**: no **Inpatient assessment and preparation of a discharge plan based on individual patient needs**: 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 **Implementation of the discharge plan**: 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 **Monitoring**: not reported **Control**: did not have access to the primary care nurse and received no supplementary education or assessment of needs beyond usual care
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

Weinberger 1996 (*Continued*)

Selective reporting (reporting bias)	Unclear risk	Not able to judge from available information
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
Applegate 1990	RCT: discharge planning plus geriatric assessment unit
Brooten 1987	Discharge planning plus home care package
Brooten 1994	Discharge planning plus home care package plus counselling
Carty 1990	Early postpartum hospital discharge
Casiro 1993	Intervention: discharge planning plus home care package
Choong 2000	Intervention: clinical pathway for patients with a fractured neck of femur, discharge planning is not described
Cossette 2015	Intervention is focused on decreasing the number of emergency room visits, not discharge planning
Donahue 1994	Intervention discharge planning plus postdischarge care package
Dudas 2001	Intervention is focused on telephone follow-up, not discharge planning. Randomised to groups after discharge from hospital
Englander 2014	Transitional care intervention; the only element of discharge planning was primary care-medical home linkage
Epstein 1990	RCT: consultative geriatric assessment and limited follow-up
Fretwell 1990	RCT: consultative inpatient multidisciplinary team care

(*Continued*)

Gayton 1987	Controlled trial: inpatient geriatric consultation team
Germain 1995	Geriatric assessment and intervention team
Gillette 1991	Hospital-based case management team for neonatal intensive care
González-Guerrero 2014	Control group given the same manual as intervention group at discharge
Haggmark 1997	Study design not clear
Hansen 1992	RCT: follow-up home visits
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
Landefield 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

(*Continued*)

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

NCT02202096 (*Continued*)

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 ≥ 18 years, medicine diagnosis, discharged home, ≥ 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
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 ≥ 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	-

NCT02351648 (*Continued*)

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 ≥ 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 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 ≥ 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

NCT02421133 (*Continued*)

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]

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

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

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
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]

Comparison 5. Effect of discharge planning on mortality

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Mortality at 6 to 9 months	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]
2 Mortality for trials recruiting both patients with a medical condition and those recovering from surgery			Other data	No numeric data
3 Mortality at 12 months			Other data	No numeric data

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

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

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]

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

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 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.

Review: Discharge planning from hospital

Comparison: 1 Effect of discharge planning on hospital length of stay

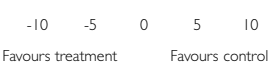
Outcome: 1 Hospital length of stay - older patients with a medical condition

Study or subgroup	Discharge planning N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Kennedy 1987	39	7.8 (0)	41	9.7 (0)			Not estimable
Moher 1992	136	7.43 (6.33)	131	9.4 (8.97)		10.5 %	-1.97 [-3.84, -0.10]
Naughton 1994	51	5.4 (5.5)	60	7 (7)		6.8 %	-1.60 [-3.93, 0.73]
Naylor 1994	72	7.4 (3.8)	66	7.5 (5.2)		15.6 %	-0.10 [-1.63, 1.43]
Harrison 2002	92	7.59 (8.36)	100	7.67 (7.99)		6.8 %	-0.08 [-2.40, 2.24]
Rich 1993a	63	4.3 (8.8)	35	5.7 (12)		1.8 %	-1.40 [-5.93, 3.13]
Rich 1995a	142	3.9 (10)	140	6.2 (11.4)		5.8 %	-2.30 [-4.80, 0.20]
Preen 2005	91	11.6 (5.7)	98	12.4 (7.4)		10.4 %	-0.80 [-2.68, 1.08]
Sulch 2000	76	50 (19)	76	45 (23)		0.8 %	5.00 [-1.71, 11.71]
Laramee 2003	131	5.5 (3.5)	125	6.4 (5.2)		30.8 %	-0.90 [-1.99, 0.19]
Lindpaintner 2013	30	12.2 (6.7)	30	12.4 (5.7)		3.7 %	-0.20 [-3.35, 2.95]
Gillespie 2009	182	11.9 (13)	186	10.5 (9.3)		6.9 %	1.40 [-0.91, 3.71]
Total (95% CI)	**1105**		**1088**			**100.0 %**	**-0.73 [-1.33, -0.12]**

Heterogeneity: Chi^2 = 11.04, df = 10 (P = 0.35); I^2 =9%

Test for overall effect: Z = 2.35 (P = 0.019)

Test for subgroup differences: Not applicable



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

Review: Discharge planning from hospital

Comparison: 1 Effect of discharge planning on hospital length of stay

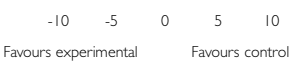
Outcome: 2 Sensitivity analysis imputing missing SD for Kennedy trial

Study or subgroup	Discharge planning		Control		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Fixed,95% CI		IV,Fixed,95% CI
Harrison 2002	92	7.59 (8.36)	100	7.67 (7.99)		6.7 %	-0.08 [-2.40, 2.24]
Kennedy 1987	39	7.8 (3.8)	41	9.7 (5.2)		9.1 %	-1.90 [-3.89, 0.09]
Laramee 2003	131	5.5 (3.5)	125	6.4 (5.2)		30.1 %	-0.90 [-1.99, 0.19]
Lindpaintner 2013	30	12.2 (6.7)	30	12.4 (5.7)		3.6 %	-0.20 [-3.35, 2.95]
Moher 1992	136	7.43 (6.33)	131	9.4 (8.97)		10.3 %	-1.97 [-3.84, -0.10]
Naughton 1994	51	5.4 (5.5)	60	7 (7)		6.6 %	-1.60 [-3.93, 0.73]
Naylor 1994	72	7.4 (3.8)	66	7.5 (5.2)		15.3 %	-0.10 [-1.63, 1.43]
Preen 2005	91	11.6 (5.7)	98	12.4 (7.4)		10.2 %	-0.80 [-2.68, 1.08]
Rich 1993a	63	4.3 (8.8)	35	5.7 (12)		1.7 %	-1.40 [-5.93, 3.13]
Rich 1995a	142	3.9 (10)	140	6.2 (11.4)		5.7 %	-2.30 [-4.80, 0.20]
Sulch 2000	76	50 (19)	76	45 (23)		0.8 %	5.00 [-1.71, 11.71]
Total (95% CI)	**923**		**902**			**100.0 %**	**-0.98 [-1.57, -0.38]**

Heterogeneity: Chi^2 = 8.47, df = 10 (P = 0.58); I^2 =0.0%

Test for overall effect: Z = 3.20 (P = 0.0014)

Test for subgroup differences: Not applicable



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

Review: Discharge planning from hospital

Comparison: 1 Effect of discharge planning on hospital length of stay

Outcome: 3 Hospital length of stay - older surgical patients

Study or subgroup	Discharge planning N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Naylor 1994	68	15.8 (9.4)	66	14.8 (8.3)		15.2 %	1.00 [-2.00, 4.00]
Lin 2009	26	6.04 (2.41)	24	6.29 (2.17)		84.8 %	-0.25 [-1.52, 1.02]
Total (95% CI)	**94**		**90**			**100.0 %**	**-0.06 [-1.23, 1.11]**

Heterogeneity: $Chi^2 = 0.57$, df = 1 (P = 0.45); $I^2 = 0.0\%$

Test for overall effect: Z = 0.10 (P = 0.92)

Test for subgroup differences: Not applicable

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.

Review: Discharge planning from hospital

Comparison: 1 Effect of discharge planning on hospital length of stay

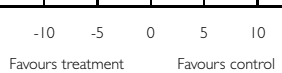
Outcome: 4 Hospital length of stay - older medical and surgical patients

Study or subgroup	Discharge planning N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Weight	Mean Difference IV,Fixed,95% CI
Hendriksen 1990	135	11 (0)	138	14.3 (0)			Not estimable
Evans 1993	417	11.9 (12.7)	418	12.5 (13.5)		100.0 %	-0.60 [-2.38, 1.18]
Total (95% CI)	**552**		**556**			**100.0 %**	**-0.60 [-2.38, 1.18]**

Heterogeneity: not applicable

Test for overall effect: Z = 0.66 (P = 0.51)

Test for subgroup differences: Not applicable



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

Review: Discharge planning from hospital

Comparison: 2 Effect of discharge planning on unscheduled readmission rates

Outcome: 1 Within 3 months of discharge from hospital

Study or subgroup	Treatment n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 Unscheduled readmission for those with a medical condition					
Balaban 2008	4/47	4/49		0.6 %	1.04 [0.28, 3.93]
Farris 2014	49/281	47/294		7.6 %	1.09 [0.76, 1.57]
Goldman 2014	89/347	77/351		12.6 %	1.17 [0.90, 1.53]
Harrison 2002	23/80	31/77		5.2 %	0.71 [0.46, 1.11]
Jack 2009	47/370	59/368		9.8 %	0.79 [0.56, 1.13]
Kennedy 1987	11/39	14/40		2.3 %	0.81 [0.42, 1.55]
Lainscak 2013	25/118	43/135		6.6 %	0.67 [0.43, 1.02]
Laramee 2003	49/131	46/125		7.8 %	1.02 [0.74, 1.40]
Legrain 2011	64/317	99/348		15.6 %	0.71 [0.54, 0.93]
Moher 1992	22/136	18/131		3.0 %	1.18 [0.66, 2.09]
Naylor 1994	11/72	11/70		1.8 %	0.97 [0.45, 2.10]
Nazareth 2001	64/164	69/176		11.0 %	1.00 [0.76, 1.30]
Rich 1993a	21/63	16/35		3.4 %	0.73 [0.44, 1.20]
Rich 1995a	41/142	59/140		9.8 %	0.69 [0.50, 0.95]
Shaw 2000	5/51	12/46		2.1 %	0.38 [0.14, 0.99]
Subtotal (95% CI)	**2358**	**2385**	◆	**99.2 %**	**0.87 [0.79, 0.97]**
Total events: 525 (Treatment), 605 (Control)					
Heterogeneity: Chi^2 = 19.52, df = 14 (P = 0.15); I^2 =28%					
Test for overall effect: Z = 2.65 (P = 0.0080)					
2 Older people admitted to hospital following a fall					
Lin 2009	2/26	2/24		0.3 %	0.92 [0.14, 6.05]
Pardessus 2002	5/30	3/30		0.5 %	1.67 [0.44, 6.36]

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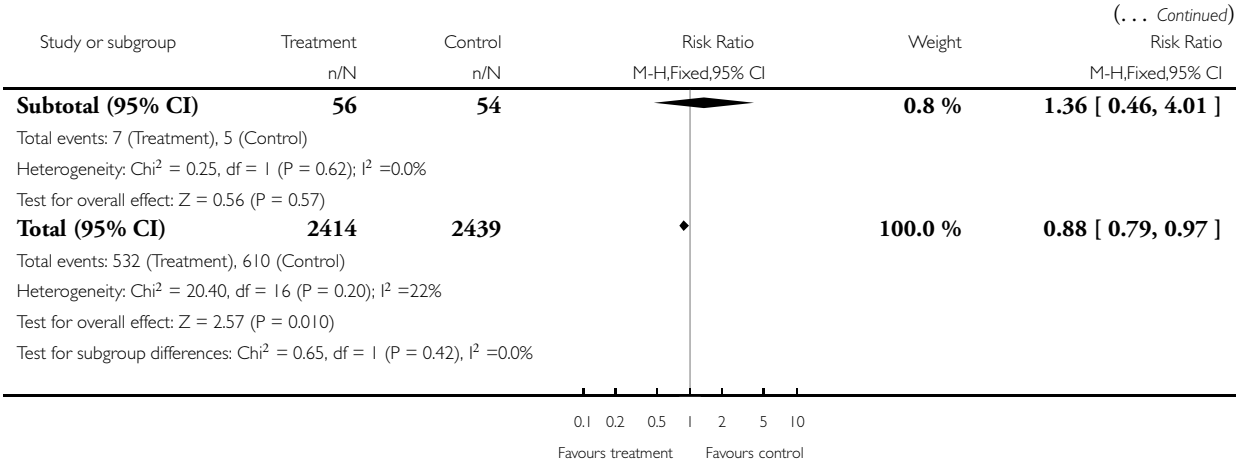


Analysis 2.2. Comparison 2 Effect of discharge planning on unscheduled readmission rates, Outcome 2 Patients with medical or surgical condition.

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%)	-

Patients with a medical condition (*Continued*)

	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 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

Patients with a medical condition (*Continued*)

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.

Patients who have had surgery

Study	**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.

Patients with a mental health diagnosis

Study	**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

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

Patients with a medical condition

Study	**Days in hospital**	**Notes**
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.

Patients with a medical or surgical condition

Study	**Days in hospital**	**Notes**
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	**Days to first readmission** 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.

Patients with a surgical condition

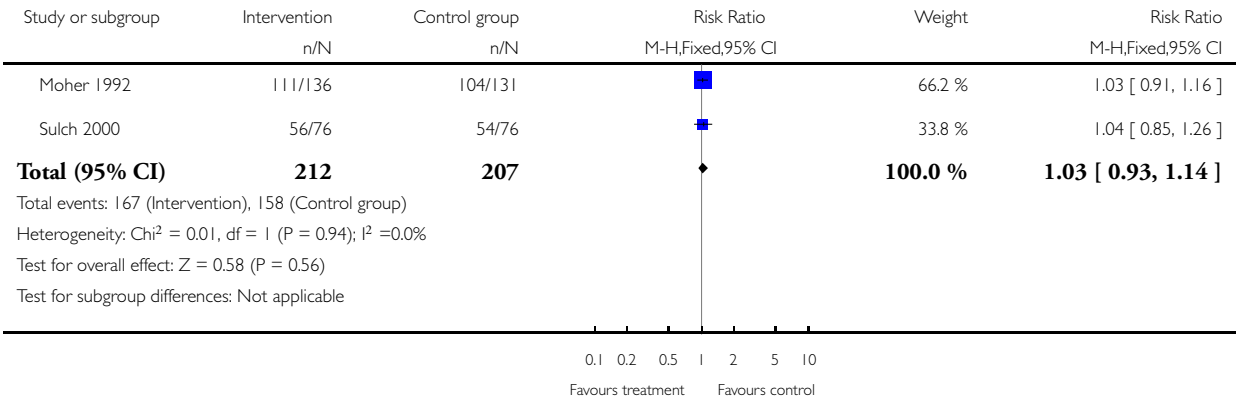
Study	**Days in hospital**	**Notes**
Naylor 1994	Surgical readmission days 2 weeks: T = 34 d (n = 68), C = 32 d (n = 66) Difference 2 d; 95% CI − 13 to 17 2 to 6 weeks: T = 63 (n = 68), C = 52 (n = 66) Difference 11 d; 95% CI − 20 to 52 6 to 12 weeks: T = 52 (n = 68), C = 26 (n = 66) Difference 26 d;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

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

Review: Discharge planning from hospital

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.

Patients with a medical condition

Study	**Place of discharge**	**Notes**
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%	-

Patients with a medical condition (*Continued*)

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.

Patients with a medical or surgical condition

Study	**Place of discharge**	**Notes**
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.

Review: Discharge planning from hospital

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

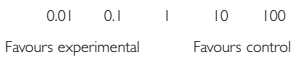
Study or subgroup	Discharge planning n/N	Control group n/N	Odds Ratio M-H,Fixed,95% CI	Weight	Odds Ratio M-H,Fixed,95% CI
Pardessus 2002	7/30	12/30		100.0 %	0.46 [0.15, 1.40]
Total (95% CI)	**30**	**30**		**100.0 %**	**0.46 [0.15, 1.40]**

Total events: 7 (Discharge planning), 12 (Control group)

Heterogeneity: not applicable

Test for overall effect: Z = 1.37 (P = 0.17)

Test for subgroup differences: Not applicable



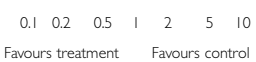
Analysis 5.1. Comparison 5 Effect of discharge planning on mortality, Outcome 1 Mortality at 6 to 9 months.

Review: Discharge planning from hospital

Comparison: 5 Effect of discharge planning on mortality

Outcome: 1 Mortality at 6 to 9 months

Study or subgroup	Treatment n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
1 Older people with a medical condition					
Goldman 2014	10/347	6/351		4.3 %	1.69 [0.62, 4.59]
Lainscak 2013	11/118	13/135		8.7 %	0.97 [0.45, 2.08]
Laramee 2003	13/131	15/125		11.0 %	0.83 [0.41, 1.67]
Legrain 2011	56/317	65/348		44.4 %	0.95 [0.68, 1.31]
Nazareth 2001	22/137	19/151		12.9 %	1.28 [0.72, 2.25]
Rich 1995a	13/142	17/140		12.3 %	0.75 [0.38, 1.49]
Sulch 2000	10/76	6/76		4.3 %	1.67 [0.64, 4.36]
Subtotal (95% CI)	**1268**	**1326**		**97.9 %**	**1.02 [0.82, 1.27]**



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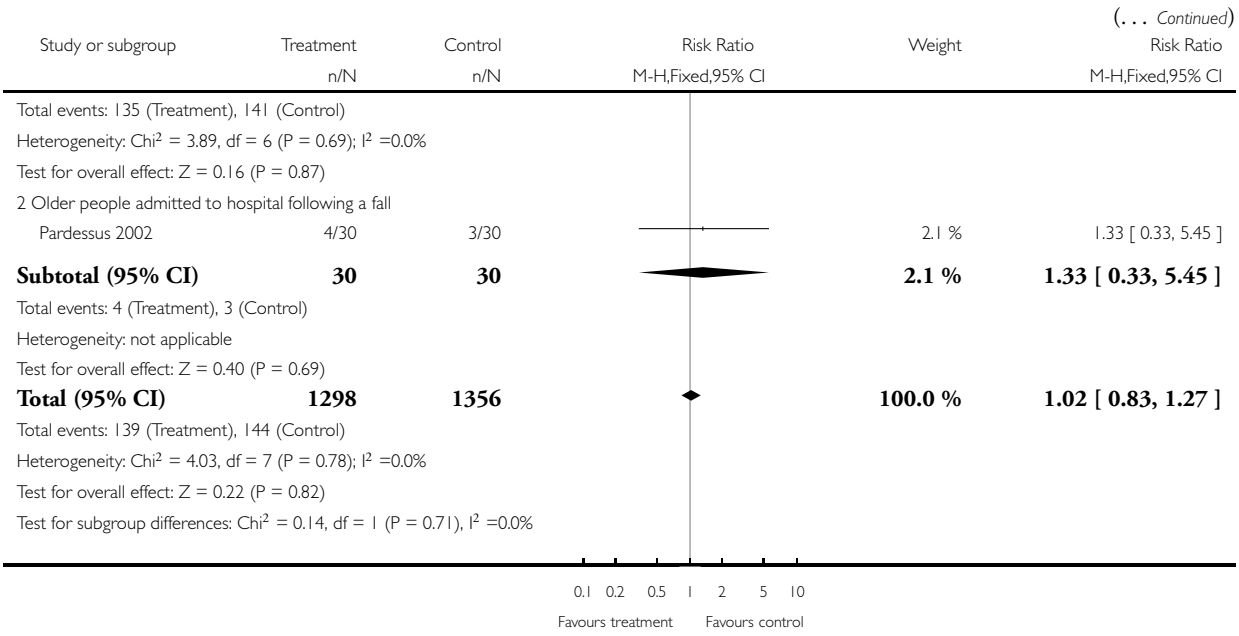


Analysis 5.2. Comparison 5 Effect of discharge planning on mortality, Outcome 2 Mortality for trials recruiting both patients with a medical condition and those recovering from surgery.

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.

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%	

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

Patient-reported outcomes: Patients with a medical condition

Study	Patient health outcomes	Notes
Harrison 2002	**SF-36** 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 **Minnesota Living with Heart Failure Questionnaire (MLHFQ)** 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	**St. George's Respiratory Questionnaire (SGRQ)** 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: • Mental status • Perception of health • Self-esteem • Affect Not possible to calculate exact P value

Patient-reported outcomes: Patients with a medical condition (*Continued*)

Nazareth 2001	**General well-being questionnaire**: 1 = ill health, 5 = good health 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	-
Preen 2005	SF-12 (N not reported for follow-up) Mental component score Predischarge score: T = 37.4 SD 5.4 C = 39.8 SD 6.1 7 d postdischarge: T = 42.4 SD 5.6 C = 40.9 SD 5.7 Physical component score Predischarge score: T = 27.8 SD 4.8 C = 28.3 SD 4.7 7 d postdischarge: T = 27.2 SD 4.5 C = 27.2 SD 4.1	-
Rich 1995a	**Chronic Heart Failure Questionnaire** Treatment N = 67, Control N = 59 Total score 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 Dyspnoea 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) Fatigue 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) Emotional function At baseline:	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

	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) Environmental mastery 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)	
Sulch 2000	**Barthel activities of daily living** 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 **Rankin score** Median score At 4 weeks: T = 1, C = 1 At 12 weeks: T = 3, C = 3 At 26 weeks: T = 3, C = 3 **Hospital anxiety and depression scale** Anxiety Median scores At 4 weeks: T = 5, C = 5 At 12 weeks: T = 4, C = 4 At 26 weeks T = 4, C = 4 Depression Median scores At 4 weeks: T = 6, C = 5 At 12 weeks: T = 5, C = 5 At 26 weeks: T = 5, C = 5 **EuroQol** At 4 weeks: T = 41, C = 44 Median scores	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 (*Continued*)

	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	**OARS Multidimensional Functional Assessment Questionnaire** (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	**SF 36** Mean (SD) *Physical aspects* 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 *Physical functioning* 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 *Role physical* 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 *Bodily pain* 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 *General health perceptions* 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	-

Patient-reported outcomes: Patients with a surgical condition (*Continued*)

	Mental aspects 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 *Mental health* 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 *Role emotion* 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 *Social functioning* 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 *Vitality* 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	**Functional Autonomy Measurement System (SMAF)** 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 **Katz ADL** 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 **IADL**	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)

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

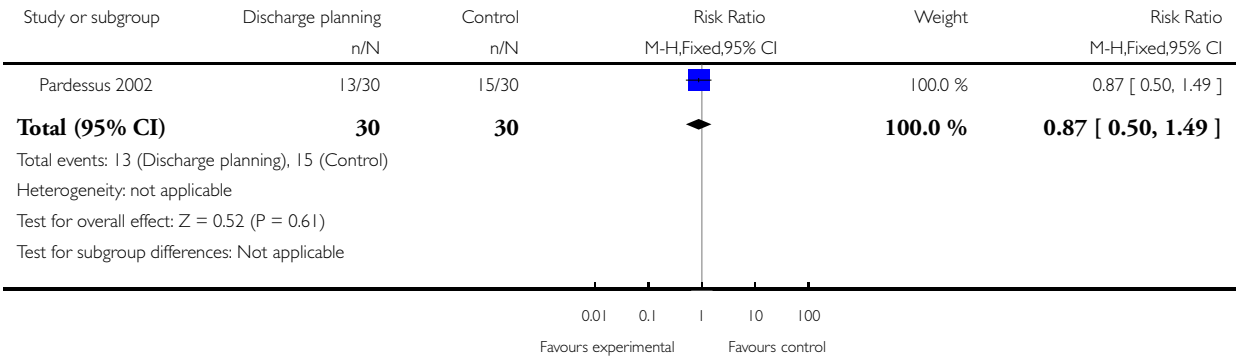
	At 6 months: Mean scores T = 2.41 ± 0.20, C = 2.96 ± 0.18 At 12 months: T = 2.24 ± 0.19, C = 3.14 ± 0.16	

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.

Review: Discharge planning from hospital

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.

Patient-reported outcomes: Patients with a mental health diagnosis

Study	**Patient health outcomes**	**Notes**
Naji 1999	Hospital Anxiety Depression Scale 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 Behavioural and Symptom Identification Scale Relation to self/other	-

Patient-reported outcomes: Patients with a mental health diagnosis (*Continued*)

	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	

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

Satisfaction

Study	**Satisfaction**	**Notes**
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 Patients: T = 1 (1-2), C = 1 (1-2) Carers: T = 1 (1-2), C = 2 (1-3)	4-point Likert-scale, lower scores indicate higher satisfaction
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 treat-

Satisfaction (*Continued*)

		ment 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
Professional's satisfaction		
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

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

Patients with a medical condition

Study	**Costs**	**Notes**
Gillespie 2009	*Total* T: USD 12000; C: USD 12500 Mean difference: − USD 400 (− USD 4000 to USD 3200) *Visits to ED* T: USD 160; C: USD 260 Mean difference: − USD 100 (− USD 220 to − USD 10) *Readmissions*	Costs calculated for 2008

	T: USD 12000; C: USD 12300 Mean difference: − USD 300 (− USD 3900 to USD 3300)	
Laramee 2003	*Total inpatient and outpatient median costs* T = USD 15,979 C = USD 18,662 P = 0.14	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	-	Number: T = 51, C = 60 Total cost of hospital care including breakdown of costs for laboratory, diagnostic imaging, pharmacy and rehabilitation services
Naylor 1994	*Initial stay mean charges* (USD): T = 24,352 ± 15,920 (n = 72) C = 23,810 ± 18,449 (n = 70) Difference 542 (CI − 5121 to 6205) *Medical readmission total charges in* USD (CIs are in thousands): At 2 weeks: T = 68,754 C = 239,002 Difference = − 170,247 (CI − 253 to − 87) 2-6 weeks: T = 52,384 C = 189,892 Difference = − 137,508 (CI − 210 to − 67) 6-12 weeks: T = 471,456 C = 340,496 Difference = 130,960 (CI − 205 to 467)	Charge data were used to calculate the cost of the initial hospitalisation 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 Total charges including readmission charges (first readmission only if multiple readmissions)
Rich 1995a	*Intervention cost* USD 216 per patient *Caregiver cost* T = USD 1164, C = USD 828 Difference USD 336 *Other medical care* T = USD 1257, C = USD 1211 Difference USD 46 *Readmission costs* T = USD 2178, C = USD 3236	-

Patients with a medical condition (*Continued*)

	Difference − USD 1058 *All costs* T = USD 4815, C = USD 5275 Difference − USD 460	

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

Patients with a surgical condition

Study	**Costs**	**Notes**
Naylor 1994	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) 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)	Charge data were used to calculate the cost of the initial hospitalisation Total charges including readmission charges (first readmission only if multiple readmissions) 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

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

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.

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	-

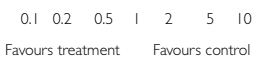
Analysis 8.5. Comparison 8 Effect of discharge planning on hospital care costs, Outcome 5 Hospital outpatient department attendance.

Review: Discharge planning from hospital

Comparison: 8 Effect of discharge planning on hospital care costs

Outcome: 5 Hospital outpatient department attendance

Study or subgroup	Treatment n/N	Control n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Nazareth 2001	39/137	40/151		100.0 %	1.07 [0.74, 1.56]
Total (95% CI)	**137**	**151**		**100.0 %**	**1.07 [0.74, 1.56]**
Total events: 39 (Treatment), 40 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.38 (P = 0.71)					
Test for subgroup differences: Not applicable					

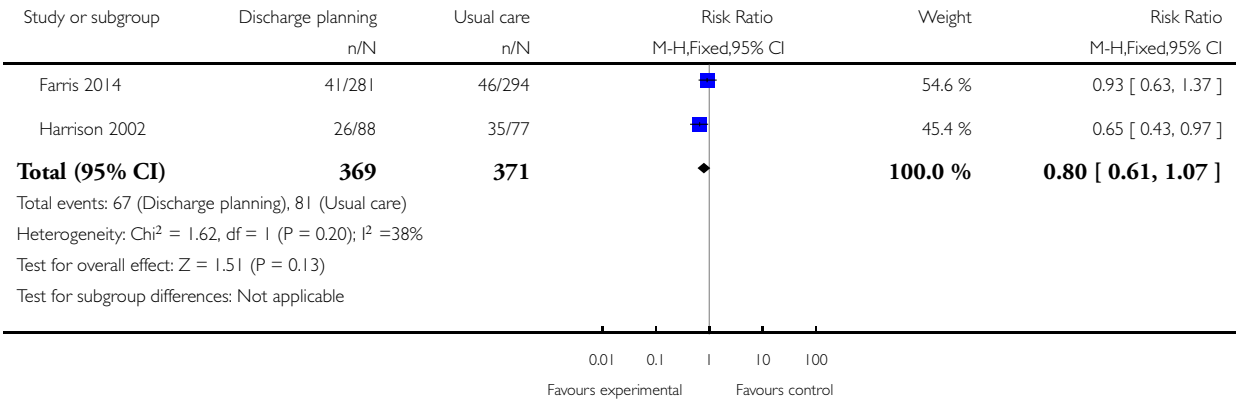


Analysis 8.6. Comparison 8 Effect of discharge planning on hospital care costs, Outcome 6 First visits to the emergency room.

Review: Discharge planning from hospital

Comparison: 8 Effect of discharge planning on hospital care costs

Outcome: 6 First visits to the emergency room



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

Patients with a medical condition

Study	Use of services	Notes
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:	-

Patients with a medical condition (*Continued*)

	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 P < 0.001	-

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

Medication problems after being discharged from hospital

Study	**Number of problems**	**Notes**
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.

Adherence to medicines

Study	**Adherence to medicines**	**Notes**
Nazareth 2001	At 3 months: T = 79, mean 0.75 (SD 0.3), C = 72 mean 0.75 (SD 0.28) At 6 months:	0 = none 1 = total/highest level

Adherence to medicines (*Continued*)

	T = 60, mean 0.78 (SD 0.30), C = 58 mean 0.78 (SD 0. 30)	
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.

Knowledge about medicines

Study	**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.

Hoarding of medicines

Study	**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	0 = none 1 = total/highest level

Hoarding of medicines (*Continued*)

	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	

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

Prescription errors

Study	
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.

Medication appropriateness

Study	**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) P = 0.78 90 d post-discharge T = 11.6 (SD 10.5), C = 11.1 (11.3) P = 0.94	As measured by the medication appropriateness index (MAI); summed MAI per participant Results for Enhanced v Control intervention (results for minimal intervention not reported)

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 vid 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
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

Last assessed as up-to-date: 5 October 2015.

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.

(*Continued*)

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 Gonç alves-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.

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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.
- 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