Discharge planning from hospital to home (Review)

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[Intervention Review]

Discharge planning from hospital to home

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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 improve the co-ordination of services following discharge from hospital.

Objectives

To determine the effectiveness of planning the discharge of patients moving from hospital.

Search strategy

We updated the review using the Cochrane EPOC Group Trials Register, MEDLINE, EMBASE and the Social Science Citation Index (last searched in March 2009).

Selection criteria

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

Data collection and analysis

Two authors independently undertook data analysis and quality assessment using a predesigned data extraction sheet. Studies are grouped according to patient group (elderly medical patients, surgical patients and those with a mix of conditions) and by outcome.

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Main results

Twenty-one RCTs (7234 patients) are included; ten of these were identified in this update. Fourteen trials recruited patients with a medical condition (4509 patients), four recruited patients with a mix of medical and surgical conditions (2225 patients), one recruited patients from a psychiatric hospital (343 patients), one from both a psychiatric hospital and from a general hospital (97 patients), and the final trial recruited patients admitted to hospital following a fall (60 patients). Hospital length of stay and readmissions to hospital were significantly reduced for patients allocated to discharge planning (mean difference length of stay -0.91, 95% CI -1.55 to -0.27, 10 trials; readmission rates RR 0.85, 95% CI 0.74 to 0.97, 11 trials). For elderly patients with a medical condition (usually heart failure) there was insufficient evidence for a difference in mortality (RR 1.04, 95% CI 0.74 to 1.46, four trials) or being discharged from hospital to home (RR 1.03, 95% CI 0.93 to 1.14, two trials). This was also the case for trials recruiting patients recovering from surgery and a mix of medical and surgical conditions. In three trials patients allocated to discharge planning reported increased satisfaction. There was little evidence on overall healthcare costs.

Authors' conclusions

The evidence suggests that a structured discharge plan tailored to the individual patient probably brings about small reductions in hospital length of stay and readmission rates for older people admitted to hospital with a medical condition. The impact of discharge planning on mortality, health outcomes and cost remains uncertain.

PLAIN LANGUAGE SUMMARY

Discharge planning from hospital to home

Discharge planning is the development of an individualised discharge plan for the patient prior to leaving hospital, with the aim of containing costs and improving patient outcomes. Discharge planning should ensure that patients are discharged from hospital at an appropriate time in their care and that, with adequate notice, the provision of other services will be organised.

A review of the effects of different discharge plans was conducted. After searching for relevant studies, 21 studies were found which compared discharge plans tailored to the individual patients with routine discharge care that was not individualised.

This review indicates that a structured discharge plan tailored to the individual patient probably brings about a small reduction in hospital length of stay and readmission rates, and an increase in patient satisfaction. The impact on health outcomes is uncertain.

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SUMMARY OF FINDINGS FOR THE MAIN COMPARISON *[Explanation]*

Effect of discharge planning on unscheduled readmission rates for patients admitted to hospital with a medical condition

Patient or population: Patients admitted to hospital with a medical condition
Settings: Hospital
Intervention: Effect of discharge planning on unscheduled readmission rates

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Control	Effect of discharge planning on unscheduled readmission rates				
Unscheduled readmission within 3 months of discharge from hospital	Study population		RR 0.85 (0.75 to 0.97)	2612 (12 studies)	⊕⊕⊕◯ **moderate**[1,2]	This pooled analysis includes one trial recruiting patients admitted to hospital following a fall
	266 per 1000	226 per 1000 (200 to 258)				
	Medium risk population					
	305 per 1000	259 per 1000 (229 to 296)				
Unscheduled readmission within 3 months of discharge from hospital	Study population		RR 0.85 (0.74 to 0.97)	2552 (11)		This pooled analysis excludes one trial recruiting patients admitted to hospital following a fall

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	270 per 1000	**230 per 1000** (200 to 262)	
	Medium risk population		
	350 per 1000	**298 per 1000** (259 to 340)	

*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 quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1] We did not identify unpublished literature for inclusion in the review.
[2] The evidence was downgraded to moderate as allocation concealment was unclear for 5 of the 11 trials.

BACKGROUND

Cost containment is a feature of all healthcare systems, especially for acute hospital services (Schwartz 1991). Recent trends include decreasing the length of stay for inpatient care; reducing the number of long stay beds; moving care into the community; an increased use of day surgery; providing increased levels of acute care at home ('hospital at home'); and policies such as discharge planning. The aim of these policies has been to contain costs and improve patient outcomes. For example, discharge planning may influence both the length of hospital stay and the pattern of care within the community by bridging the gap between hospital and home (Townsend 1988). Medical or non-medical reasons may delay a patient's discharge from hospital. It has been estimated that 30% of all hospital discharges are delayed for non-medical reasons (Selker 1989). Despite recent advances in electronic records, patient pathways and technology assisted decision support, the following three factors identified over 20 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; poor organisation, for example, late booking of transport services to take a patient home, preventing timely discharge from hospital; and poor communication between the hospital and community service providers.

There is evidence to suggest that discharge planning combined with additional post-discharge 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 Sates of America (USA), 42% of the national healthcare budget is spent on inpatient care, and readmissions account for one quarter of Medicare inpatient expenditure (Anderson 1984). Even a small reduction in readmission rates could have a substantial financial impact (Anderson 1985).

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 United Kingdom (UK) the Department of Health has published guidance on discharge practice for health and social care (Dept of Health 2003). However, procedures may vary between specialities in the same hospital (Brent Soc Ser 1991; Victor 1988). Furthermore, discharge planning may be embedded in another intervention, such as a specialised assessment unit (Rubenstein 1984) or home follow up (Parker 2002). These disparities make it difficult to interpret data on the effectiveness of discharge planning. We have conducted a systematic review of discharge planning to categorise the different types of interventions and study populations, and to assess the effectiveness of organising services in this way.

We have excluded interventions where the focus is on the provision of care after discharge from hospital, and those in which discharge planning is part of a larger package of care but the process and components are poorly described.

OBJECTIVES

To determine the effectiveness of planning the discharge of patients from hospital to home. The following questions were addressed:

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 the incidence of complications related to the initial admission compared to usual care.
4. 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?

5. Effect of discharge planning on mortality rate compared to usual care.
6. Effect of discharge planning on patient health outcomes compared to usual care.
7. Effect of discharge planning on patients' and caregivers' satisfaction compared to usual care.

Does discharge planning reduce overall costs of health care?

8. Effect of discharge planning on hospital care costs compared to usual care.
9. Effect of discharge planning on community care costs compared to usual care.
10. Effect of discharge planning on overall costs of health care compared to usual care.
11. Effect of discharge planning on the use of medication.

METHODS

Criteria for considering studies for this review

Types of studies

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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. Where possible the process of discharge planning is divided according to the steps identified by Marks (Marks 1994):
a) Pre-admission assessment (where possible).
b) Case finding on admission.
c) Inpatient assessment and preparation of a discharge plan based on individual patient needs, for example a multi-disciplinary assessment involving the patient and their family and communication between relevant professionals within the hospital.
d) Implementation of the discharge plan; this should be consistent with the assessment and requires documentation of the discharge process.
e) Monitoring.
We excluded studies from the review if they did not include an assessment and implementation phase of discharge planning; if it was not possible to separate the effects of discharge planning from the other components of the intervention or if discharge planning appeared to be a minor part of a multi-faceted intervention; or if the focus was on the provision of care after discharge from hospital. The control group had to receive standard care with no structured discharge planning.

Types of outcome measures

1. Length of stay in hospital.
2. Readmission rate to hospital.
3. Complication rate.
4. Place of discharge.
5. Mortality rate.
6. Patient health status.
7. Patient satisfaction.
8. Carer satisfaction.
9. Psychological health of patient.
10. Psychological health of caregivers.
11. Cost of discharge planning to the hospital and to the community.
12. The use of medication for trials evaluating a pharmacy discharge plan was included in the update to reflect the focus of the intervention for three trials.

Search methods for identification of studies

We searched the following databases: the Cochrane Effective Practice and Organisation of Care (EPOC) Group Register (March 2009), Ovid MEDLINE(R) 1966 to March 2009, EMBASE 1980 to March 2009, CINAHL1982 to 1996, EconLit 1969 to 1996, SIGLE (grey literature) 1980 to 1996 and PsycLIT 1974 to1996. Full details of the search terms used are in the Appendices at the end of this document. The EPOC Register is compiled with searches of the following databases: MEDLINE (from 1966), HealthSTAR (from 1975), EMBASE (from 1980) and CINAHL (from 1982). New records in MEDLINE, HealthSTAR, EMBASE and CINAHL are searched on a regular basis for additional studies. The Cochrane Central Register of Controlled Trials (CENTRAL) database in *The Cochrane Library* is searched every three months (each issue) for studies relevant to EPOC.
We checked the reference lists of articles identified electronically for evaluations of discharge planning and obtained potentially relevant articles. We contacted individual trialists, whose trials are included in the review, to clarify issues and to identify unpublished data.

Data collection and analysis

For this current update one author (SS) read all the abstracts in the records retrieved by the electronic searches to identify publications that appeared to be eligible for this review. Three authors (SS, JM and NL) then independently selected the studies to be included in the review by reading these abstracts and then the full papers. Any disagreement was settled by discussion. Two authors working independently (SS, JM, NL, LC, IC, AM) extracted data from each article using a data extraction form developed by EPOC, and modified and amended for the purposes of this review. We assessed the quality of the selected trials using the criteria included in the 'Risk of bias' table (Cochrane Handbook). We contacted investigators for missing data; none provided unpublished data.
The primary analysis was a comparison of discharge planning versus routine discharge care for each of the review questions. We calculated risk ratio (RR), using a fixed-effect model, for the dichotomous outcomes mortality, unscheduled readmission and discharge destination, with 95% confidence intervals (CI) for all point estimates. Values < 1 indicate outcomes favouring discharge planning. We calculated mean differences (MD) for the length of hospital stay. 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 elective surgery could differ from those who are elderly and are admitted with an acute medical condition, or with multiple medical conditions. We quantified heterogeneity using Cochran's Q test (Cochrane 1954) and the I^2 statistic, the latter quantifying the percentage of the total variation across studies that is due to heterogeneity rather than chance (Higgins 2003); smaller percentages suggest less observed heterogeneity. We

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judged combining data from the included studies inappropriate for the other outcomes due to the different methods of measuring and reporting the remaining outcome variables.

We excluded trials when discharge planning was part of a broader package of inpatient care; the decision to exclude a trial was dependent on the detail provided by the authors. We also excluded any studies that had major methodological weaknesses despite fulfilling our criteria for inclusion; details of why studies were excluded are reported in the 'Characteristics of excluded studies'.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies.

Electronic searching yielded a total of 3684 citations. From these abstracts, 62 studies appeared to meet the entry criteria and were retrieved for further assessment. Twenty-one trials (Balaban 2008; Bolas 2004; Evans 1993; Harrison 2002; Hendriksen 1990; Jack 2009; Kennedy 1987; Laramee 2003; Moher 1992; Naji 1999; Naughton 1994; Naylor 1994; Nazareth 2001; Pardessus 2002; Parfrey 1994; Preen 2005; Rich 1993; Rich 1995; Shaw 2000; Sulch 2000; Weinberger 1996), recruiting a total of 7234 participants, met all the review criteria. One of the trials included in the review was translated from Danish to English (Hendriksen 1990); the remaining trials were published in English. Ten trials were identified in this most recent update (Balaban 2008; Bolas 2004; Harrison 2002; Jack 2009; Laramee 2003; Naji 1999; Pardessus 2002; Preen 2005; Rich 1993; Rich 1995).

Follow-up times varied from two weeks to nine months. The trials included in the review evaluated a broadly similar intervention of discharge planning, which included an assessment, planning, implementation and monitoring phase, although six trials did not describe a monitoring phase (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 patient's stay in hospital, from admission to three days prior to discharge. Three trials evaluated a pharmacy discharge plan implemented by a hospital pharmacy. The patients' medication was rationalised, the GP, community pharmacist or both, were sent a pharmacy discharge plan and patients were provided with information about their medication (Bolas 2004; Nazareth 2001; Shaw 2000). The study population differed between the trials. Fourteen trials recruited patients with a medical condition (Balaban 2008; Bolas 2004; Harrison 2002; Jack 2009; Kennedy 1987; Laramee 2003; Moher 1992; Naughton 1994; Nazareth 2001; Preen 2005; Rich 1993; Rich 1995; Sulch 2000; Weinberger 1996); one trial recruited older people (> 65 years) admitted to hospital following a fall (Pardessus 2002); four trials recruited patients with a mix of medical and surgical conditions (Evans 1993; Hendriksen 1990; Naylor 1994; Parfrey 1994); and two trials recruited participants from an acute psychiatric ward (Naji 1999; Shaw 2000), one of these also recruited patients from a care of the elderly ward (Shaw 2000). Two trials used a questionnaire designed to identify patients likely to require discharge planning (Evans 1993; Parfrey 1994). The average age of patients recruited to eight of the trials was > 75 years; > 70 years in four trials and > 65 years in three trials. One trial recruited patients across two hospitals and reported data separately for the each of the hospitals. For hospital A the average age was 53 years, and for hospital B 56 years (Parfrey 1994). Another trial evaluating a pharmacy discharge plan recruited patients aged from 23 to 86 years (Shaw 2000).

The description of the type of care the control group received varied. One trial did not describe the care received by the control group (Kennedy 1987). Sixteen trials described the control group as receiving usual care with some discharge planning, but without a formal link through a co-ordinator to other departments and services, although other services were available on request from nursing or medical staff (Balaban 2008; Evans 1993; Harrison 2002; Hendriksen 1990; Jack 2009; Laramee 2003; Moher 1992; Naji 1999; Naylor 1994; Naughton 1994; Pardessus 2002; Parfrey 1994; Preen 2005; Rich 1993; Rich 1995; Weinberger 1996). The control groups in three 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; Nazareth 2001; Shaw 2000). In one trial the control group received multidisciplinary care which was not defined in advance, but was determined by the patients' progress (Sulch 2000).

Risk of bias in included studies

Twelve trials reported adequate concealment of allocation (Harrison 2002; Jack 2009; Kennedy 1987; Naji 1999; Naughton 1994; Nazareth 2001; Preen 2005; Parfrey 1994; Rich 1995; Shaw 2000; Sulch 2000; Weinberger 1996). All but two trials (Balaban 2008; Pardessus 2002) collected data at baseline, and 15 trials reported blinded measurement of outcomes (primarily for objective outcomes such as length of stay and readmission) (Balaban 2008 ;Evans 1993; Hendriksen 1990; Jack 2009; Kennedy 1987; Laramee 2003; Moher 1992; Naji 1999; Naughton 1994; Nazareth 2001; Pardessus 2002; Parfrey 1994; Rich 1993; Rich 1995; Weinberger 1996) (Figure 1).

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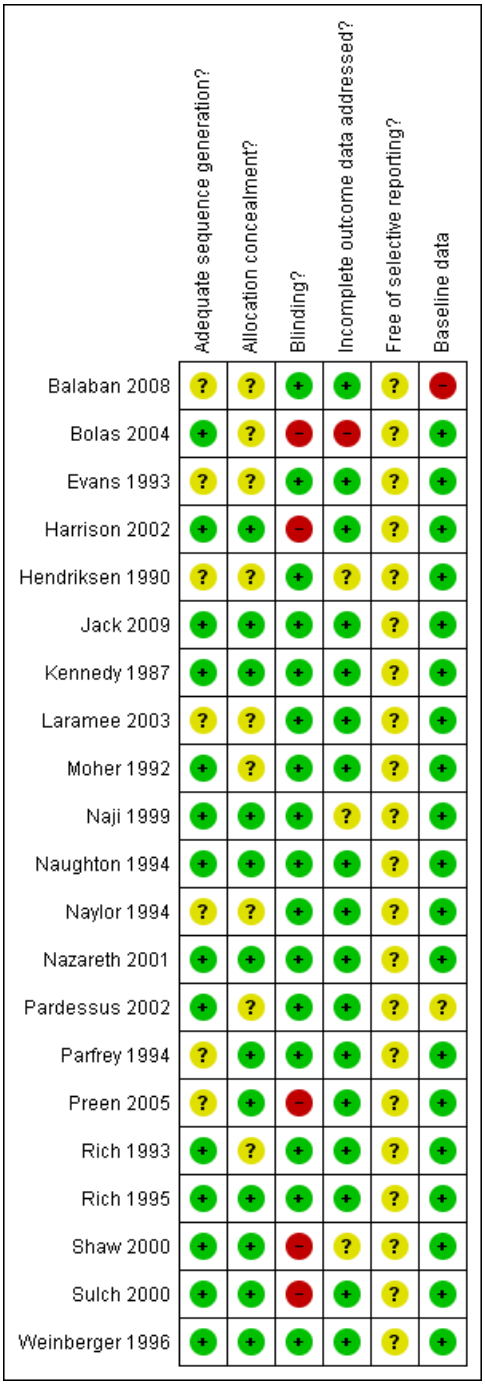
Figure 1. Methodological quality summary: review authors' judgements about each methodological quality item for each included study.



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Effects of interventions

See: **Summary of findings for the main comparison** Effect of discharge planning on unscheduled readmission rates for patients admitted to hospital with a medical condition; **Summary of findings 2** Effect of discharge planning on hospital length of stay

Does discharge planning improve the appropriate use of acute care

Effect of discharge planning on length of stay in hospital compared with usual care

There was a small, significant reduction in hospital length of stay for those allocated to discharge planning (mean difference -0.91, 95% CI -1.55 to -0.27; 10 trials, Analysis 1.1) (Harrison 2002; Kennedy 1987; Laramee 2003; Moher 1992; Naughton 1994; Naylor 1994; Preen 2005; Rich 1993; Rich 1995; Sulch 2000). This reduction increased slightly in a sensitivity analysis imputing a missing standard deviation for one trial (Kennedy 1987) (mean difference -1.01, 95% CI -1.61 to -0.40). There was no evidence of any statistical heterogeneity. Trials not included in the pooled analysis did not report a significant difference in length of stay for surgical patients (difference +1.0 day, 95% CI -2.0 to 4.0) (Naylor 1994), or for a mixed group of patients recovering from surgery, or with a medical condition (difference -3.3 days, P > 0.05) (Hendriksen 1990); (difference -0.6, 95% CI -2.38 to 1.18) (Evans 1993). One trial (Parfrey 1994), recruiting from two hospitals, reported a small, significant reduction in length of stay for patients receiving discharge planning in one hospital only (median difference -0.8 days, P < 0.03).

Effect of discharge planning on unscheduled readmission rates compared to usual care

For elderly patients with a medical condition (usually heart failure) there was a small, significant reduction in readmission rates (RR 0.85, 95% CI 0.74 to 0.97; 11 trials, Analysis 2.4) (Balaban 2008; Harrison 2002; Jack 2009; Kennedy 1987; Laramee 2003; Moher 1992; Naylor 1994; Nazareth 2001; Rich 1993; Rich 1995; Shaw 2000), with the upper limit of the confidence interval being close to 1.00. There was no evidence of statistical heterogeneity. One trial, recruiting a mix of patients, reported a statistically significant decrease 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). There was also a significant reduction in days in hospital due to readmission (difference -2.0, 95% CI -3.18 to -0.82) (Evans 1993). One trial, not included in the pooled analysis, presented readmission data in a number of different ways (Weinberger 1996). Although a statistically significant increase in mean monthly readmission rate was observed at six months follow up for patients receiving discharge planning (intervention group = 0.19 (SD + 0.4), control group = 0.14 (SD + 0.2); P = 0.005), and for the mean number of readmission days (intervention 10.2 (19.8), control 8.8 (19.7); P < 0.04), no statistically significant difference was detected at six months follow up for the proportions of patients readmitted to hospital (intervention = 49%, control = 44%; P = 0.06) (Weinberger 1996). One trial reported a significant reduction in readmission days for patients allocated to discharge planning (mean difference -33 days at two to six weeks follow up, 95% CI -53 to -13) (Naylor 1994); however, this difference was not detected at longer-term follow up. These findings were not replicated in another trial measuring readmission days at one year follow up (difference +2 days, P > 0.05) (Hendriksen 1990).
No significant reduction in readmission rates (difference +3%, 95% CI -7% to 13%) or days in hospital due to readmission (difference +26 days, 95% CI -8 to +60 at six to 12 weeks) was reported for patients recovering from surgery (Naylor 1994).

Effects of discharge planning on other process variables: patients' place of discharge

There was insufficient evidence that discharge planning made a difference to patients being discharged to home as opposed to residential care (RR 1.03, 95% CI 0.93 to 1.14; two trials) (Moher 1992; Sulch 2000) or to a nursing home (Hendriksen 1990; Naughton 1994). One trial (Evans 1993), recruiting both medical and surgical patients, reported that a greater proportion of patients allocated to discharge planning were discharged home compared with those receiving no formal discharge planning (difference 6%, 95% CI 0.4% to 12%); this difference increased at nine months follow up (difference 8.3%, 95% CI 1.6% to 15%).

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

Effect of discharge planning on mortality rate compared to usual care

For elderly patients with a medical condition (usually heart failure) there was insufficient evidence for a difference in mortality (RR 1.04, 95% CI 0.74 to 1.46) (Laramee 2003; Nazareth 2001; Rich 1995; Sulch 2000). A trial recruiting a mix of surgical and medical patients reported no difference in mortality at nine months follow up (treatment group 66/417 (16%), compared with 67/418 (16%) in the control group) (Evans 1993). The one trial recruiting patients admitted to hospital following a fall also reported no difference (RR 1.33, 95% CI 0.33 to 5.45) (Analysis 4.1) (Pardessus 2002).

Effect of discharge planning on patient health outcomes compared to usual care

Ten trials measured patient outcomes including functional status, mental well-being, perception of health, self-esteem, and affect. Three of these trials did not publish follow-up data (Kennedy 1987; Naylor 1994; Weinberger 1996) and for five trials there was insufficient evidence of a difference between groups (Evans

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1993; Harrison 2002; Naylor 1994; Nazareth 2001; Preen 2005) (Analysis 5.1). One trial, recruiting patients with heart failure, reported a significant improvement on the total score for the *Chronic Heart Failure Questionnaire* (mean difference 22.1 (20.8); P < 0.01) (Rich 1995). Another trial, recruiting patients recovering from a stroke, reported a significant functional improvement between weeks four and 12 for those allocated to the control group, who received conventional multidisciplinary care, on the Barthel score (median within-group change of 6 points for the control group versus 2 points for the treatment group P < 0.01). Otherwise, between-group differences on the Barthel Index were not statistically significant. Quality of life, as measured by the EuroQol, showed significant between-group differences at 26 weeks, in favour of the control group (control group 72 points versus treatment group 63 points; P < 0.005), but no differences were reported between groups for the Rankin score and the Hospital Anxiety and Depression scale (Sulch 2000).

Effect of discharge planning on patients' and caregivers' satisfaction compared to usual care

Two trials, recruiting patients with a medical condition, reported increased patient satisfaction for those allocated to discharge planning. In one trial follow up was at one and six months, with the greatest differences reported for patients' perceptions of continuity of care and non-financial access to medical care (Weinberger 1996). In the second trial, patients reported significantly increased satisfaction with hospital care, hospital discharge and recovery at home (Analysis 11.1). In two trials evaluating a pharmacy discharge plan, one reported no difference in satisfaction (Nazareth 2001), and the second reported that the pharmacy discharge letter improved the standard of information exchange at discharge (Bolas 2004). In the study by Moher, a subgroup of 40 patients, who were asked to complete a satisfaction questionnaire, reported increased satisfaction with discharge planning (difference 27%, P < 0.05, 95% CI 2% to 52%) (Moher 1992).

Does discharge planning reduce overall costs of health care?

Effect of discharge planning on hospital care costs compared to usual care

In the study by Naylor, recruiting patients with a medical condition, no significant differences were observed for costs between the two groups for their initial hospital stay (Naylor 1994). However, a significant difference for hospital costs was detected for total charges including readmission costs at two weeks follow up (difference -$170,247, 95% CI -$253,000 to -$87,000) and at two to six weeks follow up (difference -$137,508, 95% CI -$210,000 to -$67,000), with patients receiving discharge planning incurring lower costs. No significant difference in costs was detected for patients with surgical conditions in the same study (Naylor 1994). The study by Naughton (Naughton 1994) also observed lower costs for laboratory services for patients receiving discharge planning (mean difference per patient -£295, 95% CI -£564 to -£26). In a third trial the difference between study groups in total cost (combining actual hospital utilisation cost and estimated outpatient cost) for 738 participants was $149,995 - an average of $412 per person who received the intervention (Jack 2009).

Effect of discharge planning on community care costs compared to usual care

No studies provided cost data for this comparison. Weinberger (Weinberger 1996) measured the use of primary care and reported a significant 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). One trial provided data on general practitioner consultations and failed to detect a difference between groups at three months (mean difference 2.7%, 95% CI -7.4% to 12.7%) and at six months (mean difference 0.3%, 95% CI -11.6% to 12.3%) (Nazareth 2001).

Effect of discharge planning on overall costs of health care compared to usual care

One trial (Naughton 1994) reported no significant difference between the groups for overall health service costs.

Effect of a pharmacy discharge plan on the use of medication

Both trials evaluating the effectiveness of a pharmacy discharge plan measured different outcomes related to medication. There was no evidence of a difference in the mean number of problems (difficulty obtaining a prescription from the general practitioner, insufficient knowledge about the medication, adherence to medicines) with medication reported at 12 weeks (treatment mean of 1.4 (SD 1.2) n = 21, control mean of 2.4 (SD 1.6) n = 14) (Shaw 2000) or in adherence to medicines, knowledge about medicines and hoarding of medicines (Nazareth 2001).

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ADDITIONAL SUMMARY OF FINDINGS *[Explanation]*

Discharge planning for patients admitted to hospital with a medical condition

Patient or population: Patients admitted to hospital with a medical condition
Settings: Hospital
Intervention: Discharge planning

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of Participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Control	Discharge planning				
Hospital length of stay Follow-up: 3 to 6 months	The mean hospital length of stay ranged across control groups from **5.7 to 12.4 days**[1]	The mean hospital length of stay in the intervention groups was **0.91 lower** (1.55 to 0.27 lower)		1765 (10 studies)	⊕⊕⊕◯ **moderate**[2,3]	
Hospital length of stay Follow-up: 3 to 6 months	The mean hospital length of stay ranged across control groups from **5.7 to 12.4 days**[1]	The mean hospital length of stay in the intervention groups was **1.01 lower** (1.61 to 0.4 lower)		1765 (10 studies)	⊕⊕⊕◯ **moderate**[2,3]	Kennedy et al (1987) did not report a standard deviation (sd), this comparison uses the sd from Naylor et al (1994) as both studies were conducted in the US.

*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;

GRADE Working Group grades of evidence
High quality: Further research is very unlikely to change our confidence in the estimate of effect.
Moderate quality: Further research is likely to have an important impact on our confidence in the estimate of effect and may change the estimate.
Low quality: Further research is very likely to have an important impact on our confidence in the estimate of effect and is likely to change the estimate.
Very low quality: We are very uncertain about the estimate.

[1] The range excludes length of stay of 45 days reported by Sulch as this was an outlier.
[2] The evidence was downgraded to moderate as allocation concealment was unclear for 4 of the 10 trials.
[3] We did not identify unpublished literature for inclusion in the review.

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DISCUSSION

This review assessed the effectiveness of discharge planning in hospital. Twenty-one randomised controlled trials met the pre-set criteria for inclusion; ten of these were included in this update of the review. The reporting of different outcomes restricted the degree to which we could pool data. However, we were able to pool the data from trials recruiting older patients with a medical condition and found a small, significant reduction in hospital length of stay and readmission rates for those allocated to discharge planning. The evidence on health outcomes is limited, with one trial (Sulch 2000) reporting a greater improvement in quality of life and activities of daily living for the control group, which the authors of the trial speculate may be due to a more flexible approach to goal setting and continuing patient assessment. There is some evidence to suggest that patients receiving discharge planning experience increased levels of satisfaction with their hospital and discharge care (Moher 1992; Weinberger 1996).

There was insufficient evidence from two trials assessing the cost of implementing a formal process of discharge planning compared with standard care. Although the costs reported by the two trials differ, the variation in charges between different provider units makes it difficult to comment on the meaning of these differences. In one trial (Naylor 1994) costs to the health service were calculated using hospital charges, not on the basis of resources used. The method of costing was not described in the second trial (Naughton 1994). A third trial reported significantly lower costs for those allocated to discharge planning (Jack 2009).

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, the trial conducted by Naylor (Naylor 1994) formalised the inclusion of the patient's caregiver into the assessment process and the development of the discharge plan. Although inclusion of the caregiver or family was mentioned by some of the other trials (Evans 1993; Hendriksen 1990; Kennedy 1987; Laramee 2003; Naughton 1994), the degree to which this was done was not always apparent. The majority of the trials included a patient education component within the discharge planning process. In one trial, recruiting patients admitted to hospital following a fall, the discharge plan included a pre-discharge home visit 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 (Evans 1993; Parfrey 1994) used an assessment tool to find cases eligible for discharge planning. The monitoring of discharge planning also differed. For example, in one trial this was done primarily by telephone (Naylor 1994); and in another trial patients were given appointments to attend a primary care clinic (Weinberger 1996). Three trials evaluated the effectiveness of a pharmacy discharge plan (Bolas 2004; Nazareth 2001; Shaw 2000). An additional problem limiting the interpretation of the evidence was the difficulty in assessing the extent to which contamination between the intervention and control groups occurred.

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. Ten of the trials included in this review were based in the USA, five in the UK, three in Canada, one in Australia, one in Denmark and one in France. 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 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 designed to increase the intensity of primary care services, may explain the observed increase in readmission days for those receiving the intervention.

We excluded trials evaluating interventions where discharge planning was not the main focus of a multifaceted package of care. However, it is possible that with the move towards care pathways, and other changes aimed at co-ordinating a patient's stay in hospital, discharge planning will be less frequently implemented as an intervention in isolation, but will be part of an integrated package of care. This will present further challenges in interpreting the evidence as it will become more difficult to understand the relative contribution of each aspect of health care.

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 readmission rates. 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. It is not clear if costs are reduced or shifted from secondary to primary care as a result of discharge planning. Interestingly there is evidence from only one trial that health care services outside a secondary care setting have become

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involved in discharge planning. This is despite patients' requirements, and hence the appropriateness of a place of care, changing over time; and waiting lists for placement in a nursing home, or for home care services preventing patients being discharged from hospital at an appropriate time.

Systematic reviews have been published in related areas, for example geriatric assessment which includes discharge planning as part of a broader package of care (Stuck 1993), and 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 process of care and clinical outcomes (Kwan 2004). A published review by Parker included discharge planning interventions that were in a hospital setting, comprehensive geriatric assessment, discharge support arrangements and educational interventions, and concluded that interventions providing an educational component had an effect on reducing readmission rates (Parker 2002).

Implications for research

Surprisingly, some of the stated policy aims of discharge planning (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 this was not reported in any of the trials included in this review. 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, the provision of other services will be organised. A high level of communication between the discharge planner and the providers of services outside the hospital setting is clearly important. Future well-conducted studies should continue to collect data on readmissions and hospital length of stay and facilitate the application of the results by providing details of the intervention and the context in which it was delivered. Safeguards should be developed against contamination of the control group, for example through the design of trials employing cluster-randomisation. Methods should be developed to measure the impact of a delayed or inappropriate discharge on overall bed utilisation.

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REFERENCES

References to studies included in this review

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

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

Evans 1993 *{published data only}*
Evans RL, Hendricks RD. Evaluating hospital discharge planning: a randomised controlled trial. *Medical Care* 1993;**31**(4):358–70.

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

Hendriksen 1990 *{published data only}*
Hendriksen C, Stromgard E, Sorensen K. Current cooperation concerning admission to and discharge from geriatric hospitals [Danish] [Nyt samarbejde om gamle menneskers syehusindlaeggelse og – udskrivelse]. *Nordisk Medicin* 1990;**105**:58–60.
Hendriksen C, Strømgård E, Sørensen KH. Cooperation concerning admission to and discharge of elderly people from the hospital. 1. The coordinated contributions of home care personnel [Samarbejde om gamle menneskers sygehusindlaeggelse og – udskrivelse. 1. Hjemmesygeplejerskens koordinerende indsats pa sygehuset]. *Ugeskrift For Laeger* 1989;**151**(24):1531–4.

Jack 2009 *{published data only}*
Jack BW, Chetty VK, Anthony D, Greenwald JL, Sanchez GM, Johnson AE, Forsythe SR, O'Donnell JK, Paasche-Orlow MK, Manasseh C, Martin S, Culpepper L. A reengineered hospital discharge program to decrease rehospitalization. *Annals of Internal Medicine* 2009;**150**(3):178–87.

Kennedy 1987 *{published data only}*
Kennedy L, Neidlinger S, Scroggins K. Effective comprehensive discharge planning. *Gerontologist* 1987;**27**(5):577–80.

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

Copyright © 2010 The Cochrane Collaboration. Published by John Wiley & Sons, Ltd.

Moher 1992 *{published data only}*
Moher D, Weinberg A, Hanlon R, Runnalls K. Effects of a medical team coordinator on length of hospital stay. *Canadian Medical Association Journal* 1992;**146**(4):511–15.

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

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

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

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

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

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

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

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

Rich 1995 *{published data only}*
Rich MW, Beckham V, Wittenberg C, Leven C, Freedland KE, Carney RM. A multidisciplinary intervention to prevent the readmission of elderly patients with congestive heart failure. *New England Journal of Medicine* 1995;**333**:1190–5.

Shaw 2000 *{published data only}*
Shaw H, Mackie CA, Sharkie I. Evaluation of effect of pharmacy discharge planning on medication problems experienced by discharged acute admission mental health patients. *International Journal of Pharmacy Practice* 2000;**8**:144–53.

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

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

References to studies excluded from this review

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

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

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

Carty 1990 *{published data only}*
Carty EM, Bradley CF. A randomized, controlled evaluation of early postpartum hospital discharge. *Birth* 1990;**17**:199–204.

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

Choong 2000 *{published data only}*
Choong PFM, Langford AK, Dowsey MM, Santamaria NM. Clinical pathway for fractured neck of femur: a prospective controlled study. *Medical Journal of Australia* 2000;**172**:423–6.

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

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

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

Fretwell 1990 *{published data only}*
Fretwell MD, Raymond PM, McGarvey ST, Owens N, Traines M, Silliman RA, et al.The Senior Care Study. A controlled trial of a

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consultative/unit-based geriatric assessment program in acute care. *Journal of the American Geriatrics Society* 1990;**38**(10):1073–81.

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

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

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

Haggmark 1997 ***{published data only}***
Häggmark C, Nilsson B. Effects of an intervention programme for improved discharge planning. *Vård i Norden* 1997;**2**:4–8.

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

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

Hogan 1990 ***{published data only}***
Hogan DB, Fox RA. A prospective controlled trial of a geriatric consultation team in an acute-care hospital. *Age and Ageing* 1990; **19**:107–13.

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

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

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

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

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

Martin 1994 ***{published data only}***
Martin F, Oyewole A, Moloney A. A randomized controlled trial of a high support hospital discharge team for elderly people. *Age and Ageing* 1994;**23**:228–34.

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

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

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

Melin 1995a ***{published data only}***
Melin AL. A randomized trial of multidisciplinary in-home care for frail elderly patients awaiting hospital discharge. *Aging (Milan, Italy)* 1995;**7**(3):247–50.

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

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

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

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

Nickerson 2005 ***{published data only}***
Nickerson A, McKinnon NJ, Roberst N, Saulnier L. Drug therapy problems, inconsistencies and omissions identified during a medication reconciliation and seamless care service. *Healthcare Quarterly* 2005;**8**:65–72.

Nikolaus 1995 ***{published data only}***
Nikolaus T, Specht-Leible N, Bach M, Wittmann-Jennewein C, Oster P, Schlierf G. Effectiveness of hospital-based geriatric evaluation and management and home intervention team (GEM-HIT): rationale and design of a 5-year randomized trial. *Zeitschrift für Gerontologie und Geriatrie* 1995;**28**(1):47–53.

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

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

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

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

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

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

Smith 1988 *{published data only}*
Smith DM, Weinberger M, Katz BP, Moore PS. Postdischarge care and readmissions. *Medical Care* 1988;**26**(7):699–708.

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

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

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

Voirol 2004 *{published data only}*
Voirol P, Kayser SR, Chang CY, Chang QL, Youmans SL. Impact of pharmacists' interventions on the pediatric discharge medication process. *Annals of Pharmacotherapy* 2004;**38**(10):1597–1602.

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

Additional references

Anderson 1984
Anderson GF, Steinberg EP. Hospital readmissions in the Medicare population. *New England Journal of Medicine* 1984;**311**:1349–53.

Anderson 1985
Anderson GF, Steinberg EP. Predicting hospital readmissions in the Medicare population. *Inquiry* 1985;**22**:251–8.

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

Brent Soc Ser 1991
Brent Social Services Dept. *Hospital discharge and continuing care in Brent, London*. London: Brent Social Services Dept, 1991.

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

Cochrane Handbook
Higgins JPT, Green S (editors). Cochrane Handbook for Systematic Reviews of Interventions Version 5.0.1 [updated September 2008]. The Cochrane Collaboration. Available from www.cochrane-handbook.org.

Dept of Health 2003
Department of Health. Discharge from hospital: pathway, process and practice. A manual of discharge practice for health and social care commissioners, managers and practitioners. Department of Health www.doh.gov.uk/changeagentteam/discharge˙getri.pdf.

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

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

Marks 1994
Marks L. *Seamless care or patchwork quilt? Discharging patients from acute hospital care*. London: Kings Fund, 1994.

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

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

Schwartz 1991
Schwartz WB, Mendelson DN. Hospital cost containment in the 1980s. Hard lessons learned and prospects for the 1990s. *New England Journal of Medicine* 1991;**324**:1037–42.

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Selker 1989

Selker HP, Beshansky JR, Pauker SG, Kassirer JP. The epidemiology of delays in a teaching hospital. *Medical Care* 1989;**27**:112.

Stuck 1993

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

Townsend 1988

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

Victor 1988

Victor CR, Vetter NJ. Preparing the elderly for discharge from hospital: a neglected aspect of patient care?. *Age and Ageing* 1988; **17**:155–63.

* *Indicates the major publication for the study*

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CHARACTERISTICS OF STUDIES

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

Balaban 2008

Methods	RCT
Participants	A culturally and linguistically diverse group of patients admitted to a 100-bed community teaching hospital (Somerville Hospital) as an emergency. The hospital is affiliated with Harvard Medical School, which provides a safety net system. Number 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 (number female): T = 27/47 (57.4%), C = 30/49 (61%) Non-English speaking: T = 19/47 (40%), C = 9/49 (18.4%) Patients had to have a "medical home" to be discharged to; this is defined as having an established primary care provider (physician or nurse practitioner)
Interventions	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 patient's 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.
Outcomes	Hospital length of stay and readmission rates Follow up: at 21 and 31 days
Notes	122 patients randomised and 24 excluded after randomisation as they were discharged to another institution, 2 were excluded as they died during the hospital admission, leaving 96 participants T = 47, C = 49
Risk of bias	

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Balaban 2008 (*Continued*)

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	Not described
Allocation concealment?	Unclear	Not described
Blinding? All outcomes	Yes	Main outcome measure was readmission rates.
Incomplete outcome data addressed? All outcomes	Yes	Follow-up data for > 80%
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	No	Comparison at end of treatment only

Bolas 2004

Methods	RCT
Participants	Patients recruited within 48 hours of an emergency or unplanned admission to the medical admissions unit, aged 55 years or over and taking 3 regular drugs or more Exclusion criteria: those transferred to another hospital, admitted or transferred to a nursing home, patient or caregiver unable to communicate with pharmacist, any mental illness or alcohol related admission, or 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: T = female 41/119 (%), C = 42/124 (%) 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 help line Control intervention: standard clinical pharmacy service
Outcomes	Patient satisfaction, knowledge of medicines, hoarding of medicines Readmissions and length of stay data not reported

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Bolas 2004 (*Continued*)

Notes	

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	Computer generated random number
Allocation concealment?	Unclear	Allocation concealment was not described
Blinding? All outcomes	No	Yes for readmission data. No for knowledge of medicines and GP and community pharmacists' views.
Incomplete outcome data addressed? All outcomes	No	Follow up of patients: 67% (162/243) Low response rate in survey of GPs (55% response rate) and community pharmacists (56% response rate)
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

Evans 1993

Methods	RCT
Participants	Participants: patients were screened for risk factors that would prolong their length of hospital stay. Patients were older people with a medical condition, neurological condition, or recovering from surgery. Number of patients recruited: T = 417, C = 418 Mean age: T = 66.6 years, C = 67.9 years
Interventions	Setting: VA Hospital, Seattle Pre-admission assessment: no Case finding on admission: yes, patients screened for risk factors that may prolong length 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. 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.

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Evans 1993 (*Continued*)

Notes	Also validated an instrument to assess high-risk patients Intervention implemented on day 3 of hospital admission

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	Not described
Allocation concealment?	Unclear	Not described
Blinding? All outcomes	Yes	Yes for objective measures
Incomplete outcome data addressed? All outcomes	Yes	All patients randomised accounted for at follow-up
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

Harrison 2002

Methods	RCT
Participants	Older people with congestive heart failure who lived within the regional home care radius (60 km), were expected to be discharged with home nursing care and were not cognitively impaired Number of patients recruited: T = 100, C = 100 Mean age: T = 75.5 years (SD 10.4), C = 75.7 years (SD 9.7) Sex: T = 43/92, C = 44/100
Interventions	Setting: large urban teaching hospital, Ottawa, Canada Pre-admission assessment: no Case finding on admission: yes, 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: yes. 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 hours of discharge Control group: 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 co-ordinator con-

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Harrison 2002 (*Continued*)

	sulted 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.
Notes	

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	Computer generated schedule of random numbers
Allocation concealment?	Yes	Random allocation by a research co-ordinator
Blinding? All outcomes	No	No for patient assessed outcomes Yes for objective measure of readmission
Incomplete outcome data addressed? All outcomes	Yes	157/200 (81%) completed the study
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

Hendriksen 1990

Methods	RCT
Participants	Elderly patients 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 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. Control group care described as usual care
Outcomes	Hospital length of stay, readmission to hospital, discharge destination

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Hendriksen 1990 (*Continued*)

Notes	Details of measures of outcome not provided. Translated from Danish. Intervention implemented at time of admission.

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	Not described
Allocation concealment?	Unclear	Not described
Blinding? All outcomes	Yes	For objective measures of outcome
Incomplete outcome data addressed? All outcomes	Unclear	Not described
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	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: T = 195 men (52%), C = 176 men (47%) White non-Hispanic: T = 106 (28%), C = 103 (27%); Black non-Hispanic: T = 191 (51%), C = 197 (52%); Hispanic: T = 38 (10), C = 38 (10%); other race or mixed race: T = 38 (10%), C = 38 (10%)
Interventions	Pre-admission assessment: no Case finding on admission: at 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

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	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 to 4 days 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
Outcomes	Readmission, patient satisfaction and cost
Notes	Waiting for readmission data from the authors

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Index cards were randomly arranged indicating either the usual care or intervention group, these were in opaque envelopes labelled consecutively with study numbers. We assigned eligible participants who consented to enrollment to a study group by revealing the concealed index card. This process continued until 2 participants were enrolled each day of the week (or 3 participants if the first 2 participants were randomly assigned to the usual care group).
Allocation concealment?	Yes	The authors state that the research assistants could not selectively choose potential participants for enrolment or predict assignment
Blinding? All outcomes	Yes	Research staff doing follow-up telephone calls and reviewing hospital records were blinded to study group assignment
Incomplete outcome data addressed? All outcomes	Yes	Participant-reported outcome data were collected by telephone for 615 of 738 (83%) participants a median of 32 days (IQR, 30 to 36 days) after discharge, with a similar proportion of intervention (307 (83%)) and usual care (307 (83%)) group participants
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data collected at recruitment

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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
Interventions	Setting: 500-bed, non-profit acute care teaching hospital, Texas 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 family. A primary nurse assessed patients' post-discharge 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 sociodemographic 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. Control group 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

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	Random number schedule described
Allocation concealment?	Yes	Allocation provided by the statistics department
Blinding? All outcomes	Yes	For objective measures of outcome
Incomplete outcome data addressed? All outcomes	Yes	All patients randomised accounted for at follow up
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

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

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	or ongoing lack of adherence to treatment plan, previous CHF hospital admission, living alone, and 4 or more hospitalisations in the past 5 years Number recruited: T = 141, C = 146 Mean age: T = 70.6 years (11.4 yrs), C = 70.8 years (12.2 yrs) Sex (number female) T = 59 (42%), C = 72 (50%) Ethnicity: not reported Living alone: not reported Support at home: T = 127/141 (90%), C = 140/146 (96%)
Interventions	Setting: Burlington, Vt, a 550-bed academic medical centre, which serves the largely rural geographic areas of Vermont and Upstate New York 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 primary care physician (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 group: 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. Post-discharge care was conducted by the patient's own local physician. The home care service figures were 44%.
Outcomes	Readmissions, mortality, hospital bed days, resource use and patient satisfaction. Follow up at 3 months.
Notes	-

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	Not described
Allocation concealment?	Unclear	Not described
Blinding? All outcomes	Yes	Yes for readmission and length of stay

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Laramee 2003 (*Continued*)

Incomplete outcome data addressed? All outcomes	Yes	Loss to follow up: 234 / 287 = > 81% T = 122/141, C = 112/146
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

Moher 1992

Methods	RCT
Participants	Elderly medical patients Number of patients recruited: T = 136, C = 131 Mean age: T = 66.3 years, C = 64.3 years
Interventions	Setting: 2 clinical teaching units, Ottawa 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 Control group received 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

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Computer generated blocks
Allocation concealment?	Unclear	Allocation procedure not described
Blinding? All outcomes	Yes	Yes for objective measures of outcome
Incomplete outcome data addressed? All outcomes	Yes	All patients randomised accounted for at follow up
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

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Naji 1999

Methods	RCT
Participants	848 acute psychiatric admissions of which 147 (17.3%) were readmissions, 112 (13.2%) were assessed as ineligible by the consultant (too ill or requiring contact with GP), 65 (7.7%) were not registered with a GP or had no fixed address. Of the remaining, 343/524 were recruited: T = 168, C = 175
Interventions	Setting: 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 posted. Monitoring: no Control group 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

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	Independent computer program
Allocation concealment?	Yes	Independent to researchers
Blinding? All outcomes	Yes	Objective measures used for readmission, consultations and length of stay. Validated standardised patient assessed outcomes also measured.
Incomplete outcome data addressed? All outcomes	Unclear	Less than 80% for patient assessed: 1 month completion T = 106/168 (63%), C = 111/175 (63%)
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data collected on day of discharge: baseline completion T = 132/168 (79%), C = 133/175 (76%)

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Naughton 1994

Methods	RCT
Participants	Elderly medical patients admitted from emergency department Number of patients recruited: T = 51, C = 60 Mean age: 80 years
Interventions	Setting: private, non-profit, academic medical centre, Chicago 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 post-hospital treatment place was in place at the time of discharge and 2 weeks later. The nurse specialist co-ordinated the transfer to home health care. Patients who did not have a primary care provider received outpatient care at the hospital. Control group: 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

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Card indicating assignment to the intervention or control group were placed sequentially in opaque sealed envelopes
Allocation concealment?	Yes	Sealed envelopes provided by admitting clerk
Blinding? All outcomes	Yes	Yes for objective measures of outcome
Incomplete outcome data addressed? All outcomes	Yes	141 patients initially randomised, of these 25 were ineligible and 5 were transferred to surgical services, leaving 111 to be analysed
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

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Naylor 1994

Methods	RCT
Participants	Elderly medical and cardiac surgery patients Mean age: 76 years Number of patients recruited: T = 140, C = 136
Interventions	Setting: Hospital of the University of Pennsylvania 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 caregiver, 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 post-discharge with ongoing evaluation of the effectiveness of the discharge plan Control group 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

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	Not described
Allocation concealment?	Unclear	Not described
Blinding? All outcomes	Yes	Yes for objective measures
Incomplete outcome data addressed? All outcomes	Yes	52/364 (14%) changed their minds about participating in the study or could not be contacted
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

Nazareth 2001

Methods	RCT
Participants	Elderly patients, aged 75 years and over, on 4 or more medicines who were discharged from 3 acute wards and one long-stay ward. Each patient had a mean of 3 chronic medical conditions, and was on a mean of 3 drugs (SD 2) at discharge. Mean age of participants 84 years (SD 5.2)

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Nazareth 2001 (*Continued*)

	Number of patients recruited: T = 181, C = 181
Interventions	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 caregiver and community professionals. An aim was to optimise communication between secondary and primary care professionals. Follow-up visit by community hospital at 7 to 14 days 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, caregiver, community pharmacist and GP Monitoring: follow up in the community by a pharmacist Control group were 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

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Computer generated random numbers
Allocation concealment?	Yes	Allocation by independent pharmacist at the health authority's central community pharmacy office
Blinding? All outcomes	Yes	Blinding of objective outcomes
Incomplete outcome data addressed? All outcomes	Yes	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
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

Pardessus 2002

Methods	RCT

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Pardessus 2002 (*Continued*)

Participants	Aged >= 65 who were hospitalised for falling and were able to return home. Patients were excluded if they were cognitively impaired (MM < 24), did not have a phone, lived further than 30 km, or if the falls were secondary to cardiac, neurologic, vascular, or therapeutic problems. Sex: (number female) T = 23/30 (76%), C = 24/30 (80%) Number recruited: T = 30, C = 30
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: yes. 2-hour 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 group: 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	-

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	Random number table
Allocation concealment?	Unclear	Not described
Blinding? All outcomes	Yes	For objective measure of outcome only (readmission and mortality)
Incomplete outcome data addressed? All outcomes	Yes	All patients randomised accounted for at follow up
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Unclear	Baseline data reported

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Parfrey 1994

Methods	RCT
Participants	Medical and surgical patients Mean age: 53 years Number of patients recruited: hospital A: T = 421, C = 420
Interventions	Setting: Newfoundland 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 Control group 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

Item	Authors' judgement	Description
Adequate sequence generation?	Unclear	Not described
Allocation concealment?	Yes	Sealed envelopes
Blinding? All outcomes	Yes	Yes for objective measures of outcome
Incomplete outcome data addressed? All outcomes	Yes	All patients randomised accounted for at follow up
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

Preen 2005

Methods	RCT

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Preen 2005 (*Continued*)

Participants	Patients with chronic obstructive pulmonary disease, cardiovascular disease, or both. Mean age: 75.1± 10.9 years Sex: (number female): T = 57 (62%), C = 58 (59%) Number of patients recruited: T = 91, C = 98
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: yes. Discharge planning was based on the Australian Enhanced Primary Care Initiative and tailored to each patient. The discharge plan was developed 24 to 48 hours prior to discharge. Problems were identified from hospital notes and patient/caregiver consultation, goals were developed and agreed upon with the patient/caregiver 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 general medical practitioner (GP) and consultation with the GP was scheduled within 7 days post-discharge. Copies faxed to all service providers identified on the care plan. Monitoring: research nurse followed up if GP did not respond in 24 hours and the GP scheduled a consultation (within 7 days post-discharge)for patient review Control group: 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 general practitioner
Outcomes	SF-12, patient satisfaction and views of the discharge process and GP views of the discharge planning process at 7 days post discharge
Notes	-

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Unclear	Not described
Allocation concealment?	Yes	Described as an "allocation concealment technique"
Blinding? All outcomes	No	Blinding for objective measures of outcome
Incomplete outcome data addressed? All outcomes	Yes	61/189 patients did not return surveys (32% drop-out), GP 70.4% response rate at 7 days post-discharge
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	At discharge from hospital

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Rich 1993

Methods	RCT
Participants	Older people with congestive heart failure (CHF) Number recruited: 261 with congestive heart failure were identified: 52 were classified as low risk, 123 as intermediate risk (with 1 risk factor), 65 as high risk for rehospitalisation and 21 died during the admission and were excluded from the analysis, leaving 98 patients (61 moderate risk, 37 high risk): Treatment = 63, Control = 35 (recruited between April 1988 and March 1989) Age: 70 years and older Sex: (number female) T = 38/63 (60%), C = 20/35 (57%) Ethnicity: number white T = 29/63, C = 20/35 The following were excluded: patients at low risk (n = 52), those who died during admission (n = 21), residence outside the catchment area (n = 23), planned discharge to a nursing home or long-term care facility (n = 15), non-cardiac illness likely to result in readmission, psychiatric disturbance (n = 8), patient or physician refusal (n = 23), logistical reasons (n = 21)
Interventions	Setting: Jewish Hospital at Washington University Pre-admission assessment: yes Case finding on admission: yes Inpatient assessment and preparation of a discharge plan based on individual patient needs: yes 1. Intensive education about CHF and its treatment during daily visits by cardiovascular research nurse to discuss the diagnosis, symptoms, treatment, follow up and prognosis of CHF using a 15-page booklet *Congestive Heart Failure: a Patient's Guide* which was developed by the investigators for the elderly CHF patient. Dietary advice by dietician and study nurse; a 1.5 to 2.0 gram sodium diet was designed, minimising changes in eating patterns. 2. Assessment of medication with recommendations designed to improve compliance and reduce adverse effects. A medication card was provided detailing the time and dose of all drugs. Information about side effects was given. Daily recording of weights was emphasised and patients were instructed to contact researchers for weight changes in excess of 3 to 5 pounds. Scales were provided if necessary. 3. Early discharge planning: patient seen by a social worker and member of the home care team to facilitate discharge planning and ease the transition from the hospital to the home environment. Economic, social and transport problems were identified and managed. 4. Enhanced follow up through home care and telephone contacts with additional assistance provided if needed. Patients were visited at home within 48 hours of hospital discharge and then 3 times in the first week and at regular intervals thereafter. At each visit, the home care nurse reinforced the teaching materials, reviewed medications, diet and activity guidelines, physical assessment, and cardiovascular examination, plus assessed for additional problem areas. Study nurse contacted patients by phone, and patients were encouraged to call researchers or personal physician with any new problems or questions. Implementation of the discharge plan: yes Monitoring: yes Control intervention: 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

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Rich 1993 (*Continued*)

	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

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	2:1 treatment:control allocated
Allocation concealment?	Unclear	Not described
Blinding? All outcomes	Yes	For objective measures of outcome (readmission, mortality)
Incomplete outcome data addressed? All outcomes	Yes	All patients randomised accounted for at follow up
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

Rich 1995

Methods	RCT
Participants	Confirmed heart failure and at least 1 of the following risk factors for early readmission: priory history of heart failure, 4 or more hospitalisations in the preceding 5 years, congestive heart failure precipitated by acute MI or uncontrolled hypertension Age: median age 79 years Ethnicity: non-white race 55% Sex: (number female) T = 96/142 (68%), C = 83/140 (59%) Living alone: T = 58/142 (41%), C = 62/140 (44%) Exclusion criteria: residence outside the catchment area for the Jewish Hospital Home Care, planned discharge to a long-term care facility, severe dementia, severe psychiatric illness, anticipated survival of less than 3 months, refusal to participate, logistic or discretionary reasons (e.g. participation in the pilot study) Number recruited: T = 142 C = 140 (recruited between July 1990 and June 1994)
Interventions	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: yes. This included using a teaching booklet, individualised dietary assessment and instruction by a dietician with reinforcement by the cardiovascular research nurse,

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Rich 1995 (*Continued*)

	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: yes with social services Monitoring: not clear Control group: 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

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Computer generated list of random numbers
Allocation concealment?	Yes	Neither patient nor members of the study team were aware of the treatment assignment until after randomisation
Blinding? All outcomes	Yes	For objective measures of outcome (mortality, readmissions and death)
Incomplete outcome data addressed? All outcomes	Yes	All patients randomised accounted for at follow up
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

Shaw 2000

Methods	RCT
Participants	Patients discharged from a psychiatric hospital or care of the elderly ward with a mean age of 47 (SD 17) years. 82% in the intervention group were diagnosed with an affective disorder, and 57% in the control group. 43% in the intervention group were diagnosed with a psychotic disorder, and 16% in the control group. Number of drugs on admission ranged from 1 to 10. Number recruited: T = 51, C = 46
Interventions	Pre-admission assessment: no Case finding on admission: no Inpatient assessment and preparation of a discharge plan based on individual patient

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Shaw 2000 (*Continued*)

	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 Control group care not described
Outcomes	Readmission to hospital, readmission due to non-compliance, medication problems after being discharged from hospital
Notes	-

Risk of bias

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Table of generated numbers with a randomised permuted block size of 6
Allocation concealment?	Yes	Randomisation by the project pharmacist
Blinding? All outcomes	No	Not possible to blind patients
Incomplete outcome data addressed? All outcomes	Unclear	> 30% attrition at 12 weeks
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

Sulch 2000

Methods	RCT
Participants	Patients were recovering from a stroke (excluded those with a mild deficit and those with severe cognitive or physical disability) Mean age (SD): T = 75 (11) years, C = 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 integrated care pathway (ICP). Multi disciplinary training preceded implementation of the ICP. ICP was piloted for 3 months prior to recruitment to the trial. Control group: to avoid contamination the multidisciplinary process of care received by

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Sulch 2000 (*Continued*)

	the control group was reviewed with a 3-month run-in period to ensure implementation. Groups received comparable amounts of physiotherapy and occupational therapy.
Outcomes	Length of hospital 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

Item	**Authors' judgement**	**Description**
Adequate sequence generation?	Yes	Computer generated list of randomised numbers
Allocation concealment?	Yes	Randomisation office allocated patients to intervention or control
Blinding? All outcomes	No	Participants and health professionals aware of allocation group
Incomplete outcome data addressed? All outcomes	Yes	All patients randomised accounted for at follow up
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

Weinberger 1996

Methods	RCT
Participants	Patients with diabetes mellitus, heart failure, chronic obstructive pulmonary disease Number of patients recruited: T = 695, C = 701 Mean age: T = 63.0 years, C = 62.6 years
Interventions	Setting: 9 VA hospitals Pre-admission assessment: no Case finding on admission:no Inpatient assessment and preparation of a discharge plan based on individual patient needs: 3 days before discharge a primary nurse assessed the patient's post-discharge needs. 2 days 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

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Weinberger 1996 (*Continued*)

	post-discharge appointment. Control group 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 days of discharge 9 VA hospitals participated in the trial Discharge planning within 3 days of discharge

Risk of bias

Item	Authors' judgement	Description
Adequate sequence generation?	Yes	Produced by statistical co-ordinating centre
Allocation concealment?	Yes	Allocation made by telephoning the statistical co-ordinating centre
Blinding? All outcomes	Yes	Objective measures of outcome and telephone interviews
Incomplete outcome data addressed? All outcomes	Yes	All patients randomised accounted for at follow up
Free of selective reporting?	Unclear	Not able to judge from available information
Baseline data?	Yes	Baseline data reported

DA = discharge advocate; ADL = activities of daily living; AHCP = after-hospital care plan; C = control; CHF = congestive heart failure; CM = case manager; COPD = chronic obstructive pulmonary disease; IADL = instrumental activities of daily living; ICP = integrated care pathway; IQR = interquartile range; MI = myocardial infarction; MM=mini-mental assessment; OT=occupational therapist; PCP = primary care provider; PT=physiotherapist; RCT = randomised controlled trial; RED = re-engineered discharge; RN = registered nurse; T = treatment

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

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 post-partum hospital discharge

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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
Donahue 1994	Intervention discharge planning plus post-discharge care package
Dudas 2001	Intervention is focused on telephone follow up not discharge planning. Randomised to groups after discharge from hospital.
Epstein 1990	RCT: consultative geriatric assessment and limited follow up
Fretwell 1990	RCT: consultative inpatient multidisciplinary team care
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
Haggmark 1997	Study design not clear
Hansen 1992	RCT: follow-up home visits
Hickey 2000	1. Patients in the intervention group received discharge planning from a nurse case manager, patients in the control group received discharge planning on request 2. Method of randomisation not described. Unit of randomisation was a ward team, 4 randomised to intervention and 2 to standard care.
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 post-discharge follow up
Landefield 1995	Special unit plus rehabilitation
Martin 1994	RCT of discharge planning plus hospital at home
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

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Melin 1993	Post-discharge care
Melin 1995a	RCT (secondary analysis). In-home primary care.
Melin 1995b	Post-discharge care
Murray 1995	Controlled trial. Communication between hospital and home.
Naylor 1999	RCT. Discharge planning and home follow up.
Naylor 2004	The intervention was a complex package of care where the main emphasis was not on discharge planning. During the hospitalisation phase there was collaboration with physicians and other providers to optimise the patient's health status at discharge, design the discharge plan, and arrange for needed home care services. Special emphasis was placed on preventing functional decline and streamlining medication regimens. Advanced practice nurses (APNs) were able to provide input to the nursing staff regarding the discharge needs of patients and caregivers, thus maximising the time staff nurses devoted to these areas. APNs worked with discharge planners to prevent duplication of post-discharge services and co-ordinate the ordering of essential medical supplies.
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
Saltz 1988	RCT: effect of geriatric consultation team on discharge placement
Siu 1996	Geriatric assessment started at hospital and continued at home
Smith 1988	RCT: post-discharge intervention to reduce non-elective readmission
Thomas 1993	RCT: comprehensive geriatric consultation team
Townsend 1988	Post-discharge care
Victor 1988	Augmented home help scheme
Voirol 2004	RCT of a paediatric pharmacy discharge planning process. There was a high loss to follow up of T = 91/145 (63%), C = 81/146 (55%)
Winograd 1993	RCT: inpatient interdisciplinary geriatric assessment team

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APN= HMO=health maintenance organisation; RCT = randomised controlled trial

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DATA AND ANALYSES

Comparison 1. 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	10	1765	Mean Difference (IV, Fixed, 95% CI)	-0.91 [-1.55, -0.27]
2 Hospital length of stay - older medical and surgical patients	2	1108	Mean Difference (IV, Fixed, 95% CI)	-0.60 [-2.38, 1.18]
3 Hospital length of stay - older surgical patients	1	134	Mean Difference (IV, Fixed, 95% CI)	1.0 [-2.00, 4.00]
4 Sensitivity analysis imputing missing SD for Kennedy trial	10	1765	Mean Difference (IV, Fixed, 95% CI)	-1.01 [-1.61, -0.40]

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 Patients with a medical condition			Other data	No numeric data
2 Patients who have had surgery			Other data	No numeric data
3 Patients with medical or surgical condition			Other data	No numeric data
4 Unscheduled readmission within 3 months of discharge from hospital	12	2612	Risk Ratio (M-H, Fixed, 95% CI)	0.85 [0.75, 0.97]
4.1 Unscheduled readmission for those with a medical condition	11	2552	Risk Ratio (M-H, Fixed, 95% CI)	0.85 [0.74, 0.97]
4.2 Older people admitted to hospital following a fall	1	60	Risk Ratio (M-H, Fixed, 95% CI)	1.67 [0.44, 6.36]
5 Patients with a mental health diagnosis			Other data	No numeric data

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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 or surgical condition			Other data	No numeric data
2 Patients with a medical condition			Other data	No numeric data
3 Patients with a surgical condition			Other data	No numeric data

Comparison 4. Mortality

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Mortality at 6 to 9 months	5	1038	Risk Ratio (M-H, Fixed, 95% CI)	1.05 [0.75, 1.47]
1.1 Older people with a medical condition	4	978	Risk Ratio (M-H, Fixed, 95% CI)	1.04 [0.74, 1.46]
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

Comparison 5. Effect of discharge planning on patient health outcomes

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 medical or surgical condition			Other data	No numeric data
4 Effect of discharge planning on patients' and carers' satisfaction			Other data	No numeric data
5 Patients with a mental health diagnosis			Other data	No numeric data

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Comparison 6. Effect of discharge planning on healthcare 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

Comparison 7. Effect of discharge planning on use of primary care services

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 8. 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 with a medical condition			Other data	No numeric data
2 Patients with a medical or surgical condition			Other data	No numeric data
3 Patients discharged from hospital to home	2	419	Risk Ratio (M-H, Fixed, 95% CI)	1.03 [0.93, 1.14]
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 9. Outpatient attendance

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Older patients with a medical condition	1	288	Risk Ratio (M-H, Fixed, 95% CI)	1.07 [0.74, 1.56]

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Comparison 10. Medication

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

Comparison 11. Satisfaction

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

Comparison 12. Cost

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Patients with a mental health diagnosis			Other data	No numeric data
2 Patients with heart failure			Other data	No numeric data
3 Patients admitted to a general medical service			Other data	No numeric data

Comparison 13. Process of care measures

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Process of care			Other data	No numeric data

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Comparison 14. Emergency room visits

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 First visits to the emergency room	1	165	Risk Ratio (M-H, Fixed, 95% CI)	0.65 [0.43, 0.97]

Comparison 15. Number of falls at follow up

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Older people admitted to hospital following a fall	1	60	Risk Ratio (M-H, Fixed, 95% CI)	0.87 [0.50, 1.49]

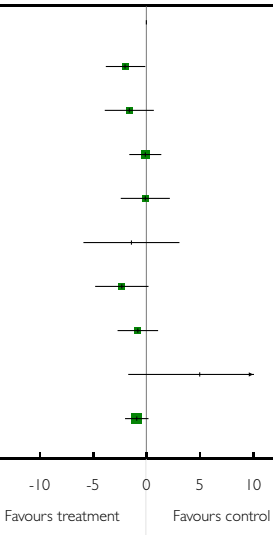
Analysis 1.1. Comparison 1 Hospital length of stay, Outcome 1 Hospital length of stay - older patients with a medical condition.

Review: Discharge planning from hospital to home

Comparison: 1 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	Mean Difference IV,Fixed,95% CI
Kennedy 1987	39	7.8 (0)	41	9.7 (0)		0.0 [0.0, 0.0]
Moher 1992	136	7.43 (6.33)	131	9.4 (8.97)		-1.97 [-3.84, -0.10]
Naughton 1994	51	5.4 (5.5)	60	7 (7)		-1.60 [-3.93, 0.73]
Naylor 1994	72	7.4 (3.8)	66	7.5 (5.2)		-0.10 [-1.63, 1.43]
Harrison 2002	92	7.59 (8.36)	100	7.67 (7.99)		-0.08 [-2.40, 2.24]
Rich 1993	63	4.3 (8.8)	35	5.7 (12)		-1.40 [-5.93, 3.13]
Rich 1995	142	3.9 (10)	140	6.2 (11.4)		-2.30 [-4.80, 0.20]
Preen 2005	91	11.6 (5.7)	98	12.4 (7.4)		-0.80 [-2.68, 1.08]
Sulch 2000	76	50 (19)	76	45 (23)		5.00 [-1.71, 11.71]
Laramee 2003	131	5.5 (3.5)	125	6.4 (5.2)		-0.90 [-1.99, 0.19]



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Study or subgroup	Discharge planning N	Mean(SD)	Control N	Mean(SD)	Mean Difference IV,Fixed,95% CI	Mean Difference IV,Fixed,95% CI
Total (95% CI)	**893**		**872**			**-0.91 [-1.55, -0.27]**
Heterogeneity: Chi² = 7.37, df = 8 (P = 0.50); I² =0.0%						
Test for overall effect: Z = 2.79 (P = 0.0052)						

Analysis 1.2. Comparison 1 Hospital length of stay, Outcome 2 Hospital length of stay - older medical and surgical patients.

Review: Discharge planning from hospital to home

Comparison: 1 Hospital length of stay

Outcome: 2 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	Mean Difference IV,Fixed,95% CI
Hendriksen 1990	135	11 (0)	138	14.3 (0)		0.0 [0.0, 0.0]
Evans 1993	417	11.9 (12.7)	418	12.5 (13.5)		-0.60 [-2.38, 1.18]
Total (95% CI)	**552**		**556**			**-0.60 [-2.38, 1.18]**
Heterogeneity: Chi² = 0.0, df = 0 (P = 1.00); I² =0.0%						
Test for overall effect: Z = 0.66 (P = 0.51)						

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Analysis 1.3. Comparison 1 Hospital length of stay, Outcome 3 Hospital length of stay - older surgical patients.

Review: Discharge planning from hospital to home

Comparison: 1 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)		100.0 %	1.00 [-2.00, 4.00]
Total (95% CI)	**68**		**66**			**100.0 %**	**1.00 [-2.00, 4.00]**

Heterogeneity: not applicable

Test for overall effect: Z = 0.65 (P = 0.51)

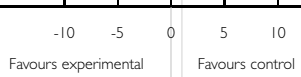
Analysis 1.4. Comparison 1 Hospital length of stay, Outcome 4 Sensitivity analysis imputing missing SD for Kennedy trial.

Review: Discharge planning from hospital to home

Comparison: 1 Hospital length of stay

Outcome: 4 Sensitivity analysis imputing missing SD for Kennedy trial

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
Harrison 2002	92	7.59 (8.36)	100	7.67 (7.99)		6.9 %	-0.08 [-2.40, 2.24]
Kennedy 1987	39	7.8 (3.8)	41	9.7 (5.2)		9.4 %	-1.90 [-3.89, 0.09]
Laramee 2003	131	5.5 (3.5)	125	6.4 (5.2)		31.2 %	-0.90 [-1.99, 0.19]
Moher 1992	136	7.43 (6.33)	131	9.4 (8.97)		10.6 %	-1.97 [-3.84, -0.10]
Naughton 1994	51	5.4 (5.5)	60	7 (7)		6.9 %	-1.60 [-3.93, 0.73]
Naylor 1994	72	7.4 (3.8)	66	7.5 (5.2)		15.8 %	-0.10 [-1.63, 1.43]
Preen 2005	91	11.6 (5.7)	98	12.4 (7.4)		10.6 %	-0.80 [-2.68, 1.08]
Rich 1993	63	4.3 (8.8)	35	5.7 (12)		1.8 %	-1.40 [-5.93, 3.13]
Rich 1995	142	3.9 (10)	140	6.2 (11.4)		5.9 %	-2.30 [-4.80, 0.20]
Sulch 2000	76	50 (19)	76	45 (23)		0.8 %	5.00 [-1.71, 11.71]



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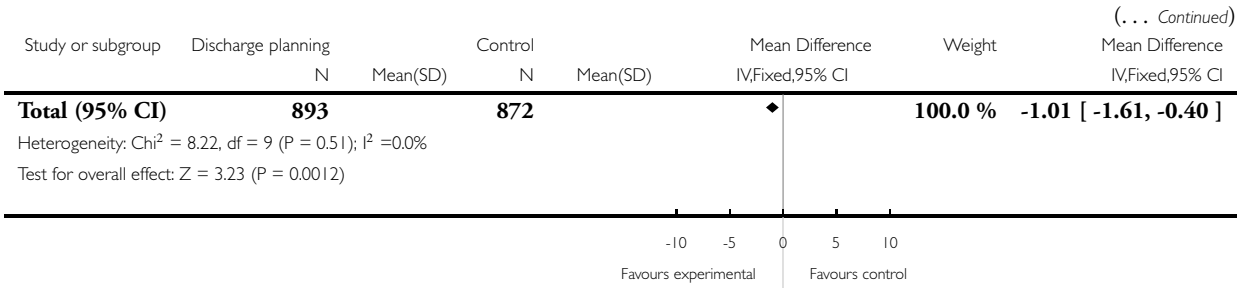

Analysis 2.1. Comparison 2 Effect of discharge planning on unscheduled readmission rates, Outcome 1 Patients with a medical condition.

Patients with a medical condition

Kennedy 1987	At 1 week: T = 2/38 (5%), C = 8/40 (20%) Difference -15%; 95% CI -29% to -0.4% At 8 weeks: T = 11/39 (28%), C = 14/40 (35%) Difference -7%; 95% CI -27.2% to 13.6%	-
Laramee 2003	At 90 days: 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 6 to 12 weeks: T = 11/72 (15%), C = 11/70 (16%) Difference 1%; 95% CI -8% to 12%	Authors also report readmission data for 2 to 6 weeks follow up
Nazareth 2001	At 3 months: T = 64/164 (39%), C = 69/176 (39.2%) Difference 0.18; 95% CI -10.6% to 10.2% At 6 months: T = 38/136 (27.9%), C = 43/151 (28.4%) Difference 0.54; 95% CI -11 to 9.9%	-
Shaw 2000	At 3 months: T = 5/51 (10%), C = 12/46 (26%) OR 3.25; 95% CI 0.94 to 12.76, P = 0.06	Authors also report data for readmission due to non-compliance with medication At 3 months: T = 4/51 (8%), C = 7/46 (15%) Difference -7%; 95% CI -0.2 to 0.05
Weinberger 1996	Number of readmissions per month T = 0.19 (+0.4) (n = 695), C = 0.14 (+ 0.2), P = 0.005 (n = 701)	Non-parametric test used to calculate P values for monthly readmissions

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Patients with a medical condition (*Continued*)

	At 6 months: T = 49%, C = 44%, P = 0.06 Treatment group readmitted "sooner" (P = 0.07)	

Analysis 2.2. Comparison 2 Effect of discharge planning on unscheduled readmission rates, Outcome 2 Patients who have had surgery.

Patients who have had surgery

Naylor 1994	Within 6 to 12 weeks: T = 7/68 (10%), C = 5/66 (7%) Difference 3%; 95% CI 7% to 13%	-

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

Patients with medical or surgical condition

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	-

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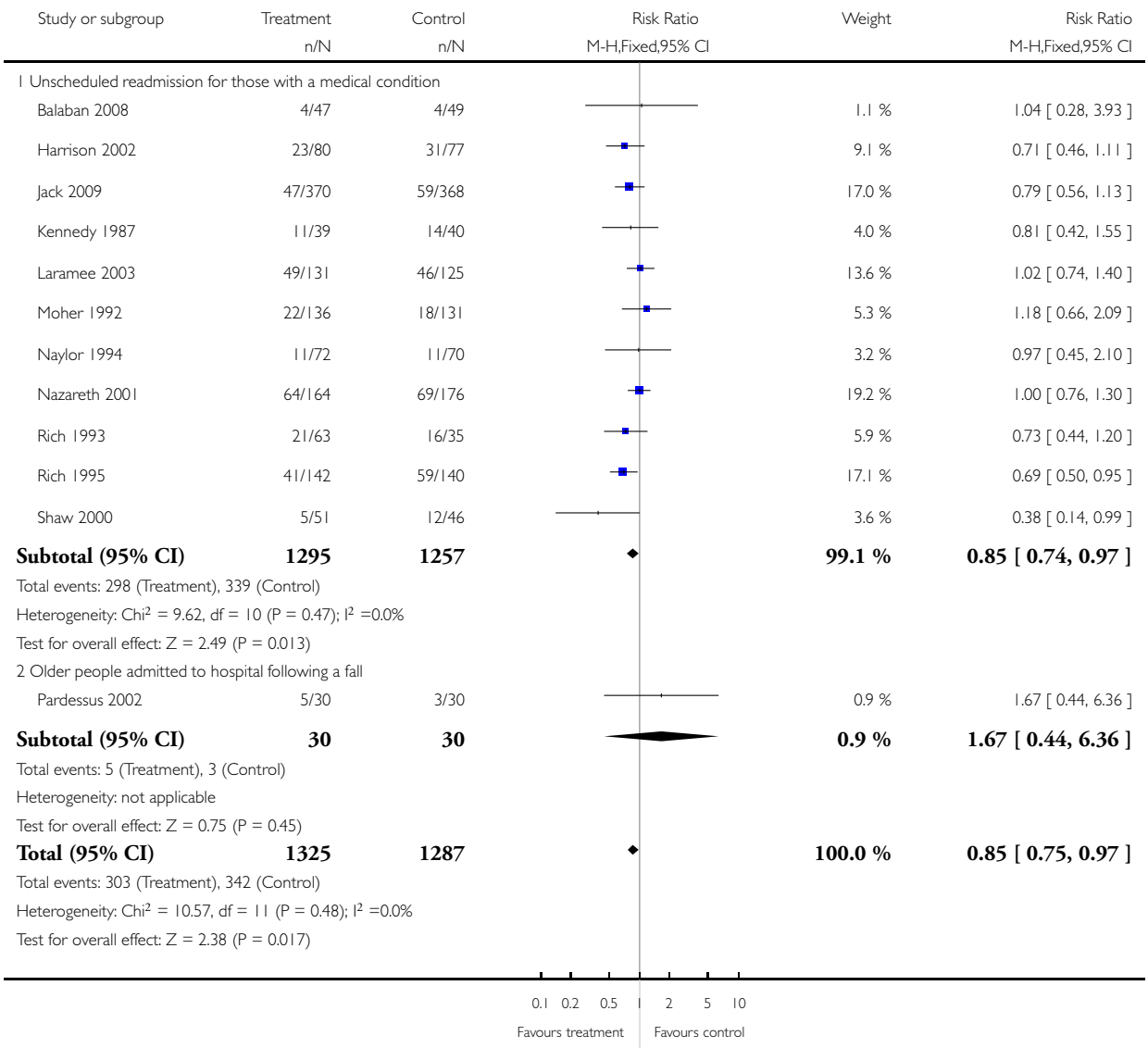
Analysis 2.4. Comparison 2 Effect of discharge planning on unscheduled readmission rates, Outcome 4 Unscheduled readmission within 3 months of discharge from hospital.

Review: Discharge planning from hospital to home

Comparison: 2 Effect of discharge planning on unscheduled readmission rates

Outcome: 4 Unscheduled readmission within 3 months of discharge from hospital



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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

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 days, C = 153 days

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

Patients with a medical or surgical condition

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 days per readmission C = 13.5 days per readmission P > 0.05	
Rich 1993	**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 3.2. Comparison 3 Effect of discharge planning on days in hospital due to unscheduled readmission, Outcome 2 Patients with a medical condition.

Patients with a medical condition

Naylor 1994	Medical readmission days 2 weeks: T = 21days (n = 72), C = 73 days (n = 70) Difference -52 days; 95% CI -78 to -26 2 to 6 weeks: T=16 days (n = 72), C=49 days (n = 70) Difference -33 days; 95% CI -53 to -13 6 to 12 weeks: T = 94 days (n = 72), C=100 days (n = 70) Difference -6 days; 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 days, P < 0.04	-

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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

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

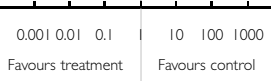
Analysis 4.1. Comparison 4 Mortality, Outcome 1 Mortality at 6 to 9 months.

Review: Discharge planning from hospital to home

Comparison: 4 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					
Laramee 2003	13/131	15/125		25.8 %	0.83 [0.41, 1.67]
Nazareth 2001	22/137	19/151		30.4 %	1.28 [0.72, 2.25]
Rich 1995	13/142	17/140		28.8 %	0.75 [0.38, 1.49]
Sulch 2000	10/76	6/76		10.1 %	1.67 [0.64, 4.36]
Subtotal (95% CI)	**486**	**492**		**95.0 %**	**1.04 [0.74, 1.46]**
Total events: 58 (Treatment), 57 (Control)					
Heterogeneity: Chi^2 = 2.68, df = 3 (P = 0.44); I^2 =0.0%					
Test for overall effect: Z = 0.21 (P = 0.83)					
2 Older people admitted to hospital following a fall					
Pardessus 2002	4/30	3/30		5.0 %	1.33 [0.33, 5.45]
Subtotal (95% CI)	**30**	**30**		**5.0 %**	**1.33 [0.33, 5.45]**
Total events: 4 (Treatment), 3 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.40 (P = 0.69)					
Total (95% CI)	**516**	**522**		**100.0 %**	**1.05 [0.75, 1.47]**
Total events: 62 (Treatment), 60 (Control)					
Heterogeneity: Chi^2 = 2.80, df = 4 (P = 0.59); I^2 =0.0%					
Test for overall effect: Z = 0.30 (P = 0.76)					



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Analysis 4.2. Comparison 4 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

Evans 1993	T = 66/417 (16%) C = 67/418 (16%)	-

Analysis 5.1. Comparison 5 Effect of discharge planning on patient health outcomes, Outcome 1 Patients with a medical condition.

Patients with a medical condition

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 (SD12.45) 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
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
Nazareth 2001	General well-being questionnaire: 1 = ill health, 5 = good health	-

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Patients with a medical condition (*Continued*)

	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 0.1; 95% CI -0.14 to 0.34	
Preen 2005	SF-12 (N not reported for follow up) Mental component score Pre-discharge score: T = 37.4 SD 5.4 C = 39.8 SD 6.1 7 days post-discharge: T = 42.4 SD 5.6 C = 40.9 SD 5.7 Physical component score Pre-discharge score: T = 27.8 SD 4.8 C = 28.3 SD 4.7 7 days post-discharge: T = 27.2 SD 4.5 C = 27.2 SD 4.1	-
Rich 1995	**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 days: 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 days: 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 days: T = 18.3 (6.3), C = 16.8 (5.5) Change score 5.4 (5.5) Emotional function At baseline: T = 31.9 (8.5), C = 33.3 (8.1) At 90 days: T = 37.4 (7.8), C = 35.2 (8.4)	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

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Patients with a medical condition (*Continued*)

	Change score 5.6 (7.1) Environmental mastery At baseline: T = 18.3 (5.8), C = 18.9 (4.8) At 90 days: 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 At 4 weeks:	-

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Patients with a medical condition (*Continued*)

	T = 41, C = 44 P = 0.1 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 5.2. Comparison 5 Effect of discharge planning on patient health outcomes, Outcome 2 Patients with a surgical condition.

Patients with a surgical condition

Naylor 1994	No differences between groups reported	No data reported

Analysis 5.3. Comparison 5 Effect of discharge planning on patient health outcomes, Outcome 3 Patients with a medical or surgical condition.

Patients with a medical or surgical condition

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 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	-

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Analysis 5.4. Comparison 5 Effect of discharge planning on patient health outcomes, Outcome 4 Effect of discharge planning on patients' and carers' satisfaction.

Effect of discharge planning on patients' and carers' satisfaction

Moher 1992	Satisfied with medical care: T = 89%, C = 62% Difference 27%; 95% CI 2% to 52%, P < 0.05	"Please rate how satisfied you were with the care you received…" Subgroup of 40 patients, responses from 18 in the treatment group and 21 in the control group
Nazareth 2001	Client satisfaction questionnaire score (1 = dissatisfied, 4 = satisfied) At 3 months: T = 76, mean 3.3 (SD 0.6) C = 73, mean 3.3 (SD 0.6) At 6 months: T = 62, mean 3.4 (SD 0.6) C = 61, mean 3.2 (SD 0.6) Mean difference 0.2; 95% CI -0.56 to 0.96	P < 0.05
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

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Analysis 5.5. Comparison 5 Effect of discharge planning on patient health outcomes, Outcome 5 Patients with a mental health diagnosis.

Patients with a mental health diagnosis

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 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 6.1. Comparison 6 Effect of discharge planning on healthcare costs, Outcome 1 Patients with a medical condition.

Patients with a medical condition

Laramee 2003	Total inpatient and outpatient median costs T = $15,979 C = $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 $33.93 for the CM. The average intervention cost per patient was $228.52, and the average time spent with each intervention patient was 6.7 hours per 12 weeks.
Naughton 1994	Mean total hospital costs per patient ($): T = 4525 ± 5087 C = 6474 ± 7000	Number: T = 51, C = 60

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Patients with a medical condition (*Continued*)

	P = 0.093 Mean costs for services per patient ($): Laboratory: T = 518 ± 523 C = 813 ± 839 P = 0.026 Difference £295; 95% CI -£564 to -£26.0 Diagnostic imaging: T = 67 ± 145 C = 84 ± 15 P = 0.539 Pharmacy: T = 165 ± 278 C = 389 ± 886 P = 0.068 Rehabilitation: T = 98 ± 254 C = 115 ± 201 P = 0.696	Total cost of hospital care including breakdown of costs for laboratory, diagnostic imaging, pharmacy and rehabilitation services
Naylor 1994	Initial stay mean charges ($): 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 $ (CIs are in thousands): At 2 weeks: T = 68,754 C = 239,002 Difference = -170,247 (CI -253 to -87) 2 to 6 weeks: T = 52,384 C = 189,892 Difference = -137,508 (CI -210 to -67) 6 to 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)

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Analysis 6.2. Comparison 6 Effect of discharge planning on healthcare costs, Outcome 2 Patients with a surgical condition.

Patients with a surgical condition

Naylor 1994	Surgical initial stay mean charges ($): T = 105,936 ± 52,356 (n = 68) C = 98,640 ± 52,331 (n = 66) Difference 7296 (CI -5141 to 19,733) Surgical readmission total charges ($): At 2 weeks: T = 111,316 C = 104,768 Difference = 6548 (CI -43 to 56) 2 to 6 weeks: T = 209,536 C = 170,248 Difference = 39,288 (CI -66 to 144) 6 to 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 days of subsequent hospitalisations, as patients were readmitted to a variety of hospitals with a wide range of charges

Analysis 7.1. Comparison 7 Effect of discharge planning on use of primary care services, Outcome 1 Patients with a medical condition.

Patients with a medical condition

Laramee 2003	Visiting Nurse post-discharge: T = 70/141(50%), Control: 64/146 (44%)	-
Nazareth 2001	General practice attendance: At 3 months: T = 101/130 (77.7%) C = 108/144 (75%) Difference 2.7%; 95% CI -7.4 to 12.7% At 6 months: T = 76/107 (71%) C = 82/116 (70.7%) Difference 0.3%; 95% CI -11.6 to 12.3%	-
Weinberger 1996	Median time from hospital discharge to the first visit: Treatment 7 days Control 13 days 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	-

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Patients with a medical condition (*Continued*)

	Mean number of visits to general medical clinic: Treatment 3.7 Control 2.2 P < 0.001	

Analysis 8.1. Comparison 8 Effect of discharge planning on patients' place of discharge, Outcome 1 Patients with a medical condition.

Patients with a medical condition

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
Moher 1992	Discharged to home: T = 111/136 (82%), C = 104/131 (79%) Difference 2.2%; 95% CI -7.3% to 11.7%	-
Naughton 1994	Discharged to nursing home: T = 3/51 (5.9%) C = 2/60 (3.3%) Difference 2.5%; 95% CI -5.3% to 10.4%	-
Sulch 2000	Discharged home: T = 56/76 (74%), C = 54/76 (71%) Discharged to an institution: T = 10/76 (13%), C = 16/76 (21%) OR 1.5; 95% CI 0.5 to 2.8	-

Analysis 8.2. Comparison 8 Effect of discharge planning on patients' place of discharge, Outcome 2 Patients with a medical or surgical condition.

Patients with a medical or surgical condition

Evans 1993	Discharged to home: T = 330/417 (79%), C = 305/418 (73%) P<0.05 difference 6%; 95% CI 0.39% to 12% Home at 9 months: T = 259/417 (62%), C = 225/418 (54%) P<0.05 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%	-

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Analysis 8.3. Comparison 8 Effect of discharge planning on patients' place of discharge, Outcome 3 Patients discharged from hospital to home.

Review: Discharge planning from hospital to home

Comparison: 8 Effect of discharge planning on patients' place of discharge

Outcome: 3 Patients discharged from hospital to home

Study or subgroup	Intervention n/N	Control group n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Moher 1992	111/136	104/131		66.2 %	1.03 [0.91, 1.16]
Sulch 2000	56/76	54/76		33.8 %	1.04 [0.85, 1.26]
Total (95% CI)	**212**	**207**		**100.0 %**	**1.03 [0.93, 1.14]**

Total events: 167 (Intervention), 158 (Control group)

Heterogeneity: Chi^2 = 0.01, df = 1 (P = 0.94); I^2 =0.0%

Test for overall effect: Z = 0.58 (P = 0.56)

Analysis 8.4. Comparison 8 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 to home

Comparison: 8 Effect of discharge planning on patients' place of discharge

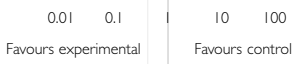
Outcome: 4 Older patients admitted to hospital following a fall in residential care at 1 year

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)



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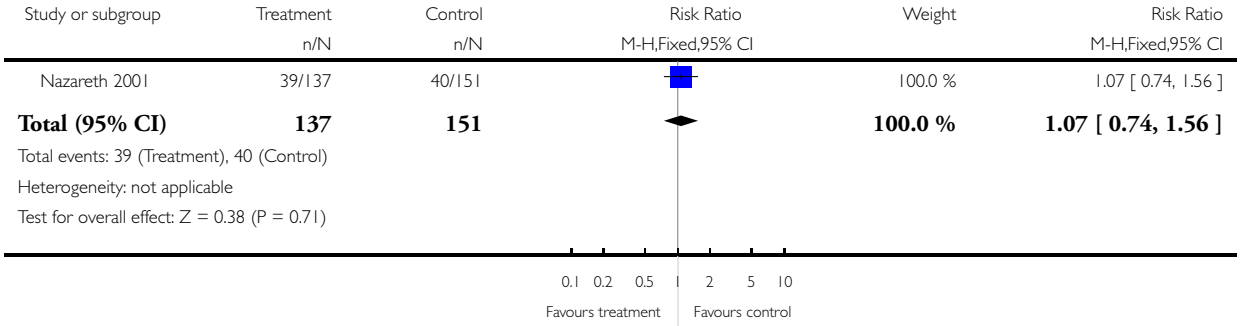
Analysis 9.1. Comparison 9 Outpatient attendance, Outcome 1 Older patients with a medical condition.

Review: Discharge planning from hospital to home

Comparison: 9 Outpatient attendance

Outcome: 1 Older patients with a medical condition



Analysis 10.1. Comparison 10 Medication, Outcome 1 Medication problems after being discharged from hospital.

Medication problems after being discharged from hospital

Bolas 2004	Intervention group demonstrated a higher rate of reconciliation of patient 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 Medication, Outcome 2 Adherence to medicines.

Adherence to medicines

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

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Analysis 10.3. Comparison 10 Medication, Outcome 3 Knowledge about medicines.

Knowledge about medicines

Bolas 2004	Mean error rate in knowledge of drug therapy at 10 to 14 days 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 0.3) Mean difference 0.01; 95% CI -0.12 to 0.13	0 = none 1 = total/highest level

Analysis 10.4. Comparison 10 Medication, Outcome 4 Hoarding of medicines.

Hoarding of medicines

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

Analysis 11.1. Comparison 11 Satisfaction, Outcome 1 Satisfaction.

Satisfaction

Professional's satisfaction	
Bolas 2004	
Patient 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) 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

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Analysis 12.1. Comparison 12 Cost, Outcome 1 Patients with a mental health diagnosis.

Patients with a mental health diagnosis

Naji 1999	T = an additional £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 12.2. Comparison 12 Cost, Outcome 2 Patients with heart failure.

Patients with heart failure

Rich 1995	Intervention cost $216 per patient Caregiver cost T = $1164, C = $828 Difference $336 Other medical care T = $1257, C = $1211 Difference $46 Readmission costs T = $2178, C = $3236 Difference -$1058 All costs T = $4815, C = $5275 Difference -$460	-

Analysis 12.3. Comparison 12 Cost, Outcome 3 Patients admitted to a general medical service.

Patients admitted to a general medical service

Jack 2009	The actual cost of emergency department visits totaled $21,389 for the usual care group and $11,285 for the intervention group. The actual cost of hospital visits totaled $412,544 for the usual care group and $268,942 for the intervention group. Follow-up PCP appointments were given an estimated cost of $55, on the basis of costs from an average hospital follow-up visit at Boston Medical Center. The estimated cost of primary care outpatient visits within 30 days after discharge totaled $8906 for 44% of 368 usual care participants and $12,617 for 62% of 370 intervention participants. The difference between study groups in total cost (combining actual hospital utilisation cost and estimated outpatient cost) for 738 participants was $149,995 - an average of $412 per person who received the intervention. This represents a 33.9% lower observed cost for the intervention group.

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Analysis 13.1. Comparison 13 Process of care measures, Outcome 1 Process of care.

Process of care

Naji 1999	Received discharge summary: T = 121/168 (83%), C = 125/175 (81%) Difference 2%; 95% CI -6 to 12 Attended initial appointment with GP: T = 104/168 (68%), C = 106/175 (72%) Difference -4.0%; 95% CI -9.0 to 11.0 Median number of GP appointments after initial consultation Median (IQR): T = 4 (2.0, 6.75) (n = 168), C = 4 (2.0, 7.0) (n = 175)	-

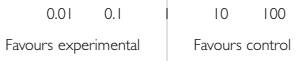
Analysis 14.1. Comparison 14 Emergency room visits, Outcome 1 First visits to the emergency room.

Review: Discharge planning from hospital to home

Comparison: 14 Emergency room visits

Outcome: 1 First visits to the emergency room

Study or subgroup	Discharge planning n/N	Usual care n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Harrison 2002	26/88	35/77		100.0 %	0.65 [0.43, 0.97]
Total (95% CI)	**88**	**77**		**100.0 %**	**0.65 [0.43, 0.97]**
Total events: 26 (Discharge planning), 35 (Usual care)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.09 (P = 0.037)					



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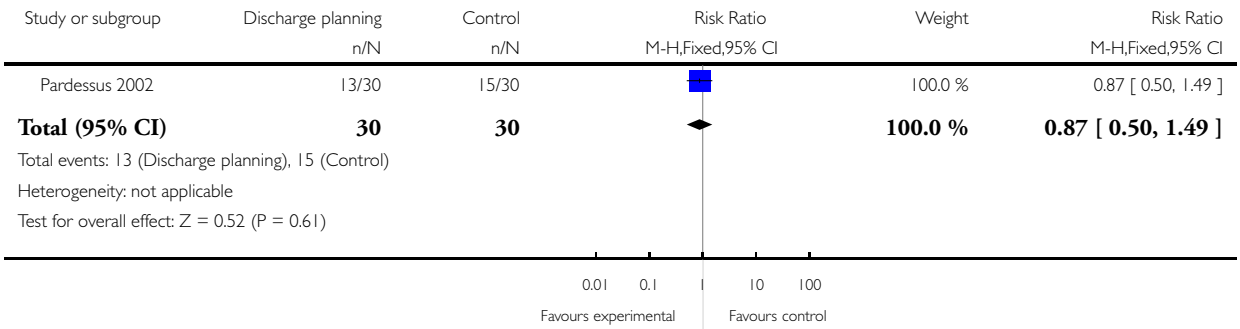
Analysis 15.1. Comparison 15 Number of falls at follow up, Outcome 1 Older people admitted to hospital following a fall.

Review: Discharge planning from hospital to home

Comparison: 15 Number of falls at follow up

Outcome: 1 Older people admitted to hospital following a fall



APPENDICES

Appendix 1. Appendix 1

EPOC Register

{Discharge plan} OR {discharge planning} OR {discharge plans} OR {delayed discharge*} AND {admission} OR {readmission*} OR {length of stay} OR {disease management} OR {fragmentation of care} OR {admissions} AND {2001} OR {2002} OR {2003} OR {2004} OR {2005} OR {2006} OR {2007} OR {2008} OR {2009}

OVID MEDLINE (R) and EMBASE search strategy

Subject search:

1 ((patient* adj3 discharg*) or (hospital* adj3 discharg*) or (discharg* adj3 plan*)).tw. (45713)
2 *Patient Discharge/(4581)
3 1 or 2 (47577)
4 *Patient Readmission/(1204)
5 (readmission* or re-admission* or (length adj of adj stay)).tw. (29237)
6 4 or 5 (29571)
7 6 and 3 (4957)
8 limit 7 to yr="2008 - 2009" (508)

MEDLINE RCT filter from Cochrane handbook:

9 randomized controlled trial.pt. (167756)
10 controlled clinical trial.pt. (32658)
11 randomi*.ab. (319860)
12 placebo.ab. (133676)
13 drug therapy.fs. (637858)
14 randomly.ab. (173580)
15 trial.ab. (246648)
16 groups.ab. (1041224)
17 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 (2009081)

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18 (animals not (humans and animals)).sh. (1196638)
19 17 not 18 (1824730)
Subject AND RCT filter (for the MEDLINE results):
20 8 and 19 (166)
EMBASE RCT filter from Cochrane handbook:
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*).tw. (876690)
22 exp cross-over studies/ or exp double-blind method/ or exp random allocation/or exp single-blind method/ (192850)
23 21 or 22 (914961)
Subject AND RCT filter (for the EMBASE results):
24 8 and 23 (94)
Combine MEDLINE/EMBASE and de-duplicate:
25 24 or 20 (176)
26 remove duplicates from 25 (126)

CINAHL

discharge plan*,. patient discharge, length of stay hospital discharg*.

EconLit

discharge plan*.

PsychLit

discharge plan, hospital discharge

SIGLE database for grey literature

discharg* plan, patient discharge, hospital discharge

F E E D B A C K

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

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WHAT'S NEW

Last assessed as up-to-date: 25 March 2009.

10 November 2009	New citation required and conclusions have changed	Authors found 10 new studies, providing evidence about the effect of discharge planning.
10 November 2009	New search has been performed	New search completed July 2009. Ten new studies.

HISTORY

Protocol first published: Issue 3, 1997

Review first published: Issue 4, 2000

23 September 2003	New search has been performed	Search identified additional trials for inclusion

CONTRIBUTIONS OF AUTHORS

Sasha Shepperd (SS) co-authored the protocol for the review with Julie Parkes (no longer an author), obtained funding for the review, scanned the abstracts and extracted data, took the lead in writing the review, did the data analysis, constructed the results tables, and led on updating the review.

Jacqueline McClaran assisted with data extraction for the update of the review and commented on drafts of the previous update. Natasha Lannin, Lindy Clemson, Annie McCluskey and Ian Cameron assisted with study selection and data extraction for the update of the review, and commented on a draft of this update.

DECLARATIONS OF INTEREST

None.

SOURCES OF SUPPORT

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

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We have added a risk of bias table to this update of the review

INDEX TERMS

Medical Subject Headings (MeSH)

*Patient Discharge; Controlled Clinical Trials as Topic; Health Care Costs; Length of Stay; Outcome Assessment (Health Care); Patient Readmission; Randomized Controlled Trials as Topic

MeSH check words

Humans

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