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Early discharge hospital at home (Review)

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TABLE OF CONTENTS

[Intervention Review]

Early discharge hospital at home

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ABSTRACT

Background

Early discharge hospital at home is a service that provides active treatment by healthcare professionals in the patient's home for a condition that otherwise would require acute hospital inpatient care. This is an update of a Cochrane review.

Objectives

To determine the effectiveness and cost of managing patients with early discharge hospital at home compared with inpatient hospital care.

Search methods

We searched the following databases to 9 January 2017: the Cochrane Effective Practice and Organisation of Care Group (EPOC) register, Cochrane Central Register of Controlled Trials (CENTRAL), MEDLINE, Embase, CINAHL, and EconLit. We searched clinical trials registries.

Selection criteria

Randomised trials comparing early discharge hospital at home with acute hospital inpatient care for adults. We excluded obstetric, paediatric and mental health hospital at home schemes.

Data collection and analysis

We followed the standard methodological procedures expected by Cochrane and EPOC. We used the GRADE approach to assess the certainty of the body of evidence for the most important outcomes.

Main results

We included 32 trials (N = 4746), six of them new for this update, mainly conducted in high-income countries. We judged most of the studies to have a low or unclear risk of bias. The intervention was delivered by hospital outreach services (17 trials), community-based services (11 trials), and was co-ordinated by a hospital-based stroke team or physician in conjunction with community-based services in four trials.

Studies recruiting people recovering from stroke

Early discharge hospital at home probably makes little or no difference to mortality at three to six months (risk ratio (RR) 0.92, 95% confidence interval (CI) 0.57 to 1.48, N = 1114, 11 trials, moderate-certainty evidence) and may make little or no difference to the risk of hospital readmission (RR 1.09, 95% CI 0.71 to 1.66, N = 345, 5 trials, low-certainty evidence). Hospital at home may lower the risk of living in institutional setting at six months (RR 0.63, 96% CI 0.40 to 0.98; N = 574, 4 trials, low-certainty evidence) and might slightly improve patient satisfaction (N = 795, low-certainty evidence). Hospital at home probably reduces hospital length of stay, as moderate-certainty evidence found that people assigned to hospital at home are discharged from the intervention about seven days earlier than people receiving inpatient care (95% CI 10.19 to 3.17 days earlier, N = 528, 4 trials). It is uncertain whether hospital at home has an effect on cost (very low-certainty evidence).

Studies recruiting people with a mix of medical conditions

Early discharge hospital at home probably makes little or no difference to mortality (RR 1.07, 95% CI 0.76 to 1.49; N = 1247, 8 trials, moderate-certainty evidence). In people with chronic obstructive pulmonary disease (COPD) there was insufficient information to determine the effect of these two approaches on mortality (RR 0.53, 95% CI 0.25 to 1.12, N = 496, 5 trials, low-certainty evidence). The intervention probably increases the risk of hospital readmission in a mix of medical conditions, although the results are also compatible with no difference and a relatively large increase in the risk of readmission (RR 1.25, 95% CI 0.98 to 1.58, N = 1276, 9 trials, moderate-certainty evidence). Early discharge hospital at home may decrease the risk of readmission for people with COPD (RR 0.86, 95% CI 0.66 to 1.13, N = 496, 5 trials low-certainty evidence). Hospital at home may lower the risk of living in an institutional setting (RR 0.69, 0.48 to 0.99; N = 484, 3 trials, low-certainty evidence). The intervention might slightly improve patient satisfaction (N = 900, low-certainty evidence). The effect of early discharge hospital at home on hospital length of stay for older patients with a mix of conditions ranged from a reduction of 20 days to a reduction of less than half a day (moderate-certainty evidence, N = 767). It is uncertain whether hospital at home has an effect on cost (very low-certainty evidence).

Studies recruiting people undergoing elective surgery

Three studies did not report higher rates of mortality with hospital at home compared with inpatient care (data not pooled, N = 856, low-certainty evidence; mainly orthopaedic surgery). Hospital at home may lead to little or no difference in readmission to hospital for people who were mainly recovering from orthopaedic surgery (N = 1229, low-certainty evidence). We could not establish the effects of hospital at home on the risk of living in institutional care, due to a lack of data. The intervention might slightly improve patient satisfaction (N = 1229, low-certainty evidence). People recovering from orthopaedic surgery allocated to early discharge hospital at home were discharged from the intervention on average four days earlier than people allocated to usual inpatient care (4.44 days earlier, 95% CI 6.37 to 2.51 days earlier, , N = 411, 4 trials, moderate-certainty evidence). It is uncertain whether hospital at home has an effect on cost (very low-certainty evidence).

Authors' conclusions

Despite increasing interest in the potential of early discharge hospital at home services as a less expensive alternative to inpatient care, this review provides insufficient evidence of economic benefit (through a reduction in hospital length of stay) or improved health outcomes.

PLAIN LANGUAGE SUMMARY

Services for patients discharged home early

What is the aim of this review?

To find out if providing early discharge hospital at home improves patient health outcomes and reduces costs to the health service, compared with in-hospital care.

Key messages

Compared with in-hospital care, early discharge hospital at home probably makes little or no difference to patient health outcomes or being readmitted to hospital, and probably reduces hospital length of stay and the chance of being admitted to an institution such as a care home. Patients who receive care at home might be more satisfied with the care received. The effect on health service costs is uncertain.

What was studied in this review?

One way to deal with the demand for hospital beds is to reduce hospital length of stay by discharging people early to receive health care at home. We systematically reviewed the literature on the effect of providing early discharge hospital at home services. These services are usually provided by a team of healthcare professionals, such as doctors, nurses and physiotherapists. The team visits the homes of people who have been discharged early to provide them with acute hospital care in their homes. We were interested in assessing the impact of early discharge hospital at home had on patient health outcomes and health service costs. This is an update of a Cochrane Review.

What are the main results of this review?

The review authors found 32 studies, six of which are new for this update. In total, 4746 people from twelve countries participated in those studies. The intervention was mainly delivered by hospital outreach services and community-based services. Most of the studies were well designed and conducted. The studies looked at the effect of these services in patients with different types of conditions: patients who had a stroke, older patients with different types of medical conditions and patients who had surgery. These studies show that, when compared to in-hospital care, early discharge hospital at home services probably make little or no difference to patient health outcomes or being readmitted to hospital, yet probably decreases hospital length of stay. Patients who receive care at home might be more satisfied and less likely to be admitted to institutional care. There is little evidence of cost savings to the healthcare system of discharging patients home early to hospital at home care.

How up to date is the review?

The review authors searched for studies that had been published up to 9 January 2017.

SUMMARY OF FINDINGS FOR THE MAIN COMPARISON [Explanation]

Effect of early discharge hospital at home for patients recovering from a stroke

Patient or population: patients recovering from a stroke who otherwise would require acute hospital inpatient care
Setting: Australia, Canada, Norway, Sweden, Thailand, United Kingdom
Intervention: early discharge hospital at home
Comparison: usual care

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	Number of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Without early discharge hospital at home (assumed risk)	With early discharge hospital at home (corresponding risk)				
Mortality (3 - 6 month follow-up)	56 per 1000	52 per 1000 (32 to 83)	RR 0.92 (0.57 to 1.48)	1114 (11 trials)	⊕⊕⊕◯ Moderate [1]	
Hospital readmission (3 - 6 month follow-up)	187 per 1000	204 per 1000 (133 to 211)	RR 1.09 (0.71 to 1.66)	345 (5 trials)	⊕⊕◯◯ Low [2]	
Living in an institutional setting (3 - 6 month follow-up)	150 per 1000	95 per 1000 (60 to 147)	RR 0.63 (0.40 to 0.98)	574 (4 trials)	⊕⊕◯◯ Low [2]	
Patient satisfaction	Early discharge hospital at home may slightly improve satisfaction with healthcare received for patients recovering from a stroke		-	795 (6 trials)	⊕⊕◯◯ Low [2]	
Hospital length of stay	The mean hospital length of stay in the control groups ranged from 16.1 to 42 days	The mean hospital length of stay in the intervention groups was 6.68 lower (95% CI 10.19 to 3.17 lower)	MD -6.68 (-10.19 to -3.17)	528 (4 trials)	⊕⊕⊕◯ Moderate [1]	5 other randomised trials reported that early discharge hospital at home led to a median reduction in hospital length of stay, rang-

				ing from -8 days to -15 days
Cost	It is uncertain if early discharge hospital at home leads to a reduction in costs to the health service	-	664 participants (4 trials)	⊕◯◯◯ Very low [3]

*__The risk in the intervention group__ (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; **MD:** Mean difference; **RR:** Risk ratio

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1] Downgraded 1 point for imprecision due to wide CIs.
[2] Downgraded 2 points for imprecision due to wide CIs.
[3] Downgraded 3 points due to inconsistency and imprecision.

BACKGROUND

Description of the condition

The concept of hospital at home originated with Hospitalisation à Domicile in France in 1961 and has been implemented in a number of other countries, including the USA (Leff 2009), Canada (Lemelin 2007), Australia (Crilly 2012), the United Kingdom (Lee 2015), and Spain (Vilà 2015). In its original form, Hospitalisation à Domicile was intended to provide care, including specialist care, at home for certain groups of patients who traditionally received care and treatment in hospital but who opted, with the support of their families, to be cared for in their home (Clarke 1984; Morris 1983).

Description of the intervention

Today, hospital at home schemes vary in their philosophy and focus of care, and may be community-based or provided as a hospital outreach service. In the UK, the focus of hospital at home is usually on the provision of personal, nurse-led care, building on the existing structure of primary care, although there are exceptions, for example home intravenous services (Matthews 2007). In other countries, such as the USA and Australia, hospital-based outreach services tend to dominate (Leff 2005), and in a few, integration of specialist hospital services and primary care is more common.

How the intervention might work

The types of services provided by early discharge hospital at home are designed to provide health care for patients discharged early from hospital and provide co-ordinated rehabilitation with specialist care (Hunt 2009; Iyengar 2007), with the aim of providing a service that relieves the pressure on acute hospital beds. We have conducted parallel reviews of admission avoidance hospital at home (Shepperd 2016b) and of terminal care hospital at home (Shepperd 2016a).

Why it is important to do this review

It is not known if patients admitted to early discharge hospital at home have better, equivalent or worse health outcomes compared with patients receiving inpatient hospital care, nor if the provision of early discharge hospital at home results in a reduction or an increase in costs to the health service. This is an update of a Cochrane Review (Shepperd 2009b).

OBJECTIVES

To determine the effectiveness and cost of managing patients with early discharge hospital at home compared with inpatient hospital care.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised trials.

Types of participants

Patients aged 18 years and over who are eligible to received health care from an early discharge hospital at home service. We do not include patients with long-term care needs unless they required admission to hospital for an acute episode of care. We excluded evaluations of obstetric, paediatric and mental health hospital at home schemes from the review, since our preliminary literature searches suggested that separate reviews would be justified for each of these groups, due to the different types of patient group and volume of literature (Parker 2002; Shepperd 2009a).

Types of interventions

Studies comparing early discharge hospital at home with acute hospital inpatient care. We used the following definition to determine if studies should be included in the review: hospital at home is a service that provides active treatment by healthcare professionals in the patient's home for a condition that otherwise would require acute hospital inpatient care, and always for a limited time period. In particular, hospital at home has to offer a specific service to patients in their home requiring healthcare professionals to take an active part in the patients' care. If hospital at home were not available then the patient would not be discharged early from hospital and would remain on an acute hospital ward. We therefore exclude the following services from this review: services providing long-term care, services provided in outpatient settings or post-discharge from hospital, end-of-life care at home and self-care by the patient in their home, such as self-administration of an intravenous infusion.

Types of outcome measures

Main outcomes

- Mortality
- Hospital readmissions

Other outcomes

- Functional status
- Patient-reported outcomes (including psychological well-being, general and disease-specific health status, quality of life and cognitive functioning)
- Clinical complications
- Living in an institutional setting at follow-up
- Patient satisfaction
- Caregiver outcomes (including satisfaction and burden)
- Staff views (including general practitioners' satisfaction)
- Length of stay (including number of days in hospital and total number of days of care received)
- Use of health service resources, including costs of the intervention and usual care.

We did not exclude studies due to only reporting secondary outcomes.

Search methods for identification of studies

Electronic searches

We searched the following databases on January 9th 2017 for references published since the last version of this review:

- Cochrane Central Register of Controlled Trials (CENTRAL), including the EPOC Group Specialised Register, Wiley. Search date 9 January 2017
- MEDLINE, 1946 to 9 January 2017, MEDLINE and MEDLINE In-Process and other non-indexed citations, OvidSP
- Embase, 1974 to 9 January 2017, OvidSP
- Cumulative Index to Nursing and Allied Health Literature (CINAHL), 1980 to 9 January 2017, EbscoHost
- EconLit, 1886 to 9 January 2017, Proquest

We did not apply language or publication status restrictions to these searches. See Appendix 1 for details of the search strategies used.

Searching other resources

We checked the reference lists of articles identified electronically for evaluations of hospital at home and obtained potentially relevant articles. We conducted a citation search of all included studies in the previous version of this review, using the Science Citation Index (search date: 22 April 2015). We searched clinical trial registries using the term "hospital at home" and "admission" for open, interventional trials that recruited adults and older adults (ClinicalTrials.gov), and the terms "hospital at home" (who.int/ictrp).

Data collection and analysis

Selection of studies

One review author (DGB) read all the abstracts in the records retrieved by the electronic and other searches for this update, to identify publications that appeared to be eligible for this review. Two review authors (SS and DGB) independently read these publications and selected studies for the review according to the pre-specified inclusion criteria. We resolved disagreements by discussion.

Data extraction and management

Two review authors (from SS, SI or DGB) completed data extraction independently using a checklist developed by EPOC, modified and amended for the purposes of this review (EPOC 2015a).

Assessment of risk of bias in included studies

Two review authors (from SS, SI or DGB) independently assessed risks of bias in the included studies, using a variation of the EPOC suggested 'Risk of bias' criteria for reviews (EPOC 2015c):

1. Random sequence generation
2. Allocation concealment
3. Baseline outcome measurements
4. Baseline characteristics
5. Blinding of participants and personnel
6. Blinding of outcome assessment
7. Incomplete outcome data
8. Selective reporting of outcomes

Unit of analysis issues

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

Dealing with missing data

Whenever required, we contacted investigators of primary studies for data missing from the published reports.

Assessment of heterogeneity

We quantified heterogeneity by Cochran's Q (Cochran 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.

Data synthesis

Our statistical analyses sought to include all randomised patients and were done on an intention-to-treat basis. To reduce differences between trials, where possible we grouped trials by the patients' condition (patients recovering from a stroke, older people with a mix of conditions (including chronic obstructive pulmonary disease), or trials recruiting patients recovering from surgery), as the healthcare needs, and therefore the delivery of the intervention, differ for these populations. We defined 'older patients' as those older than 65 years. For each comparison using published data for dichotomous outcomes we calculated risk ratios (RRs) using a fixed-effect model to combine data. We did not attempt a direct comparison of costs, although we had planned to do so, because the trials collected data on different resources, and used different methods to calculate costs. When combining outcome data was not possible because of differences in the population recruited, the reporting of outcomes and follow-up times, we reported the results as published in the individual studies.

Summary of findings

We graded our confidence in the evidence by creating three 'Summary of findings' tables, one for each of the patient groups (see Data synthesis for more detail), using the approach recommended by the GRADE working group (Guyatt 2008) and the specific guidance developed by EPOC (EPOC 2015b; EPOC 2015c). We included the main outcomes of mortality and hospital readmission, as well as living in an institutional setting at follow-up, patient satisfaction, length of stay and costs. We used the five GRADE considerations (study limitations, consistency of effect, imprecision, indirectness, and risk of bias) to assess the certainty of the evidence as it relates to the main outcomes (Guyatt 2008). We used methods and recommendations described in the *Cochrane Handbook* (Higgins 2011).

Subgroup analysis and investigation of heterogeneity

We did not formally investigate variation of effect in this review using subgroup analyses.

RESULTS

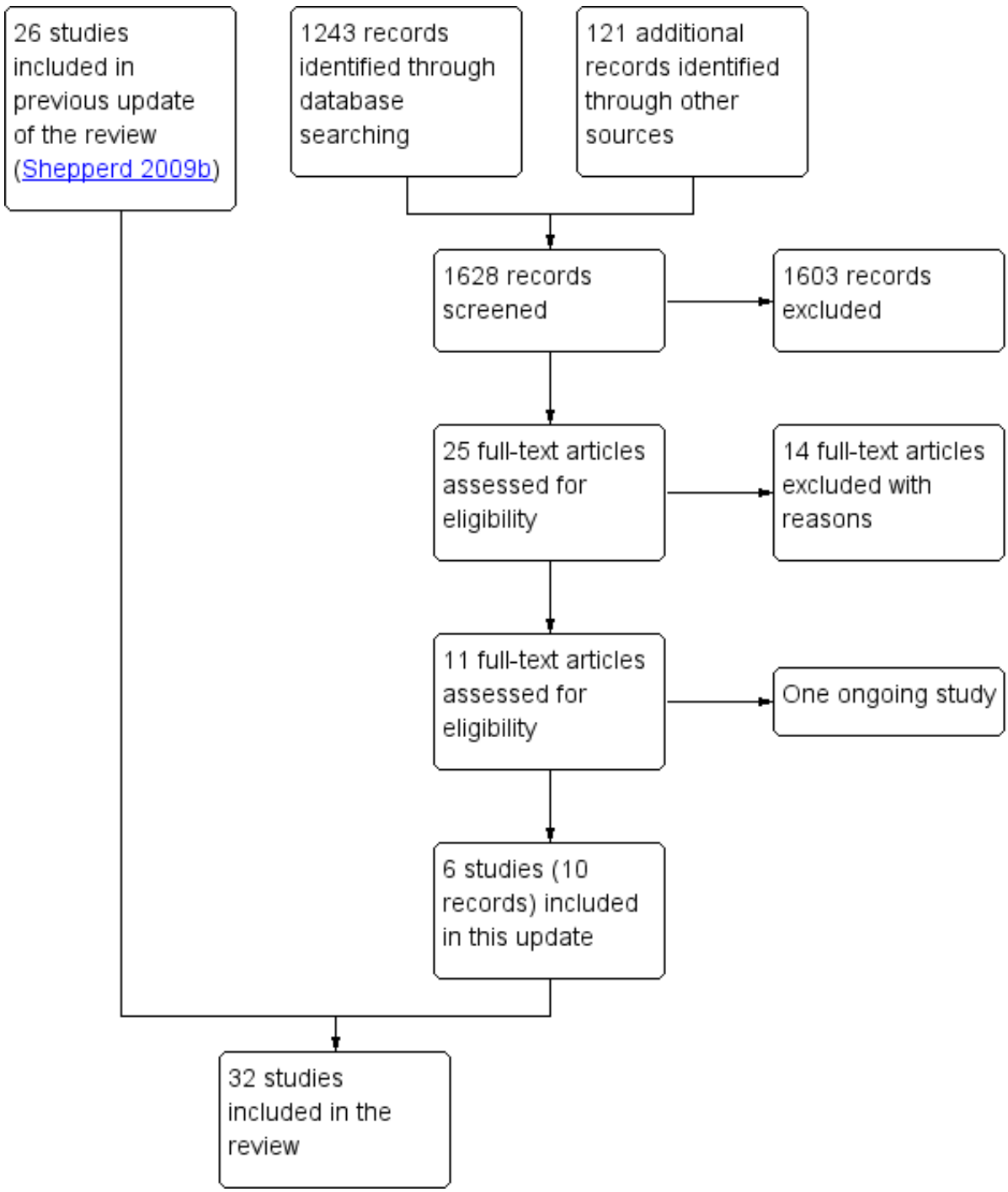
Description of studies

We identified 30 published trials, and two unpublished trials, of early discharge hospital at home, six of which are new for this update.

Results of the search

The search retrieved 1628 records, of which 1603 were ineligible. We obtained full-text versions of the remaining 25 records, 10 of which fulfilled the inclusion criteria (six trials,10 records) and bringing the total number of trials included in the review to 32 (4746 participants) (Figure 1). We also identified one ongoing trial (NCT01622205).

Figure 1. Study flow diagram.



Included studies

Study populations

Eleven trials recruited participants recovering from a stroke (Anderson 2000; Askim 2004; Bautz-Holter 2002; Donnelly 2004; Indredavik 2000; Manchester FASTER; Mayo 2000; Rodgers 1997; Rudd 1997; Suwenwela 2001; Widén Holmqvist 1998). Eight trials recruited participants with a mix of conditions (Caplan 2006; Cunliffe 2004; Donald 1995; Harris 2005; Martin 1994; Rada 2008; Richards 1998; Shepperd 1998) and five trials participants with chronic obstructive pulmonary disease (COPD) (Cotton 2002; Díaz Lobato 2005; Ojoo 2002; Skwarska 2000; Utens 2012). There was one trial each for non-alcoholic mild acute pancreatitis (Ince 2014) and chronic heart failure (Tibaldi 2013). The trials targeting recovery from elective surgery recruited participants with hernia and varicose veins (Adler 1978; Ruckley 1978), coronary artery bypass grafting (Booth 2004), knee replacement (Palmer Hill 2000) and hip fracture (Crotty 2002; Karlsson 2016). The majority of the studies came from the United Kingdom (16 trials), followed by Australia (three trials) and Norway (three trials). All of the remaining studies came from different countries (Canada, Chile, Italy, New Zealand, Spain, Sweden, Thailand, The Netherlands, Turkey).

Interventions

In 17 trials care was provided in the patients' homes by a hospital outreach service (Anderson 2000; Askim 2004; Bautz-Holter 2002; Booth 2004; Caplan 2006; Cotton 2002; Crotty 2002; Díaz Lobato 2005; Donnelly 2004; Harris 2005; Ince 2014; Karlsson 2016; Mayo 2000; Ojoo 2002; Palmer Hill 2000; Skwarska 2000; Tibaldi 2013); in 11 trials by community services (Adler 1978; Cunliffe 2004; Donald 1995; Martin 1994; Rada 2008; Richards 1998; Rodgers 1997; Ruckley 1978; Shepperd 1998; Utens 2012; Widén Holmqvist 1998); and in four trials care was co-ordinated by a hospital-based stroke team or physician in conjunction with community-based services (Donnelly 2004; Indredavik 2000; Mayo 2000; Rudd 1997). In each trial the care provided by the intervention was primarily nursing, with additional care sometimes being provided by care assistants or home helps. Hospital at home interventions in 18 trials described employing specialist and dedicated nurses (Anderson 2000; Askim 2004; Bautz-Holter 2002; Booth 2004; Caplan 2006; Cotton 2002; Crotty 2002; Cunliffe 2004; Donnelly 2004; Harris 2005; Karlsson 2016; Mayo 2000; Ojoo 2002; Palmer Hill 2000; Skwarska 2000) or specialist physicians (Díaz Lobato 2005; Rada 2008; Tibaldi 2013). Physiotherapy care was provided by 18 of the interventions (Anderson 2000; Askim 2004; Bautz-Holter 2002; Crotty 2000; Cunliffe 2004; Donald 1995; Harris 2005; Indredavik 2000; Karlsson 2016; Mayo 2000; Palmer Hill 2000; Rada 2008; Richards 1998; Rodgers 1997; Rudd 1997; Shepperd 1998; Tibaldi 2013; Widén Holmqvist 1998) and occupational therapist care by 16 (Anderson 2000; Askim 2004; Bautz-Holter 2002; Crotty 2000; Cunliffe 2004; Donald 1995; Donnelly 2004; Harris 2005; Indredavik 2000; Karlsson 2016; Mayo 2000; Richards 1998; Rodgers 1997; Rudd 1997; Shepperd 1998; Widén Holmqvist 1998). A social worker was part of the hospital at home team in seven of the interventions (Anderson 2000; Crotty 2002; Cunliffe 2004; Harris 2005; Rada 2008; Rodgers 1997; Tibaldi 2013) and three interventions included a dietitian (Karlsson 2016; Mayo 2000; Rodgers 1997). Access to a speech therapist was described in four of the interventions (Anderson 2000; Crotty 2002; Harris 2005; Rodgers 1997). In one trial rehabilitation was provided by trained Red Cross volunteers (Suwenwela 2001).

Excluded studies

We excluded 34 studies, 12 of which are new for this update. The main reason for exclusion is that the intervention was not hospital at home, but instead the provision of health care was in outpatient clinics or a mixture of outpatient and at-home care (14 trials). We list the reasons for exclusion in the Characteristics of excluded studies table.

Risk of bias in included studies

See Figure 2 and Figure 3.

Figure 2. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

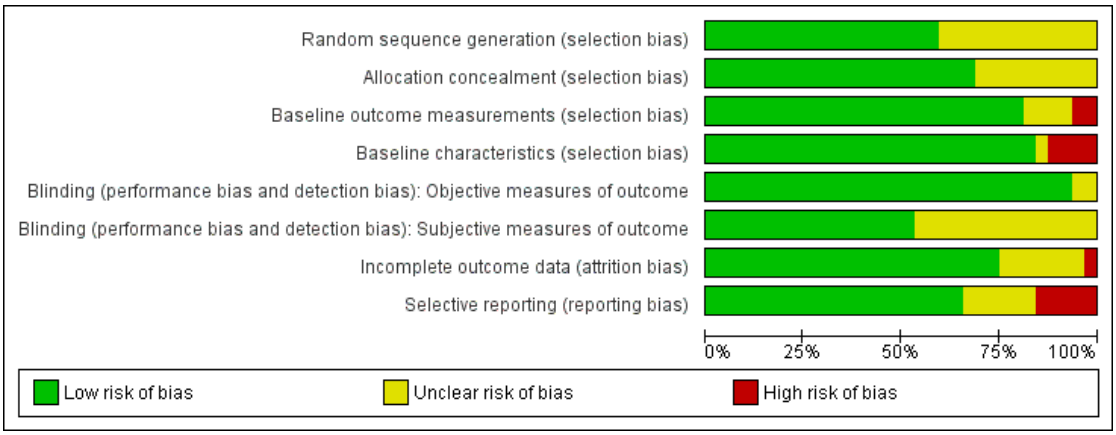
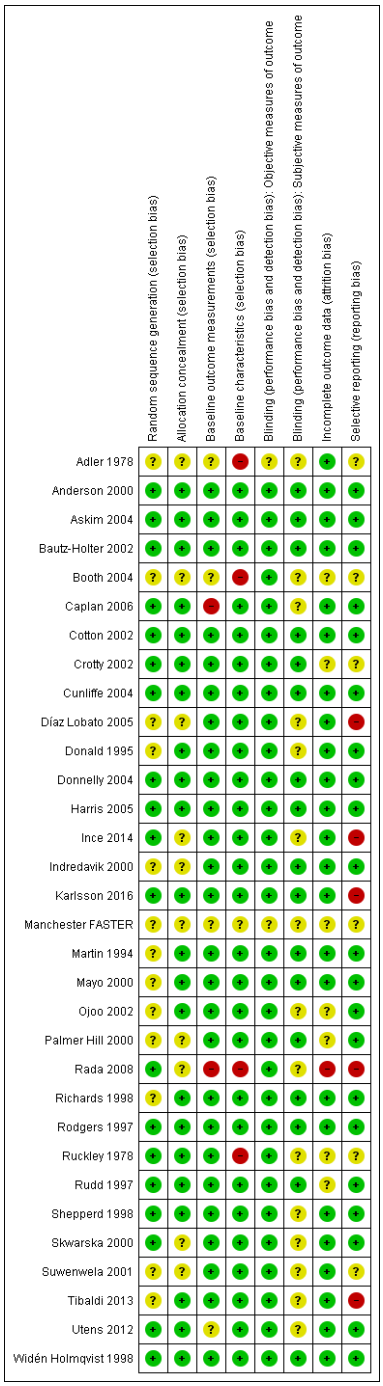


Figure 3. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.



Allocation

In 22 trials the method of randomisation and concealment of allocation was clearly described (see the Characteristics of included studies table for details). For the remaining trials selection bias was unclear due to limitations in reporting.

Blinding

For 15 trials there was an unclear risk of detection bias for the assessment of patient-reported outcomes, and a low risk for the remaining 17 trials.

Incomplete outcome data

The risk of attrition bias was unclear for seven trials, high for one trial, and low for the remaining trials.

Selective reporting

Five trials were at high risk of bias for selective reporting, as main outcomes changed from protocol registration to trial publication or not all the outcomes defined as part of the Methods were presented in the Results. The risk of selection bias was unclear for five trials and low for the remaining 22 trials.

Other potential sources of bias

Risk of bias for baseline outcome measurements was high for two trials, unclear for four trials, and low for the remaining 26 trials. Four trials were at high risk for baseline characteristics, as there were considerable differences between patients from the intervention and the control groups. One trial had an unclear risk of baseline characteristics and the remaining 27 trials were assessed as low risk.

Effects of interventions

See: **Summary of findings for the main comparison** Effect of early discharge hospital at home for patients recovering from a stroke; **Summary of findings 2** Effect of early discharge hospital at home for patients with a mix of conditions; **Summary of findings 3** Effect of early discharge hospital at home for patients recovering from surgery

We included 32 trials (N = 4746), six of which are new for this update. We report the analyses by the patients' condition at recruitment: patients recovering from a stroke, older people with a mix of conditions (including COPD), and those recovering from surgery.

1. Early discharge hospital at home for patients recovering from a stroke

Eleven trials recruited patients recovering from a stroke (Anderson 2000; Askim 2004; Bautz-Holter 2002; Donnelly 2004; Indredavik 2000; Manchester FASTER; Mayo 2000; Rodgers 1997; Rudd 1997; Suwenwela 2001; Widén Holmqvist 1998), and two trials that recruited older patients with a mix of conditions included participants recovering from a stroke (Cunliffe 2004; Shepperd 1998).

Mortality

At three to six months follow-up early discharge hospital at home probably makes little or no difference to mortality for patients recovering from a stroke (RR 0.92, 95% CI 0.57 to 1.48; N = 1114; 11 studies; I^2 = 0%; moderate-certainty evidence; Analysis 1.1), or at 12-month follow-up (Analysis 1.2). Throughout the Data and analyses, "T" refers to the intervention group that received early discharge hospital at home, and "C" refers to the control group that received in-hospital care.

Hospital readmission

We combined data from five trials that reported hospital readmission (Analysis 1.3), indicating that early discharge hospital at home may make little or no difference at three to six months follow-up (RR 1.09, 95% CI 0.71 to 1.66; N = 345; 5 studies; I^2 = 0%; low-certainty evidence), or at 12 months; Analysis 1.4).

Functional status

Ten trials assessed functional status, with a range of different measures, and at different time points (Analysis 1.5). Early discharge hospital at home probably makes little or no difference to functional status for patients admitted to hospital following a stroke (moderate level of certainty).

Patient-reported outcomes

Seven trials included self-reported quality of life or health status (Analysis 1.6.1; Analysis 1.6.2); early discharge hospital at home probably makes little or no difference to these outcomes (moderate-certainty evidence).

Clinical complications

No study reported on clinical complications for patients recovering from a stroke.

Living in an institutional setting at follow-up

We combined data on place of residence from four trials (Analysis 1.7), finding that early discharge hospital at home may reduce the likelihood of living in a institutional setting at six months follow-up (RR 0.63, 95% CI 0.40 to 0.98; N = 574; 4 trials; I^2 = 0%; low-certainty evidence).

Patient satisfaction

Six trials reported different aspects of patient satisfaction, indicating that the intervention might slightly improve patient satisfaction (Analysis 1.8) (N = 795; 6 trials, low-certainty evidence). Two trials reported that early discharge may slightly improve patient satisfaction (Donnelly 2004; Suwenwela 2001), and four trials reported similar levels of satisfaction levels between groups (Anderson 2000; Bautz-Holter 2002; Rudd 1997, Widén Holmqvist 1998).

Caregiver outcomes

Early discharge hospital at home may make little or no difference to caregiver outcome (low-certainty; 6 trials; Analysis 1.9).

Staff views

No study reported on staff views for patients recovering from a stroke.

Length of stay

Ten trials reported length of stay. We combined data from four trials and found that early discharge hospital at home probably reduces hospital length of stay (mean difference -6.68 days, 95% CI -10.19 to -3.17; N = 528; 4 trials; I^2 = 0%, moderate-certainty evidence; Analysis 1.10). The remaining trials reported a median reduction ranging from -8 days (Donnelly 2004) to -15 days (Anderson 2000), for those allocated to hospital at home. Two trials reported a median length of stay in hospital at home of five weeks (range 1 to 19; Anderson 2000) and nine weeks (range 1 to 44 weeks; Rodgers 1997) (Analysis 1.11; moderate-certainty evidence).

Use of health service resources and cost

Four trials reported inpatient, outpatient and total healthcare costs, with different healthcare resources measured and valued (very low-certainty evidence; Analysis 1.12). Two trials reported similar costs to the health service for early discharge hospital at home and inpatient care (Donnelly 2004; Rudd 1997). Two trials found that early discharge hospital at home may reduce hospital costs, one conducted in Canada (mean difference CAD -3280.95, P < 0.0001; Mayo 2000); and another in Australia (mean difference AUD 4678; 95% CI AUD -6680 to AUD -2676; Anderson 2000), although this difference was offset when community costs were included (difference AUD -2013; 95% CI AUD -4696 to AUD 669).

2. Early discharge hospital at home for older people with a mix of conditions

Eight trials recruited patients with a medical condition (Caplan 2006; Cunliffe 2004; Donald 1995; Harris 2005; Martin 1994; Rada 2008; Richards 1998; Shepperd 1998), and five trials recruited patients with chronic obstructive pulmonary disease (COPD) (Cotton 2002; Díaz Lobato 2005; Ojoo 2002; Skwarska 2000; Utens 2012). In trials that recruited patients with a medical condition 28% of the study population were recovering from a fracture (Cunliffe 2004) and 72% were recovering from surgery (Richards 1998). There was one trial each for patients with acute non-alcoholic pancreatitis (Ince 2014) and decompensating heart failure (Tibaldi 2013).

Mortality

Early discharge hospital at home probably makes little or no difference in mortality to older people with a mix of conditions, or COPD. Twelve trials reported data for mortality at three to six months follow-up for older people with a mix of conditions, and we pooled data from eight of them (RR 1.07, 95% CI 0.76 to 1.49; N = 1247; I^2 = 0%; moderate-certainty evidence; Analysis 2.1) and from five trials recruiting patients with COPD (RR 0.53, 95% CI 0.25 to 1.12; N = 496; I^2 = 0%; low-certainty evidence; Analysis 2.2).

Hospital readmission

Fifteen trials reported data on hospital readmission. We pooled data for nine trials recruiting older people with a mix of conditions, median follow-up of three months (RR 1.25, 95% CI 0.98 to 1.58; N = 1276; I^2 = 0%, moderate-certainty evidence; Analysis 2.3), and five trials for participants with COPD with two to three months follow-up (RR 0.86, 95% CI 0.66 to 1.13; N = 496; I^2 = 0%, low-certainty evidence; Analysis 2.4). Early discharge hospital at home probably increases the risk of readmissions for older people with a with a mix of conditions, and may decrease the risk of readmissions for people with COPD.

Functional status

Seven trials assessed functional status and one trial measured falls (Analysis 2.5). We combined data from four of the seven trials that recruited older patients with a medical condition and measured functional ability with the Barthel Index. Early discharge hospital at home probably makes little or no difference to functional status (mean difference 0.34, 95% CI -0.18 to 0.86; N = 639; I^2 = 61%, moderate-certainty evidence; Analysis 2.6). One trial

(Cunliffe 2004) that recruited older people with a mix of medical and surgical conditions reported improved scores for those allocated to early discharge hospital at home on two domains of the Nottingham Extended Activities of Daily Living Scale: activities in the kitchen (mean difference 1.1, 95% CI 0.2 to 2.3), and domestic activities (mean difference 1.1, 95% CI 0.2 to 2.0) at three-month follow-up, but not for mobility or leisure. There was substantial heterogeneity between trials.

Patient-reported outcomes

Twelve trials assessed patient-reported outcomes, including quality of life, self-assessed health status, cognitive functioning and psychological well-being (Analysis 2.7). One trial reported improved scores on psychological well-being, using the General Health Questionnaire for participants allocated to early discharge hospital at home (mean difference -2.4, 95% CI -4.1 to -0.7) at three months, and at 12 months follow-up (mean difference -1.9, 95% CI -3.5 to -0.4) (Cunliffe 2004; Analysis 2.7.4). The remaining trials reported little or no difference between groups for older people with a mix of conditions and patients with COPD (see Analysis 2.7 for details on the measures used).

Clinical complications

One study reported the number of participants experiencing delirium, with fewer participants experiencing delirium during rehabilitation in those allocated to early discharge hospital at home, as measured by days of delirium during rehabilitation (Treatment: 3/530, standard deviation (SD) 0.6; Control: 12/376, SD 3.2, P = 0.003; Caplan 2006).

Living in an institutional setting at follow-up

Hospital at home may lower the risk of living in an institutional setting at one-year follow-up (RR 0.69, 95% CI 0.48 to 0.99; N = 484; 3 trials, I^2 45%, low-certainty evidence; Analysis 2.8), or at a shorter follow-up time (Analysis 2.9).

Patient satisfaction

Six trials reported patient satisfaction (N = 900; low-certainty evidence; Analysis 2.10). Two of the trials reported increased levels of satisfaction for those allocated to early discharge hospital at home (Caplan 2006; Ojoo 2002), and four trials reported little or no difference (Harris 2005; Richards 1998; Shepperd 1998; Utens 2012). One trial that interviewed patients reported that most of them were very positive about their experience, and cited good communication, frequent and timely visits and close attention to detail as positive aspects of the service (Cunliffe 2004; data not tabulated).

Caregiver outcomes

Five trials measured caregiver outcomes, including strain and general health. Three reported little or no difference (Cunliffe 2004; Shepperd 1998; Utens 2012), while two found less caregiver strain in early discharge hospital at home (Harris 2005; Tibaldi 2013; Analysis 2.11). Three trials reported that early discharge hospital at home may increase carer satisfaction (Harris 2005; Ojoo 2002; Utens 2012), and two reported little or no difference (Caplan 2006; Shepperd 1998).

Staff views

One trial reported that staff perceived that providing care in the patients' homes facilitated participation in rehabilitation, that the service was better staffed than the usual discharge services provided, and that rehabilitation services were co-ordinated with social care (Cunliffe 2004; results not tabulated); and a second trial reported little or no difference in general practitioners' level of satisfaction (Caplan 2006) (Analysis 2.12).

Length of hospital stay

Eight trials reported a reduction in hospital length of stay for older people with a medical condition that ranged from -0.36 to -22 days (, N = 767, moderate-certainty evidence), and three trials that recruited patients with COPD reported a reduction of one to two days (Analysis 2.13). We did not combine data for older people with a medical condition, due to variation among study populations and because some of the trials did not provide standard deviations. We combined data for four trials and found that early discharge hospital at home probably reduces hospital length of stay (mean difference -6.76 days, 95% CI -10.60 to -2.92, N = 613; I^2 = 79%; Analysis 2.14); however, results should be interpreted with caution, due to substantial heterogeneity.

We pooled data from three trials that reported both length of stay in hospital and hospital at home; early discharge hospital at home may increase the number of days of health care received (mean difference 6.43, 95% CI 2.84 to 10.03, N = 378, I^2 = 0%; Analysis 2.15).

Use of healthcare resources and cost

Seven trials reported the costs associated with the intervention, with variation in estimates partly reflecting the different healthcare resources that were measured and how these were valued (Analysis 2.16.1; very low-certainty evidence). Two trials that recruited older people with a medical condition reported little or no difference (Shepperd 1998; Utens 2012), and three trials found that early discharge may reduce healthcare costs (Caplan 2006; Cunliffe 2004 as reported by Miller 2005; Ince 2014). One trial reported that early discharge hospital at home may increase the per patient cost

(Harris 2005). One trial, that recruited patients with COPD reported that early discharge hospital at home may increase healthcare costs (based on variable healthcare costs over a hospital length of stay) (Shepperd 1998), two trials reported that early discharge hospital at home may lower costs (based on an average cost per day) (Cotton 2002; Skwarska 2000), and a third trial little or no difference (Utens 2012).

3. Early discharge hospital at home following elective surgery

We report the results of eight trials evaluating the effectiveness of hospital at home for patients discharged early from hospital following elective surgery. Most of the trials recruited patients recovering from orthopaedic surgery (Crotty 2000; Karlsson 2016; Palmer Hill 2000; Richards 1998; Shepperd 1998), followed by surgery for hernia and varicose veins (Adler 1978; Ruckley 1978) and coronary artery bypass grafting (Booth 2004).

Mortality

Three trials reported data on mortality for patients following surgery, with little or no difference (N = 856, low-certainty evidence; Analysis 3.1).

Hospital readmission

Five trials reported hospital readmission. Early discharge hospital at home may lead to little or no difference in readmission to hospital during follow-up (low-certainty evidence, N = 1229; Analysis 3.2).

Functional status

Two trials assessed functional status using the Barthel Index (low-certainty evidence; Analysis 3.3). Crotty 2002 reported that early discharge hospital at home may improve functional status (median difference in change score at four months follow-up 3.00, P < 0.05); and Richards 1998 reported that early discharge hospital at home makes little or no difference to functional status at three months follow-up (mean difference 0.17, 95% CI -0.76 to 1.10) (higher scores indicate more independence).

Patient-reported outcomes

Six trials assessed patient-reported outcomes, specifically considering quality of life and self-reported health status (Analysis 3.4), and found that early discharge hospital at home probably leads to little or no difference in patient-reported outcomes (moderate-certainty evidence).

Clinical complications

There was little or no difference in clinical complications for patients recovering from hernia repair, bypass surgery or varicose vein surgery in the three trials reporting this outcome, two of which were conducted nearly 40 years ago (Adler 1978; Booth 2004; Ruckley 1978; Analysis 3.5).

Living in an institutional setting at follow-up

Data on place of residence at follow-up were not reported.

Patient satisfaction

Early discharge hospital at home may slightly improve patient satisfaction (N = 1229, low-certainty evidence; Analysis 3.6). In one trial (Ruckley 1978) patients in the early discharge group reported an increased advantage for themselves compared to those staying in hospital (Treatment: 108/117 (92.3%); Control: 95/121 (78.5%), difference 13.8%, 95% CI 5% to 23%, P < 0.01). Participants recovering from a hip or knee replacement, hysterectomy (Shepperd 1998), hernia or varicose vein repair (Adler 1978), fractured neck of femur (Crotty 2000) or a mix of orthopaedic surgical procedures (Richards 1998) reported little or no difference in satisfaction. Differences were reported for patients' preferred place of care, with each group of patients preferring care at home (difference for patients recovering from a hip replacement 35.7%, 95% CI 16.7% to 54.8%; difference for patients recovering from a knee replacement 34%, 95% CI 14% to 54%; difference for women recovering from a hysterectomy 19%, 95% CI 8% to 30%) (Shepperd 1998).

Caregiver outcomes

Four trials reported on caregiver outcomes (low-certainty evidence; Analysis 3.7). In three trials (Adler 1978; Ruckley 1978; Shepperd 1998) early discharge hospital at home led to caregivers of patients who had received elective surgery (varicose veins, hernia repair, hysterectomy) being less satisfied; and two other trials reported little or no difference for carer strain and satisfaction for caregivers of patients recovering from a hip or knee replacement (Shepperd 1998) or fractured neck of femur (Crotty 2000). Gunnel 2000 (secondary publication to Richards 1998) reported little or no difference in caregiver outcomes for 133 carers, measured by the Carer Strain Index.

Staff views

Four studies reported on staff views of early discharge hospital at home for patients following surgery; general practitioners of participants allocated to both groups reported similar workloads (Analysis 3.8).

Hospital length of stay

Six trials reported on hospital length of stay. Early discharge hospital at home probably reduces hospital length of stay for patients recovering from orthopaedic surgery (MD -4.44 days, 95% CI -6.37 to -2.51; N = 411; 4 trials; I^2 0%; Analysis 3.9), and for patients recovering from bypass surgery (MD -2.7 days; P < 0.001; low-certainty evidence; Analysis 3.10). We did not include one trial recruiting participants recovering from hip surgery in the analysis, as it did not report usable data; the study authors reported participants allocated to the intervention group had a hospital stay shorter than participants allocated to the control group (Intervention: median 17, Q1 - Q3 12 - 26; Control: Median 23, Q1 - Q3 17 - 32). The intervention probably leads to an increase in total days of health care provided (hospital length of stay plus hospital at home length of stay) (MD 2.79, 95% CI 0.77 to 4.81; N = 245; 2 trials; I^2 0%; Analysis 3.11). However, interpretation of these results is limited by the small number of studies that recruited a small number of participants.

Use of healthcare resources and cost

It is uncertain if early discharge hospital at home leads to a reduction in costs to the health service (very low-certainty evidence; Analysis 3.12). One trial, that recruited patients with a mix of medical and surgical patients (Coast 1998, publication related to Richards 1998), reported that hospital at home may be less costly than hospital care when using average costs for hospital length of stay (mean cost per patient over three months GBP 2516 versus GBP 3292). Another trial, that accounted for the marginal costs incurred during a patient's episode of hospital care (and hence the marginal savings of early discharge) reported that early discharge hospital at home may make little or no difference to healthcare costs for patients recovering from a hip or knee replacement, or hysterectomy (Shepperd 1998), and a second trial also reported little or no difference at 12 months follow-up for patients recovering from bypass surgery (Booth 2004). Two trials reported cost data from 40 years ago (Adler 1978; Ruckley 1978).

ADDITIONAL SUMMARY OF FINDINGS [Explanation]

Effect of early discharge hospital at home for patients with a mix of conditions

Patient or population: older patients with a mix of conditions who otherwise would require acute hospital inpatient care
Setting: Australia, Chile, Italy, New Zealand, Spain, The Netherlands, Turkey, United Kingdom
Intervention: early discharge hospital at home
Comparison: usual care

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	Number of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Without early discharge hospital at home (assumed risk)	With early discharge hospital at home (corresponding risk)				
Mortality	Patients with a mix of conditions (3 - 6 month follow-up)		RR 1.07 (0.76 to 1.49)	1247 (8 trials)	⊕⊕⊕◯ Moderate [1]	
	93 per 1000	100 per 1000 (71 to 0139				
	Patients with COPD (2 - 3 month follow-up)		RR 0.53 (0.25 to 1.12)	496 (5 trials)	⊕⊕◯◯ Low [2]	
	69 per 1000	35 per 1000 (17 to 77)				
Hospital readmission	Patients with a mix of conditions (3 months follow-up)		RR 1.25 (0.98 to 1.58)	1276 (9 trials)	⊕⊕⊕◯ Moderate [1]	
	148 per 1000	191 per 1000 (146 to 247)				
	Patients with COPD (3 months follow-up)		RR 0.86 (0.66 to 1.13)	496 (5 trials)	⊕⊕◯◯ Low [2]	

	317 per 1000	272 per 1000 (209 to 358)				
Living in an institutional setting (mix of conditions) at 1-year follow-up	233 per 1000	161 per 1000 (112 to 231)	RR 0.69 (0.48 to 0.99)	484 (3 trials)	⊕⊕◯◯ Low [2]	
Patient satisfaction	Early discharge hospital at home may slightly improve satisfaction with healthcare received for older people with a mix of healthcare conditions		-	900 (6 trials)	⊕⊕◯◯ Low [2]	
Hospital length of stay	The effect of early discharge hospital at home on hospital length of stay for older patients with a mix of conditions ranged from a reduction of 20 days to a reduction of less than half a day			767 (7 trials)	⊕⊕⊕◯ Moderate [1]	Data were not combined for older people with a medical condition due to variation among study populations and because some of the trials did not provide standard deviation
Cost	It is uncertain if early discharge hospital at home leads to a reduction in costs to the health service		-	1369 (8 trials)	⊕◯◯◯ Very low [3]	

*__The risk in the intervention group__ (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; **MD:** Mean difference; **RR:** Risk ratio; **COPD:** Chronic obstructive pulmonary disease

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1] Downgraded 1 points for imprecision due to wide CIs.
[2] Downgraded 2 points for imprecision due to wide CIs.
[3] Downgraded 3 points due to inconsistency and imprecision.

Effect of early discharge hospital at home for patients recovering from surgery

Patient or population: patients recovering from surgery who otherwise would require acute hospital inpatient care
Setting: Australia, Sweden, United Kingdom
Intervention: early discharge hospital at home
Comparison: usual care

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	Number of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Without early discharge hospital at home (assumed risk)	With early discharge hospital at home (corresponding risk)				
Mortality	Early discharge hospital at home probably leads to little or no difference in mortality		-	856 (3 trials)	⊕⊕◯◯[1] Low	
Hospital readmission	Early discharge hospital at home probably leads to little or no difference in readmission to hospital		-	1229 (5 trials)	⊕⊕◯◯[1] Low	
Living in an institutional setting	Data on place of residence at follow-up were not reported.		-	-	-	
Patient satisfaction	Early discharge hospital at home may slightly improve satisfaction with healthcare received		-	1229 (5 trials)	⊕⊕◯◯ Low [1]	
Hospital length of stay (patients recovering from orthopaedic surgery)	The mean hospital length of stay in the control groups ranged from 11.9 to 41.9	The mean hospital length of stay in the intervention groups was 4.44 lower (95% CI 6.37 to 2.51 lower)	MD -4.44 (-6.37 to -2.51)	411 (4 trials)	⊕⊕⊕◯ Moderate [2]	
Cost	It is uncertain if early discharge hospital at home leads to a reduction in costs to the health service		-	1129 (5 trials)	⊕◯◯◯ Very low[3]	

*__The risk in the intervention group__ (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; **MD:** Mean difference; **RR:** Risk ratio

GRADE Working Group grades of evidence
High certainty: We are very confident that the true effect lies close to that of the estimate of the effect
Moderate certainty: We are moderately confident in the effect estimate: The true effect is likely to be close to the estimate of the effect, but there is a possibility that it is substantially different
Low certainty: Our confidence in the effect estimate is limited: The true effect may be substantially different from the estimate of the effect
Very low certainty: We have very little confidence in the effect estimate: The true effect is likely to be substantially different from the estimate of effect

[1] Downgraded 2 points due to inconsistency and imprecision.
[2] Downgraded 1 point due to imprecision.
[3] Downgraded 3 points due to inconsistency and imprecision.

DISCUSSION

Summary of main results

We included 32 trials in this systematic review of early discharge hospital at home. For patients recovering from a stroke, early discharge hospital at home probably makes little or no difference to mortality at three to six months (moderate-certainty evidence) and may make little or no difference to the risk of readmission (low-certainty evidence). There is moderate-certainty evidence that hospital length of stay is reduced, and the risk of living in an institutional setting at six-month follow-up may be lower (low-certainty evidence). The intervention might slightly improve patient satisfaction (low-certainty evidence). It is uncertain whether hospital at home has an effect on cost to the health service for people recovering from a stroke (very low-certainty evidence). For patients with a mix of medical conditions, early discharge hospital at home probably makes little or no difference to mortality (moderate-certainty evidence); and may increase the risk of readmission. There was insufficient information to determine the effect on mortality and readmission in trials recruiting participants with COPD (low-certainty evidence). Early discharge hospital at home probably reduces hospital length of stay for older patients with a mix of conditions (moderate-certainty evidence). The intervention might slightly improve patient satisfaction and the risk of living in an institutional setting (low-certainty evidence), and it is uncertain whether it has an effect on costs (very low-certainty evidence). For patients undergoing elective surgery, hospital at home may make no difference to mortality or to readmission to hospital (low-certainty evidence). We could not establish the effects of hospital at home on the risk of living in institutional care due to a lack of data. The intervention might slightly improve patient satisfaction (low-certainty evidence). People allocated to early discharge hospital at home were discharged on average four days earlier than people allocated to usual inpatient care (moderate-certainty evidence). It is uncertain whether hospital at home has an effect on costs to the health service (very low-certainty evidence).

Overall completeness and applicability of evidence

Most trials reported data on the main outcomes. A major limitation is the lack of data on the impact on informal caregivers. While the aim of early discharge hospital at home is to reduce hospital length of stay, the impact on health service costs is uncertain. It is possible that the provision of early discharge hospital at home may offset any reduction in days of health care provided and cost. It is important to take into account the transitional nature of early discharge hospital at home when determining effectiveness, as the organisation and delivery of health care changes over time. For example, two of the trials included in this review were conducted nearly 40 years ago. Both trials evaluated the early discharge of patients following elective surgery that is now routinely provided as day-case surgery (Adler 1978; Ruckley 1978). Given the overall reduction in hospital length of stay, the use of day-case surgery and the introduction of minimally invasive surgery, these trials have limited relevance today. Conversely, there are some conditions, such as myocardial infarction, where it has been reported that admission to hospital has been avoided by the use of hospital at home (Hill 1978; Mather 1976). However, with the advent of thrombolytic therapy it may no longer be appropriate for these patients to receive all their care outside a secondary-care setting. Problems can also arise when comparisons are made between countries. For example, the expansion of home care services in some countries, such as the USA, may resemble primary care services already established in another country, not hospital at home care (Hughes 2000).

Other factors may restrict the degree to which early discharge hospital at home can be implemented, for example a caregiver's willingness to take on the responsibilities associated with hospital at home. About one-third of the trials excluded participants based on caregiver availability; trials recruiting older people with a mix of conditions were more likely to have caregiver availability as an inclusion criterion (46%), when compared with trials recruiting those recovering from a stroke or having elective surgery (30% and 25%, respectively). Of the trials that did not exclude participants based on caregivers' availability, none looked into its impact on the outcomes. Another limiting factor for implementation is the level of disability, with one trial reporting that the least disabled patients were more likely to be eligible (Crotty 2000). Additionally, two trials reported that only between 1% and 2% of older adults admitted to hospital were referred to early discharge hospital at home schemes (Cunliffe 2004; Shepperd 1998).

Seven trials reported participants' socio-economic characteristics, namely ethnic background (Crotty 2002; Cunliffe 2004; Rudd 1997; Widén Holmqvist 1998), educational level (Tibaldi 2013; Widén Holmqvist 1998), and social class (Richards 1998; Shepperd 1998; Widén Holmqvist 1998). Probably because the trials were small, these characteristics were not taken into account when analysing the results. All but three studies (Ince 2014, Turkey; Rada 2008, Chile; Suwenwela 2001, Thailand) were conducted in high-income countries.

The environment in which these services are being delivered may impact on the implementation of early discharge hospital at home. It may be that schemes such as hospital at home provide a cost-effective alternative to acute care if the running costs of the local hospital are relatively high. For example, the costs of a city teaching hospital are likely to exceed those of a district general hospital, making it more likely that an alternative service with few fixed costs, such as hospital at home, would compare favourably in terms of cost. Differences in the way the service is delivered may also account for differences in cost, for example some of the trials included in the review evaluated hospital at home schemes

that did not provide 24-hour care. The closure of a ward in favour of hospital at home is less realistic if, as is often the case, patients are admitted to hospital at home from a variety of different wards and across a number of clinical areas. Although this has the advantage of increasing the number of patients admitted to hospital at home, it makes it difficult to release resources from secondary care. However, these type of services may help at the edges of a health system that is running at capacity.

All of these factors limit the number of participants eligible for early discharge hospital at home. Crotty 2002 compared those eligible for their trial with those who were not, and found that while staff estimated that 36% of patients recovering from a fractured hip were eligible for their trial, only 20% were both eligible and consented to take part in the trial. Cunliffe 2004 reports that just 2% of all medical admissions of older people to hospital were referred to an early discharge hospital at home scheme, and Shepperd 1998 that about 1% were. Crotty 2002 concluded that their hospital at home service was suitable for the least disabled group of patients and remains an unacceptable option for some patients and their families. In a sensitivity analysis, Anderson 2000 found that the severity of the patient's condition determined the cost difference between early discharge hospital at home and inpatient care, with home-based care being more cost-effective than hospital care if limited to patients with mild disability.

Certainty of the evidence

All of the studies included in this review were randomised trials, the majority of which we assessed as being at a low risk of bias. We downgraded the evidence for almost all the outcomes due to imprecision, as most of the trials had relatively small sample sizes and reported wide confidence intervals. More than half of the trials recruited fewer than 100 participants, and half of all the participants included in this review were recruited by one-fifth of the trials.The results reported by the trials were consistent for the main outcomes of mortality and hospital readmission, were broadly similar for patient satisfaction, but with some inconsistency for hospital length of stay. Only a small subgroup of the trials reported data on whether participants were living in an institutional setting at follow-up. The impact on healthcare costs and carer burden is uncertain.

Potential biases in the review process

We conducted an extensive search that included different databases of published articles and sources of unpublished literature, limiting publication bias. We have established an international network of people working in this field who alert us to new randomised trials. One review author screened title and abstracts, but we adopted a highly sensitivity approach in order to decrease the likelihood of missing a relevant study for inclusion. Two review authors screened all full texts to reduce the risk of missing a study for inclusion, and the review authors discussed studies for possible inclusion to check that we had applied the inclusion criteria consistently. Five review authors assessed the certainty of evidence using the GRADE criteria.

Agreements and disagreements with other studies or reviews

Two recently published reviews have assessed the effect of hospital at home programmes for patients with COPD, and reported that early discharge hospital at home may reduce the number of readmissions, with the quality of evidence rated as very low (McCurdy 2012) and moderate (Jeppesen 2012). One review focused on patients with heart failure, and reported that there was a small increase in time to readmission and health-related quality of life, as well as decreased costs; the authors considered the evidence to be of modest quality (Qaddoura 2015). One review assessed services that reduced the duration of hospital care for patients recovering from an acute stroke, although not all of the interventions provided early discharge hospital at home; the findings from this review of a reduction in hospital length of stay and improved patient satisfaction with these services are similar to our review (Fearon 2012).

AUTHORS' CONCLUSIONS

Implications for practice

A policy aim is for early discharge hospital at home to relieve pressure on hospital beds by providing health care in a patient's home, and also to support the realignment of health systems to meet the needs of older people by providing a range of alternatives to inpatient admission (WHO 2015). This review provides low- to moderate-certainty evidence that hospital at home does not adversely affect mortality, hospital readmission, or functional status. Although the findings of the review indicate that hospital at home decreases the length of hospital stay, as indicated by the average number of days the patients spend in hospital, there is insufficient objective evidence of the cost to the health service or patient satisfaction. The findings of the review do not demonstrate that early discharge hospital at home is so expensive that existing schemes for patients recovering from a stroke, and older patients recovering from a mix of conditions, including orthopaedic surgery, COPD, or patients who have had elective surgery, should be discontinued. However the way these services are implemented will impact on healthcare resources, as reflected by the variation in hospital length of stay among some of the trials.

The low volume of patients recruited to the studies suggests that due to a variety of factors (e.g. level of health care required, carer availability) only a small proportion of patients receiving inpatient

hospital care are eligible for early discharge hospital at home. Caregiver willingness was a feature of about one-third of the studies and this may in turn impact on how these services reduce costs and reliance on secondary care in general. Variation in the measurement and results from the analysis of costs incurred from the studies is a source of uncertainty that warrants further investigation.

Implications for research

Future primary research should focus on rigorous evaluations of the implementation of early discharge hospital at home schemes for the following patient groups: those recovering from a stroke, those with chronic obstructive pulmonary disease and older patients with a mix of conditions requiring an acute hospital inpatient stay. Patient health outcomes, patient and caregiver satisfaction, clinical complications, resource utilisation and costs should be measured using standardised methods, and studies should include a formal, planned economic analysis using costs that are sensitive to the different resources used during an episode of care. Trials should determine how early discharge hospital at home impacts on the health system, and how other services (such as social care, community hospitals, and other forms of intermediate care) interact with and support the functioning of these services. There is a lack of research data on how these types of schemes are implemented once the restrictions of a research design have been removed, for example if the range of patients admitted increases to include those who are less dependent. Implementation research could shed light on the way these services evolve outside a research setting, and why some of these services alter in terms of the types of patients they admit and the goals of the service. Related to this and to the expansion of this type of service are caregivers' views and the burden they may experience by participating in hospital at home care. While there are a small amount of data on those participating in trials, little is known about how caregivers view these types of service outside a research setting, i.e. those eligible but not consenting to take part in a trial and those outside a research setting who have the option of using hospital at home.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Adler 1978

Methods	Randomised trial
Participants	Location: UK Patients following elective surgery (hernia and varicose veins) Age: 18 to 64 years N = 224 (T: 117; C: 107) (in 27 months)
Interventions	Hospital at home (early discharge) Type of service: early discharge from hospital; no night care; organised by hospital surgeons, provided by community; clinical responsibility held by GP Skill mix and size of HAH teams: 21 home helps; 52 district nurses. No dedicated staff Control group: inpatient hospital care Study dates: January 1971 to March 1973
Outcomes	Clinical complications; patient satisfaction; caregiver satisfaction Outcomes measured at: 7 days; 6 weeks; 2 to 3 years for recurrence
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Method not reported
Allocation concealment (selection bias)	Unclear risk	Method not reported
Baseline outcome measurements (selection bias)	Unclear risk	Baseline outcome measurements not reported
Baseline characteristics (selection bias)	High risk	Baseline characteristics not reported
Blinding (performance bias and detection bias) Objective measures of outcome	Unclear risk	Clinical complications reported by consulting surgeons, nurses or general practitioners
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Patient-reported satisfaction with health care
Incomplete outcome data (attrition bias) All outcomes	Low risk	83% follow-up data

Adler 1978 (*Continued*)

Selective reporting (reporting bias)	Unclear risk	Not clear

Anderson 2000

Methods	Randomised trial
Participants	Location: Australia Patients recovering from a stroke Mean age (SD): T: 72 years (11); C: 71 (11) N = 86 (T: 42; C: 44)
Interventions	Early discharge hospital at home Type of service: specialist rehabilitation nurses; therapy sessions in patient's home and individually tailored to achieve mutually agreed goals over several weeks. Emphasis on self-learning; adjustment to disability and structured practice sessions were encouraged between sessions Occupational therapy, physiotherapy, speech therapy Control group: inpatient hospital care Study dates: February 1997 to June 1998
Outcomes	Main outcome: self-reported health status Other outcomes: mortality; functional status; quality of life; satisfaction; readmissions; length of stay Follow-up: 1, 3, 6, and 12 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer-generated allocation sequence
Allocation concealment (selection bias)	Low risk	Sealed opaque envelopes, done by different department
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for self-reported health status and functional status; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality, readmission and length of stay

Anderson 2000 (*Continued*)

Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Outcome assessor blinded to allocation collected data on patient-reported outcomes
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition rate < 5%, similar for both groups
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Askim 2004

Methods	Randomised trial
Participants	Location: Norway Patients recovering from a stroke Mean age: T: 76.9; C: 76.3 N = 62 (T: 31; C: 31)
Interventions	Early discharge outreach Type of service: physiotherapy, occupational therapy and dedicated nursing; stroke unit + home-based programme of follow-up care + primary health care. Home visit if patient lives within 30 to 45 minute radius of hospital; if greater than this the primary health team visited the home. Follow-up plan made with family and primary healthcare providers. Mobile team established a service and support system. Meeting with physician and stroke team + patient and family on the day of discharge to define follow-up care plans. For patients with extensive deficits plans for further rehabilitation were made. Once home contact was maintained by phone + at least 1 other home visit. Follow-up by mobile team terminated with an out-patient consultation (for those living within 30 to 40 minutes away from the hospital) or home visit (if more than 35 to 40 minutes). Local information meeting if a group of recruited patients lived in the same area Control group: inpatient hospital care Study dates: June 1999 to June 2001
Outcomes	Main outcome: functional status Other outcomes: mortality; readmission; health status; caregiver views; length of stay Follow-up: 6, 26 and 52 weeks
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Block randomisation, order of blocks randomly chosen
Allocation concealment (selection bias)	Low risk	Sealed opaque envelopes; procedure done externally

Askim 2004 (*Continued*)

Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional status; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality, readmission and length of stay
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Outcome assessor blinded to allocation
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients accounted for; intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Bautz-Holter 2002

Methods	Randomised trial
Participants	Location: Norway Recovering from a stroke Median age (IQR): T: 79.5 (69 to 84); C: 78 (74 to 82) N = 82 (Tt: 42; C: 40)
Interventions	Early discharge, hospital outreach community-based rehabilitation Type of service: multidisciplinary hospital-based team (1 nurse, 1 occupational therapist, 1 physiotherapist) plus community nurses Control group: inpatient hospital care Study dates: June 1997 to January 1999
Outcomes	Main outcome: functional ability Other outcomes: mortality; psychological well-being; place of residence; readmissions; length of stay Follow-up: 3 and 6 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Block randomisation by computer-generated random numbers

Bautz-Holter 2002 (*Continued*)

Allocation concealment (selection bias)	Low risk	Allocation done using sealed envelopes opened once a new participant was included
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional ability; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality, place of residence, readmission and length of stay
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Outcome assessor blinded to allocation
Incomplete outcome data (attrition bias) All outcomes	Low risk	Similar proportion of attrition in both groups; intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Booth 2004

Methods	Randomised trial
Participants	Location: UK Patients with ischaemic heart disease, first time isolated bypass surgery Age: no data N = 97 (T: 65; C: 32)
Interventions	Early discharge outreach Type of service: specialist hospital-based nurses with enhanced preoperative preparation and planned early discharge with specialist home care at 4 (± 1) days after surgery. Admission to hospital on the day of surgery Control group: inpatient hospital care Study dates: not reported
Outcomes	Main outcomes: length of hospital stay, in-hospital clinical events, total costs, readmission, quality of life Follow-up: 12 weeks
Notes	Had to have a caregiver available

Risk of bias

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

Booth 2004 (*Continued*)

Random sequence generation (selection bias)	Unclear risk	Method not reported
Allocation concealment (selection bias)	Unclear risk	Method not reported
Baseline outcome measurements (selection bias)	Unclear risk	Baseline outcome measurements not reported
Baseline characteristics (selection bias)	High risk	Baseline characteristics not reported
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for readmission, length of stay and total costs
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Unclear risk for patient-reported measures of outcome
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No loss to follow-up
Selective reporting (reporting bias)	Unclear risk	Not clear

Caplan 2006

Methods	Randomised trial
Participants	Location: Australia Elderly patients whose length of hospital stay exceeded 6 days, who were referred for geriatric rehabilitation and expected to return home and live reasonably independently Mean age (SD): T: 83.86 (7.8); C: 84.0 (7.02) N = 104 (T: 70; C: 34) Study dates: April 2000 to October 2002
Interventions	Early discharge hospital-based outreach Type of service: nurses, physiotherapy, occupational therapy, physician Control group: inpatient hospital care
Outcomes	Main outcome: delirium Other outcomes: mortality; functional and cognitive status; psychological well-being; satisfaction; readmission; length of stay; cost Follow-up: 1 month and 6 months
Notes	
Risk of bias	

Caplan 2006 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated random numbers using opaque envelopes using a 2:1 distribution
Allocation concealment (selection bias)	Low risk	Enrolment assessment done prior to patient allocation
Baseline outcome measurements (selection bias)	High risk	Baseline outcome measurements done prior to intervention for functional and cognitive status and psychological well-being; participants allocated to treatment group were more independent
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality, readmission, length of stay and cost
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Baseline assessment done blindly; follow-up assessments unblinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients accounted for; intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Cotton 2002

Methods	Randomised trial
Participants	Location: UK Patients with COPD, recruited from medical wards Mean age (SD): T: 65.7 (1.6); C: 68 (1.2) N = 81 (T: 41; C: 40)
Interventions	Hospital at home (early discharge) Type of service: emergency admissions recruited from the ward (early discharge within 3 days of readmission) respiratory nurse (did not prescribe), GP provided out-of-hours medical care Control group: inpatient hospital care Study dates: not reported (conducted over 14 months)
Outcomes	Main outcomes: readmission; hospital length of stay; mortality Follow-up: 60 days
Notes	

Cotton 2002 (*Continued*)

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Treatment allocation schedule generated by random numbers
Allocation concealment (selection bias)	Low risk	Non-clinical member of staff based remotely
Baseline outcome measurements (selection bias)	Low risk	Baseline measures of the main outcomes of readmission, length of stay and mortality at follow-up were not relevant
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcome measures ascertained from clinical records
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	All outcomes are objective
Incomplete outcome data (attrition bias) All outcomes	Low risk	Retention rate > 90%; intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Crotty 2002

Methods	Randomised trial
Participants	Location: Australia (3 metropolitan hospitals, Adelaide) Patients with a hip fracture, excluded from participating if they did not have a telephone at home or had inadequate social support Median age (IQR): T: 81.6 (78.2 - 85.4); C: 83.5 (76.6 - 85.5) N = 66 (T: 34; C: 32)
Interventions	Hospital at home (early discharge) Type of service: rehabilitation: physiotherapy, occupational therapy, speech therapist, social worker, therapy aid, nursing care, and assistance with shopping and cleaning; based on short-term treatment goals negotiated with patient and caregiver. Therapy adapted to rate of patient's progress Control group: inpatient hospital care Study dates: July 1998 to July 1999

Crotty 2002 (*Continued*)

Outcomes	Mobility; physical function; health-related quality of life; adverse events; patient and caregiver satisfaction; caregiver strain; length of stay Follow-up: 4 months
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated random sequence
Allocation concealment (selection bias)	Low risk	Randomisation by a hospital pharmacist independent of the study
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for physical functioning; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcome for length of stay
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Outcome assessor blinded to allocation
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No loss to follow-up
Selective reporting (reporting bias)	Unclear risk	Not clear

Cunliffe 2004

Methods	Randomised trial
Participants	Location: UK (Nottingham) 3 most common conditions were fractures (105/370, 28%), neurological conditions, mainly stroke (97/370, 26%), cardio-respiratory illnesses (50/370,14%); 247/370 (66%) lived alone Median age (IQR): T: 80 years (73 - 85); C: 79 (72 - 86) N = 370 (T: 185; C: 185)

Cunliffe 2004 (*Continued*)

Interventions	Hospital at home (early discharge) Type of service: provided by community services, GP had clinical responsibility, physiotherapy, occupational therapy, 3 dedicated nurses plus 7 rehabilitation assistants, provided care up to 4 weeks Community care officer liaised with social services Control group: inpatient hospital care Study dates: July 1999 to July 2000
Outcomes	Mortality; readmission; functional ability; quality of life; psychological well-being (patient and caregiver); cost Follow-up: 3 months and 12 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer-generated balanced randomisation within strata
Allocation concealment (selection bias)	Low risk	Done remotely by independent staff
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional ability and days in hospital; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality, readmission and cost
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Participants completed assessment on their own; incomplete data were completed by blinded assessor
Incomplete outcome data (attrition bias) All outcomes	Low risk	Low attrition rate and similar between groups; intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Donald 1995

Methods	Randomised trial
Participants	Location: UK Elderly medical patients Age: 76 to 90 years Number of patients in 5 months: T = 30; C = 30
Interventions	Type of scheme: early discharge; not clear if 24-hour care provided; time limit of 6 weeks Type of service: organised by hospital, provided by community; GP provided routine and emergency care Skill mix: 1 nurse manager, 1 physiotherapist, 1 occupational therapist, 3 assistants (part-time) Control group: inpatient hospital care Study dates: not reported (conducted over 5 months)
Outcomes	Main outcomes: length of stay; place of residence; use of other health services Other outcomes: mortality; functional status; psychological well-being Follow-up: 4 weeks, 12 weeks, 26 weeks
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method not described
Allocation concealment (selection bias)	Low risk	Sealed envelopes
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional status and psychological well-being; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality, place of residence, length of stay and use of other health services
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Outcome assessor not blinded to group allocation
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients accounted for

Donald 1995 (*Continued*)

Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Donnelly 2004

Methods	Randomised trial
Participants	Location: UK (Belfast) Recovering from a stroke Median age: T: 68; C: 71 N = 113 (T: 59; C: 54)
Interventions	Early discharge community-based Type of service: average of 2½ home visits a week for 3 months, each visit lasting 45 minutes Multidisciplinary meetings held to discuss the assessment of patients and progress towards rehabilitation goals, which were set by relatives, patient and therapist. Patients discharged to home following home assessment and placement of aids and equipment. Physiotherapist, occupational therapist, nurses, speech therapist Control group: inpatient hospital care Study dates: not reported (conducted over 2 years)
Outcomes	Mortality; readmission; functional status; quality of life; satisfaction; caregiver burden; length of stay; cost Follow-up: 6 months and 12 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer-generated randomly-assigned allocation
Allocation concealment (selection bias)	Low risk	Done and managed independently by statistician and secretary
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional status, quality of life and satisfaction; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality, readmission, length of stay and cost

Donnelly 2004 (*Continued*)

Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Baseline assessment done blindly; remaining assessments done unblinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition rate <10% and similar for both groups; intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Díaz Lobato 2005

Methods	Randomised trial
Participants	Location: Spain Diagnosis of COPD with a non-specific worsening requiring hospital admission Mean age: T: 66 (SD 9); C: 66 (SD 9) N = 40 (T: 20; C; 20)
Interventions	Early discharge hospital-based outreach Type of service: all patients were assessed at 72 hours post-admission and eligible patients were transferred home and received a same-day visit by a specialist doctor (pulmonologist) and a nurse, who drew up a therapeutic plan; specialist did 2 additional visits, nurse visited every 12 hours and was responsible for general care of the patient, including health status assessment, medication intake, additional tests and health education. 24/7 care available from hospital phone number Control group: inpatient hospital care Study dates: not reported
Outcomes	Main outcome: number of therapeutic failures (Treatment: readmission; C: ICU admission, clinical deterioration, infections, other complications) Other outcomes: referrals; relapse; smoking behaviour; length of stay Follow-up: 1 month
Notes	Potential conflict of interest as the study was funded by a commercial company that produces oxygen; staff from this commercial company also authored the paper

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method not reported
Allocation concealment (selection bias)	Unclear risk	Method not reported
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for clinical characteristics and smoking behaviour; similar results

Díaz Lobato 2005 (*Continued*)

		between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective main outcome, ascertained from clinical records
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Unclear whether data collection was performed by blind assessor
Incomplete outcome data (attrition bias) All outcomes	Low risk	All participants accounted for
Selective reporting (reporting bias)	High risk	Length of stay not stated as an outcome in Methods but reported in Results

Harris 2005

Methods	Randomised trial
Participants	Location: New Zealand In hospital for less than 36 hours in the emergency department of acute assessment ward (admission avoidance), or admitted and with help of hospital at home services could be discharged home earlier than would otherwise have been the case (early discharge). Patients had a broad range of diagnoses: fractures (28%); miscellaneous medical problems (18%); respiratory problems (16%); stroke and neurological diagnoses (14%); falls and injuries (11%); cardiac diagnoses (8%); and rehabilitation and other problems (5%) Mean age: 80 years N = 285 (T: 143; C: 142)
Interventions	Early discharge hospital based outreach Type of service: co-ordinated rehabilitation multidisciplinary team (physiotherapy, occupational therapy, social care, nursing) Control group: inpatient hospital care Study dates: not reported
Outcomes	Main outcomes: functional status; cognitive status Other outcomes: mortality; readmission; quality of life; satisfaction; caregiver burden; length of stay; cost Follow-up: 10 days, 30 days, and 90 days
Notes	
Risk of bias	

Harris 2005 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Computer-generated randomisation service
Allocation concealment (selection bias)	Low risk	Independent from research team
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional and cognitive status; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality, readmission, length of stay and cost
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Unblinded assessment; assessor not involved in the provision of care
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition rate < 5% and similar for both groups; intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Ince 2014

Methods	Randomised trial
Participants	Location: Turkey Diagnosis of acute non-alcoholic pancreatitis presenting to hospital within 48 hours of symptom onset Mean age: T: 55 (SD 16); C: 54 (SD 20) N = 84 (T: 42; C; 42)
Interventions	Early discharge hospital-based outreach Type of service: all patients were assessed at < 24 hours post-admission and eligible patients were transferred home with an intravenous port and visited on 2nd, 3rd, and 5th days by a staff nurse; another nurse visited every 12 hours and was responsible for general care of the patient, including vital signs and symptoms. 24/7 care available from physician (phone number provided) Control group: inpatient hospital care Study dates: November 2011 to May 2012
Outcomes	Main outcome: time to resolution of abdominal pain Other outcomes: 30-day readmission rate; time to resumption of oral solid food; cost

Ince 2014 (*Continued*)

	Follow-up: 30 days
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomisation was performed by a computer programme (RANDOM.ORG, Dublin, Ireland)
Allocation concealment (selection bias)	Unclear risk	Method not described
Baseline outcome measurements (selection bias)	Low risk	Baseline measures of the main outcomes of pain, cost and readmission at follow-up were not relevant
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar for all main characteristics
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for readmission and cost
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Not reported who performed the follow-up assessment and main outcome is subjective (pain resolution)
Incomplete outcome data (attrition bias) All outcomes	Low risk	No loss to follow-up
Selective reporting (reporting bias)	High risk	Main outcome changed between trial registry and publication (clinicaltrials.gov/ct2/show/NCT01796652); when registered, main outcome reported as 30-day readmission rates

Indredavik 2000

Methods	Randomised trial
Participants	Location: Norway Patients recovering from a stroke Mean age: T: 74; C: 73.8 N = 320 (T: 160; C: 160)
Interventions	Hospital at home (early discharge) Type of service: mobile team based in a stroke unit and working with primary care team Skill mix: nurse, physiotherapist, occupational therapist, stroke physician Control group: combined active and rehabilitation stroke unit and further follow-up organised by rehabilitation clinic and/or primary healthcare system

Indredavik 2000 (*Continued*)

	Study dates: March 1995 to March 1997
Outcomes	Mortality; functional status; place of residence; hospital length of stay Fwollo-up: 6 weeks and 26 weeks
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method not described
Allocation concealment (selection bias)	Unclear risk	Method not described
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional status; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for length of stay and place of residence
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Outcome assessor blinded to allocation
Incomplete outcome data (attrition bias) All outcomes	Low risk	No losses to follow-up
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Karlsson 2016

Methods	Single-blind randomised trial with parallel assignment
Participants	Location: Sweden Patients aged ≥ 70 years hospitalised for acute hip fracture surgery Age: mean (SD): 83 years (6.7) N = 205 (T: 107; C: 98)
Interventions	Geriatric Interdisciplinary Home Rehabilitation (GIHR); the team was supervised by a geriatrician and included nursing, occupational therapy, physiotherapy, with social work and dietary advice also available if necessary. Number of home visits and rehabilitation programme was tailored to the patient's needs

Karlsson 2016 (*Continued*)

	Comparison: conventional care and rehabilitation in the geriatric ward Study dates: May 2008 to June 2011
Outcomes	Main outcomes: walking ability indoors and outdoors; use of walking device; gait speed. Length of stay and mortality also reported Follow-up: 3 months and 12 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Sequentially-numbered lots in opaque, sealed envelopes
Allocation concealment (selection bias)	Low risk	Nurse at the ward, not involved in the study
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional performance (including walking ability) prior to fracture; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective measures (length of stay; mortality)
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Assessments in hospital took place in a neutral room at the ward in order to keep the assessors blinded to group allocation and they had no other contact with the geriatric ward or access to patients' medical records during the study period
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition at 12 months of 6% (intervention group) and 3% (control group)
Selective reporting (reporting bias)	High risk	Trial registration includes 13 outcomes, including 6 primary outcomes, of which only 1 is reported (www.isrctn.com/ISRCTN15738119)

Manchester FASTER

Methods	Randomised trial No details on Methods
Participants	Location: UK Patients recovering from a stroke
Interventions	Hospital at home (early discharge)
Outcomes	Mortality
Notes	Unpublished

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Not reported, unpublished data
Allocation concealment (selection bias)	Unclear risk	Not reported, unpublished data
Baseline outcome measurements (selection bias)	Unclear risk	Not reported, unpublished data
Baseline characteristics (selection bias)	Unclear risk	Not reported, unpublished data
Blinding (performance bias and detection bias) Objective measures of outcome	Unclear risk	Not reported, unpublished data
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Not reported, unpublished data
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not reported, unpublished data
Selective reporting (reporting bias)	Unclear risk	Not reported, unpublished data

Martin 1994

Methods	Randomised trial
Participants	Location: UK Elderly medical patients Mean age: 81.5 years N = 54 (T: 29; C: 25)

Martin 1994 (*Continued*)

Interventions	Hospital at home (early discharge) Type of service: hospital-based; GP has clinical responsibility; no night care Skill mix of HAH team: 1 nurse manager; 10 unqualified staff Control group: inpatient hospital care Study dates: June 1989 to February 1990
Outcomes	Main outcomes: place of residence; readmission Other outcomes: mortality; functional status; psychological well-being; cognitive status; use of other health services Follow-up: 6 weeks, 12 weeks, and 12 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method not described
Allocation concealment (selection bias)	Low risk	Sealed envelopes
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional and cognitive status and psychological well-being; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar for main characteristics
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality, readmission, place of residence, and use of other health services
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Unblinded assessment; assessor not involved in the provision of care
Incomplete outcome data (attrition bias) All outcomes	Low risk	No losses to follow-up
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Mayo 2000

Methods	Randomised trial
Participants	Location: Canada Patients recovering from a stroke Mean age (SD): T: 70.3 (12.7); C: 69.6 (12.7) N = 114 (Treatment: 58; C: 56)
Interventions	Early discharge hospital outreach Type of service: multidisciplinary team: physiotherapist, occupational therapist, dedicated nurses, speech therapist Control group: inpatient hospital care Study dates: not reported (study conducted over 2 years)
Outcomes	Main outcome: functional status Other outcomes: mortality; quality of life; length of stay Follow-up: 1 month and 3 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Stratified blocked balanced randomisation
Allocation concealment (selection bias)	Low risk	Done by central office independent of the research team
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional status; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality and length of stay
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Done by blinded assessor
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition < 10% and similar for both groups
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Ojoo 2002

Methods	Randomised trial
Participants	Location: UK Patients with chronic obstructive pulmonary disease Mean age: Treatment: 69.7; C: 70.1 N = 60 (T: 30; C: 30)
Interventions	Hospital at home (early discharge within 48 hours of admission) Type of service: daily monitoring by 2 respiratory outreach nurses who were accessible by phone daily from 9:00 to 17:00, out-of-hours advice from Medical Chest Unit: GPs aware but not involved in care Those living alone with no phone were excluded from the trial Control group: inpatient hospital care Study dates: May 1999 and February 2000
Outcomes	Length of stay; days of care; symptom score; respiratory function; patient and caregiver satisfaction Follow-up: 2 weeks for satisfaction, 3 months for readmission
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method not reported
Allocation concealment (selection bias)	Low risk	Sealed envelopes
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for respiratory function and symptom score; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for length of stay and days of care
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Method not reported
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Attrition rate < 10%, similar proportion for both groups

Ojoo 2002 (*Continued*)

Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Palmer Hill 2000

Methods	Randomised trial
Participants	Location: UK Patients recovering from a knee replacement Age: no data N= 60 (T: 32; C: 28)
Interventions	Hospital at home (early discharge) Type of service: orthopaedic outreach team (2 orthopaedic nurses, a healthcare assistant, a physiotherapist) provide domiciliary care and a 24-hour on-call service Control group: inpatient hospital care Study dates: December 1997 to October 1998
Outcomes	Clinical condition of the knee joint; complications; readmission; patient satisfaction Follow-up: 6 weeks, 12 weeks, and 1 year
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Not reported
Allocation concealment (selection bias)	Unclear risk	Not reported
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for knee and functional scores; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for readmission
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Completed by the patients and returned anonymised
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	86% completed follow-up

Palmer Hill 2000 (*Continued*)

Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Rada 2008

Methods	Randomised trial
Participants	Location: Chile Adult inpatients with a mix of conditions requiring interventions usually provided in the hospital Mean age: T: 56 (range 19 - 91); C: 68 (range 19 - 97) N = 59 (Treatment: 29; C: 30)
Interventions	Early discharge hospital-based outreach Type of service: multidisciplinary team composed of 2 nurses, 2 physiotherapists, 1 geriatrician, 1 social worker, 2 paramedic technicians. Specific visiting scheduling not provided Control group: inpatient hospital care Study dates: not reported
Outcomes	Main outcome: length of hospitalisation, measured at discharge (considering both treatment modalities as hospitalisation) Other outcomes: delirium; pressure ulcers; ADLs; readmission (28-day, 3-month, 6-month); emergency room visits (28-day, 3-month, 6-month); mortality (28-day, 3-month, 6-month)
Notes	Only 57% of the expected sample was recruited

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Tailor-made software; patients randomised after completing the baseline assessment (information provided by author)
Allocation concealment (selection bias)	Unclear risk	Method not reported
Baseline outcome measurements (selection bias)	High risk	Baseline outcome measurements done prior to intervention for functional status and delirium; groups differed for both
Baseline characteristics (selection bias)	High risk	Baseline characteristics of treatment and control groups differed for relevant characteristics (age and gender)
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for length of stay

Rada 2008 (*Continued*)

Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Not reported who performed the follow-up assessments for patient-reported outcomes or how it was done
Incomplete outcome data (attrition bias) All outcomes	High risk	Recruitment stopped before achieving complete estimated sample (57%)
Selective reporting (reporting bias)	High risk	No data reported for main outcome (length of hospitalisation)

Richards 1998

Methods	Randomised trial
Participants	Location: UK Elderly patients recovering from elective surgery or emergency medical admissions (31% fractured neck of femur, 21% other fractures, 11% hip replacement, 10% cerebrovascular accidents, 10% knee replacements, 22% miscellaneous reasons for admission) Mean age: 78.3 (SD 6.9) N = 241 (T: 160, of which 50 had a medical diagnosis; C: 81, of which 25 had a medical diagnosis)
Interventions	Hospital at home (early discharge) Type of service: early discharge from hospital; no night care Control group: inpatient hospital care, which included development of care pathways and discharge planning Study dates: July 1994 and October 1995
Outcomes	Main outcomes: resources and cost Follow-up: 4 weeks and 3 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Block-stratified randomisation
Allocation concealment (selection bias)	Low risk	Sealed envelopes produced independently of the research and clinical staff
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for self-reported overall health; difference between groups adjusted for in the analysis

Richards 1998 (*Continued*)

Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for resources and cost
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Unblinded assessment; assessor not involved in the provision of care
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition < 10% and similar for both groups; intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Rodgers 1997

Methods	Randomised trial
Participants	Location: UK Patients recovering from a stroke Median age (range): T: 73 (47 - 93); C: 73 (44 - 91) N = 92 (T: 46; C: 46)
Interventions	Hospital at home (early discharge) Type of service: community-based stroke team that provided an in-reach service to 3 local acute hospitals, visiting patients prior to discharge. Multidisciplinary team of occupational therapist, physiotherapist, speech and language therapist, social worker. Nursing provided by the primary care team. GP had clinical responsibility, with support from a consultant working in stroke medicine. The stroke team used a key worker approach and patients held a copy of their record which they or their caregiver could add to. Review meetings involved patients and caregivers in their homes. Care available 24 hours a day if required Control group: inpatient hospital care Study dates: February 1995 and January 1996
Outcomes	Quality of life; functional status; psychological well-being; caregiver well-being; readmission rate; place of discharge Follow-up: 7-10 days post-discharge and 3 months post-stroke
Notes	

Risk of bias

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

Rodgers 1997 (*Continued*)

Random sequence generation (selection bias)	Low risk	Computerised randomisation service
Allocation concealment (selection bias)	Low risk	Centralised randomisation service
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional status; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for readmission and place of discharge
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Unblinded assessment; assessor not involved in the provision of care
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition rate < 5%, similar proportion for both groups
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Ruckley 1978

Methods	Randomised trial
Participants	Location: UK Patients following elective surgery (hernia and varicose veins) Mean age: 43 years N = 360 (T: 117; C: 121; Convalescent: 122)
Interventions	Hospital at home Type of service: organised by the hospital, provided by the community; clinical responsibility held by the GP Skill mix of HAH team: 15 GPs; district nurses Control group: inpatient hospital care Study dates: not reported
Outcomes	Clinical complications; patient satisfaction; readmission; caregiver satisfaction Follow-up: 2 to 3 weeks
Notes	

Risk of bias

Ruckley 1978 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Restricted randomisation
Allocation concealment (selection bias)	Low risk	Sealed envelopes
Baseline outcome measurements (selection bias)	Low risk	Baseline measures of the main outcomes of clinical complications, readmission, and satisfaction with treatment received at follow-up were not relevant
Baseline characteristics (selection bias)	High risk	Baseline characteristics of treatment and control groups not reported
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for readmission
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Unclear risk for clinical complications and satisfaction, as method of assessment not reported
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	No loss to follow-up
Selective reporting (reporting bias)	Unclear risk	Not clear

Rudd 1997

Methods	Randomised trial
Participants	Location: London, UK Patients recovering from a stroke Mean age (SD): T: 70 (11); C: 72 (12) N = 331 (T: 167; C: 164)
Interventions	Hospital at home (early discharge) Type of service: co-ordinated by hospital-based consultant, community-based nursing and therapy; 24-hour care not available Control group: hospital care and hospital-organised rehabilitation Study dates: January 1993 to July 1995
Outcomes	Main outcome: functional status Other outcomes: mortality; readmission; psychological well-being; patient satisfaction; caregiver satisfaction; caregiver burden Follow-up, 2 months, 4 months, and 6 months
Notes	

Rudd 1997 (*Continued*)

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Restricted randomisation in permuted blocks of 10
Allocation concealment (selection bias)	Low risk	Blank sealed opaque envelopes
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional status; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality and readmission
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Completed by blinded assessor
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Attrition < 5%, similar proportion between groups
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Shepperd 1998

Methods	Randomised trial
Participants	Location: Northamptonshire, UK Patients recovering from elective surgery or with a medical condition Mean age: T: 71; C: 70 (knee replacement T: 68, C: 72; hip replacement T: 71, C: 70; hysterectomy T: 45, C: 44; older patients with a medical condition T: 77, C: 76; COPD T: 71, C: 73) N = 538: T: 263, of which 65 had a medical diagnosis (15 of 65 had COPD), 37 were recovering from a hip replacement, 47 from a knee replacement and 114 from a hysterectomy; C: 275, of which 63 had a medical diagnosis (17 had COPD), 49 were recovering from a hip replacement, 39 from a knee replacement and 124 from a hysterectomy
Interventions	Hospital at home (early discharge and admission avoidance) Type of service: community-based nursing and therapy, nursing aids, GP had clinical responsibility Control group: inpatient hospital care

Shepperd 1998 (*Continued*)

	Study dates: October 1994 to November 1996
Outcomes	Mortality; readmission; functional status; psychological well-being; quality of life; patient satisfaction; caregiver satisfaction; caregiver burden; resource use; cost Follow-up: 1 month and 3 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer-generated random sequence
Allocation concealment (selection bias)	Low risk	Telephone randomisation
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional status and general health status; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality, readmission and length of stay
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Patient-reported measures of outcome; participants and researchers aware of allocation group
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition < 12%, similar for both groups; intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	All outcomes reported in the protocol were published

Skwarska 2000

Methods	Randomised trial
Participants	Location: Edinburgh, Scotland Patients with COPD Mean age (range): T: 68.5 (39 - 84); C: 69.9 (51 - 86) N = 184 (T: 122; C: 62)

Skwarska 2000 (*Continued*)

Interventions	Hospital at home (early discharge from admissions unit) Type of service: acute respiratory assessment service nurse, medical advice from on-call respiratory team and GP; out-of-hours care provided by GP Control group: inpatient hospital care Study dates: November 1996 to May 1998
Outcomes	Respiratory function; quality of life; additional care; GP satisfaction; costs Follow-up: 8 weeks
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer-generated random numbers in a 2:1 ratio
Allocation concealment (selection bias)	Unclear risk	Method not reported
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for respiratory function and disease-related characteristics; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for costs and additional care
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Data collected by the same nurse who provided care
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition rate < 6%
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

Suwenwela 2001

Methods	Randomised trial
Participants	Location: Thailand Recovering from a stroke Mean age (SD): T: 58.4 years (9.6); C: 59.8 (9.9) N = 102 (T: 52; C: 50)

Suwenwela 2001 (*Continued*)

Interventions	Type of service: community-based early discharge service, run by Red Cross volunteers; family members were trained to give injections under nurse guidance while the patient was in hospital, and encouraged to participate in physical and occupational therapy so they could help with home rehabilitation Control group: inpatient hospital care Study dates: December 1998 to August 1999
Outcomes	Mortality; functional status; satisfaction Follow-up: 6 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method not described
Allocation concealment (selection bias)	Unclear risk	Method not described
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for stroke-related characteristics; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Method not described
Incomplete outcome data (attrition bias) All outcomes	Low risk	No losses to follow-up
Selective reporting (reporting bias)	Unclear risk	Not clear from authors' description

Tibaldi 2013

Methods	Randomised trial
Participants	Location: Italy Adult inpatients with 2+ episodes of hospitalisation for decompensating heart failure in the last 6 - 12 months Mean age: 81 N = 52 (T: 26; C: 26)
Interventions	Early discharge hospital-based outreach Type of service: multidisciplinary team composed of nurses, physiotherapists,geriatricians, and social worker, available from 8 a.m. to unstated closure time. Specific visit scheduling not provided. 24-hour care mostly provided by out-of-hours service but 24-hour advice also available from the team Control group: inpatient hospital care Study dates: September 2008 to May 2010
Outcomes	Mortality, place of discharge, number of readmissions and causes of readmission, length of stay, functional and cognitive status, psychological well-being, nutritional status and quality of life, pain perception and their state of health, caregiver stress Follow-up: 1 month
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Method not reported
Allocation concealment (selection bias)	Low risk	Allocation occurred 12 - 24 hours after hospital admission, and after initial stabilisation treatment and baseline measurements, and consenting
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional and cognitive status, psychological well-being, quality of life, pain; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar
Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality, place of discharge, readmission and length of stay
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Not reported who performed the follow-up assessments for patient-reported outcomes

Tibaldi 2013 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients accounted for
Selective reporting (reporting bias)	High risk	Authors state several measures collected at follow-up for which results are not reported

Utens 2012

Methods	Randomised trial
Participants	Location: The Netherlands Patients aged ≥ 40 years with COPD exacerbations Mean age (SD): T: 68.3 (10.3), C: 67.8 (11.3) N = 139 (T: 70; C: 69)
Interventions	Early discharge hospital-based outreach Type of service: all patients treated in hospital for 3 days, T discharged home on day 4, followed by home visits by nurses on 4 consecutive days; respiratory physician supervised nurses' performance and had clinical responsibility. 24-hour support provided by the hospital (phone number provided). GPs were informed about patients' participation but not directly involved Control group: inpatient hospital care (7 days) Study dates: November 2007 to March 2011
Outcomes	Main outcome: changes in Clinical COPD Questionnaire scores Other outcomes: number of treatment failures; number of readmissions and time to readmission; mortality and time to death; health-related quality of life; caregiver burden; patient and primary informal caregiver satisfaction Follow-up: 3 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Randomisation performed using a computer-generated randomisation list with sealed envelopes
Allocation concealment (selection bias)	Low risk	Independently done
Baseline outcome measurements (selection bias)	Unclear risk	Baseline outcome measurements done prior to intervention for clinical characteristics; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar

Utens 2012 (*Continued*)

Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for mortality and readmission
Blinding (performance bias and detection bias) Subjective measures of outcome	Unclear risk	Collected by unblinded trial nurses
Incomplete outcome data (attrition bias) All outcomes	Low risk	> 80% participants retained; intention-to-treat analysis
Selective reporting (reporting bias)	Low risk	All protocol outcomes reported

Widén Holmqvist 1998

Methods	Randomised trial
Participants	Location: Stockholm, Sweden Patients recovering from a stroke Mean age (SD): T: 70.8 years (7.6); C: 72.6 (8.9) N = 81 (T: 41; C: 40)
Interventions	Hospital at home Type of service: community-based nursing and therapy Control group: inpatient hospital care Study dates: September 1993 to March 1996
Outcomes	Functional status; psychological well-being; patient satisfaction; use of hospital and home rehabilitation service Follow-up: 3 months
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computerised random block procedure
Allocation concealment (selection bias)	Low risk	Sealed envelopes; done independently
Baseline outcome measurements (selection bias)	Low risk	Baseline outcome measurements done prior to intervention for functional status; similar results between groups
Baseline characteristics (selection bias)	Low risk	Baseline characteristics of treatment and control groups are reported and similar

Blinding (performance bias and detection bias) Objective measures of outcome	Low risk	Objective outcomes for use of health services
Blinding (performance bias and detection bias) Subjective measures of outcome	Low risk	Done by blinded assessor
Incomplete outcome data (attrition bias) All outcomes	Low risk	Attrition rate < 3%
Selective reporting (reporting bias)	Low risk	All outcomes reported in Methods also reported in Results

ADLs: activities of daily living; C: control group; COPD: chronic obstructive pulmonary disease; GP: general practitioner; HAH: hospital at home; ICU: intensive care unit; IQR: interquartile range; SD: standard deviation; T: treatment group

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

Study	Reason for exclusion
Belagaje 2014	Secondary analysis of a trial that compared 2 interventions for acute ischaemic stroke; no hospital at home was provided as part of the intervention
Bonnema 1998	This study evaluated early discharge from hospital of women following surgery for breast cancer; no hospital at home was provided
Bove 2015	Protocol for a randomised trial; usual care will not be provided in hospital
Brooten 1994	Obstetrics (this group of patients was not included in the review)
Bundred 1998	This study evaluated early discharge from hospital of women following surgery for breast cancer; no hospital at home was provided
Collins 2014	Small feasibility study (N = 14)
Cruz Eng 2015	Intervention group received care both at home and as an outpatient
Faucher 2012	Participants allocated to early discharge followed up in outpatient clinics, not at home
Fjaertoft 2011	Intervention could be provided either at home or in an outpatient clinic
Gerson 1976	No standard measures of outcome used. A physician, not blind to the patients' group assignment, assessed clinical function. No criteria were used to define an untoward event. No intention-to-treat analysis, data were analysed

(*Continued*)

	by the care the patient received
Gjelsvik 2014	The comparison group was also discharged home
Hansen 1992	This study did not evaluate hospital at home, but a model for follow-up visits at home after discharge from hospital
Hernandez 2003	39% of those allocated to hospital care were not admitted to hospital, so the degree to which the intervention substituted for hospital care is not clear
Hill 1978	This study evaluated hospital at home care for patients with a myocardial infarction. Managing this group of patients totally at home is now obsolete, as thrombolytic therapy has made admission to hospital necessary
Hofstad 2014	Randomised trial that compared 2 early supported discharge models, 1 provided health care in a day unit and the other in the patients' homes. A third group were allocated to an institutional stay if necessary and/or physiotherapy as needed in the municipality (0 - 2 hours per week)
Koopman 1996	This study compared patients treated with intravenous standard heparin administered in hospital with fixed dose subcutaneous low-molecular weight heparin administered at home, when feasible. Patients were taught to self-administer the low molecular weight heparin. Care was not provided in the patients' homes by a team of healthcare professionals; the intervention was not therefore considered hospital at home
Levine 1996	This study compared the use of intravenous standard heparin administered in the hospital with the administration of subcutaneous low molecular weight heparin primarily at home. The study nurse taught the patient to administer the medication. Care was not provided in the patients' homes by a team of healthcare professionals; the intervention was not therefore considered hospital at home
Magid 1989	This trial recruited 22 patients to compare the acceptance of inpatient with home continuous intravenous infusion of chemotherapy. While in hospital patients were instructed on the use of the infusers before discharge. The infusion was delivered in a continuous flow over 24 hours and new defusers were attached by the patient. Care was not provided in the patients' homes by a team of healthcare professionals. The intervention was not therefore considered hospital at home as no additional services were provided
Mascardi 2015	Participants allocated to early discharge followed up in outpatient clinics, not at home
Mather 1976	This study evaluated hospital at home care for patients with a myocardial infarction. Managing this group of patients totally at home is now obsolete, as thrombolytic therapy has made admission to hospital necessary
Melin 1992	Recruited patients with long-term care needs. Hospital at home was a substitute for long-term care
Melin 1993	Recruited patients with long-term care needs. Hospital at home was a substitute for long term care
Otero 2010	Early discharge programme, hospital at home services not provided
Rasmussen 2016	Intervention was not early discharge but instead a combination of pre-discharge home intervention, hospital intervention, and post-discharge intervention
Romano 1991	Compares therapies at home, no comparison with hospital care

(*Continued*)

Rønning 1998	Inpatient hospital rehabilitation compared with rehabilitation provided by the municipalities in a variety of settings which included nursing home rehabilitation on an inpatient or outpatient basis, and further ambulatory rehabilitation by a visiting physical therapist, speech therapist and/or nurse. Primary care also provided
Sigurdsson 2008	Some of the participants allocated to control group were discharged to a convalescent home mid-trial
Stone 1968	A case-control study, with control patients selected to match the homecare patients
Wade 1985	Compared 2 districts, with and without a domiciliary stroke service
Wang 2012	Qualitative study reporting on a small trial (N = 9)
Williams 1981	Patients were randomly allocated to 24-hour bed rest in hospital or mobilisation at home following intra-articular irradiation of the knee with yttrium-90. No additional services were provided at home
Wolter 2004	Intravenous therapy, analysis based on number of readmissions, data not provided on number of people readmitted. Authors contacted, no reply
Zimmer 1984	Evaluated the effectiveness of a home care programme for home-bound chronically ill patients. The home care programme was not a substitute for inpatient hospital care, but an addition to existing community services
Zimmer 1985	Evaluated the effectiveness of a home care programme for home bound chronically ill patients. The home care programme was not a substitute for in-patient hospital care, but an addition to existing community services

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

NCT01622205

Trial name or title	GOThenburg Very Early Supported Discharged (GOTVED)
Methods	Single-blind randomised trial with parallel assignment
Participants	Adults aged 18+ years with confirmed moderate to severe stroke and life expectancy of > 1 year
Interventions	Home visits performed by a rehabilitation team (physiotherapists, occupational therapists and a stroke nurse) . Person-centred approach
Outcomes	Main outcomes: anxiety and depression at 1-, 3-, and 12-month follow-up Other outcomes: functional status, balance, quality of life, impact of stroke and readmission; all at 1-, 3-, and 12-month follow-up
Starting date	May 2011 (estimated completion date July 2016)
Contact information	

NCT01622205 (*Continued*)

Notes	ClinicalTrials.gov NCT01622205

DATA AND ANALYSES

Comparison 1. Early discharge hospital at home versus inpatient care for those recovering from a stroke

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Mortality at 3 - 6 months	11	1114	Risk Ratio (M-H, Fixed, 95% CI)	0.92 [0.57, 1.48]
2 Mortality at 12 months			Other data	No numeric data
3 Hospital readmission at 3 - 6 months	5	345	Risk Ratio (M-H, Fixed, 95% CI)	1.09 [0.71, 1.66]
4 Hospital readmission at 12 months follow-up			Other data	No numeric data
5 Functional status			Other data	No numeric data
6 Patient outcomes			Other data	No numeric data
6.1 Quality of life/self-reported health status			Other data	No numeric data
6.2 Psychological well-being			Other data	No numeric data
7 Institutional care at 6 months follow-up (Rodgers 3-month data)	4	574	Risk Ratio (M-H, Fixed, 95% CI)	0.63 [0.40, 0.98]
8 Patient satisfaction and preference for place of care			Other data	No numeric data
9 Caregiver outcomes			Other data	No numeric data
10 Hospital length of stay	4	528	Mean Difference (IV, Fixed, 95% CI)	-6.68 [-10.19, -3.17]
11 Length of stay: inpatient days (including readmission days) and home-based treatment			Other data	No numeric data
12 Cost and use of other services			Other data	No numeric data
12.1 Cost			Other data	No numeric data
12.2 Use of other services			Other data	No numeric data

Comparison 2. Early discharge hospital at home versus inpatient care for older people with a mix of conditions

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Mortality at 3 - 6 months - older people with a mix of conditions	8	1247	Risk Ratio (M-H, Fixed, 95% CI)	1.07 [0.76, 1.49]
2 Mortality - chronic obstructive pulmonary disease	5	496	Risk Ratio (M-H, Fixed, 95% CI)	0.53 [0.25, 1.12]
3 Hospital readmission at 3 months - older people with a mix of conditions	9	1276	Risk Ratio (M-H, Fixed, 95% CI)	1.25 [0.98, 1.58]
4 Hospital readmission for those with COPD	5	496	Risk Ratio (M-H, Fixed, 95% CI)	0.86 [0.66, 1.13]

5 Functional status - older people a mix of conditions, including COPD			Other data	No numeric data
5.1 Functional status			Other data	No numeric data
5.2 Falls			Other data	No numeric data
6 Functional status at 3 months - older people with a mix of conditions	4	639	Mean Difference (IV, Fixed, 95% CI)	0.34 [-0.18, 0.86]
7 Patient-reported outcomes			Other data	No numeric data
7.1 Quality of life/self-reported health status: Older people with a mix of conditions			Other data	No numeric data
7.2 Quality of life/self-reported health status: Older people with COPD			Other data	No numeric data
7.3 Cognitive functioning			Other data	No numeric data
7.4 Psychological well-being			Other data	No numeric data
8 Institutional care at 1 year follow-up (Donald 6 months) - older patients with a mix of conditions	3	484	Risk Ratio (M-H, Fixed, 95% CI)	0.69 [0.48, 0.99]
9 Patients' place of residence at follow-up (not included in meta-analysis)			Other data	No numeric data
10 Patient satisfaction and preference for place of care			Other data	No numeric data
11 Caregiver outcomes			Other data	No numeric data
12 Staff views			Other data	No numeric data
13 Length of stay			Other data	No numeric data
13.1 Inpatient days (including readmission days) and hospital at home length of stay (not included in meta-analysis)			Other data	No numeric data
13.2 Total length of stay - hospital plus hospital at home			Other data	No numeric data
14 Hospital length of stay - older people with a mix of conditions	4	613	Mean Difference (IV, Fixed, 95% CI)	-6.76 [-10.60, -2.92]
15 Total length of stay - older people with a mix of mainly medical conditions	3	378	Mean Difference (IV, Fixed, 95% CI)	6.43 [2.84, 10.03]
16 Cost and resource use			Other data	No numeric data
16.1 Cost			Other data	No numeric data
16.2 Use of other services			Other data	No numeric data

Comparison 3. Early discharge hospital at home versus inpatient care following elective surgery

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Mortality			Other data	No numeric data
2 Hospital readmission			Other data	No numeric data
3 Functional status			Other data	No numeric data
4 Patient outcomes: Quality of life/self-reported health status			Other data	No numeric data
5 Clinical complications			Other data	No numeric data
6 Patient satisfaction			Other data	No numeric data
7 Caregiver outcomes			Other data	No numeric data
8 Staff views - GP workload			Other data	No numeric data
9 Hospital length of stay - older people recovering from surgery	4	411	Mean Difference (IV, Fixed, 95% CI)	-4.44 [-6.37, -2.51]
10 Length of stay (not included in meta-analysis)			Other data	No numeric data
11 Total length of stay - older people having elective surgery	2	245	Mean Difference (IV, Fixed, 95% CI)	2.79 [0.77, 4.81]
12 Cost			Other data	No numeric data

WHAT'S NEW

Last assessed as up-to-date: 9 January 2017.

Date	Event	Description
31 January 2017	New citation required but conclusions have not changed	The review includes 32 trials. Conclusions have not changed. Authorship has changed
30 January 2017	New search has been performed	We searched for new trials to 9 January 2017 and identified 6 new trials We updated the Methods to comply with Cochrane guidance, including adding 'Summary of findings' tables

HISTORY

Protocol first published: Issue 3, 1996

Review first published: Issue 1, 1998

Date	Event	Description
6 July 2011	Amended	Revised reference to published review
8 June 2011	Amended	Title changed for consistency, changes to published notes
17 February 2011	Amended	Minor changes to published notes
12 November 2008	New citation required and conclusions have changed	Review has been split from original review.
10 November 2008	New search has been performed	This review is an update of Shepperd 2005 but has been split into three different reviews.
28 July 2008	Amended	Converted to new review format.

CONTRIBUTIONS OF AUTHORS

SS identified relevant studies, extracted data from included trials, compiled summary tables of the results and led on writing the review.

SS and DGB analysed the results.

SI extracted data from included trials and commented on drafts of the review.

DGB screened titles and abstracts, identified relevant studies, extracted and assessed data, developed the 'Summary of findings' table, and updated the Background, the Methods and the Discussion.

DGB, SI, HAD, JB, JG, PL, SZR, and SS read and commented on the manuscript.

DECLARATIONS OF INTEREST

DGB: none known

SI: none known

HAD: none known

JB: none known

JG: none known

PL: none known

SHR: none known

SS: none known

JB, JG, SHR and SS were investigators on five of the included trials. These authors were not involved in the risk of bias assessment of their own trials. All GRADE judgements were debated with review authors not involved in trials.

SOURCES OF SUPPORT

Internal sources

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

External sources

- NIHR Research Scientist in Evidence Synthesis Award, UK.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We updated the Methods to comply with Cochrane current standards for reporting reviews (MECIR 2012) and EPOC-specific standards (epoc.cochrane.org/epoc-specific-resources-review-authors).

We have added 'Summary of findings' tables.

We added a new outcome (falls) that had not been specified in the protocol.

We added new authors to the review team (DGB, HAD, JB, JG, PL).

NOTES

This review is an update; the original review was first published in Issue 1, 1998 of the Cochrane Library (Shepperd 1998).

The original review has now been separated into three distinct reviews: *Early discharge hospital at home* (the current review), *Hospital at home: home-based end-of-life care* (Shepperd 2016a), and *Admission avoidance hospital at home* (Shepperd 2016b), all published in the Cochrane Library. The titles have been changed for consistency.

INDEX TERMS

Medical Subject Headings (MeSH)

*Hospitalization [economics]; Home Care Services, Hospital-Based [economics; *standards]; Patient Care [economics; standards]; Patient Discharge; Randomized Controlled Trials as Topic

MeSH check words

Adult; Humans