Organised inpatient (stroke unit) care for stroke (Review)

Stroke Unit Trialists' Collaboration

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TABLE OF CONTENTS

[Intervention Review]

Organised inpatient (stroke unit) care for stroke

Stroke Unit Trialists' Collaboration[1]

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ABSTRACT

Background

Organised stroke unit care is provided by multidisciplinary teams that exclusively manage stroke patients in a ward dedicated to stroke patients, with a mobile stroke team or within a generic disability service (mixed rehabilitation ward).

Objectives

To assess the effect of stroke unit care compared with alternative forms of care for people following a stroke.

Search methods

We searched the trials registers of the Cochrane Stroke Group (January 2013) and the Cochrane Effective Practice and Organisation of Care (EPOC) Group (January 2013), MEDLINE (2008 to September 2012), EMBASE (2008 to September 2012) and CINAHL (1982 to September 2012). In an effort to identify further published, unpublished and ongoing trials, we searched 17 trial registers (January 2013), performed citation tracking of included studies, checked reference lists of relevant articles and contacted trialists.

Selection criteria

Randomised controlled clinical trials comparing organised inpatient stroke unit care with an alternative service. After formal risk of bias assessment, we have now excluded previously included quasi-randomised trials.

Data collection and analysis

Two review authors initially assessed eligibility and trial quality. We checked descriptive details and trial data with the co-ordinators of the original trials.

Main results

We included 28 trials, involving 5855 participants, comparing stroke unit care with an alternative service. More-organised care was consistently associated with improved outcomes. Twenty-one trials (3994 participants) compared stroke unit care with care provided in general wards. Stroke unit care showed reductions in the odds of death recorded at final (median one year) follow-up (odds ratio (OR) 0.87, 95% confidence interval (CI) 0.69 to 0.94; P = 0.005), the odds of death or institutionalised care (OR 0.78, 95% CI 0.68 to 0.89; P = 0.0003) and the odds of death or dependency (OR 0.79, 95% CI 0.68 to 0.90; P = 0.0007). Sensitivity analyses indicated that the observed benefits remained when the analysis was restricted to securely randomised trials that used unequivocally blinded outcome assessment with a fixed period of follow-up. Outcomes were independent of patient age, sex, initial stroke severity or stroke type, and appeared to be better in stroke units based in a discrete ward. There was no indication that organised stroke unit care resulted in a longer hospital stay.

Authors' conclusions

Stroke patients who receive organised inpatient care in a stroke unit are more likely to be alive, independent, and living at home one year after the stroke. The benefits were most apparent in units based in a discrete ward. We observed no systematic increase in the length of inpatient stay.

PLAIN LANGUAGE SUMMARY

Organised inpatient (stroke unit) care

Organised stroke unit care is a form of care provided in hospital by nurses, doctors and therapists who specialise in looking after stroke patients and work as a co-ordinated team. This review of 28 trials, involving 5855 participants, showed that patients who receive this care are more likely to survive their stroke, return home and become independent in looking after themselves. A variety of different types of stroke unit have been developed. The best results appear to come from those which are based in a dedicated ward.

BACKGROUND

Description of the condition

Stroke is now the third leading cause of disability (Murray 2012) and the second leading cause of mortality (Lozano 2012) worldwide. The global disease burden of stroke increased by 19% between 1990 and 2010 (Murray 2012) and current projections estimate the number of deaths worldwide will rise to 6.5 million in 2015 and to 7.8 million in 2030 (Strong 2007). Interventions that are applicable to a majority of stroke patients and that aim to reduce associated mortality and disability are essential.

During their initial illness, stroke patients are frequently admitted to hospital where they can receive care in a variety of ways and in a range of settings. Traditionally, the care of stroke patients was provided within departments of general (internal) medicine, neurology or medicine for the elderly where they would be managed alongside a range of other patient groups. A more-focused approach to the management of stroke patients in hospital has been developed.

Description of the intervention

Organised inpatient (stroke unit) care is a term used to describe the focusing of care for stroke patients in hospital under a multidisciplinary team who specialise in stroke management (SUTC 1997a). This concept is not new and its value has been debated for more than 20 years (Ebrahim 1990; Garraway 1985; Langhorne 1993; Langhorne 1998; Langhorne 2012). In essence, the debate has concerned whether the perceived effort and cost of focusing the care of hospitalised stroke patients within specially organised units would be matched by tangible benefits for the patients receiving that care. In particular, would more patients survive and make a good recovery as a result of organised inpatient (stroke unit) care?

Why it is important to do this review

A systematic review of all available trials (SUTC 1997a) previously described the range of characteristics of stroke unit care and addressed the question of whether improving the organisation of inpatient stroke care can bring about improvements in important patient outcomes. This review continues to be extended and updated within The Cochrane Library (SUTC 2001; SUTC 2007).

OBJECTIVES

To assess the effect of stroke unit care compared with alternative forms of care for people following a stroke.

Originally, there were four broad objectives for this systematic review. To establish:

1. the characteristic features of organised inpatient (stroke unit) care;

2. if organised inpatient (stroke unit) care could provide better patient outcomes than alternative forms of care;

3. if benefits were apparent across a range of patient groups;

4. if different approaches to organised stroke unit care were effective (in particular, we hypothesised that organised care would be more effective than that of general medical wards, but that different forms of organised care would achieve similar outcomes).

Within the current version of this review, we wished to establish whether the previous conclusions were altered by the inclusion of new outcome data from recent trials and further subgroup analyses based on patient and intervention characteristics. We have structured the review to allow the inclusion of future trials that address important questions about the optimal ways to organise stroke patient care.

METHODS

Criteria for considering studies for this review

Types of studies

We included all randomised controlled clinical trials that compared an organised system of inpatient (stroke unit) care with an alternative form of inpatient care. This was usually the contemporary conventional care but could include an alternative model of organised inpatient care (see Types of interventions). Previous versions of this review (SUTC 1997a; SUTC 2001; SUTC 2007) have included trials with quasi-random treatment allocation (such as bed availability or date of admission). However, in an effort to ensure this ongoing systematic review focuses on data from trials with strict randomisation procedures we excluded all quasi-randomised trials for this update.

Types of participants

Any person admitted to hospital who had suffered a stroke was eligible. We recorded the delay between stroke onset and hospital admission but did not use this as an exclusion criterion. We used a clinical definition of stroke: focal neurological deficit due to cerebrovascular disease, excluding subarachnoid haemorrhage and subdural haematoma.

Types of interventions

Organised inpatient (stroke unit) care can be considered a complex organisational intervention comprising multidisciplinary staffing providing a complex package of care to stroke patients in hospital. In the original version of this review (SUTC 1997a), the primary question was whether organised inpatient (stroke unit) care could improve outcomes compared with the contemporary conventional care (usually in general medical wards). We have now modified the analyses in a minor way to reflect the emerging hierarchy of service organisation and to allow the comparison of 'more-organised' versus 'less-organised' services. We have done this because some recent trials have addressed new questions and included comparisons of two services both of which met the basic definition of organised (stroke unit) care and so could not really be described as conventional care. However, the original service descriptions used in this review (SUTC 1997a) indicated that service organisation could be considered as a hierarchy which, in descending order, was as follows.

1. Stroke ward: where a multidisciplinary team including specialist nursing staff based in a discrete ward cares exclusively for stroke patients. This category included the following subdivisions:
   i) acute stroke units that accept patients acutely but discharge early (usually within seven days); these appear to fall into three broad subcategories:
      a) 'intensive' model of care with continuous monitoring, high nurse staffing levels and the potential for life support;
      b) 'semi-intensive' with continuous monitoring, high nurse staffing but no life support facilities; and
      c) 'non-intensive' with none of the above;
   ii) rehabilitation stroke units that accept patients after a delay, usually of seven days or more, and focus on rehabilitation; and
   iii) comprehensive (ie combined acute and rehabilitation) stroke units that accept patients acutely but also provide rehabilitation for at least several weeks if necessary. Both the rehabilitation unit and comprehensive unit models offer prolonged periods of rehabilitation.
2. Mixed rehabilitation ward: where a multidisciplinary team including specialist nursing staff in a ward provides a generic rehabilitation service but not exclusively caring for stroke patients.
3. Mobile stroke team: where a peripatetic multidisciplinary team (excluding specialist nursing staff) provides care in a variety of settings.
4. General medical ward: where care is provided in an acute medical or neurology ward without routine multidisciplinary input.

Types of outcome measures

Primary outcomes

The primary analysis examined death, dependency and the requirement for institutional care at the end of scheduled follow-up of the original trial (four trials subsequently extended follow-up). We categorised dependency into two groups where we took 'independent' to mean that an individual did not require physical

assistance for transfers, mobility, dressing, feeding or toileting. We considered individuals who failed any of these criteria 'dependent'. The criteria for independence were approximately equivalent to a modified Rankin score of 0 to 2, or a Barthel Index of more than 18 out of 20 (Wade 1992). We took the requirement for long-term institutional care to mean care in a residential home, nursing home or hospital at the end of scheduled follow-up.

Secondary outcomes

Secondary outcome measures included patient quality of life, patient and carer satisfaction, and duration of stay in hospital or institution or both.

Search methods for identification of studies

See the 'Specialized register' section in the Cochrane Stroke Group module. We searched for trials in all languages and arranged the translation of relevant papers published in languages other than English.

Electronic searches

We searched the trials registers of the Cochrane Stroke Group (January 2013) and the Cochrane Effective Practice and Organisation of Care (EPOC) Group (January 2013). In addition, in collaboration with the Cochrane Stroke Group Trials Search Co-ordinator, we searched MEDLINE (2008 to September 2012) (Appendix 1), EMBASE (2008 to September 2012) (Appendix 2) and CINAHL (1982 to September 2012) (Appendix 3). To avoid duplication of effort we restricted the searches of MEDLINE and EMBASE from January 2008 as these databases have already been searched to that date for all stroke trials and relevant trials added to the Cochrane Stroke Group Trials Register.

We searched the following registers of ongoing trials using the keyword 'stroke' (January 2013):

- ClinicalTrials.gov (http://clinicaltrials.gov/);
- The Australian New Zealand Clinical Trials Registry (www.anzctr.org.au);
- CenterWatch Clinical Trials Listing Service (www.centerwatch.com);
- Chinese Clinical Trial Register (www.chictr.org);
- Community Research & Development Information Service (of the European Union) (cordis.europa.eu/en/home.html);
- Current Controlled Trials *meta*Register of Controlled Trialls (mRCT) - active and archived registers (www.controlled-trials.com/mrct) and International Standard Randomised Controlled Trial Number Register (www.controlled-trials.com/isrctn/);
- WHO International Clinical Trials Registry (www.who.int/trialsearch);
- Hong Kong clinical trials register (www.hkclinicaltrials.com);
- Clinical Trials Registry - India (CTRI) (www.ctri.in);
- Nederlands Trialregister (www.trialregister.nl/trialreg/index.asp);
- South African National Clinical Trial Register (www.sanctr.gov.za);
- UK Clinical Research Network Portfolio database (portal.nihr.ac.uk/Pages/Portfolio.aspx);
- UK Clinical Trials Gateway (www.controlled-trials.com/ukctr);
- UK National Research Register (NRR) (trials and other research - archived September 2007) (portal.nihr.ac.uk/Pages/NRRArchive.aspx);
- University Hospital Medical Information Network (UMIN) Clinical Trials Registry (for Japan) (www.umin.ac.jp/ctr/);
- The Internet Stroke Center - Stroke Trials Registry (www.strokecenter.org/trials);
- Clinical Trials Results register (www.clinicaltrialresults.org).

Searching other resources

In an effort to identify further published, unpublished and ongoing trials, we:

1. performed citation tracking using Web of Science Cited Reference Search for all included studies;
2. searched the reference lists of included trials and all relevant articles;
3. obtained further information from individual trialists;
4. contacted other researchers in the field and publicised our preliminary findings at stroke conferences in the UK, Scandinavia, Germany, the Netherlands, Switzerland, Spain, Canada, South America, Australia, Belgium, USA and Hong Kong.

Data collection and analysis

Selection of studies

For this updated review, one author (PF) read the titles and abstracts of the records obtained from the electronic searches and excluded obviously irrelevant studies. We obtained the full copy of the remaining studies and two review authors (PF, PL) independently selected studies for inclusion based on the following eligibility criteria:

1. randomised controlled trial;
2. service intervention providing a form of organised inpatient (stroke unit) care;
3. service aim is to improve functional recovery and survival after stroke;
4. trial of stroke patients.

We established the characteristics of unpublished trials through discussion with the trial co-ordinator prior to analysis of the results.

Data extraction and management

If possible, the principal review author (PL) obtained descriptive information about the service characteristics of the organised inpatient (stroke unit) care and conventional care settings through a structured interview or correspondence conducted with the trial co-ordinators (n = 17). We obtained outstanding information from published sources. We then allocated trials to service subgroups. We confirmed outcome data from published sources and supplemented them with unpublished information provided by the co-ordinator of each individual trial. We asked trialists to provide information on the number of participants who were dead, dependent, requiring institutional care or missing at the end of scheduled follow up. For this updated review, for which data were available only from published sources, two review authors (PF, PL) independently extracted data using a standard data extraction form. We sought subgroup information primarily for the combined outcome of death or requiring institutional care. We obtained unpublished aggregated data for a majority of trials but insufficient amounts of individual patient data were available to allow a comprehensive individual patient data analysis.

We obtained subgroup data regarding the following participant groups (see SUTC 1997a for details):

1. age: up to 75 years or greater than 75 years;
2. sex: male or female;
3. stroke severity: dependency at the time of randomisation (usually within one week of the index stroke):
   i) mild stroke: equivalent to a Barthel Index of 10 to 20 out of 20 during the first week;
   ii) moderate stroke: equivalent to a Barthel Index of 3 to 9 out of 20 during the first week;
   iii) severe stroke: equivalent to a Barthel Index of 0 to 2 out of 20 during the first week;
4. stroke type: ischaemic or haemorrhagic based on neuroimaging.

Assessment of risk of bias in included studies

We assessed risk of bias using The Cochrane Collaboration's risk of bias tool, as described in Chapter 8 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011). We identified the method of concealment of treatment allocation, the presence of an intention-to-treat analysis and the presence of blinding of outcome assessment as potentially important factors for sensitivity analyses, but we did not use them as exclusion criteria.

Measures of treatment effect

Where our primary outcomes of death, dependency or institutionalisation after the end of scheduled follow-up were reported, we analysed these using the odds ratio (OR) and 95% confidence interval (CI) of an adverse outcome.

As a secondary outcome, we aimed to record length of stay in hospital or an institution as the mean and standard deviation (SD). Where only medians were available, we assumed these were approximate to the mean. Where no other data were provided with the mean value, we inferred the SD as being at least as large as those in the comparable trials using the same measure. Because length of stay was reported in a variety of ways we used standardised mean difference (SMD) and 95% CI.

Unit of analysis issues

We anticipated that the majority of trials would have a simple parallel-group design in which each individual was randomised to one of two treatment groups. We planned to perform subgroup analyses should a trial have three (or more) treatment groups.

Dealing with missing data

Where data were missing for the outcomes of death, dependency or institutionalisation we assumed the participant to be alive, independent and living at home. We aimed to explore the implications of these assumptions in sensitivity analyses.

Assessment of heterogeneity

We planned to determine heterogeneity using the I^2 statistic. We defined significant heterogeneity as an I^2 of greater than 50%. Where significant heterogeneity occurred, we explored potential sources using pre-planned sensitivity analyses.

Assessment of reporting biases

We employed a comprehensive search strategy in an effort to avoid reporting biases. To identify unpublished studies we searched trial registers and contacted trialists and other experts in the field.

Data synthesis

We checked all individual patient data for internal consistency and consistency with published reports. One review author entered data into the Review Manager software (RevMan 5.2) (RevMan 2012) and a second review author checked the entries. We analysed binary outcome data using OR and 95% CI. We analysed continuous outcome data using SMD and 95% CI. We used a fixed-effect model first but replaced this with a random-effects model if there was significant heterogeneity.

Subgroup analysis and investigation of heterogeneity

Subgroup analyses involved a reanalysis stratified by participant or service subgroup using tabular subgroup data provided by the trialists. We used a fixed-effect approach unless there was statistically significant heterogeneity, in which case results were confirmed using a random-effects statistical model.

Sensitivity analysis

We planned sensitivity analyses around the key aspects of trial quality that we identified during our assessment of risk of bias (that is method of randomisation (concealment of treatment allocation), blinding of outcome assessment and a fixed period of follow-up).

RESULTS

Description of studies

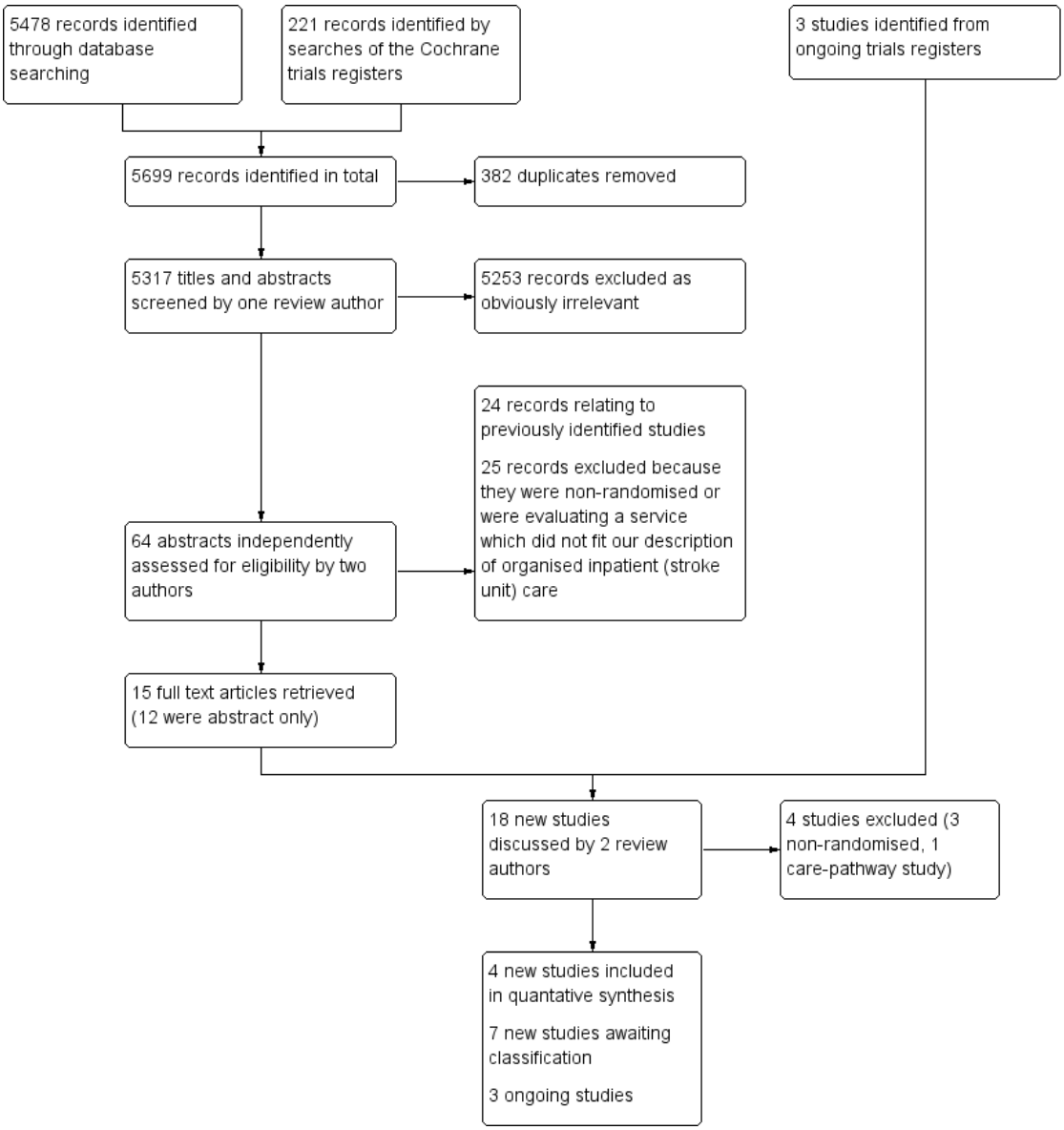
See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification; Characteristics of ongoing studies.

Results of the search

The search strategy for previous versions of this review identified 48 potentially eligible trials, of which we excluded 13 (Abissi 1995; Asplund 2000; Davis 2000; Di Lauro 2003; Durastanti 2005; Koton 2005; Langhorne 2001; Moloney 1999; Ricauda 2004; Ronning 1998a; Ronning 1998b; Silva 2004; Walter 2005), two were ongoing (Stone 1998; Wang 2004) and two were awaiting further assessment (HAMLET 2009; Pearson 1988). Therefore, the previous version of this review included 31 trials (6936 participants) in quantitative data syntheses.

For this updated review, the searches of MEDLINE, EMBASE and CINAHL identified 5478 records and from these and the searches of the Cochrane trials registers and other sources, we identified 18 new potentially eligible trials for consideration using the four selection criteria (Figure 1). In addition, we identified newly published data for one previously included trial (Athens 1995).

Figure 1. Flow diagram illustrating the results of the updated searches



The assessors agreed on the inclusion of four trials (Guangdong 2008; Guangdong 2009; Huaihua 2004; Hunan 2007) and the exclusion of four trials (Diagana 2008; Middleton 2006; Pappa 2009; Shiraishi 2004) (see Excluded studies), which were newly identified for this updated review. We require further information for seven trials (Anhui 2008; China (Hao) 2010; China (Pei) 2011; China (Wang) 2008; China (Wu) 2007; Haikou 2007; Shanghai 2006) in order to assess eligibility, and an additional three trials (Baden 2007; Beijing 2009; Shanghai 2009) do not yet have available outcome data.

After formal risk of bias assessment the assessors also agreed on the exclusion of seven of the 31 trials included in the previous version of this review. These seven trials employed informal randomisation procedures (quasi-randomised) based on bed availability (Cavallini 2003; Strand 1985; von Arbin 1980; Yagura 2005), a strict admission rota (Hamrin 1982; Patel 2000) or patient date of birth (Ronning 1998). Of the four trials that were awaiting further assessment or were ongoing at the time of the previous literature search, the assessors excluded three trials as no outcome data were available (Pearson 1988; Stone 1998; Wang 2004) and one trial as no data for the comparison of intensive monitoring versus standard ward-based care have been reported for non-surgical control participants (HAMLET 2009).

Therefore, this updated review incorporates an individual patient data meta-analysis for 28 randomised controlled trials with 5855 participants.

Included studies

Service characteristics within organised (stroke unit) care and conventional care settings

Descriptive information was available for all trials: in seven trials we had access to published information only (Birmingham 1972; Guangdong 2008; Guangdong 2009; Huaihua 2004; Hunan 2007; Illinois 1966; New York 1962), in two trials we had detailed unpublished information (Beijing 2004; Joinville 2003) and in the remaining 19 trials a structured interview was carried out with the trial co-ordinator to determine the service characteristics.

Our original publication outlined the features of the stroke unit trials (SUTC 1997a). In summary, organised inpatient (stroke unit) care was characterised by: (1) co-ordinated multidisciplinary rehabilitation, (2) staff with a specialist interest in stroke or rehabilitation, (3) routine involvement of carers in the rehabilitation process and (4) regular programmes of education and training. Several factors indicating a more intensive or more comprehensive input of care were also associated with the stroke unit setting. Various service models of care exist (Table 1) but the core characteristics (SUTC 1997a) that were invariably included in the stroke unit setting were: (1) multidisciplinary staffing - that is medical, nursing and therapy staff (usually including physiotherapy, occupational therapy, speech therapy, social work); and (2) co-ordinated multidisciplinary team care incorporating meetings at least once per week. Where both the services compared could satisfy the description of stroke unit care the more-organised system of care was taken as the index service.

Service comparisons within the 28 trials with outcome data are detailed in Table 2. The total number of comparisons is greater than the number of trials because in three trials participants could be randomised to one of two alternatives to stroke unit care; two of these trials used a stratified randomisation procedure (Nottingham 1996; Orpington 1993) and one did not (Dover 1984). In two small trials the conventional care (general medical) group also received some input from a specialist nurse (Illinois 1966; New York 1962). Although this was not strictly general medical ward care, we have included this information since relatively little novel nursing input appears to have been available. The exclusion of these trials would not alter the conclusions of the systematic review substantially. In one trial, some participants appear to have been treated outside the rehabilitation wards (that is by peripatetic team care) but the number is unclear (New York 1962). This trial is currently classified as a mixed rehabilitation ward.

Of the four trials newly identified for this update, three compared a model of stroke unit care using integrated traditional Chinese medicine (TCM) (e.g. acupuncture and herbal remedies) versus standard 'Western medicine' stroke unit care (Guangdong 2008; Hunan 2007) or a general medical ward (Guangdong 2009); one trial compared a comprehensive stroke ward within a neurology unit with a general medical ward (Huaihua 2004). The duration of rehabilitation provided in all four newly identified trials was unclear and in only two trials was the timing of randomisation reported (Guangdong 2009; Huaihua 2004).

Of the 24 previously included trials, 22 incorporated rehabilitation lasting several weeks if required; 16 of these units admitted participants acutely and eight after a delay of one or two weeks. Two trials evaluated an acute stroke (semi-intensive) unit with no continuing rehabilitation. One trial proved difficult to categorise as it contained elements of an acute (semi-intensive) unit but offered some rehabilitation (Athens 1995). It is classified here as a comprehensive stroke unit. No trials evaluated an 'intensive care' model of stroke unit.

Excluded studies

See Characteristics of excluded studies.

Of the 28 excluded studies, 14 were not strictly randomised, four were evaluations of care pathways, four did not have available outcome data, three evaluated an intervention that did not fit our description of organised inpatient (stroke unit) care, two managed

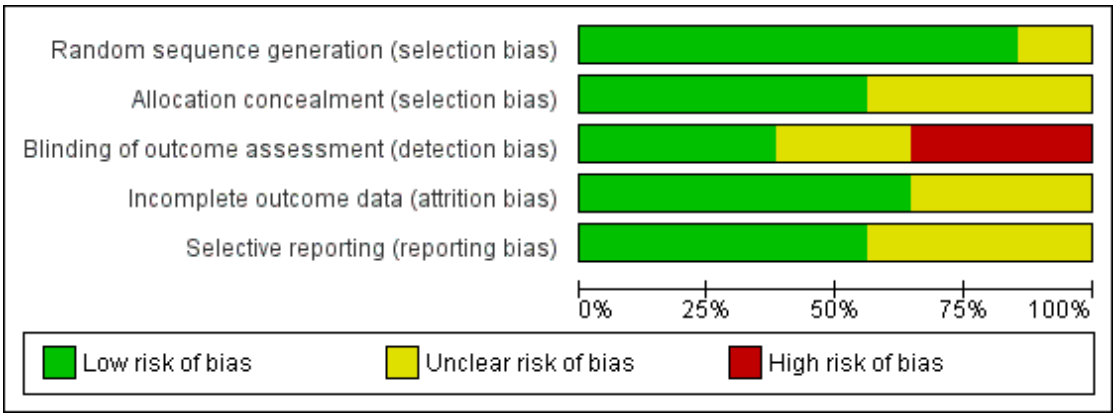
intervention and control participants within the same unit and one reported retrospective data from a previous study.

Risk of bias in included studies

See the 'Risk of bias' graph (Figure 2), the 'Risk of bias' summary (Figure 3) and the Characteristics of included studies table.

Figure 2. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.

Figure 3. Risk of bias graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.



Allocation

Fifteen trials (Athens 1995; Dover 1984; Edinburgh 1980; Goteborg-Ostra 1988; Goteborg-Sahlgren 1994; Groningen 2003; Helsinki 1995; Kuopio 1985; Manchester 2003; Montreal 1985; Orpington 1993; Orpington 2000; Svendborg 1995; Tampere 1993; Trondheim 1991) used a clearly concealed randomisation procedure.

Blinding

Eleven trials (Goteborg-Sahlgren 1994; Groningen 2003; Helsinki 1995; Hunan 2007; Joinville 2003; Kuopio 1985; Manchester 2003; Montreal 1985; Nottingham 1996; Orpington 2000; Perth 1997) used an unequivocally blinded final assessment for all participants.

Incomplete outcome data

Nine trials had minor omissions of death and place of residence data (18 stroke unit participants and 35 controls in total) (Birmingham 1972; Dover 1984; Edinburgh 1980; Manchester 2003; Montreal 1985; Nottingham 1996; Orpington 1993; Orpington 2000; Tampere 1993). For the purpose of our analysis these participants were assumed to be alive and living at home, which may have introduced a minor bias in favour of the control group.

Effects of interventions

The results of the systematic review are presented in six sections as follows.

Section 1: Organised inpatient (stroke unit) care versus alternative care. First, we have outlined the main outcomes for the comparison of organised inpatient (stroke unit) care with an alternative service. Therefore, this section examines the impact of increased levels of organisation of stroke care on patient outcomes. Where both services compared could satisfy the definition of stroke unit care, the more-organised system of care was taken as the index service.

Section 2: Organised inpatient (stroke unit) care versus general medical ward. We have then described the results for the most common comparison: organised stroke unit care versus a general medical ward. This section includes analyses of different subgroups of patient and service type.

Sections 3, 4, 5 and 6: Comparisons of different forms of organised inpatient (stroke unit) care. Finally, we have presented the results for direct comparisons of different forms of organised stroke unit care.

Section 1 : Organised stroke unit care versus alternative care

Comparison 1.1: Death by the end of scheduled follow-up

Outcome data were available for all 28 trials (5855 participants) in which a novel organised inpatient (stroke unit) intervention

was compared with an alternative (less-organised) service (Analysis 1.1). Case fatality recorded at the end of scheduled follow-up (median follow-up 12 months; range six weeks to 12 months) was lower in the organised (stroke unit) care group in 21 of 28 trials. The overall summary estimate was an OR of 0.76 (95% CI 0.66 to 0.88; P = 0.0001). There was a borderline significant subgroup interaction (P = 0.04) with more positive effects seen in subgroups based on trials of stroke wards. When we restricted the analysis to those trials in which scheduled follow-up was continued for a fixed period of six months or one year (that is excluding Beijing 2004; Goteborg-Ostra 1988; Groningen 2003; Guangdong 2008; Guangdong 2009; Illinois 1966; Montreal 1985; New York 1962; Orpington 1993; Orpington 1995), the overall OR was essentially unchanged (OR 0.80, 95% CI 0.69 to 0.93; P = 0.0001).

Comparison 1.2: Death or institutional care by the end of scheduled follow-up

Outcome data were available for 23 trials (4840 participants) (Analysis 1.2). The median duration of follow-up was one year. The summary result indicated a significant reduction in the odds of a patient dying or requiring long-term institutional care (OR 0.76, 95% CI 0.67 to 0.86; P = 0.0001). There was a borderline significant subgroup interaction (P = 0.02) with more positive effects usually seen in subgroups based on trials of stroke wards. When we excluded trials that had a very short or variable period of follow-up (Beijing 2004; Goteborg-Ostra 1988; Groningen 2003; Illinois 1966; Montreal 1985; New York 1962; Orpington 1993; Orpington 1995), we found that the overall estimate of apparent benefit was unaffected (OR 0.75, 95% CI 0.65 to 0.86; P = 0.0001)

Comparison 1.3: Death or dependency by the end of scheduled follow-up

Outcome data were available for 23 trials (4807 participants) (Analysis 1.3). The summary result indicated a significant reduction in the odds of the combined adverse outcomes of death or dependency (OR 0.80, 95% CI 0.67 to 0.97; P < 0.00001) with no significant heterogeneity. The conclusions were not altered by the exclusion of trials with a variable follow-up period. The main methodological difficulty when using dependency as an outcome was the degree of blinding at final assessment and the potential for bias if the assessor was aware of the treatment allocation. The results were unchanged (OR 0.74, 95% CI 0.61 to 0.90; P = 0.002) when restricted to those trials in which an unequivocally blinded final assessment for all participants was undertaken (Goteborg-Sahlgren 1994; Groningen 2003; Helsinki 1995; Joinville 2003; Kuopio 1985; Manchester 2003; Montreal 1985; Nottingham 1996; Orpington 2000).

Comparison 1.4 and 1.5: Length of stay (days) in a hospital or institution or both

Length of stay data were available for 18 individual trials (4115 participants) (Analysis 1.4; Analysis 1.5). Mean (or median) length of stay ranged from 11 to 162 days in the stroke unit groups and from 12 to 129 days in the control groups. Twelve trials reported a shorter length of stay in the stroke unit group and six a more prolonged stay. The calculation of a summary result for length of stay was subject to major methodological limitations: length of stay was calculated in different ways (for example acute hospital stay, total stay in hospital or institution), two trials recorded median rather than mean length of stay and in two trials the SD had to be inferred from the P value or from the results of similar trials. Overall, using a random-effects model, there was no significant reduction in the length of stay in the stroke unit group (SMD -0.15, 95% CI -0.32 to 0.02; P = 0.09). The summary estimate was complicated by considerable heterogeneity that limits the extent to which more general conclusions can be inferred.

We reanalysed results according to whether length of stay was defined as stay in acute hospital only or the total length of stay in a hospital or institution in the first year after stroke (Analysis 1.5). There was no significant difference between the two groups and no reduction in heterogeneity.

Comparisons 1.6, 1.7 and 1.8: Death, death or institutional care, and death or dependency at five-year follow-up

Three trials (1139 participants) carried out supplementary studies extending participant follow-up to five years post-stroke (Athens 1995; Nottingham 1996; Trondheim 1991) for the outcome of death, and two trials (535 participants) carried out supplementary studies extending participant follow-up to five years post-stroke (Nottingham 1996; Trondheim 1991) for the outcomes of death or institutionalisation and death or dependency. The OR for adverse outcomes continued to favour stroke unit care but with some heterogeneity: death 0.74 (95% CI 0.59 to 0.94; P = 0.01) (Analysis 1.6), death or institutional care 0.59 (95% CI 0.33 to 1.05; P = 0.07) (Analysis 1.7) and death or dependency 0.54 (95% CI 0.22 to 1.34; P = 0.18) (Analysis 1.8).

Comparisons 1.9, 1.10 and 1.11: Death, death or institutional care, and death or dependency at 10-year follow-up

Three trials (1152 participants) extended follow-up to 10 years post stroke for the outcome of death (Athens 1995; Nottingham 1996; Trondheim 1991) and two trials (535 participants) extended follow-up to 10 years post stroke for the outcomes of death or institutionalisation and death or dependency (Nottingham 1996; Trondheim 1991). Again, the summary results continued to favour stroke unit care but with increased heterogeneity and a loss of statistical significance for the outcomes of death and death or dependency: OR for death 0.67 (95% CI 0.43 to 1.03; P = 0.07)

(Analysis 1.9), death or institutional care 0.57 (95% CI 0.37 to 0.88; P = 0.01) (Analysis 1.10) and death or dependency 0.70 (95% CI 0.27 to 1.80; P = 0.45) (Analysis 1.11).

Participant satisfaction and quality of life

Only three trials recorded outcome measures related to participant quality of life (Nottingham Health Profile; EuroQol Quality of Life Scale) (Manchester 2003; Nottingham 1996; Trondheim 1991). In Nottingham 1996 and Trondheim 1991, there was a pattern of improved results among stroke unit survivors with the results attaining statistical significance in the two trials. However, for the Manchester 2003 trial there was no statistically significant difference between the study groups. We could find no systematically gathered information on participant preferences.

Sensitivity analyses by trial characteristics

In view of the variety of trial methodologies described we carried out a sensitivity analysis based only on those trials with a low risk of bias: (1) secure randomisation procedures; (2) unequivocally blinded outcome assessment; (3) a fixed one-year period of follow-up. Seven trials met all of these criteria (Goteborg-Sahlgren 1994; Groningen 2003; Helsinki 1995; Kuopio 1985; Manchester 2003; Nottingham 1996; Orpington 2000). Stroke unit care was associated with a statistically non-significant reduction in the odds of death (OR 0.82, 95% CI 0.64 to 1.05; P = 0.12) and statistically significant reductions in the odds of death or institutional care (OR 0.77, 95% CI 0.63 to 0.96; P = 0.02) and death or dependency (OR 0.76, 95% CI 0.62 to 0.93; P = 0.009).

Subgroup analyses by patient characteristics

Predefined subgroup analyses were based on previous versions of this review (SUTC 1997a) and each subgroup analysis included data from at least nine trials (at least 1111 participants). These were based on participants' age, sex and initial stroke severity. For this updated version we have incorporated additional data based on pathological stroke type (ischaemic or haemorrhagic stroke). See Figure 4, Figure 5 and Figure 6.

Figure 4. Analysis of patient characteristics on effectiveness of organised stroke unit care versus alternative service for the outcome of death by the end of scheduled follow-up.

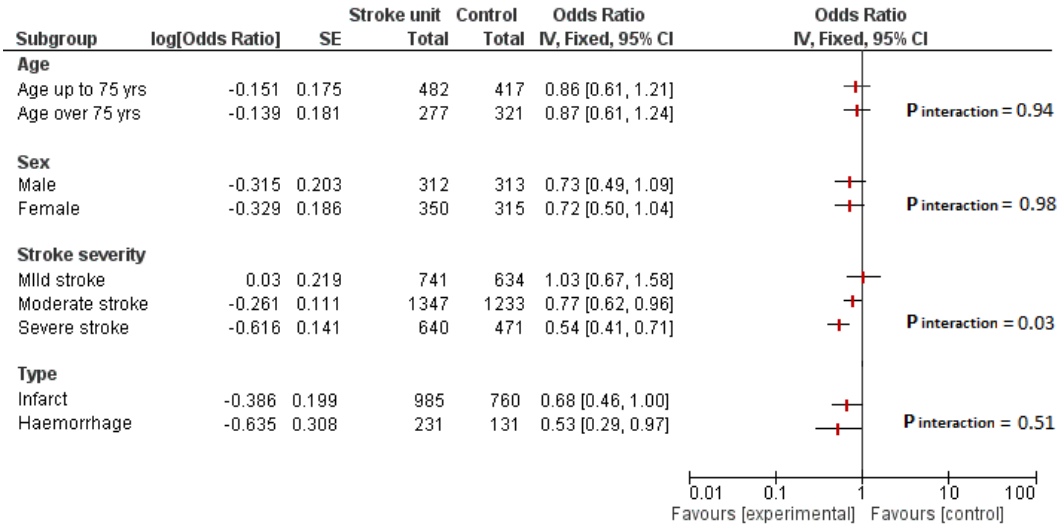


Figure 5. Analysis of patient characteristics on effectiveness of organised stroke unit care versus alternative service for the outcome of death or institutionalisation by the end of scheduled follow-up.

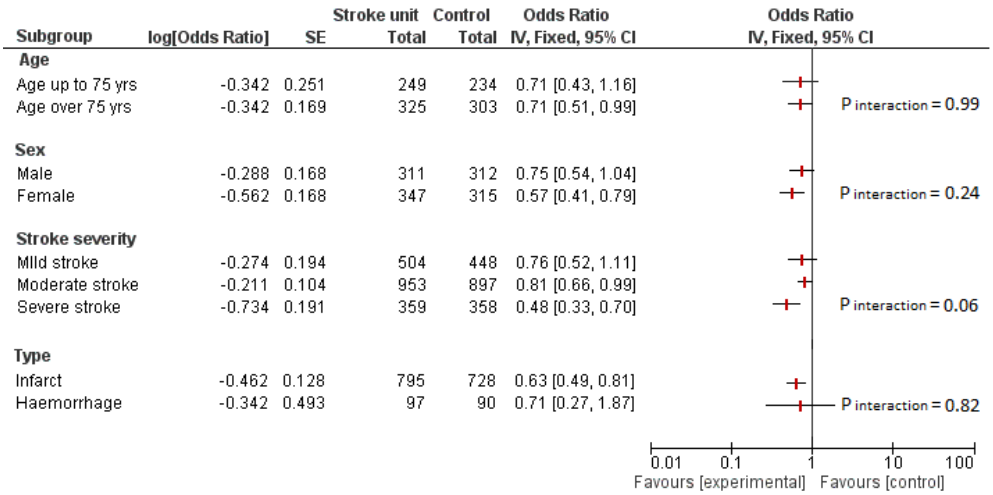
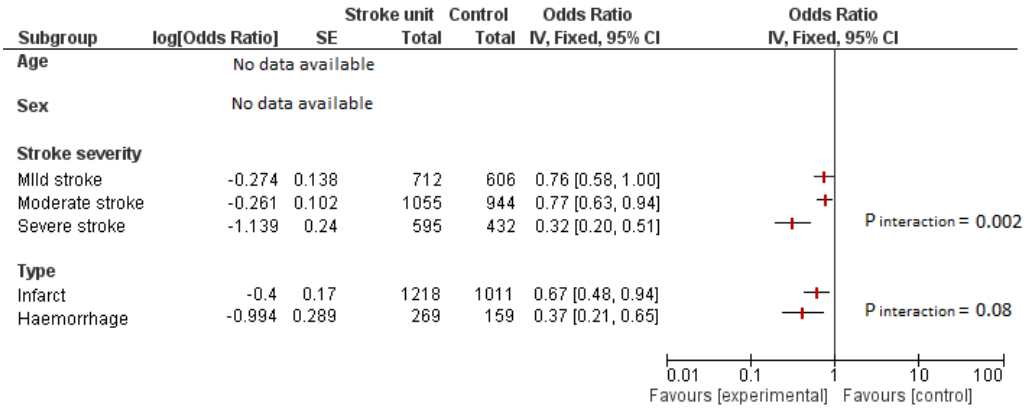


Figure 6. Analysis of patient characteristics on effectiveness of organised stroke unit care versus alternative service for the outcome of death or dependency by the end of scheduled follow-up.



Caution is needed when interpreting these subgroup analyses particularly as a relatively small number of outcome events were observed, which limits the statistical power. Furthermore, the results may change depending on the outcome chosen. These results indicate that in general the magnitude of benefit seemed greater for participants with more-severe stroke. However, stroke unit benefits are apparent across a range of participant subgroups (that is age, sex, initial stroke severity and stroke type). Analysis by stroke severity confirmed that there was no statistically significant reduction in case fatality in mild stroke patients (OR 1.03, 95% CI 0.67 to 1.58). However, mild stroke patients managed in stroke units had a reduced risk of dependency (OR 0.76, 95% CI 0.58 to 1.00).

Section 2: Organised stroke unit care versus general medical wards

Comparisons 2.1, 2.2 and 2.3: Death, death or institutional care, and death or dependency by the end of scheduled follow-up

A variety of predefined subgroup analyses were carried out based on service characteristics. Two different models of care (comprehensive stroke ward, mixed assessment or rehabilitation ward) tended to be more effective than general medical ward care. However, for the comparison of rehabilitation stroke wards or mobile team care (peripatetic service) versus general medical wards there were no statistically significant differences. Overall, stroke unit care showed reductions in the odds of death recorded at final (median one year) follow-up (OR 0.81, 95% CI 0.69 to 0.94; P = 0.005) (Analysis 2.1), the odds of death or institutionalised care (OR 0.78, 95% CI 0.68 to 0.89; P = 0.0003) (Analysis 2.2) and the odds of death or dependency (OR 0.79, 95% CI 0.68 to 0.90; P = 0.0007) (Analysis 2.3). Interpretation of length of stay data was complicated by substantial heterogeneity. There was no evidence of a systematic increase in length of stay.

Sections 3, 4, 5 and 6: Comparisons of different forms of organised stroke unit care

In planning our analyses we specified in advance that an important question for service planning would be whether the benefits of stroke unit care depended upon the establishment of a ward dedicated only to stroke care (stroke ward) or could be achieved through a mobile stroke team or a generic disability service (mixed rehabilitation unit) that specialises in the management of disabling illness including stroke. We therefore analysed those trials that directly compared two different forms of organised stroke unit care that met the basic descriptive criteria of stroke unit care (see 'Description of Studies'): multidisciplinary staffing co-ordinated through regular team meetings.

Of the eight trials identified for which outcome data were available, one compared an acute (semi-intensive) stroke ward with a comprehensive stroke ward (Groningen 2003), one compared an acute (semi-intensive) stroke ward with a mixed rehabilitation ward (Tampere 1993), one compared a stroke ward that combined acute care and rehabilitation (comprehensive stroke ward) with a general medical ward where care was co-ordinated by a multidisciplinary team (mobile team care) (Orpington 2000), two compared a stroke ward with integrated TCM with a 'Western medicine' stroke ward (Guangdong 2008; Hunan 2007) and three incorporated designs in which patients could be randomised either to a stroke rehabilitation ward or to conventional care in either a general medical ward or mixed rehabilitation ward within a Department of Geriatric Medicine (Dover 1984; Nottingham 1996; Orpington 1993). Data were available for both these subgroups of participants.

Section 3: Acute stroke ward versus alternative service

Analysis 3.1, Analysis 3.2, Analysis 3.3 and Analysis 3.4: Death, death or institutional care, death or dependency by the end of scheduled follow-up and length of stay in hospital or institution

Overall, acute (monitoring) units did not have statistically significant different odds of death, death or requiring institutional care, or death or dependency when compared with acute (non-intensive) units. Interpretation of length of stay data was complicated by substantial heterogeneity. There was no evidence of a systematic increase in length of stay.

Section 4: Comprehensive stroke ward versus alternative service

Analysis 4.1, Analysis 4.2, Analysis 4.3 and Analysis 4.4: Death, death or institutional care, death or dependency by the end of scheduled follow-up and length of stay in hospital or institution

One trial compared a comprehensive stroke ward (providing acute care and rehabilitation) with admission to general wards where care was provided by a mobile stroke team (Orpington 2000). They found statistically significant (P < 0.001) reductions in death and the combined outcome of death or institutional care among the comprehensive stroke ward group. Fewer comprehensive stroke ward participants were dead or dependent at the end of follow-up, but this result did not achieve statistical significance. However, Orpington 2000 is the only trial in this analysis comparing comprehensive stroke wards with an alternative service so these results require confirmation. There was no significant difference in length of stay.

Section 5: Rehabilitation stroke ward versus alternative service

Analysis 5.1, Analysis 5.2, Analysis 5.3 and Analysis 5.4: Death, death or institutional care, death or dependency by the end of scheduled follow-up and length of stay in hospital or institution

There was a pattern of improved outcomes in the stroke rehabilitation ward with statistically significantly fewer deaths (P = 0.02) and a statistically non-significant trend for fewer participants with the composite end points of death or requiring institutional care and death or dependency. However, the numbers were small and no definite conclusions could be drawn. Interpretation of length of stay data was complicated by substantial heterogeneity. There was no evidence of a systematic increase in length of stay.

Section 6: Stroke ward plus TCM versus alternative service

Analysis 6.1: Death at the end of scheduled follow-up

There was no significant difference in the odds of death in a stroke ward with integrated TCM when compared with a standard 'Western medicine' stroke ward. The type of care provided in a stroke unit with integrated TCM has not been well described. The overall estimate is based on the results of a single trial and no definitive conclusions can be drawn.

DISCUSSION

Summary of main results

Main analysis

The updated information in Section 1 confirms our previous observations that people receiving organised inpatient (stroke unit) care were more likely to survive, regain independence and return home than those receiving a less-organised service. This apparent effect remains of moderate statistical significance for case fatality. The conclusions could be overturned by a number of unpublished randomised trials with neutral results. However, the observed reductions in the combined adverse outcomes (death or institutionalisation, death or dependency) are much more robust statistically. The three trials that have extended follow-up for five or 10 years have found a sustained benefit among stroke unit patients.

The requirement for long-term care is a useful surrogate for disability (Barer 1993) and is likely to show good inter-observer agreement. The absolute rates of institutionalisation, however, will be influenced by a variety of national and cultural factors. The combined adverse outcome of death or dependency is a more direct measure of patient outcome, but is subject to potential observer bias where final assessments were not carried out in a blinded manner. The sensitivity analysis based on those trials that used an unequivocally blinded assessment suggested that such bias has not seriously influenced the results.

The analysis of length of stay is complicated by the different methods of reporting results, the widely varying control group lengths of stay and the statistically significant heterogeneity between different trials. The most reasonable conclusion appears to be that there was no systematic increase in length of stay associated with organised (stroke unit) care and there may have been a modest reduction.

Subgroup analyses

In any discussion of the comparison of results in different subgroups it is worth bearing in mind that the main issue is not whether a subgroup result is statistically different from zero but whether there is statistically significant heterogeneity between the estimates of effect in each of the relevant subgroups. Our analyses are limited by relatively low statistical power and so must be interpreted with great caution. The subgroup analyses indicate that the observed benefits of organised stroke unit care are not limited to any one subgroup of patients or models of stroke unit organisation that were examined. Apparent benefits were seen in people of both sexes, aged under and over 75 years, with ischaemic or haemorrhagic stroke and across a range of stroke severities.

The apparent relation between stroke severity and outcome must be interpreted with caution. People with more severe stroke symptoms are at greater risk of death or requiring institutional care and hence stand to gain more from treatment. Patients with a mild stroke appeared to benefit from stroke unit care when death or dependency was the chosen outcome (Figure 6), but this effect was less certain for the outcomes of death, or death or institutional care. Two approaches to stroke unit care, that is comprehensive units and mixed assessment/rehabilitation units, tended to be more effective than care in a general medical ward. There was a similar trend for rehabilitation stroke units. However, mobile stroke care appeared to have a more neutral effect. Apparent benefits were seen in units with acute admission policies as well as those with delayed admission policies and in units which could offer a period of rehabilitation lasting several weeks.

Comparison of different types of stroke unit care

Results Sections 3 to 6 of the review focused on those trials that directly compared two different forms of care, both of which met our basic definition of organised inpatient (stroke unit) care: multidisciplinary team care co-ordinated through regular meetings. The results of this analysis indicate statistically significantly improved results from a dedicated stroke ward over a mobile stroke team. There were also trends towards better outcomes within the dedi-

cated stroke rehabilitation ward setting as opposed to the mixed rehabilitation ward, and within the acute (semi-intensive) ward as opposed to the comprehensive ward. However, in none of the three primary outcomes was there a convincing statistically significant result and more information is required. No firm conclusions could be drawn for the comparisons of a stroke ward integrated with TCM versus a 'Western medicine' stroke ward or an acute (semi-intensive) ward with a mixed rehabilitation unit.

Costs and benefits

Stroke units appear to improve outcomes, but at what cost? In cost terms, length of stay is likely to dominate any individual component of acute patient care and rehabilitation. Longer-term costs are likely to be dominated by the need for nursing care. Studies from several developed countries (Warlow 2008) have shown that fixed costs (particularly nursing staff salaries) account for over 90% of spending on people with acute stroke. Remedial therapy represents only a small proportion of the total cost of hospitalisation. In one analysis, stroke unit care was not clearly associated with an increase in total health and social care costs, but these conclusions were sensitive to some variations in cost estimates (Major 1998). More research is required to elucidate the cost implications of stroke units.

Overall completeness and applicability of evidence

Our original systematic review of organised inpatient (stroke unit) care (SUTC 1997a) addressed the question of whether improving the organisation of inpatient stroke care could bring about important improvements in patient outcomes in comparison with the contemporary conventional care. This analysis has now been extended and updated in Section 1 to reflect the comparison of 'more-organised' versus 'less-organised' care. We have done this because some recent trials have included service comparisons where a stroke unit service based in a stroke ward was compared with a less-organised alternative service (such as mixed rehabilitation ward or mobile stroke team) that was not strictly conventional care. This approach to analysis allows one to view all service comparisons before focusing on various subgroup comparisons.

This update includes four new trials (763 participants), but the overall conclusions remain unaltered in comparison with previous versions. The review now summarises data from a total of 28 trials (5855 participants) from 12 countries in Asia, Australasia, Europe, North America and South America. The majority of trials have been performed in high-income countries; the applicability of stroke unit care in low- or middle-income countries is less clear (Langhorne 2012).

As discussed, our subgroup analyses suggest the benefits of organised inpatient (stroke unit) care are seen across a wide range of stroke patients. This is supported by evidence from observational studies of stroke unit care (Seenan 2007), which have established that stroke units can operate effectively in routine settings beyond a specialised research environment. The current analysis does not explain how stroke units may improve patient outcomes. This could be due to greater staff expertise, better diagnostic procedures, better nursing care, early mobilisation, the prevention of complications or more effective rehabilitation procedures (Langhorne 1998).

Quality of the evidence

The quality of evidence in this updated review has been made more uniform by the exclusion of several quasi-randomised prospective controlled clinical trials that were previously included in the data synthesis (see Description of studies). The main reason for this change was to simplify the inclusion criteria for this and future updates. However, it is worth noting that the exclusion of these trials did not affect the overall estimate of treatment effect.

We judged some trials to be at high risk of bias due to poor allocation concealment and unblinded outcome assessment; in others, these important methodological aspects were not clearly reported making a judgement of risk of bias difficult. The improvement in survival observed with stroke unit care no longer remained statistically significant in sensitivity analyses restricted to the seven trials at low risk of bias. It is possible that methodological limitations within the trials led to an overestimation of the effect size for this outcome. It is reassuring that effect sizes for the composite adverse outcomes of death or institutionalisation or death or dependency remained largely unaltered.

We recognise that some of the included trials are relatively old, possibly with entirely different standards of care from those used currently. Similarly, although a majority of included trials were fairly recent, most would still have been undertaken in an era without routine access to intravenous thrombolysis for acute stroke. While essentially all stroke patients would be eligible for admission to a stroke unit, only a small proportion would be eligible for treatment with thrombolysis even in the most established acute centres. Moreover, all included trials were randomised, therefore any differences in the standard of care should not have had a confounding effect on the final conclusions.

Potential biases in the review process

Through a comprehensive search strategy and established connections with other researchers in the field we are confident that we have identified all potentially relevant studies. We did not search the Chinese databases. However, we were unable to classify or obtain useable outcome data for seven of the 11 Chinese studies we did identify for this update (Anhui 2008; China (Hao) 2010; China (Pei) 2011; China (Wang) 2008; China (Wu) 2007; Haikou 2007; Shanghai 2006). We recognise that the absence of data from these studies in our meta-analysis could potentially introduce bias.

Methodological limitations may also have influenced the analysis of descriptive information about service organisation (SUTC 1997a). We collated service descriptions retrospectively through discussion with the trialists who ran the organised (stroke unit) care. Our findings may therefore be biased towards the expectations of the trialists and by a tendency to discuss the results with the trialists who ran the organised stroke unit care more so than with those who ran the conventional care. At best, this represents a strictly factual account of service characteristics; at worst, it represents a consensus view of the trialists about which features of stroke unit care were effective.

AUTHORS' CONCLUSIONS

Implications for practice

People with acute stroke are more likely to survive, return home and regain independence if they receive organised inpatient (stroke unit) care. This is typically provided by a co-ordinated multidisciplinary team operating within a discrete stroke ward that can offer a substantial period of rehabilitation if required. There are no firm grounds for restricting access according to a person's age, sex, stroke severity or pathological stroke type (that is ischaemic or haemorrhagic).

Since the original publication of this review, stroke services in many developed countries have undergone substantial reorganisation in line with national strategies and clinical practice guidelines to enable improvements in access to stroke unit care. More recently, stroke services in many countries have been further reorganised to reflect a two-tiered (or hub-and-spoke) model of care in which a central 'comprehensive stroke centre' (or 'hyper-acute stroke unit') is equipped with facilities for acute intravenous or intra-arterial treatments, intensive monitoring, advanced imaging and neurosurgery. These then serve a number of 'primary stroke centres' or stroke units within a hospital network or geographical location. Although this approach seems almost intuitive to many stroke clinicians, it has never been formally tested in randomised controlled trials. Until such trials are available, stroke services should ensure that every stroke patient receives the core service characteristics identified in the randomised trials.

Implications for research

Future trials should focus on examining the potentially important components of stroke unit care and direct comparisons of different models of organised stroke unit care, particularly with regard to the hyper-acute stroke unit model. In low-income healthcare settings, appropriately powered clinical trials could help define how barriers to the establishment of stroke units could be overcome (Langhorne 2012). Outcome measures should not only include the outcomes of death, dependency and institutionalisation, but also domains of patient satisfaction, quality of life and cost. Preplanned collaboration between comparable trials could alleviate some of the problems of retrospective systematic reviews such as ensuring that similar variables and outcomes are recorded in any new trial.

Anyone carrying out a relevant randomised trial of a stroke service component is invited to contact Peter Langhorne regarding a future collaborative review.

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This review is dedicated to the memory of Peter Berman, Mona Britton and Richard Stevens.

REFERENCES

References to studies included in this review

Athens 1995 ***{published and unpublished data}***

Pappa T, Xynos K, Theodorakis M, Salliaris M, Kostopoulos K, Vemmos K. The impact of acute stroke unit treatment on long term survival. *Cerebrovascular diseases* 2007;**23 Suppl 2**:64.

Spengos K, Tsivgoulis G, Manios E, Papamichael C, Konstastinopoulou A, Vemmos K. Which patients benefit most from treatment in a stroke unit?. Stroke 2004; Vol. 35, issue 1:294.

* Vemmos K, Takis K, Madelos D, Synetos A, Volotasiou V, Tzavellas H. Stroke unit treatment versus general medical wards: long term survival. *Cerebrovascular Diseases* 2001;**11 Suppl 4**:8.

Beijing 2004 ***{published data only}***

* Ma RH, Wang YJ, Qu H, Yang ZH. Assessment of the early effectiveness of a stroke unit in comparison to the general ward. *Chinese Medical Journal* 2004;**117**(6):852–5.

Ma RH, Wang YJ, Zhao XQ, Wang CX, Yang ZH, Qu H. The impact of stroke unit on early outcome of cerebral infarction patients. *Zhonghua Nei Ke Za Zhi* 2004;**43**(3): 183–5.

Birmingham 1972 ***{published data only}***

Peacock PB, Riley CHP, Lampton TD, Raffel SS, Walker JS. In: Stewart GT editor(s). *Trends in Epidemiology: The Birmingham Stroke, Epidemiology and Rehabilitation Study*. Springfield, Illinois: Thomas, 1972:231–345.

Dover 1984 ***{published and unpublished data}***

Stevens RS, Ambler NR, Warren MD. A randomised

controlled trial of a stroke rehabilitation ward. *Age and Ageing* 1984;**13**:65–75.

Dover 1984 (GMW) ***{published and unpublished data}***
Stevens RS, Ambler NR, Warren MD. A randomised controlled trial of a stroke rehabilitation ward. Age and Ageing 1984; Vol. 13:65–75.

Dover 1984 (MRW) ***{published and unpublished data}***
Stevens RS, Ambler NR, Warren MD. A randomised controlled trial of a stroke rehabilitation ward. Age and Ageing 1984; Vol. 13:65–75.

Edinburgh 1980 ***{published and unpublished data}***
Garraway WM, Akhtar AJ, Hockey L, Prescott RJ. Management of acute stroke in elderly: follow up of a controlled trial. *British Medical Journal* 1980;**281**:827–9.

Goteborg-Ostra 1988 ***{unpublished data only}***
Svensson A, Harmsen P, Wilhelmsen L. Goteborg Ostra Stroke Unit Trial. Personal communication.

Goteborg-Sahlgren 1994 ***{published and unpublished data}***
Claesson L, Gosman-Hedstrom G, Fagerberg B, Blomstrand C. Hospital re-admissions in relation to acute stroke unit care versus conventional care in elderly patients the first year after stroke: The Goteborg 70+ stroke study. *Age and Ageing* 2003;**32**:109–13.
Claesson L, Gosman-Hedstrom G, Johannesson M, Fagerberg B, Blomstrand C. Resource utilization and costs of stroke unit care integrated in a care continuum: A 1-year controlled, prospective, randomized study in elderly patients. The Goteborg 70+ stroke study. *Stroke* 2000;**31**: 2569–77.
Claesson L, Gosman-Hedstrom G, Johannesson M, Fagerberg B, Blomstrand C. Stroke unit care - effects on ADL, health-related quality of life and health economy. *Cerebrovascular Diseases* 1999;**9 Suppl 1**:115.
Fagerberg B, Blomstrand C. Do stroke units save lives?. Lancet 1993; Vol. 342:992.
* Fagerberg B, Claesson L, Gosman-Hedstrom G, Blomstrand C. Effect of acute stroke unit care integrated with care continuum versus conventional treatment: A randomized 1-year study of elderly patients. The Goteborg 70+ stroke study. *Stroke* 2000;**31**:2578–84.

Groningen 2003 ***{published data only}***
Sulter G, Elting JW, Langedijik M, Maurits NM, De Keyser J. Admitting acute ischaemic stroke patients to a stroke care monitoring unit versus a conventional stroke unit; a randomized pilot study. *Stroke* 2003;**34**:101–4.

Guangdong 2008 ***{published data only}***
Yang N, LI G, Zhang Z, Wang B. Clinical efficacy observing of the treatment in stroke unit of integrated TCM and western medicine on patients with ischaemic stroke in acute stage. *Chinese Archives of Traditional Chinese Medicine* 2008; **26**:2750–3.

Guangdong 2009 ***{published data only}***
Yang N, Zheng L. Cost benefit and effect analysis for patients with ischaemic stroke on stroke unit of integration traditional Chinese and western medicine. *Chinese Archives of Traditional Chinese Medicine* 2009;**27**:1331–3.

Helsinki 1995 ***{published and unpublished data}***
Kaste M, Palomaki H. By whom should elderly stroke patients be treated?. *Stroke* 1992;**23**(1):163.
Kaste M, Palomaki H. Who should treat elderly stroke patients?. *Journal of Stroke and Cerebrovascular Diseases* 1992;**2 Suppl 1**:S27.
* Kaste M, Palomaki H, Sarna S. Where and how should elderly stroke patients be treated? A randomised trial. *Stroke* 1995;**26**:249–53.

Huaihua 2004 ***{published data only}***
Liao Y, Zeng JS, Zhou J, Xie CM, Yang DY, Liu SX, et al.Pattern and superiority of stroke unit in treating patients with stroke. *Chinese Journal of Clinical Rehabilitation* 2004; **8**:6014–5.

Hunan 2007 ***{published data only}***
Li X, Wu Q, Liu W. The effects of the treatment in stroke unit of integrated therapy TCM and WM on patients with stroke in acute stage. *Journal of Emergency in Traditional Chinese Medicine* 2007;**16**(4):381–3.

Illinois 1966 ***{published data only}***
Gordon EE, Kohn KH. Evaluation of rehabilitation methods in the hemiplegic patient. *Journal of Chronic Diseases* 1966;**19**:3–16.

Joinville 2003 ***{published data only}***
Cabral NL, Moro C, Silva GR, Scola RH, Werneck LC. Study comparing the stroke unit outcome and conventional ward treatment: A randomised study in Joinville, Brazil. *Arquivos de Neuro-psiquatria* 2003;**61**(2-A):188–93.

Kuopio 1985 ***{published and unpublished data}***
Sivenius J, Pyorala K, Heinonen OP, Salonen JT, Reikkinen P. The significance of intensity of rehabilitation after stroke - a controlled trial. *Stroke* 1985;**16**:928–31.

Manchester 2003 ***{published and unpublished data}***
Dey P, Woodman M, Gibbs A. Fast track assessment and rehabilitation for stroke patients (FASTAR). Report (Project number RD0/28/1/02) 2003.
* Dey P, Woodman M, Gibbs A, Steele R, Stocks SJ, Wagstaff S, et al.Early assessment by a mobile stroke team: a randomised controlled trial. *Age and Ageing* 2005;**34**: 331–8.

Montreal 1985 ***{published and unpublished data}***
Wood-Dauphinee S, Shapiro S, Bass E, Fletcher C, Georges P, Hensby V, et al.A randomised trial of team care following stroke. *Stroke* 1984;**5**:864–72.

Newcastle 1993 ***{published and unpublished data}***
Aitken PD, Rodgers H, French JM, Bates D, James OFW. General medical or geriatric unit care for acute stroke? A controlled trial. *Age and Ageing* 1993;**22 Suppl 2**:4–5.

New York 1962 ***{published data only}***
Feldman DJ, Lee PR, Unterecker J, Lloyd K, Rusk HA, Toole A. A comparison of functionally orientated medical care and formal rehabilitation in the management of patients with hemiplegia due to cerebrovascular disease. *Journal of Chronic Diseases* 1962;**15**:297–310.

Nottingham 1996 *{published and unpublished data}*

Drummond A, Lincoln N, Juby L. Effects of stroke unit on knowledge of stroke and experiences in hospital. *Age and Ageing* 2001;**30**:129–33.

Drummond A, Pearson B, Lincoln NB, Berman P. Ten year follow up of a randomised controlled trial of care in a stroke rehabilitation unit. *BMJ* 2005;**331**:491–2.

Husbands SL, Lincoln NB, Drummond AER, Gladman J, Trescoli C. Five-year results of a randomized controlled trial of a stroke rehabilitation unit. *Clinical Rehabilitation* 1999; **13**(6):530–1.

* Juby LC, Lincoln NB, Berman P. The effect of a stroke rehabilitation unit on functional and psychological outcome. A randomised controlled trial. *Cerebrovascular Diseases* 1996;**6**:106–10.

Lincoln NB, Husbands S, Trescoli C, Drummond AER, Gladman JRF, Berman P. Five year follow up of a randomised controlled trial of a stroke rehabilitation unit. *BMJ* 2000;**320**:549.

Nottingham 1996 (GMW) *{published and unpublished data}*

Juby LC, Lincoln NB, Berman P. The effect of a stroke rehabilitation unit on functional and psychological outcome. A randomised controlled trial. *Cerebrovascular Diseases* 1996;**6**:106–10.

Nottingham 1996 (MRW) *{published and unpublished data}*

Juby LC, Lincoln NB, Berman P. The effect of a stroke rehabilitation unit on functional and psychological outcome. A randomised controlled trial. *Cerebrovascular Diseases* 1996;**6**:106–10.

Orpington 1993 *{published and unpublished data}*

Kalra L. Inpatient rehabilitation for elderly stroke patients. *Journal of the American Geriatrics Society* 1994;**42**:1027.

* Kalra L, Dale P, Crome P. Improving stroke rehabilitation: a controlled study. *Stroke* 1993;**24**:1462–7.

Orpington 1993 (GMW) *{published and unpublished data}*

Kalra L, Dale P, Crome P. Improving stroke rehabilitation: a controlled study. *Stroke* 1993;**24**:1462–7.

Orpington 1993 (MRW) *{published and unpublished data}*

Kalra L, Dale P, Crome P. Improving stroke rehabilitation: a controlled study. *Stroke* 1993;**24**:1462–7.

Orpington 1995 *{published and unpublished data}*

Kalra L, Eade J. Role of stroke rehabilitation units in managing severe disability after stroke. *Stroke* 1995;**26**: 2031–4.

Orpington 2000 *{published and unpublished data}*

Evans A, Harraf F, Donaldson N, Kalra L. Randomised controlled study of stroke unit care versus stroke team care in different stroke subtypes. *Stroke* 2002;**33**:449–55.

Evans A, Perez I, Harraf H, Melbourn A, Steadman J, Donaldson N, et al.Can differences in management processes explain different outcomes between stroke unit and stroke team care?. *Lancet* 2001;**358**:1586–92.

Evans A, Perez I, Melbourn A, Steadman J, Kalra L. Alternative strategies in stroke: a randomised controlled trial of three strategies of stroke management and rehabilitation. *Cerebrovascular Diseases* 2000;**10 Suppl 2**:60.

* Kalra LL, Evans A, Perez I, Knapp M, Donaldson N, Swift C. Alternative strategies for stroke: a prospective randomised controlled trial. *Lancet* 2000;**356**:894–9.

Patel A, Knapp M, Perez I, Evans A, Kalra L. Alternative strategies for stroke care: cost-effectiveness analysis from a prospective randomised controlled trial. *Cerebrovascular Diseases* 2003;**16 Suppl 4**:101.

Perth 1997 *{published and unpublished data}*

Hankey GJ, Deleo D, Stewart-Wynne EG. Stroke units: an Australian perspective. *Australian and New Zealand Journal of Medicine* 1997;**27**:437–8.

Svendborg 1995 *{published data only}*

Henriksen IO, Laursen SO. Acute stroke - treatment in a non-intensive stroke unit. *Scandinavian Journal of Rehabilitation Medicine* 1992;**Suppl 26**:153.

* Laursen SO, Henriksen IO, Dons U, Jacobsen B, Gundertofte L. Intensive rehabilitation following stroke: controlled pilot study. *Ugeskr Laeger* 1995;**157**:1996–99.

Tampere 1993 *{unpublished data only}*

Ilmavirta M, Frey H, Erila T, Fogelholm R. Stroke outcome and outcome of brain infarction. A prospective randomised study comparing the outcome of patients with acute brain infarction treated in a stroke unit and in an ordinary neurological ward. *Doctoral Thesis*. Vol. **410; series A**, Tampere: University of Tampere Faculty of Medicine, 1994.

Trondheim 1991 *{published and unpublished data}*

Indredavik B, Bakke F, Slordahl SA, Rokseth R, Haheim LL. Stroke unit treatment improves long-term quality of life: a randomized controlled trial. *Stroke* 1998;**29**:895–99.

Indredavik B, Bakke F, Slordahl SA, Rokseth R, Haheim LL. Stroke unit treatment: 10 year follow-up. *Stroke* 1999; **30**:1524–7.

Indredavik B, Bakke F, Slordahl SA, Rokseth R, Haheim LL. Treatment in a combined acute and rehabilitation stroke unit. Which aspects are important?. *Stroke* 1999;**30**: 917–23.

* Indredavik B, Bakke F, Solberg R, Rokseth R, Haahein LL, Home I. Benefit of stroke unit: a randomised controlled trial. *Stroke* 1991;**22**:1026–31.

Indredavik B, Fjaertoft H, Ekeberg RN, Loge A, Morch B. Benefit of an extended stroke unit service with early supported discharge. A randomised control trial. *Stroke* 2000;**31**:2989–94.

Indredavik B, Slordahl SA, Bakke F. Stroke unit treatment - 10 years follow-up. *Cerebrovascular Diseases* 1999;**9 Suppl 1**:122.

Indredavik B, Slordahl SA, Bakke F, Rokseth R, Haheim LL. Stroke unit treatment: long-term effects. *Stroke* 1997; **28**:1861–66.

References to studies excluded from this review

Abissi 1995 *{published data only}*

Abissi CJ, Sepe E, Patiak C, Davis JN. Cerebral infarction: comparison of a care with case-management to traditional care. *Neurology* 1995;**45 Suppl 4**:A240.

Asplund 2000 *{published data only}*
Asplund K, Gustafson Y, Jacobsson C, Bucht G, Wahlin A, Peterson J, et al.Geriatric-based general wards for older acute medical patients: a randomized comparison of outcomes and use of resources. *Journal of the American Geriatrics Society* 2000;**48**(11):1381–8.

Cavallini 2003 *{published and unpublished data}*
* Cavallini A, Micieli G, Marcheselli S, Quaglini S. Role of monitoring in the management of acute ischaemic stroke patients. *Stroke* 2003;**34**(11):2599–603.
Cavallini A, Micieli G, Zambrelli E, Quaglini S, Rogoni C. Role of continuous physiological monitoring in the acute phase of stroke. *Cerebrovascular Diseases* 2001;**11 Suppl 4**: 117.

Davis 2000 *{published data only}*
Davis M, Chambers B, Birschel P. A pilot study of monitoring in acute stroke. *Stroke* 2000;**31**(11):2869.
Davis M, Hollymann C, McGiven M, Chambers I, Egbuji J, Barer D. Physiological monitoring in acute stroke. *Age and Ageing* 1999;**28 Suppl 1**:45.

Diagana 2008 *{published data only}*
Diagana M, Ould Abdallahi Salem B, N'Diaye M, LeCornet C, Quet F, et al.Impact of acute unit care improving post-stroke functionality outcomes in Noukachott, Mauritania. *African Journal of Neurological Sciences* 2008;**27**:38–46.

Di Lauro 2003 *{published data only}*
Di Lauro A, Pellegrino L, Savastano G, Ferraro C, Fusco M, Balzarano F, et al.A randomised trial on the efficacy of intensive rehabilitation in the acute phase of ischemic stroke. *Journal of Neurology* 2003;**250**(10):1206–8.

Durastanti 2005 *{published data only}*
Durastanti L, Puca E, Angelantonio E, Di Lorenzano S, Falcou A, Gori MC, et al.Efficacy of acute ischemic stroke patients management in an emergency department stroke unit (EDSU). *Cerebrovascular Diseases* 2005;**19 Suppl 2**:57.

HAMLET 2009 *{published data only}*
Hofmeijer J, van den Worp HB, Amelink GJ, Algra A, van Gijn J, Kapelle LJ. HAMLET hemicraniectomy after MCA infarction with life-threatening oedema trial (Abstract 11). Proceedings of the European Stroke Conference, 21-24 May, Valencia, Spain. 2003.

Hamrin 1982 *{published and unpublished data}*
* Hamrin E. Early activation after stroke: does it make a difference?. *Scandinavian Journal of Rehabilitation Medicine* 1982;**14**:101–9.
Hamrin E. One year after stroke: a follow-up of an experimental study. *Scandinavian Journal of Rehabilitation Medicine* 1982;**14**:111–6.

Koton 2005 *{published data only}*
* Koton S, Schwammenthal Y, Merzeliak O, Philips T, Tsabari R, Bruk B, et al.Effectiveness of establishing a dedicated acute stroke unit in routine clinical practice in Israel. *Israel Medical Association Journal* 2005;7:688–93.
Koton S, Schwammenthal Y, Merzeliak O, Philips T, Tsabari R, Bruk B, et al.Management and outcome of acute stroke: differences between organised short-term acute stroke unit and general medical wards. *Cerebrovacular Diseases* 2005;**19 Suppl 2**:58.

Langhorne 2001 *{published data only}*
Langhorne P, Fraser P, Wright F, Shields M, MacIntosh G, Stott D. Evaluation of an acute care protocol for stroke patients: a controlled clinical trial. *Cerebrovascular Diseases* 2001;**11 Suppl 4**:35.

Middleton 2006 *{published data only}*
Middelton S. An outcomes approach to stroke care; the importance of teamwork and evidence-based nursing care. *International Journal of Stroke* 2012;**7**:224–6.
* Middleton S, Levi C, Griffiths R, Grimshaw J, Ward J. Quality in Acute Stroke Care project: protocol for a cluster randomised control trial to evaluate the management of fever, sugar and swallowing after stroke. *Journal of Internal Medicine* 2006;**36**:A1–A14.
Middleton S, Levi C, Ward J, Grimshaw J, Griffiths R, D'Este C, et al.Fever, hyperglycaemia and swallowing dysfunction management in acute stroke: a cluster randomised controlled trial of knowledge transfer. *Implementation Science* 2009;**4**:16.
Middleton S, McElduff P, Ward J, Grimshaw J, Dale S, D'Este C, et al.Implementation of evidence-based treatment protocols to manage fever, hyperglycaemia and swallowing dysfunction in acute stroke (QASC): a cluster randomised control trial. *Lancet* 2011;**378**:1699–706.

Moloney 1999 *{published data only}*
Moloney A, Critchlow B, Jones K. A multi-disciplinary care pathway in stroke - does it improve care?. *Age and Ageing* 1999;**28 Suppl 1**:42–3.

Pappa 2009 *{published data only}*
Pappa T, Spengos K, Skoufi M, Zafiriou I, Barbaressou Z, Peppa K, et al.Acute stroke unit improves long-term survival in very old stroke patients. *Cerebrovascular Diseases* 2009;**27 Suppl 6**:13.

Patel 2000 *{unpublished data only}*
Patel N, Louw S, Zwarenstein M. *Organised care of acute stroke at Groot Schuur Hospital (MPhil in Epidemiology)*. Cape Town: University of Cape Town, 2000.

Pearson 1988 *{published data only}*
Pearson A, Durand I, Punton S. Effects of admission to a nursing unit. *Australian Journal of Advanced Nursing* 1988; **6**(1):38–42.

Ricauda 2004 *{published data only}*
Ricauda NA, Bo M, Molaschi M, Massaia M, Salerno D, Amati D, et al.Home hospitalization service for acute uncomplicated first ischemic stroke in elderly patients: a randomized trial. *Journal of the American Geriatrics Society* 2004;**52**:278–83.

Ronning 1998 *{published and unpublished data}*
* Ronning OM, Guldvog B. Stroke units versus general medical wards, II: neurological deficits and activities of daily

living: a quasi-randomised controlled trial. *Stroke* 1998;**29**: 586–90.

Ronning OM, Guldvog B, Stavem K. The benefit of an acute stroke unit in patients with intracerebral haemorrhage: a controlled trial. *Journal of Neurology Neurosurgery and Psychiatry* 2001;**70**:631–4.

Stavem K, Ronning OM. Survival over 12 years following acute stroke: initial treatment in a stroke unit versus general medical ward. *Acta Neurologica Scandinavica* 2011;**124**(6): 429–433.

Ronning 1998a *{published data only}*

Ronning OM, Guldvog B. Stroke units versus general medical wards, I: twelve- and eighteen-month survival. A randomized controlled trial. *Stroke* 1998;**29**:58–62.

Ronning 1998b *{published data only}*

Ronning OM, Guldvog B. Outcome of subacute stroke rehabilitation. A randomized controlled trial. *Stroke* 1998; **29**:779–84.

Shiraishi 2004 *{published data only}*

Shirashi N, Mizutani C, Menjho M, Deguchi A, Takase K, Hamaguchi H, et al.Comparison of daily living for a convalescent rehabilitation ward and general ward for stroke patients. *Japanese Journal of Geriatrics* 2004;**41**:646–52.

Silva 2004 *{published data only}*

* Silva Y, Piugdemont M, Castellanos M, Serena J, Suner RM, Davalos A. Semi-intensive monitoring in acute stroke and long term outcome. Stroke 2002; Vol. 33, issue 1:411.

Silva Y, Puigdemont M, Castellanos M, Serena J, Suner RM, Garcia MM, et al.Semi-intensive monitoring in acute stroke and long term outcome. *Cerebrovascular Diseases* 2005;**19**(1):23–30.

Silva Y, Serena J, Castellanos M, Ramio L, Osuna T, Davalos A. Stroke units: the effect of continuous monitoring on clinical outcome. *Cerebrovascular Diseases* 2001;**11 Suppl 4**:122.

Stone 1998 *{unpublished data only}*

Stone SP. A trial of stroke unit (SU) versus comprehensive geriatric service (CGS) management of all stroke patients. *Neurorehabilitation and Neural Repair* 1999;**13**(1):13.

Strand 1985 *{published and unpublished data}*

* Strand T, Asplund K, Eriksson S, Hagg E, Lithner F, Wester PO. A non-intensive stroke unit reduced functional disability and the need for long-term hospitalisation. *Stroke* 1985;**16**:29–34.

Strand T, Asplund K, Eriksson S, Hagg E, Lithner F, Wester PO. Stroke unit care - who benefits? Comparisons with general medical care in relation to prognostic indicators on admission. *Stroke* 1986;**17**:377–81.

von Arbin 1980 *{published data only}*

von Arbin M, Britton M, de Faire U, Helmers C, Miah K, Murray V. A study of stroke patients treated in a non-intensive stroke unit or in general medical wards. *Acta Medica Scandinavica* 1980;**208**:81–5.

Walter 2005 *{published data only}*

Walter A, Seidel G, Thie A, Raspe HH, for the SSSH Study Group. German stroke units versus conventional care in acute ischemic stroke and TIA - a prospective study. *Cerebrovascular Diseases* 2005;**19 Suppl 2**:30.

Wang 2004 *{published data only}*

Wang YJ, Gao XL, Ma RH, Wu D. Beijing Organized Stroke Care Study (BOSS). Proceedings of the 29th International Stroke Conference, San Diego, California, USA. 5–7 February 2004.

Yagura 2005 *{published data only}*

Yagura H, Miyai I, Suzuki T, Yanagihara T. Patients with severe stroke benefit most by interdisciplinary rehabilitation team approach. *Cerebrovascular Diseases* 2005;**20**:258–63.

References to studies awaiting assessment

Anhui 2008 *{published data only}*

Ni C, Li C, Han R, Chen J, Sun H, Liu S. A randomised controlled trial of standardised tertiary rehabilitation after stroke. *Journal of Rehabilitation Medicine* 2008;**Suppl 46**: 71.

China (Hao) 2010 *{published data only}*

Hao JJ. Effect of comprehensive stroke unit on patients with pneumonia after acute stroke. *Chinese Journal of Cerebrovascular Diseases* 2010;**7**:120–3.

China (Pei) 2011 *{published data only}*

Pei Z. Clinical research of organised stroke care model with integrated Chinese traditional and Western medicine in primary hospital. *Chinese Journal of Contemporary Neurology and Neurosurgery* 2011;**11**:221–5.

China (Wang) 2008 *{published data only}*

Wang ZM, Wang P, Chen J, Luo DH, Shen WM. Application of stroke rehabilitation in municipal hospitals during the acute phase of cerebral infarction. *Chinese Journal of Epidemiology* 2008;**29**:724–5.

China (Wu) 2007 *{published data only}*

Wu WL, Lu XL, Zheng MY, Liang W, Yao XL, Hu ZL. Imapct of organised stroke unit on the therapeutic effect in stroke patients. *Journal of Southern Medical University* 2010; **30**:555–6.

Haikou 2007 *{published data only}*

Su Q, Lin T, Wu Y, Cai M, Chen Z. Benefit of an extended stroke unit to acute cerebral infarction. *Cerebrovascular Diseases* 2007;**24**:490.

Shanghai 2006 *{published data only}*

* Hu YS. Standardized tertiary rehabilitation (STR) for stroke patients with hemiplegia in promoting the neurological function. *Neurorehabilitation and Neural Repair* 2006;**20**:163.

Hu YS. Standarized tertiary rehabilitation (STR) for patients with cerebral strokes accompanied by hemiplegia. *Neurorehabilitation and Neural Repair* 2006;**20**:163.

Jiang CY, Hu YS, Wang Q, Wu Y, Zhu YL. The cost-effectiveness analysis of early rehabilitation for stroke patients. *Neurorehabilitation and Neural Repair* 2006;**20**: 205.

Sun LM, Hu YS, Wu Y, Zhu YL, Fan WK. Effect of standardized tertiary rehabilitation on the motor function

in patients with cerebral stroke accompanied by hemiplegia. *Neurorehabilitation and Neural Repair* 2006;**20**:163.

References to ongoing studies

Baden 2007 ***{unpublished data only}***
Structured stroke management improves outcomes at 6 months. Ongoing study –.

Beijing 2009 ***{unpublished data only}***
Efficiency study of traditional Chinese medicine (TCM) versus western medicine (WM) on ischaemic stroke. Ongoing study –.

Shanghai 2009 ***{unpublished data only}***
A study of the stroke unit of traditional Chinese and western medicine in the treatment of ischaemic stroke. Ongoing study –.

Additional references

Barer 1993
Barer D, Gibson OP, Ellul J and the "GUESS" Group. Outcome of hospital care for stroke in 12 centres. Proceedings of the British Geriatrics Society, Spring Meeting, Glasgow. April 15–17, 1993.

Ebrahim 1990
Ebrahim S. *Clinical Epidemiology of Stroke*. 1st Edition. Oxford: Oxford University Press (Medical Publications), 1990.

Garraway 1985
Garraway WM. Stroke rehabilitation units: concepts, evaluation, and unresolved issues. *Stroke* 1985;**16**:178–81.

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

Langhorne 2012
Langhorne P, de Villiers L, Pandian JD. Applicability of stroke-unit care to low-income and middle-income countries. *Lancet Neurology* 2012;**11**:341–48.

Lozano 2012
Lozano R, Naghavi M, Foreman K, Lim S, Shibuya K, Aboyans V, et al.Global and regional mortality from 235 causes of death for 20 age groups in 1990 and 2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012;**380**:2095–128.

Murray 2012
Murray CJL, Vos T, Lozano R, Naghavi M, Flaxman AD, Michaud C, et al.Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990-2010: a systematic analysis for the Global Burden of Disease Study 2010. *Lancet* 2012;**380**:2197–223.

RevMan 2012
The Nordic Cochrane Centre, The Cochrane Collaboration. Review Manager (RevMan). 5.2. Copenhagen: The Nordic Cochrane Centre, The Cochrane Collaboration, 2012.

Seenan 2007
Seenan P, Long M, Langhorne P. Stroke units in their natural habitat: a systematic review of observational studies. *Stroke* 2007;**38**:1886–92.

Strong 2007
Strong K, Mathers C, Bonita R. Preventing stroke: saving lives around the world. *Lancet Neurology* 2007;**6**:182–7.

Wade 1992
Wade D. *Measurement in Neurological Rehabilitation*. 1st Edition. Oxford: Oxford University Press, 1992.

Warlow 2008
Warlow C, Van Gijn J, Dennis M, Wardlaw J, Bamford J, Hankey G, et al.*Stroke: Practical Management*. 3rd Edition. Oxford: Blackwell Publishing, 2008.

References to other published versions of this review

Langhorne 1993
Langhorne P, Williams BO, Gilchrist W, Howie K. Do stroke units save lives?. *Lancet* 1993;**342**:395–8.

Langhorne 1998
Langhorne P, Dennis MS, on behalf of the Stroke Unit Trialists' Collaboration. *Stroke Units: An Evidence Based Approach*. London: BMJ Books, 1998.

Major 1998
Major K, Walker A. Economics of stroke unit care. In: Langhorne P, Dennis MS editor(s). *Stroke Units: An Evidence Based Approach*. London: BMJ Books, 1998.

SUTC 1997a
Stroke Unit Trialists' Collaboration. Collaborative systematic review of the randomised trials of organised inpatient (stroke unit) care after stroke. *BMJ* 1997;**314**: 1151–9.

SUTC 1997b
Stroke Unit Trialists' Collaboration. How do stroke units improve patient outcomes? A collaborative systematic review of the randomized trials. *Stroke* 1997;**28**:2139–44.

SUTC 2001
Stroke Unit Trialists' Collaboration. Organised inpatient (stroke unit) care for stroke. *Cochrane Database of Systematic Reviews* 2001, Issue 3. [DOI: 10.1002/14651858.CD000197]

SUTC 2007
Stroke Unit Trialists' Collaboration. Organised inpatient (stroke unit) care for stroke. *Cochrane Database of Systematic Reviews* 2007, Issue 4. [DOI: 10.1002/14651858.CD000197]

* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Athens 1995

Methods	RCT Sealed envelopes Unblinded follow-up
Participants	People with acute stroke admitted to emergency department within 24 hours of symptoms Excluded TIA or recurrent stroke
Interventions	Small (6-bed) ward within Internal Medicine department Used the American Heart Association protocol, management of physiological abnormalities, and multidisciplinary team approach Compared with conventional care in general medical wards
Outcomes	Death, cause of death, length of stay Recorded up to 6.5 years (we have used 12-month data in primary analysis)
Notes	Unpublished at present

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"randomised ... using numbered opaque sealed envelopes"
Allocation concealment (selection bias)	Low risk	"opaque sealed envelopes"
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing outcome data
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Beijing 2004

Methods	RCT Divided randomly using SPSS software package
Participants	People with stroke admitted to hospital with first or recurrent stroke Subarachnoid haemorrhage or tumour were excluded

Beijing 2004 (*Continued*)

Interventions	New comprehensive stroke unit early multidisciplinary rehabilitation Control participants were admitted to general medical or general neurology wards
Outcomes	Death, NIHSS, Barthel index, Oxford Handicap Scale, patient satisfaction at the time of discharge
Notes	Some unpublished data included No institutional care available

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"divided randomly into two groups using SPSS software package"
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not described
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Unclear
Incomplete outcome data (attrition bias) All outcomes	Low risk	Similar numbers in both treatment (n = 20) and control (n = 21) groups with missing data
Selective reporting (reporting bias)	Low risk	Data on all prespecified outcomes reported

Birmingham 1972

Methods	RCT
Participants	People with stroke within 2 weeks of stroke onset Able to tolerate active rehabilitation
Interventions	Intensive rehabilitation in rehabilitation centre (mixed rehabilitation unit) (n = 29) versus normal care in general medical wards (n = 23) Organised care provided for months if required
Outcomes	Death and functional status at the end of follow-up (6 to 8 months)
Notes	Timing of outcomes not clearly stated Intervention not clearly defined 3 control participants lost to follow-up

Risk of bias

Birmingham 1972 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	"evenly divided on a random basis"
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not described
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	3 control participants (almost 10%) lost to follow-up
Selective reporting (reporting bias)	Low risk	Prespecified outcomes reported

Dover 1984

Methods	RCT
Participants	People with stroke up to 9 weeks after stroke onset (majority within 3 weeks) Fit for transfer to rehabilitation ward
Interventions	Stroke rehabilitation ward (dedicated stroke unit) (n = 116) versus general medical wards (n = 89) or geriatric medical wards (mixed rehabilitation unit) (n = 28) Organised care provided for months if required
Outcomes	Death, Rankin score, place of residence and length of stay in hospital up to 1 year after stroke
Notes	Randomisation resulted in marginally poorer prognosis in participants in the control group Numbers differ slightly from the published report after reanalysis of original data 2 control participants lost to follow-up.

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"Random allocation ... by the secretary opening the next in a stock of serially-numbered sealed envelopes"
Allocation concealment (selection bias)	Low risk	Adequate allocation concealment
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment

Dover 1984 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing outcome data explained and broadly similar numbers between intervention and control groups
Selective reporting (reporting bias)	Unclear risk	Rankin score prespecified but not reported Disability reported with a different measure

Dover 1984 (GMW)

Methods	RCT Subgroup of Dover 1984 (stroke unit versus general medical ward)
Participants	People with stroke up to 9 weeks after stroke onset (majority within 3 weeks) Fit for transfer to rehabilitation ward
Interventions	Stroke rehabilitation ward (dedicated stroke unit) (n = 98) versus general medical wards (n = 89) Organised care provided for months if required
Outcomes	Death, Rankin score, place of residence and length of stay in hospital up to 1 year after stroke
Notes	Stroke severity subgroup data inferred from distribution in the whole group

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Random allocation ... by the secretary opening the next in a stock of serially-numbered sealed envelopes"
Allocation concealment (selection bias)	Low risk	Adequate allocation concealment
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing outcome data explained and broadly similar numbers between intervention and control groups
Selective reporting (reporting bias)	Unclear risk	Rankin score prespecified but not reported Disability reported in an alternate way

Dover 1984 (MRW)

Methods	RCT Subgroup of Dover 1984 (stroke unit versus mixed rehabilitation ward)
Participants	People with stroke up to 9 weeks after stroke onset (majority within 3 weeks) Fit for transfer to rehabilitation ward.
Interventions	Stroke rehabilitation ward (dedicated stroke unit) (n = 18) versus geriatric medical wards (mixed rehabilitation unit) (n = 28) Organised care provided for months if required
Outcomes	Death, Rankin score, place of residence and length of stay in hospital up to 1 year after stroke
Notes	Stroke severity subgroup data inferred from distribution in the whole group

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Random allocation ... by the secretary opening the next in a stock of serially-numbered sealed envelopes"
Allocation concealment (selection bias)	Low risk	Adequate allocation concealment
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing outcome data explained and broadly similar numbers between intervention and control groups
Selective reporting (reporting bias)	Unclear risk	Rankin score prespecified but not reported Disability reported in an alternate way

Edinburgh 1980

Methods	RCT
Participants	People with acute stroke within 7 days of stroke onset Strokes of moderate severity
Interventions	Comprehensive stroke ward (dedicated stroke unit) (n = 155) versus general medical wards (n = 156) Organised care provided for a maximum of 16 weeks

Edinburgh 1980 (*Continued*)

Outcomes	Death, dependency, place of residence and length of initial hospital admission up to 1 year after stroke	
Notes	6 intervention and 10 control participants lost to follow-up	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Randomisation using numbered sealed envelopes
Allocation concealment (selection bias)	Low risk	Serially numbered sealed envelopes
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	4 participants in control group 'dropped-out' after randomisation and no outcome data provided
Selective reporting (reporting bias)	Low risk	Outcomes were not clearly prespecified but expected outcomes are all reported

Goteborg-Ostra 1988

Methods	RCT	
Participants	People with acute stroke within 7 days of stroke	
Interventions	Comprehensive stroke ward (n = 215) within general medical service versus conventional care in general medical wards (n = 202)	
Outcomes	Death, Barthel index, place of residence, length of hospital stay recorded at discharge	
Notes	Not yet published	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer-generated randomisation in closed envelopes
Allocation concealment (selection bias)	Low risk	Adequate allocation concealment

Goteborg-Ostra 1988 (*Continued*)

Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Unclear
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Unclear
Selective reporting (reporting bias)	Unclear risk	Unclear

Goteborg-Sahlgren 1994

Methods	RCT
Participants	People with acute stroke within 7 days of onset
Interventions	Combined service continuum linking 2 acute and 2 rehabilitation stroke wards (n = 166) versus conventional care in general medical wards (n = 83)
Outcomes	Death, dependency (Barthel index), place of residence, satisfaction and length of hospital stay up to 1 year
Notes	–

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"serially numbered sealed envelopes (randomisation in blocks of 10)"
Allocation concealment (selection bias)	Low risk	Adequate allocation concealment
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	All dichotomous outcomes reported but proportionately more follow-up assessments missing in control group (7/83) than in intervention group (6/166)
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Groningen 2003

Methods	RCT Blinded assessment of outcomes
Participants	People with acute ischaemic stroke admitted within 24 hours (conscious, hemiparetic, no prior dependency)
Interventions	Acute (semi-intensive) stroke unit with continuous physiological monitoring and intervention for 48 hours All other care as per conventional stroke unit Transfer to conventional stroke unit after 48 hours Conventional stroke unit: comprehensive stroke ward with intermittent physiological monitoring Both units had a multidisciplinary team meeting once per week Both units had discharge for rehabilitation at about 2 weeks
Outcomes	Death or poor outcome (institutional care or Rankin score > 3 or Barthel index < 12) recorded at 3 months Complications and interventions, length of stay
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"randomised ... using an envelope system on a one to one basis ..."
Allocation concealment (selection bias)	Low risk	Opaque sealed envelopes
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing outcome data
Selective reporting (reporting bias)	Low risk	All prespecified outcome data reported

Guangdong 2008

Methods	RCT
Participants	People (56 male) with acute ischaemic stroke; timing of randomisation unclear Mean age intervention group: 61.4 years (SD 9.05); mean age control group: 60.9 years (SD 8.2)

Guangdong 2008 (*Continued*)

Interventions	Stroke unit plus integrated traditional Chinese medicine (n = 58) versus 'Western medicine' stroke unit (n = 42)
Outcomes	Death, NIHSS at 30 days, Barthel Index Length of follow-up unclear
Notes	Limited translated data available

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Random number generator
Allocation concealment (selection bias)	Unclear risk	Unclear
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Unclear
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Unclear
Selective reporting (reporting bias)	Unclear risk	Unclear

Guangdong 2009

Methods	RCT
Participants	Participants (137 male) with acute ischaemic stroke, randomised on admission Average age 61.9 years in intervention group versus 63.4 years in control group
Interventions	Stroke unit with integrated traditional Chinese medicine (n = 100) versus general medical ward (n = 100)
Outcomes	Death, dependency (Barthel Index, OHS) and discharge NIHSS Cost-effectiveness analysis
Notes	Limited translated data available Overall numbers in intervention and control groups differed between original publication and data in published meta-analysis

Risk of bias

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

Guangdong 2009 (*Continued*)

Random sequence generation (selection bias)	Low risk	Random number generator
Allocation concealment (selection bias)	Unclear risk	Unclear
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Unclear
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing outcome data
Selective reporting (reporting bias)	Unclear risk	Unclear

Helsinki 1995

Methods	RCT Blinded assessment of outcomes
Participants	People with acute stroke within 7 days of stroke Unselected people over the age of 65 years
Interventions	Mixed rehabilitation unit within neurology ward (n = 121) versus conventional care in general medical wards (n = 122) Organised care provided for several weeks if required
Outcomes	Death, Barthel index, Rankin score, length of hospital stay up to 1 year after stroke
Notes	-

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Randomisation was carried out in blocks of 10, with numbered sealed envelopes."
Allocation concealment (selection bias)	Low risk	Adequate allocation concealment
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing outcome data ITT analysis
Selective reporting (reporting bias)	Unclear risk	Not all prespecified outcome data reported

Huaihua 2004

Methods	RCT
Participants	People (292 male) with acute ischaemic stroke, randomised on admission Age 38 to 79 years (mean age 59.2 years)
Interventions	Comprehensive stroke unit within neurology department (n = 324) versus general medical ward (n = 73)
Outcomes	Death or poor outcome at 1 year Functional ability at 1 year but scale used not clear
Notes	Limited translated data available

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	"randomised" Numbers in intervention group much greater than in control group
Allocation concealment (selection bias)	Unclear risk	Unclear
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Unclear
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Unclear
Selective reporting (reporting bias)	Unclear risk	Unclear

Hunan 2007

Methods	RCT
Participants	People (163 male (61.2%)) with acute stroke; timing of randomisation unclear Mean age in intervention group: 62.3 years (SD 10.7); mean age in control group: 61.2 years (SD 11.8)
Interventions	Stroke unit with integrated traditional Chinese medicine (n = 139) versus Western medicine stroke unit (n = 127)
Outcomes	Death and NIHSS, Barthel Index and mRS at 90 days Length of stay
Notes	Limited translated data available

Risk of bias

Hunan 2007 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Random number generator
Allocation concealment (selection bias)	Unclear risk	Unclear
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Unclear
Selective reporting (reporting bias)	Unclear risk	Unclear

Illinois 1966

Methods	RCT with 3:2 allocation to intervention:control
Participants	People with stroke up to 1 year after stroke onset Appropriate for rehabilitation service
Interventions	Rehabilitation service (mixed rehabilitation unit) (n = 56) versus general medical wards (which had some specialist nursing input) (n = 35) Organised care provided for months if required
Outcomes	Functional status and place of residence at end of follow-up
Notes	Intervention and control services not clearly defined No deaths reported

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Fisher's table of random numbers
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not described
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing outcome data

Illinois 1966 (*Continued*)

Selective reporting (reporting bias)	Unclear risk	Outcomes were not clearly prespecified

Joinville 2003

Methods	RCT by means of randomised numbers in the emergency room Blinded follow-up
Participants	Clinical stroke diagnosis (confirmed on CT scan) within 7 days of onset
Interventions	Comprehensive stroke unit within Neurology department (n = 35) versus conventional care in general medical wards
Outcomes	Death, Rankin score, length of stay up to 6 months
Notes	-

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"list of randomised numbers available in the emergency room"
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not described
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing outcome data
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Kuopio 1985

Methods	RCT Blinded assessment of outcome
Participants	People with stroke within 7 days of stroke onset Able to tolerate intensive rehabilitation
Interventions	Intensive rehabilitation in neurological rehabilitation unit (mixed rehabilitation ward) (n = 50) versus general wards (n = 45) Organised care provided for months if required

Kuopio 1985 (*Continued*)

Outcomes	Death, Lehman (disability) score, place of residence and total time in hospital up to 1 year after stroke	
Notes	Majority of people screened failed to meet inclusion criteria for the trial	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"randomised using sealed envelopes"
Allocation concealment (selection bias)	Low risk	"sealed envelopes"
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing outcome data
Selective reporting (reporting bias)	Unclear risk	Outcomes were not clearly prespecified

Manchester 2003

Methods	RCT Telephone randomisation and blinded follow-up	
Participants	People with acute stroke within 5 days of symptoms No recent myocardial infarction or fracture	
Interventions	Mobile stroke team (stroke physician, therapist) in 2 acute hospitals provided early assessment, advice to staff, co-ordinated early therapy input, encouraged guideline adherence Controls received usual medical ward-based care	
Outcomes	Death, institutional care, dependency, simple questions, Nottingham extended ADL score, Frenchay Aphasia Screening Test, EuroQuol, Hospital Anxiety and Depression Scale Recorded up to 12 months	
Notes	5 intervention and 4 controls missing from final follow-up 23 people underwent secondary randomisation in trial of early supported discharge team	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**

Manchester 2003 (*Continued*)

Random sequence generation (selection bias)	Low risk	"offsite office using a computer generated schedule"
Allocation concealment (selection bias)	Low risk	"allocated using a simple computer generated procedure ... initially and then in the later stages a minimisation procedure"
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	Proportionately small and similar numbers missing from intervention and control groups at 12 months
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Montreal 1985

Methods	RCT Blinded assessment of outcome
Participants	Unselected people with stroke within 7 days of stroke onset
Interventions	Mobile stroke team (dedicated stroke unit) (n = 65) versus conventional care on general medical wards (n = 65) Study ended at 6 weeks post stroke
Outcomes	Death, Barthel index, place of residence and length of initial hospital stay up to 6 weeks after stroke
Notes	Short follow-up period 1 intervention and 3 control patients lost to follow-up

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Patients were stratified ... "block randomisation within each stratum"
Allocation concealment (selection bias)	Low risk	"two series of numbered sealed envelopes"
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment

Montreal 1985 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	3 participants (1 intervention; 2 controls) removed from study due to non-stroke diagnosis following randomisation 1 additional participant not admitted from the emergency room
Selective reporting (reporting bias)	Unclear risk	Not all prespecified outcomes reported

New York 1962

Methods	RCT
Participants	People with stroke up to 2 months after stroke Appropriate for rehabilitation centre
Interventions	Mixed rehabilitation team working in rehabilitation centre or attending participants in other wards (n = 42) versus programme of care in general wards (n = 40) that had some specialist nursing input Organised care provided for months if required
Outcomes	Functional status and place of residence at end of follow-up (approximately 1 year)
Notes	No deaths reported Minor anomaly in published data table Not clear how many participants were managed in a peripatetic way

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Randomly drawn unmarked envelopes
Allocation concealment (selection bias)	Unclear risk	Allocation concealment not reported
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Unclear
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Unclear
Selective reporting (reporting bias)	Unclear risk	Unclear

Newcastle 1993

Methods	RCT
Participants	Stroke patients within 3 days of stroke onset
Interventions	Mixed rehabilitation ward in geriatric medicine department (n = 34) versus general medical wards (n = 33) Organised care provided for months if required
Outcomes	Death, Barthel index, Rankin score, place of residence and length of stay in hospital up to 6 months after stroke
Notes	Majority of patients screened failed to meet the inclusion criteria of the trial

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	"stratified based on continence and then randomly allocated"
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment unclear
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing outcome data
Selective reporting (reporting bias)	Unclear risk	Unclear

Nottingham 1996

Methods	RCT with 5:4 allocation of intervention:control Blinded assessment of outcome
Participants	Patients with stroke at 2 weeks after stroke onset Able to participate actively in rehabilitation
Interventions	Stroke rehabilitation ward in department of geriatric medicine (n = 176) versus conventional care in geriatric medical (mixed rehabilitation) ward (n = 63) or general medical wards (n = 76) Organised care provided for months if required
Outcomes	Death, Barthel index, place of residence, Nottingham Health Profile, length of hospital stay up to 1 year after stroke

Nottingham 1996 (*Continued*)

Notes	Some crossover from general medical wards to geriatric medicine department 3 intervention and 4 control participants lost to follow-up

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"stratified based on admission ward ... then randomly allocated"
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment unclear
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Small numbers (3 intervention; 4 controls) lost to follow-up Some secondary outcome assessments not completed or partially completed, which varied between groups
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Nottingham 1996 (GMW)

Methods	RCT Subgroup of Nottingham (stroke unit versus general medical ward)
Participants	People with stroke at 2 weeks after stroke onset Able to participate actively in rehabilitation
Interventions	Stroke rehabilitation ward in department of geriatric medicine (n = 78) versus conventional care in geriatric medical (mixed rehabilitation) ward (n = 63) Organised care provided for months if required
Outcomes	Death, Barthel index, place of residence, Nottingham Health Profile, length of hospital stay up to 1 year after stroke
Notes	Some crossover from general medical wards to geriatric medicine department

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"stratified based on admission ward ... then randomly allocated"

Nottingham 1996 (GMW) (*Continued*)

Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment unclear
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	Some secondary outcome assessments not completed or partially completed, which varied between groups
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Nottingham 1996 (MRW)

Methods	RCT Subgroup of Nottingham (stroke unit versus mixed rehabilitation ward)
Participants	People with stroke at 2 weeks after stroke onset Able to participate actively in rehabilitation
Interventions	Stroke rehabilitation ward in department of geriatric medicine (n = 98) versus conventional care in general medical wards (n = 76) Organised care provided for months if required
Outcomes	Death, Barthel index, place of residence, Nottingham Health Profile, length of hospital stay up to 1 year after stroke
Notes	Some crossover from general medical wards to geriatric medicine department

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"stratified based on admission ward... then randomly allocated"
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment unclear
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	Some secondary outcome assessments not completed or partially completed, which varied between groups

Nottingham 1996 (MRW) (*Continued*)

Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Orpington 1993

Methods	RCT
Participants	People with stroke who had survived for 2 weeks Suitable for transfer to rehabilitation ward
Interventions	Stroke rehabilitation ward (n = 124) versus conventional care in geriatric (mixed rehabilitation unit) (n = 73) or general medical (n = 48) wards Organised care provided for months if required
Outcomes	Death, Barthel index, place of residence and length of initial hospital stay at end of follow-up 2 intervention and 5 control patients lost to follow-up
Notes	Variable duration of follow-up (hospital discharge)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"randomised with the use of Geigy table of random numbers"
Allocation concealment (selection bias)	Low risk	"randomisation was computerized"
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	2 intervention and 5 control participants lost to follow-up
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Orpington 1993 (GMW)

Methods	RCT Subgroup of Orpington 1993 (stroke unit versus general medical ward)
Participants	People who survived a stroke for 2 weeks Suitable for transfer to rehabilitation ward

Orpington 1993 (GMW) (*Continued*)

Interventions	Stroke rehabilitation ward (n = 53) versus conventional care in general medical (n = 48) wards Organised care provided for months if required	
Outcomes	Death, Barthel index, place of residence and length of initial hospital stay at end of follow-up	
Notes	Stroke severity subgroup data inferred from distribution in whole group	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"randomised with the use of Geigy table of random numbers"
Allocation concealment (selection bias)	Low risk	"randomisation was computerized"
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	2 intervention and 5 control participants lost to follow-up
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Orpington 1993 (MRW)

Methods	RCT Subgroup of Orpington 1993 (stroke unit versus mixed rehabilitation ward)	
Participants	People who survived a stroke for 2 weeks Suitable for transfer to rehabilitation ward	
Interventions	Stroke rehabilitation ward (n = 71) versus conventional care in geriatric (mixed rehabilitation) ward (n = 73) Organised care provided for months if required	
Outcomes	Death, Barthel index, place of residence and length of initial hospital stay at end of follow-up	
Notes	Stroke severity subgroup data inferred from distribution in whole group	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**

Orpington 1993 (MRW) (*Continued*)

Random sequence generation (selection bias)	Low risk	"randomised with the use of Geigy table of random numbers"
Allocation concealment (selection bias)	Low risk	"randomisation was computerized"
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	2 intervention and 5 control participants lost to follow-up
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Orpington 1995

Methods	RCT
Participants	People who had a poor prognosis 2 weeks after stroke Suitable for transfer to rehabilitation ward
Interventions	Stroke rehabilitation ward in geriatric medicine department (n = 36) versus general medical wards (n = 37) Organised care provided for months if required
Outcomes	Death, Barthel index, place of residence, length of hospital stay at end of follow-up
Notes	Variable duration of follow-up (hospital discharge) 2 control participants lost to follow-up; assumed to be alive and independent (ITT analysis)

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	"were randomised" "the process of randomisation was not limited by bed availability"
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not described
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Unclear
Incomplete outcome data (attrition bias) All outcomes	Low risk	ITT analysis

Orpington 1995 (*Continued*)

Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Orpington 2000

Methods	RCT Blinded outcome assessment
Participants	People with acute stroke (meeting WHO definition of stroke) from a community stroke register Intermediate stroke severity
Interventions	3-arm comparison of: (1) comprehensive stroke ward (co-ordinated multidisciplinary team care) (n = 152); (2) general ward with input from hospital mobile stroke team (comprising medical, physiotherapy, occupational therapy, speech therapy but not nursing or medical specialists) (n = 152); and (3) domiciliary multidisciplinary stroke team (not relevant to this review)
Outcomes	Death, dependency (Barthel index), place of residence, length of stay and resource use up to 12 months 3 control participants lost to follow-up
Notes	-

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"unstratified ... using the block randomisation technique .... computer generated random numbers"
Allocation concealment (selection bias)	Low risk	"allocation schedule prepared using computer generated random numbers"
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	3 control participants lost to follow-up at 12 months
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Perth 1997

Methods	RCT
Participants	People with acute stroke within 7 days of stroke onset
Interventions	Comprehensive stroke ward (dedicated stroke unit) (n = 29) versus general medical wards (n = 30) Organised care provided for months if required
Outcomes	Death, Barthel index, place of residence, length of hospital stay up to 6 months after stroke
Notes	Most people screened did not enter trial

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	"were randomised"
Allocation concealment (selection bias)	Unclear risk	Method of allocation concealment not reported
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Blinded outcome assessment
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing outcome data
Selective reporting (reporting bias)	Low risk	Outcomes not clearly prespecified but all expected outcomes reported

Svendborg 1995

Methods	RCT by means of sealed envelopes (stratified by age and side of lesion)
Participants	People with acute stroke patients (within 8 days of symptoms) meeting WHO diagnostic criteria
Interventions	Comprehensive stroke ward (n = 31) versus conventional care in general medical wards (n = 34)
Outcomes	Death, dependency (Rankin score), place of residence and length of hospital stay at 6 months after randomisation
Notes	Staffing levels were higher in the stroke unit group

Risk of bias

Svendborg 1995 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Translation - randomised by the envelope method (drawing lots), stratified by age and side of lesion
Allocation concealment (selection bias)	Low risk	Sealed envelopes
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Unclear
Incomplete outcome data (attrition bias) All outcomes	Low risk	No obvious missing outcome data
Selective reporting (reporting bias)	Unclear risk	Unclear

Tampere 1993

Methods	RCT
Participants	People with acute stroke within 7 days of stroke (usually earlier)
Interventions	Acute (semi-intensive) stroke ward in neurology department (n = 98) versus conventional care in a neurology department (mixed rehabilitation unit) (n = 113) Organised care provided for approximately 1 week only
Outcomes	Death, Rankin score, place of residence, length of hospital stay up to 1 year after stroke 1 intervention and 1 control participant removed due to non-stroke diagnosis
Notes	Short duration (1 week) in stroke unit before transfer to conventional service

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"Randomisation was performed with the aid of a table of random numbers" "randomly assigned using serially numbered, sealed, envelopes"
Allocation concealment (selection bias)	Low risk	"serially numbered, sealed, envelopes"
Blinding of outcome assessment (detection bias) All outcomes	High risk	Unblinded outcome assessment

Tampere 1993 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	1 participant in intervention group and 1 participant in control group removed due to incorrect diagnosis
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

Trondheim 1991

Methods	RCT
Participants	People with stroke within 7 days (usually within 24 hours) of stroke onset Exclusion of deeply unconscious patients and those previously resident in a nursing home
Interventions	Comprehensive stroke ward (dedicated stroke unit) (n = 110) versus general medical wards (n = 110) Organised care provided for a maximum of 6 weeks
Outcomes	Death, Barthel index, place of residence and length of stay in hospital or institution up to 1 year after stroke
Notes	-

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"randomly assigned ... using serially numbered sealed envelopes"
Allocation concealment (selection bias)	Low risk	"serially numbered sealed envelopes"
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Both blinded and open assessments available for 50% of participants at 52 weeks; open assessments only available for 50% Correlation between blinded and open was high but risk of bias remains unclear
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing outcome data
Selective reporting (reporting bias)	Low risk	All prespecified outcomes reported

ADL: activities of daily living
CT: computerised tomography
GMW: general medical ward
ITT: intention-to-treat
mRS: modified Rankin Scale
MRW: mixed rehabilitation ward
NIHSS: National Institutes of Health Stroke Scale

OHS: Oxford Handicap Scale
RCT: randomised controlled trial
SD: standard deviation
TIA: transient ischaemic attack
WHO: World Health Organization

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

Study	Reason for exclusion
Abissi 1995	Trial tested a care plan protocol only No other aspect of organisation was under evaluation
Asplund 2000	Trial of a geriatric assessment unit
Cavallini 2003	Quasi-randomised treatment allocation
Davis 2000	Intervention and control arms of trial were treated within same stroke unit
Di Lauro 2003	Intervention and control arms of trial were treated within same stroke unit
Diagana 2008	Quasi-randomised treatment allocation
Durastanti 2005	Quasi-randomised treatment allocation
HAMLET 2009	Does not report outcomes for different medical treatment arms
Hamrin 1982	Quasi-randomised treatment allocation
Koton 2005	Treatment allocated by selection criteria
Langhorne 2001	Study tested a care plan protocol only No other aspect of organisation was under evaluation
Middleton 2006	Care pathway study only
Moloney 1999	Care pathway study only
Pappa 2009	Non-randomised
Patel 2000	Quasi-randomised treatment allocation
Pearson 1988	No available outcome data
Ricauda 2004	Trial comparing home care team versus general medical wards
Ronning 1998	Quasi-randomised treatment allocation

(*Continued*)

Ronning 1998a	A portion of the data were collected retrospectively All prospective data are included in the Akershus study (Ronning 1998)
Ronning 1998b	Comparison of stroke rehabilitation ward with discharge to community-based stroke rehabilitation
Shiraishi 2004	Non-randomised treatment allocation
Silva 2004	Treatment allocated by the study neurologist
Stone 1998	No available outcome data
Strand 1985	Quasi-randomised treatment allocation
von Arbin 1980	Quasi-randomised treatment allocation
Walter 2005	Non-randomised treatment allocation
Wang 2004	No available outcome data
Yagura 2005	Quasi-randomised treatment allocation

Characteristics of studies awaiting assessment *[ordered by study ID]*

Anhui 2008

Methods	RCT
Participants	People with acute stroke
Interventions	"Standardised tertiary rehabilitation" (n = 51) versus usual inpatient care (n = 51)
Outcomes	Functional outcome (unknown scale) and quality of life (WHOQOL-BREF) at 1, 3 and 6 months Cost analysis
Notes	Currently no useable data

China (Hao) 2010

Methods	Possible RCT
Participants	People with pneumonia (n = 159) after acute stroke (within 2 weeks)
Interventions	Management in comprehensive stroke unit versus general ward Allocated 'treatment' group depended on which ward the person was in when pneumonia developed

China (Hao) 2010 (*Continued*)

Outcomes	Death, NIHSS, Barthel index at 21 days Length of stay; cost analysis
Notes	Method of randomisation unclear

China (Pei) 2011

Methods	RCT
Participants	People with stroke (n = 236)
Interventions	Randomly assigned to organised stroke care model with integrated Chinese medicine (n = 121) versus traditional care group (n = 115)
Outcomes	Death, NIHSS, Barthel Index, OHS score at 21 days
Notes	Currently no useable data

China (Wang) 2008

Methods	RCT
Participants	People with 'acute cerebral infarction'
Interventions	Randomly assigned to stroke rehabilitation unit group (n = 77) versus ordinary group (n = 73)
Outcomes	NIHSS, Barthel Index (duration of follow-up unclear), length of stay
Notes	-

China (Wu) 2007

Methods	RCT
Participants	2367 people with acute stroke
Interventions	Randomly assigned to organised stroke ward versus general ward
Outcomes	Death, 'non-recovery' and 'improvement' over 5 years
Notes	Currently no useable data

Haikou 2007

Methods	RCT
Participants	People with acute ischaemic stroke randomised within 1 week
Interventions	Randomised into extended stroke unit versus general medical ward for a period of 3 weeks
Outcomes	Discharge Barthel Index and NIHSS
Notes	Currently no useable data

Shanghai 2006

Methods	RCT
Participants	Cerebral stroke from 22 hospitals
Interventions	"Standardised tertiary rehabilitation" versus routine care
Outcomes	Functional recovery (unknown scale); cost-effectiveness analysis
Notes	Currently no useable data

NIHSS: National Institutes of Health Stroke Scale
OHS: Oxford Handicap Scale
RCT: randomised controlled trial
WHOQOL-BREF: World Health Organization Quality of Life Project

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

Baden 2007

Trial name or title	Structured stroke management improves outcomes at 6 months
Methods	-
Participants	-
Interventions	-
Outcomes	-
Starting date	-
Contact information	-

Baden 2007 (*Continued*)

Notes	Kantonsspital Baden

Beijing 2009

Trial name or title	Efficiency study of traditional Chinese medicine (TCM) versus western medicine (WM) on ischaemic stroke
Methods	-
Participants	-
Interventions	-
Outcomes	-
Starting date	-
Contact information	-
Notes	Dongzhimen Hospital and Beijing Tiantan Hospital

Shanghai 2009

Trial name or title	A study of the stroke unit of traditional Chinese and western medicine in the treatment of ischaemic stroke
Methods	-
Participants	-
Interventions	-
Outcomes	-
Starting date	-
Contact information	Qiujuan Zhang, zqiyyy@hotmail.com
Notes	Yueyang Hospital, Shanghai

DATA AND ANALYSES

Comparison 1. Organised stroke unit care versus alternative service

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Death by the end of scheduled follow-up	31		Peto Odds Ratio (Peto, Fixed, 95% CI)	Subtotals only
1.1 Stroke ward versus general medical ward	15	3521	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.75 [0.63, 0.90]
1.2 Mixed rehabilitation ward versus general medical ward	6	630	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.91 [0.58, 1.42]
1.3 Mobile stroke team versus general medical ward	2	438	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.08 [0.71, 1.65]
1.4 Stroke ward versus mixed rehabilitation ward	4	542	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.82 [0.54, 1.24]
1.5 Stroke ward versus mobile stroke team	1	304	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.35 [0.19, 0.65]
1.6 Stroke ward versus stroke ward	1	54	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.18 [0.04, 0.79]
1.7 Stroke ward (plus TCM) versus stroke ward	2	366	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.54 [0.13, 2.22]
2 Death or institutional care by the end of scheduled follow-up	26		Peto Odds Ratio (Peto, Fixed, 95% CI)	Subtotals only
2.1 Stroke ward versus general medical ward	13	2924	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.74 [0.63, 0.87]
2.2 Mixed rehabilitation ward versus general medical ward	5	578	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.71 [0.51, 0.99]
2.3 Mobile stroke team versus general medical ward	2	438	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.27 [0.84, 1.93]
2.4 Stroke ward versus mixed rehabilitation ward	4	542	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.90 [0.64, 1.27]
2.5 Stroke ward versus mobile stroke team	1	304	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.40 [0.23, 0.68]
2.6 Stroke ward versus stroke ward	1	54	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.48 [0.16, 1.38]
3 Death or dependency by the end of scheduled follow-up	26		Peto Odds Ratio (Peto, Fixed, 95% CI)	Subtotals only
3.1 Stroke ward versus general medical ward	12	2839	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.75 [0.64, 0.88]
3.2 Mixed rehabilitation ward versus general medical ward	6	630	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.65 [0.47, 0.90]
3.3 Mobile stroke team versus general medical ward	2	438	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.80 [0.52, 1.22]
3.4 Stroke ward versus mixed rehabilitation ward	4	542	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.01 [0.68, 1.50]
3.5 Stroke ward versus mobile stroke team	1	304	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.73 [0.46, 1.14]

3.6 Stroke ward versus stroke ward	1	54	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.39 [0.13, 1.17]
4 Length of stay (days) in a hospital or institution or both	19	4115	Std. Mean Difference (IV, Random, 95% CI)	-0.15 [-0.32, 0.02]
4.1 Stroke ward	16	3728	Std. Mean Difference (IV, Random, 95% CI)	-0.20 [-0.39, -0.00]
4.2 Mixed rehabilitation ward	3	387	Std. Mean Difference (IV, Random, 95% CI)	0.08 [-0.21, 0.37]
5 Length of stay (days) in a hospital or hospital plus institution	19	4115	Std. Mean Difference (IV, Random, 95% CI)	-0.15 [-0.32, 0.02]
5.1 Acute hospital stay only	7	1817	Std. Mean Difference (IV, Random, 95% CI)	-0.23 [-0.50, 0.03]
5.2 Hospital and institution stay	12	2298	Std. Mean Difference (IV, Random, 95% CI)	-0.09 [-0.33, 0.15]
6 Death at 5-year follow-up	3	1139	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.74 [0.59, 0.94]
7 Death or institutional care at 5-year follow-up	2	535	Odds Ratio (M-H, Random, 95% CI)	0.59 [0.33, 1.05]
8 Death or dependency at 5-year follow-up	2	535	Odds Ratio (M-H, Random, 95% CI)	0.54 [0.22, 1.34]
9 Death at 10-year follow-up	3	1152	Odds Ratio (M-H, Random, 95% CI)	0.67 [0.43, 1.03]
10 Death or institutional care at 10-year follow-up	2	535	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.57 [0.37, 0.88]
11 Death or dependency at 10-year follow-up	2	535	Odds Ratio (M-H, Random, 95% CI)	0.70 [0.27, 1.80]

Comparison 2. Organised stroke unit care versus general medical wards

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Death by the end of scheduled follow-up	23	4591	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.81 [0.69, 0.94]
1.1 Comprehensive stroke ward versus general medical ward	11	2988	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.77 [0.63, 0.93]
1.2 Rehabilitation stroke ward versus general medical ward	4	535	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.69 [0.46, 1.05]
1.3 Mobile stroke team versus general medical ward	2	438	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.08 [0.71, 1.65]
1.4 Mixed rehabilitation ward versus general medical ward	6	630	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.91 [0.58, 1.42]
2 Death or institutional care by the end of scheduled follow-up	20	3940	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.78 [0.68, 0.89]
2.1 Comprehensive stroke ward versus general medical ward	9	2391	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.74 [0.62, 0.88]
2.2 Rehabilitation stroke ward versus general medical ward	4	533	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.76 [0.52, 1.09]
2.3 Mobile stroke team versus general medical ward	2	438	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.27 [0.84, 1.93]
2.4 Mixed rehabilitation ward versus general medical ward	5	578	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.71 [0.51, 0.99]

3 Death or dependency by the end of scheduled follow-up	19	3510	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.79 [0.68, 0.90]
3.1 Comprehensive stroke ward versus general medical ward	7	1909	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.82 [0.68, 0.98]
3.2 Rehabilitation stroke ward versus general medical ward	4	533	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.83 [0.57, 1.23]
3.3 Mobile stroke team versus general medical ward	2	438	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.80 [0.52, 1.22]
3.4 Mixed rehabilitation ward versus general medical ward	6	630	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.65 [0.47, 0.90]
4 Length of stay (days) in a hospital or institution	13	2934	Std. Mean Difference (IV, Random, 95% CI)	-0.08 [-0.23, 0.06]
4.1 Comprehensive stroke ward versus general medical ward	9	2373	Std. Mean Difference (IV, Random, 95% CI)	-0.18 [-0.34, -0.02]
4.2 Rehabilitation stroke ward versus general medical ward	1	174	Std. Mean Difference (IV, Random, 95% CI)	0.37 [0.07, 0.67]
4.3 Mobile stroke team versus general medical ward	0	0	Std. Mean Difference (IV, Random, 95% CI)	0.0 [0.0, 0.0]
4.4 Mixed rehabilitation ward versus general ward	3	387	Std. Mean Difference (IV, Random, 95% CI)	0.08 [-0.21, 0.37]

Comparison 3. Different systems of organised care: acute stroke ward versus alternative service

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Death by the end of scheduled follow-up	2	265	Odds Ratio (M-H, Random, 95% CI)	0.49 [0.04, 5.92]
1.1 Acute (semi-intensive) ward versus comprehensive ward	1	54	Odds Ratio (M-H, Random, 95% CI)	0.11 [0.01, 0.97]
1.2 Acute (semi-intensive) ward versus mixed rehabilitation ward	1	211	Odds Ratio (M-H, Random, 95% CI)	1.41 [0.76, 2.58]
2 Death or institutional care by the end of scheduled follow-up	2	265	Odds Ratio (M-H, Random, 95% CI)	0.88 [0.32, 2.39]
2.1 Acute (semi-intensive) ward versus comprehensive ward	1	54	Odds Ratio (M-H, Random, 95% CI)	0.46 [0.15, 1.39]
2.2 Acute (semi-intensive) ward versus mixed rehabilitation ward	1	211	Odds Ratio (M-H, Random, 95% CI)	1.32 [0.76, 2.30]
3 Death or dependency by the end of scheduled follow-up	2	265	Odds Ratio (M-H, Random, 95% CI)	0.76 [0.24, 2.41]
3.1 Acute (semi-intensive) ward versus comprehensive ward	1	54	Odds Ratio (M-H, Random, 95% CI)	0.38 [0.12, 1.18]

3.2 Acute (semi-intensive) ward versus mixed rehabilitation ward	1	211	Odds Ratio (M-H, Random, 95% CI)	1.24 [0.72, 2.14]
4 Length of stay (days) in a hospital or institution	2	265	Std. Mean Difference (IV, Random, 95% CI)	-0.89 [-2.58, 0.79]
4.1 Acute (semi-intensive) ward versus comprehensive ward	1	54	Std. Mean Difference (IV, Random, 95% CI)	-1.78 [-2.42, -1.14]
4.2 Acute (semi-intensive) ward versus mixed rehabilitation ward	1	211	Std. Mean Difference (IV, Random, 95% CI)	-0.06 [-0.33, 0.21]

Comparison 4. Different systems of organised care: comprehensive stroke ward versus alternative service

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Death by the end of scheduled follow-up	1	304	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.35 [0.19, 0.65]
1.1 Comprehensive stroke ward versus mobile stroke team	1	304	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.35 [0.19, 0.65]
2 Death or institutional care by the end of scheduled follow-up	1	304	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.40 [0.23, 0.68]
2.1 Comprehensive stroke ward versus mobile stroke team	1	304	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.40 [0.23, 0.68]
3 Death or dependency by the end of scheduled follow-up	1	304	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.73 [0.46, 1.14]
3.1 Comprehensive stroke ward versus mobile stroke team	1	304	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.73 [0.46, 1.14]
4 Length of stay (days) in a hospital or institution	1	301	Std. Mean Difference (IV, Random, 95% CI)	0.07 [-0.16, 0.30]
4.1 Comprehensive stroke ward versus mobile stroke team	1	301	Std. Mean Difference (IV, Random, 95% CI)	0.07 [-0.16, 0.30]

Comparison 5. Different systems of organised care: rehabilitation stroke ward versus alternative service

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Death by the end of scheduled follow-up	3	331	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.51 [0.29, 0.90]
1.1 Rehabilitation stroke ward versus mixed rehabilitation ward	3	331	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.51 [0.29, 0.90]
2 Death or institutional care by the end of scheduled follow-up	3	331	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.71 [0.46, 1.09]

2.1 Rehabilitation stroke ward versus mixed rehabilitation ward	3	331	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.71 [0.46, 1.09]
3 Death or dependency by the end of scheduled follow-up	3	331	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.80 [0.45, 1.42]
3.1 Rehabilitation stroke ward versus mixed rehabilitation stroke ward	3	331	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.80 [0.45, 1.42]
4 Length of stay (days) in a hospital or institution	3	331	Std. Mean Difference (IV, Random, 95% CI)	0.22 [-0.61, 1.05]
4.1 Rehabilitation stroke ward versus mixed rehabilitation ward	3	331	Std. Mean Difference (IV, Random, 95% CI)	0.22 [-0.61, 1.05]

Comparison 6. Different systems of organised care: stroke ward (plus TCM) versus stroke ward

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Death by the end of scheduled follow-up	2	366	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.54 [0.13, 2.22]
1.1 Stroke ward (plus TCM) versus stroke ward	2	366	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.54 [0.13, 2.22]

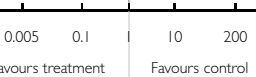
Analysis 1.1. Comparison 1 Organised stroke unit care versus alternative service, Outcome 1 Death by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 1 Death by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Peto Odds Ratio Peto,Fixed,95% CI
1 Stroke ward versus general medical ward				
Athens 1995	103/302	127/302		0.71 [0.51, 0.99]
Beijing 2004	12/195	19/197		0.62 [0.30, 1.29]
Dover 1984 (GMW)	34/98	35/89		0.82 [0.45, 1.48]
Edinburgh 1980	48/155	55/156		0.82 [0.51, 1.32]
Goteborg-Ostra 1988	16/215	12/202		1.27 [0.59, 2.73]
Goteborg-Sahlgren 1994	45/166	19/83		1.25 [0.68, 2.27]
Guangdong 2009	2/100	5/100		0.41 [0.09, 1.86]
Huaihua 2004	10/324	10/73		0.11 [0.03, 0.35]
Joinville 2003	9/35	12/39		0.78 [0.29, 2.14]
Nottingham 1996 (GMW)	14/98	10/76		1.10 [0.46, 2.61]
Orpington 1993 (GMW)	3/53	6/48		0.43 [0.11, 1.70]
Orpington 1995	7/34	17/37		0.33 [0.12, 0.87]
Perth 1997	4/29	6/30		0.65 [0.17, 2.50]
Svendborg 1995	14/31	12/34		1.50 [0.56, 4.02]
Trondheim 1991	27/110	36/110		0.67 [0.37, 1.20]
Subtotal (95% CI)	**1945**	**1576**		**0.75 [0.63, 0.90]**
Total events: 348 (Treatment), 381 (Control)				
Heterogeneity: Chi^2 = 22.54, df = 14 (P = 0.07); I^2 =38%				
Test for overall effect: Z = 3.16 (P = 0.0016)				
2 Mixed rehabilitation ward versus general medical ward				
Birmingham 1972	4/29	2/23		1.63 [0.30, 8.90]
Helsinki 1995	26/121	27/122		0.96 [0.52, 1.77]
Illinois 1966	0/56	0/35		0.0 [0.0, 0.0]
Kuopio 1985	8/50	10/45		0.67 [0.24, 1.86]
New York 1962	0/42	0/40		0.0 [0.0, 0.0]



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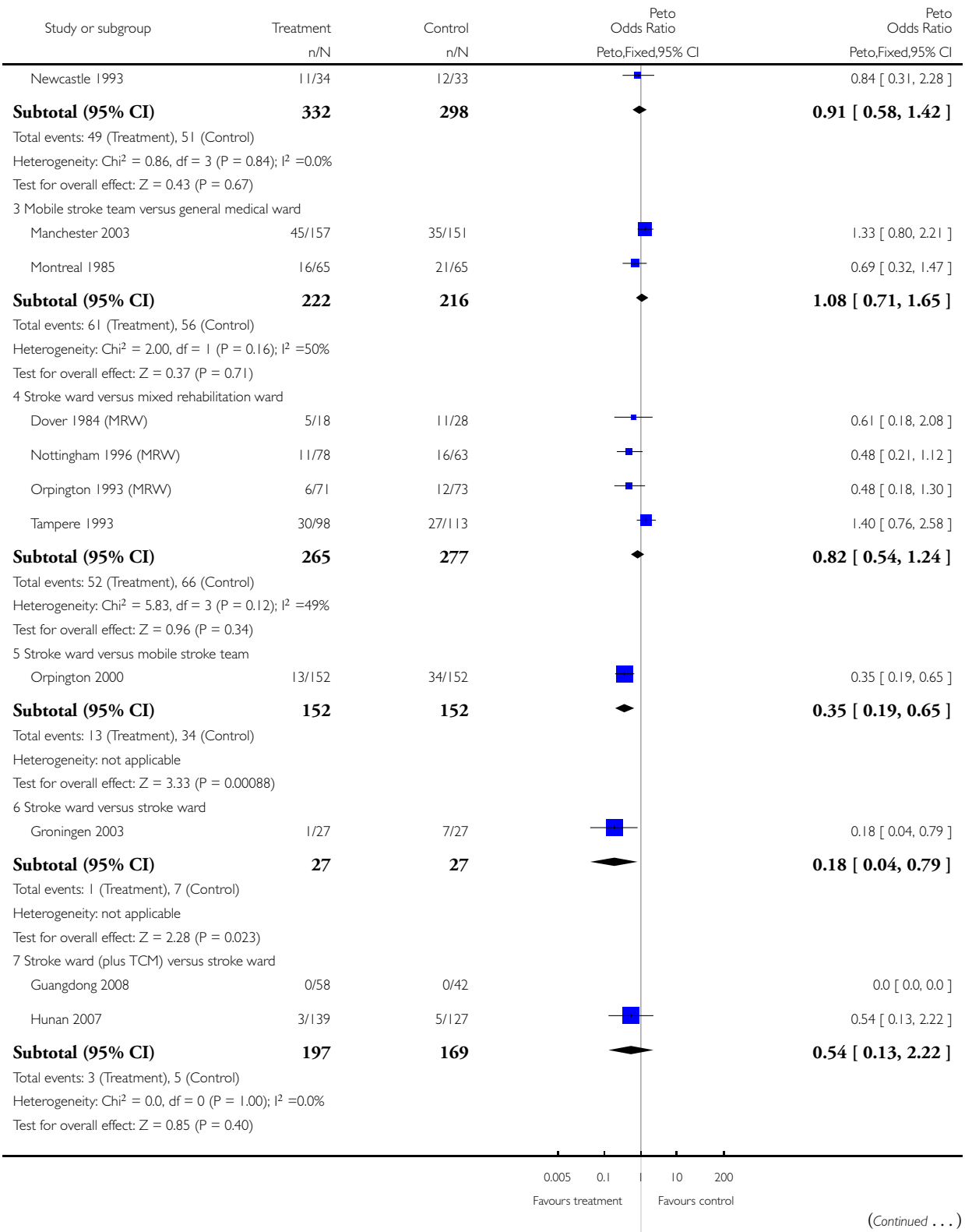

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Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Peto Odds Ratio Peto,Fixed,95% CI
Test for subgroup differences: Chi² = 13.36, df = 6 (P = 0.04), I² =55%				

Analysis 1.2. Comparison 1 Organised stroke unit care versus alternative service, Outcome 2 Death or institutional care by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 2 Death or institutional care by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Stroke ward versus general medical ward					
Athens 1995	107/302	138/302		24.1 %	0.65 [0.47, 0.90]
Beijing 2004	23/195	27/197		7.2 %	0.84 [0.47, 1.52]
Dover 1984 (GMW)	50/98	48/89		7.7 %	0.89 [0.50, 1.58]
Edinburgh 1980	66/155	78/156		12.8 %	0.74 [0.48, 1.16]
Goteborg-Ostra 1988	49/215	43/202		11.9 %	1.09 [0.69, 1.73]
Goteborg-Sahlgren 1994	64/166	34/83		8.8 %	0.90 [0.53, 1.55]
Joinville 2003	9/35	12/39		2.5 %	0.78 [0.29, 2.14]
Nottingham 1996 (GMW)	28/98	21/76		5.8 %	1.05 [0.54, 2.03]
Orpington 1993 (GMW)	9/53	12/48		2.8 %	0.62 [0.24, 1.61]
Orpington 1995	18/34	30/37		2.6 %	0.28 [0.10, 0.76]
Perth 1997	6/29	14/30		2.2 %	0.32 [0.11, 0.93]
Svendborg 1995	18/31	20/34		2.6 %	0.97 [0.36, 2.58]
Trondheim 1991	41/110	61/110		9.1 %	0.48 [0.28, 0.82]

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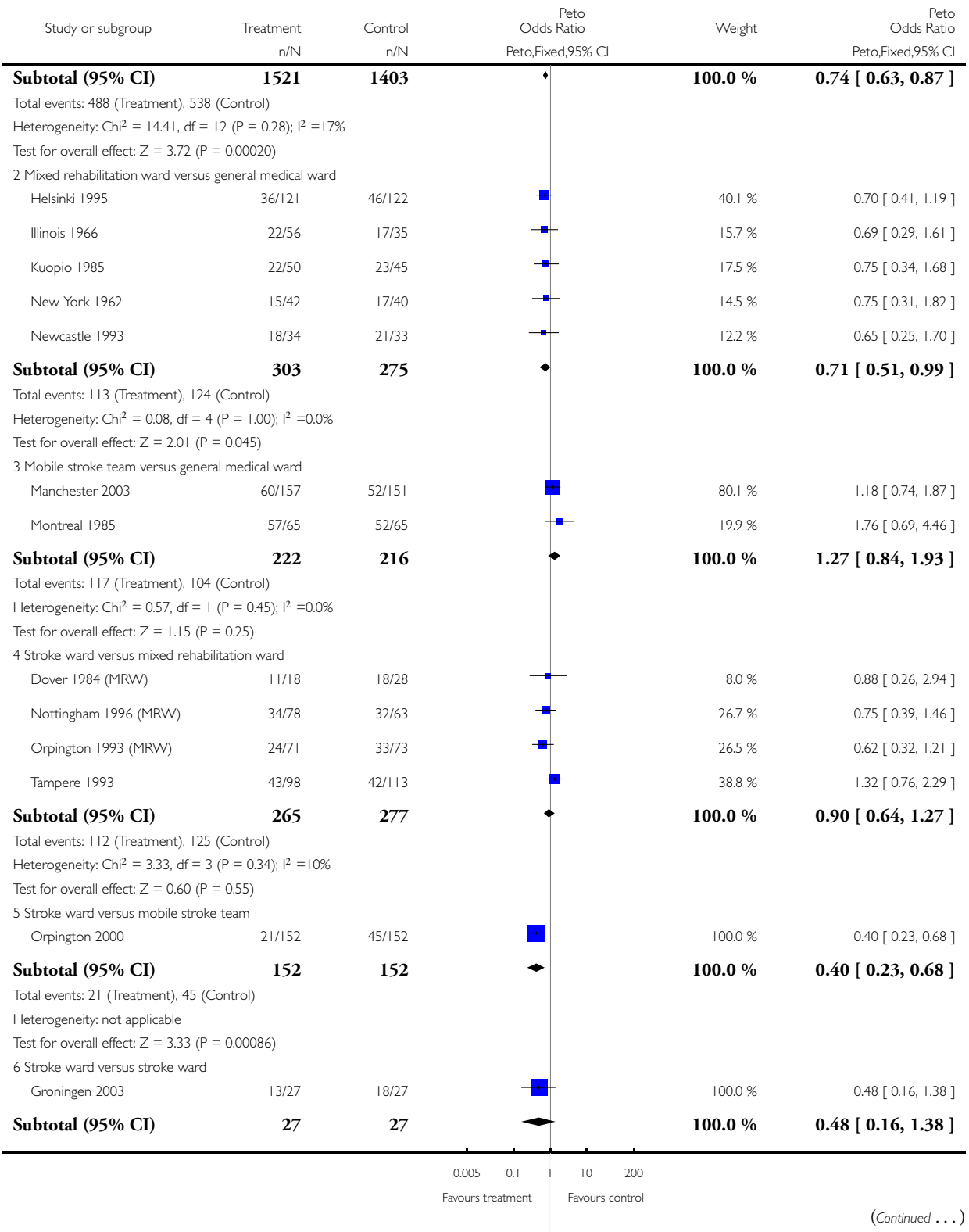

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Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Total events: 13 (Treatment), 18 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.36 (P = 0.17)					
Test for subgroup differences: Chi² = 13.42, df = 5 (P = 0.02), I² =63%					

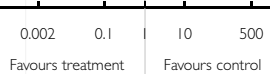
Analysis 1.3. Comparison 1 Organised stroke unit care versus alternative service, Outcome 3 Death or dependency by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 3 Death or dependency by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Peto Odds Ratio Peto,Fixed,95% CI
1 Stroke ward versus general medical ward				
Athens 1995	138/302	145/302		0.91 [0.66, 1.25]
Beijing 2004	113/195	118/197		0.92 [0.62, 1.38]
Dover 1984 (GMW)	54/98	50/89		0.96 [0.54, 1.70]
Edinburgh 1980	93/155	94/156		0.99 [0.63, 1.56]
Goteborg-Sahlgren 1994	108/166	54/83		1.00 [0.58, 1.74]
Huaihua 2004	83/324	39/73		0.27 [0.16, 0.47]
Joinville 2003	18/35	23/39		0.74 [0.30, 1.84]
Nottingham 1996 (GMW)	63/98	52/76		0.83 [0.44, 1.56]
Orpington 1993 (GMW)	38/53	39/48		0.59 [0.24, 1.48]
Orpington 1995	34/34	37/37		0.0 [0.0, 0.0]
Perth 1997	10/29	15/30		0.54 [0.19, 1.49]



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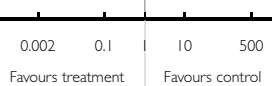
Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Peto Odds Ratio Peto,Fixed,95% CI
Trondheim 1991	54/110	81/110		0.36 [0.21, 0.61]
Subtotal (95% CI)	**1599**	**1240**		**0.75 [0.64, 0.88]**
Total events: 806 (Treatment), 747 (Control)				
Heterogeneity: Chi² = 26.73, df = 10 (P = 0.003); I² =63%				
Test for overall effect: Z = 3.56 (P = 0.00037)				
2 Mixed rehabilitation ward versus general medical ward				
Birmingham 1972	8/29	7/23		0.87 [0.26, 2.89]
Helsinki 1995	47/121	65/122		0.56 [0.34, 0.93]
Illinois 1966	20/56	17/35		0.59 [0.25, 1.39]
Kuopio 1985	31/50	31/45		0.74 [0.32, 1.72]
New York 1962	23/42	23/40		0.90 [0.38, 2.13]
Newcastle 1993	26/34	28/33		0.59 [0.18, 1.96]
Subtotal (95% CI)	**332**	**298**		**0.65 [0.47, 0.90]**
Total events: 155 (Treatment), 171 (Control)				
Heterogeneity: Chi² = 1.26, df = 5 (P = 0.94); I² =0.0%				
Test for overall effect: Z = 2.57 (P = 0.010)				
3 Mobile stroke team versus general medical ward				
Manchester 2003	91/157	95/151		0.81 [0.52, 1.28]
Montreal 1985	58/65	60/65		0.69 [0.21, 2.27]
Subtotal (95% CI)	**222**	**216**		**0.80 [0.52, 1.22]**
Total events: 149 (Treatment), 155 (Control)				
Heterogeneity: Chi² = 0.06, df = 1 (P = 0.81); I² =0.0%				
Test for overall effect: Z = 1.04 (P = 0.30)				
4 Stroke ward versus mixed rehabilitation ward				
Dover 1984 (MRW)	11/18	19/28		0.75 [0.22, 2.56]
Nottingham 1996 (MRW)	60/78	48/63		1.04 [0.48, 2.27]
Orpington 1993 (MRW)	63/71	69/73		0.47 [0.15, 1.53]
Tampere 1993	53/98	55/113		1.24 [0.72, 2.13]
Subtotal (95% CI)	**265**	**277**		**1.01 [0.68, 1.50]**
Total events: 187 (Treatment), 191 (Control)				
Heterogeneity: Chi² = 2.40, df = 3 (P = 0.49); I² =0.0%				
Test for overall effect: Z = 0.05 (P = 0.96)				
5 Stroke ward versus mobile stroke team				
Orpington 2000	61/152	73/152		0.73 [0.46, 1.14]
Subtotal (95% CI)	**152**	**152**		**0.73 [0.46, 1.14]**
Total events: 61 (Treatment), 73 (Control)				
Heterogeneity: not applicable				
Test for overall effect: Z = 1.38 (P = 0.17)				



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Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Peto Odds Ratio Peto,Fixed,95% CI
6 Stroke ward versus stroke ward				
Groningen 2003	7/27	13/27		0.39 [0.13, 1.17]
Subtotal (95% CI)	**27**	**27**		**0.39 [0.13, 1.17]**
Total events: 7 (Treatment), 13 (Control)				
Heterogeneity: not applicable				
Test for overall effect: Z = 1.68 (P = 0.094)				
Test for subgroup differences: Chi^2 = 4.36, df = 5 (P = 0.50), I^2 =0.0%				

Analysis 1.4. Comparison 1 Organised stroke unit care versus alternative service, Outcome 4 Length of stay (days) in a hospital or institution or both.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 4 Length of stay (days) in a hospital or institution or both

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Stroke ward							
Athens 1995	302	11.23 (6.3)	302	12.1 (7.49)		6.2 %	-0.13 [-0.29, 0.03]
Beijing 2004	195	20.6 (10.4)	197	22.3 (19.7)		6.0 %	-0.11 [-0.31, 0.09]
Dover 1984	112	116 (99)	117	113 (96)		5.7 %	0.03 [-0.23, 0.29]
Edinburgh 1980	155	54.6 (42.3)	152	75.1 (92.5)		5.9 %	-0.29 [-0.51, -0.06]
Goteborg-Ostra 1988	215	16.2 (10.6)	202	13.9 (9)		6.0 %	0.23 [0.04, 0.43]
Goteborg-Sahlgren 1994	166	28 (17)	83	36 (17)		5.7 %	-0.47 [-0.74, -0.20]
Groningen 2003	27	16 (5)	27	27 (7)		3.5 %	-1.78 [-2.42, -1.14]
Joinville 2003	35	11 (8.51)	39	12.6 (10.8)		4.5 %	-0.16 [-0.62, 0.30]

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Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
Nottingham 1996 (GMW)	98	76.72 (39.73)	76	60.38 (48.91)		5.5 %	0.37 [0.07, 0.67]
Nottingham 1996 (MRW)	78	86.74 (43.72)	63	66.71 (44.66)		5.2 %	0.45 [0.12, 0.79]
Orpington 1993	124	55 (30)	121	98 (50)		5.7 %	-1.04 [-1.31, -0.78]
Orpington 2000	152	32 (30)	149	30 (40)		5.9 %	0.06 [-0.17, 0.28]
Perth 1997	29	24 (30)	30	26.7 (30)		4.2 %	-0.09 [-0.60, 0.42]
Svendborg 1995	31	12 (22)	34	23 (34)		4.3 %	-0.38 [-0.87, 0.12]
Tampere 1993	98	13 (30)	113	15 (38)		5.6 %	-0.06 [-0.33, 0.21]
Trondheim 1991	102	75 (114.8)	104	123 (145.8)		5.6 %	-0.36 [-0.64, -0.09]
Subtotal (95% CI)	**1919**		**1809**			**85.4 %**	**-0.20 [-0.39, 0.00]**
Heterogeneity: Tau^2 = 0.13; Chi^2 = 122.48, df = 15 (P<0.00001); I^2 =88%							
Test for overall effect: Z = 1.98 (P = 0.048)							
2 Mixed rehabilitation ward							
Helsinki 1995	121	23.6 (38.8)	122	30.5 (70.6)		5.7 %	-0.12 [-0.37, 0.13]
Kuopio 1985	42	162.5 (125)	35	129.5 (119)		4.5 %	0.27 [-0.18, 0.72]
Newcastle 1993	34	52 (45)	33	41 (34)		4.3 %	0.27 [-0.21, 0.75]
Subtotal (95% CI)	**197**		**190**			**14.6 %**	**0.08 [-0.21, 0.37]**
Heterogeneity: Tau^2 = 0.03; Chi^2 = 3.41, df = 2 (P = 0.18); I^2 =41%							
Test for overall effect: Z = 0.54 (P = 0.59)							
Total (95% CI)	**2116**		**1999**			**100.0 %**	**-0.15 [-0.32, 0.02]**
Heterogeneity: Tau^2 = 0.12; Chi^2 = 128.01, df = 18 (P<0.00001); I^2 =86%							
Test for overall effect: Z = 1.69 (P = 0.091)							
Test for subgroup differences: Chi^2 = 2.42, df = 1 (P = 0.12), I^2 =59%							

Analysis 1.5. Comparison 1 Organised stroke unit care versus alternative service, Outcome 5 Length of stay (days) in a hospital or hospital plus institution.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 5 Length of stay (days) in a hospital or hospital plus institution

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Acute hospital stay only							
Athens 1995	302	11.23 (6.3)	302	12.1 (7.49)		6.2 %	-0.13 [-0.29, 0.03]
Beijing 2004	195	20.6 (10.4)	197	22.3 (19.7)		6.0 %	-0.11 [-0.31, 0.09]
Goteborg-Ostra 1988	215	16.2 (10.6)	202	13.9 (9)		6.0 %	0.23 [0.04, 0.43]
Groningen 2003	27	16 (5)	27	27 (7)		3.5 %	-1.78 [-2.42, -1.14]
Joinville 2003	35	11 (8.51)	39	12.6 (10.8)		4.5 %	-0.16 [-0.62, 0.30]
Svendborg 1995	31	12 (22)	34	23 (34)		4.3 %	-0.38 [-0.87, 0.12]
Tampere 1993	98	13 (30)	113	15 (38)		5.6 %	-0.06 [-0.33, 0.21]
Subtotal (95% CI)	**903**		**914**			**36.1 %**	**-0.23 [-0.50, 0.03]**
Heterogeneity: $Tau^2 = 0.10$; $Chi^2 = 39.44$, df = 6 (P<0.00001); $I^2 = 85\%$							
Test for overall effect: Z = 1.72 (P = 0.085)							
2 Hospital and institution stay							
Dover 1984	112	116 (99)	117	113 (96)		5.7 %	0.03 [-0.23, 0.29]
Edinburgh 1980	155	54.6 (42.3)	152	75.1 (92.5)		5.9 %	-0.29 [-0.51, -0.06]
Goteborg-Sahlgren 1994	166	28 (17)	83	36 (17)		5.7 %	-0.47 [-0.74, -0.20]
Helsinki 1995	121	23.6 (38.8)	122	30.5 (70.6)		5.7 %	-0.12 [-0.37, 0.13]
Kuopio 1985	42	162.5 (125)	35	129.5 (119)		4.5 %	0.27 [-0.18, 0.72]
Newcastle 1993	34	52 (45)	33	41 (34)		4.3 %	0.27 [-0.21, 0.75]
Nottingham 1996 (GMW)	98	76.72 (39.73)	76	60.38 (48.91)		5.5 %	0.37 [0.07, 0.67]
Nottingham 1996 (MRW)	78	86.74 (43.72)	63	66.71 (44.66)		5.2 %	0.45 [0.12, 0.79]
Orpington 1993	124	55 (30)	121	98 (50)		5.7 %	-1.04 [-1.31, -0.78]
Orpington 2000	152	32 (30)	149	30 (40)		5.9 %	0.06 [-0.17, 0.28]
Perth 1997	29	24 (30)	30	26.7 (30)		4.2 %	-0.09 [-0.60, 0.42]
Trondheim 1991	102	75 (114.8)	104	123 (145.8)		5.6 %	-0.36 [-0.64, -0.09]
Subtotal (95% CI)	**1213**		**1085**			**63.9 %**	**-0.09 [-0.33, 0.15]**
Heterogeneity: $Tau^2 = 0.15$; $Chi^2 = 87.18$, df = 11 (P<0.00001); $I^2 = 87\%$							

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Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
Test for overall effect: Z = 0.75 (P = 0.45)							
Total (95% CI)	**2116**		**1999**		◆	**100.0 %**	**-0.15 [-0.32, 0.02]**
Heterogeneity: Tau^2 = 0.12; Chi^2 = 128.01, df = 18 (P<0.00001); I^2 =86%							
Test for overall effect: Z = 1.69 (P = 0.091)							
Test for subgroup differences: Chi^2 = 0.60, df = 1 (P = 0.44), I^2 =0.0%							

Analysis 1.6. Comparison 1 Organised stroke unit care versus alternative service, Outcome 6 Death at 5-year follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 6 Death at 5-year follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Athens 1995	163/302	175/302	■	53.8 %	0.85 [0.62, 1.17]
Nottingham 1996	79/176	77/139	■	28.1 %	0.66 [0.42, 1.03]
Trondheim 1991	65/110	78/110	■	18.1 %	0.60 [0.34, 1.04]
Total (95% CI)	**588**	**551**	◆	**100.0 %**	**0.74 [0.59, 0.94]**
Total events: 307 (Treatment), 330 (Control)					
Heterogeneity: Chi^2 = 1.59, df = 2 (P = 0.45); I^2 =0.0%					
Test for overall effect: Z = 2.48 (P = 0.013)					
Test for subgroup differences: Not applicable					

Analysis 1.7. Comparison 1 Organised stroke unit care versus alternative service, Outcome 7 Death or institutional care at 5-year follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 7 Death or institutional care at 5-year follow-up

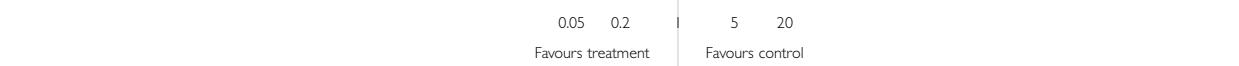
Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Nottingham 1996	100/176	88/139		56.7 %	0.76 [0.48, 1.20]
Trondheim 1991	72/110	90/110		43.3 %	0.42 [0.23, 0.79]
Total (95% CI)	**286**	**249**		**100.0 %**	**0.59 [0.33, 1.05]**

Total events: 172 (Treatment), 178 (Control)

Heterogeneity: $Tau^2 = 0.10$; $Chi^2 = 2.27$, df = 1 (P = 0.13); $I^2 = 56\%$

Test for overall effect: Z = 1.80 (P = 0.073)

Test for subgroup differences: Not applicable



Analysis 1.8. Comparison 1 Organised stroke unit care versus alternative service, Outcome 8 Death or dependency at 5-year follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 8 Death or dependency at 5-year follow-up

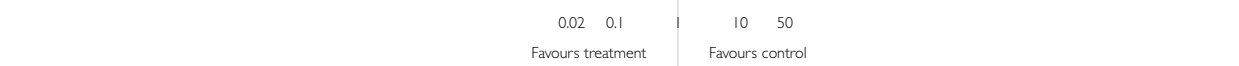
Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Nottingham 1996	139/176	114/139		54.4 %	0.82 [0.47, 1.45]
Trondheim 1991	84/110	100/110		45.6 %	0.32 [0.15, 0.71]
Total (95% CI)	**286**	**249**		**100.0 %**	**0.54 [0.22, 1.34]**

Total events: 223 (Treatment), 214 (Control)

Heterogeneity: $Tau^2 = 0.32$; $Chi^2 = 3.61$, df = 1 (P = 0.06); $I^2 = 72\%$

Test for overall effect: Z = 1.33 (P = 0.18)

Test for subgroup differences: Not applicable



Analysis 1.9. Comparison 1 Organised stroke unit care versus alternative service, Outcome 9 Death at 10-year follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 9 Death at 10-year follow-up

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Athens 1995	227/309	231/308		43.7 %	0.92 [0.64, 1.32]
Nottingham 1996	122/176	111/139		32.8 %	0.57 [0.34, 0.96]
Trondheim 1991	83/110	96/110		23.5 %	0.45 [0.22, 0.91]
Total (95% CI)	**595**	**557**		**100.0 %**	**0.67 [0.43, 1.03]**

Total events: 432 (Treatment), 438 (Control)

Heterogeneity: $Tau^2 = 0.08$; $Chi^2 = 4.29$, df = 2 (P = 0.12); $I^2 = 53\%$

Test for overall effect: Z = 1.84 (P = 0.066)

Test for subgroup differences: Not applicable

Analysis 1.10. Comparison 1 Organised stroke unit care versus alternative service, Outcome 10 Death or institutional care at 10-year follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 10 Death or institutional care at 10-year follow-up

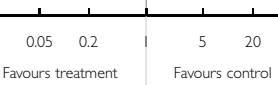
Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Nottingham 1996	131/176	113/139		67.6 %	0.68 [0.40, 1.15]
Trondheim 1991	89/110	101/110		32.4 %	0.40 [0.18, 0.86]
Total (95% CI)	**286**	**249**		**100.0 %**	**0.57 [0.37, 0.88]**

Total events: 220 (Treatment), 214 (Control)

Heterogeneity: Chi^2 = 1.24, df = 1 (P = 0.27); I^2 =19%

Test for overall effect: Z = 2.53 (P = 0.012)

Test for subgroup differences: Not applicable



Analysis 1.11. Comparison 1 Organised stroke unit care versus alternative service, Outcome 11 Death or dependency at 10-year follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 11 Death or dependency at 10-year follow-up

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Nottingham 1996	153/176	120/139		57.7 %	1.05 [0.55, 2.02]
Trondheim 1991	96/110	104/110		42.3 %	0.40 [0.15, 1.07]
Total (95% CI)	**286**	**249**		**100.0 %**	**0.70 [0.27, 1.80]**

Total events: 249 (Treatment), 224 (Control)

Heterogeneity: $Tau^2 = 0.30$; $Chi^2 = 2.60$, df = 1 (P = 0.11); I^2 =62%

Test for overall effect: Z = 0.75 (P = 0.45)

Test for subgroup differences: Not applicable

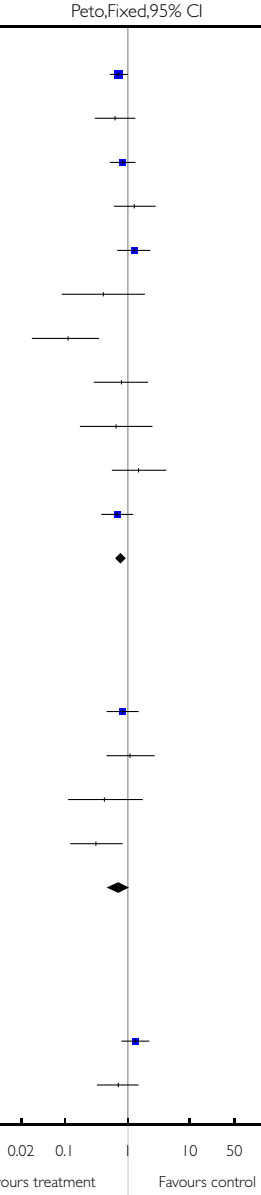
Analysis 2.1. Comparison 2 Organised stroke unit care versus general medical wards, Outcome 1 Death by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 2 Organised stroke unit care versus general medical wards

Outcome: 1 Death by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Peto Odds Ratio Peto,Fixed,95% CI
1 Comprehensive stroke ward versus general medical ward				
Athens 1995	103/302	127/302		0.71 [0.51, 0.99]
Beijing 2004	12/195	19/197		0.62 [0.30, 1.29]
Edinburgh 1980	48/155	55/156		0.82 [0.51, 1.32]
Goteborg-Ostra 1988	16/215	12/202		1.27 [0.59, 2.73]
Goteborg-Sahlgren 1994	45/166	19/83		1.25 [0.68, 2.27]
Guangdong 2009	2/100	5/100		0.41 [0.09, 1.86]
Huaihua 2004	10/324	10/73		0.11 [0.03, 0.35]
Joinville 2003	9/35	12/39		0.78 [0.29, 2.14]
Perth 1997	4/29	6/30		0.65 [0.17, 2.50]
Svendborg 1995	14/31	12/34		1.50 [0.56, 4.02]
Trondheim 1991	27/110	36/110		0.67 [0.37, 1.20]
Subtotal (95% CI)	**1662**	**1326**		**0.77 [0.63, 0.93]**
Total events: 290 (Treatment), 313 (Control)				
Heterogeneity: Chi^2 = 18.28, df = 10 (P = 0.05); I^2 =45%				
Test for overall effect: Z = 2.70 (P = 0.0069)				
2 Rehabilitation stroke ward versus general medical ward				
Dover 1984 (GMW)	34/98	35/89		0.82 [0.45, 1.48]
Nottingham 1996 (GMW)	14/98	10/76		1.10 [0.46, 2.61]
Orpington 1993 (GMW)	3/53	6/48		0.43 [0.11, 1.70]
Orpington 1995	7/36	17/37		0.31 [0.12, 0.81]
Subtotal (95% CI)	**285**	**250**		**0.69 [0.46, 1.05]**
Total events: 58 (Treatment), 68 (Control)				
Heterogeneity: Chi^2 = 4.58, df = 3 (P = 0.21); I^2 =35%				
Test for overall effect: Z = 1.75 (P = 0.080)				
3 Mobile stroke team versus general medical ward				
Manchester 2003	45/157	35/151		1.33 [0.80, 2.21]
Montreal 1985	16/65	21/65		0.69 [0.32, 1.47]



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Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Peto Odds Ratio Peto,Fixed,95% CI
Subtotal (95% CI)	**222**	**216**		**1.08 [0.71, 1.65]**
Total events: 61 (Treatment), 56 (Control)				
Heterogeneity: Chi^2 = 2.00, df = 1 (P = 0.16); I^2 =50%				
Test for overall effect: Z = 0.37 (P = 0.71)				
4 Mixed rehabilitation ward versus general medical ward				
Birmingham 1972	4/29	2/23		1.63 [0.30, 8.90]
Helsinki 1995	26/121	27/122		0.96 [0.52, 1.77]
Illinois 1966	0/56	0/35		0.0 [0.0, 0.0]
Kuopio 1985	8/50	10/45		0.67 [0.24, 1.86]
New York 1962	0/42	0/40		0.0 [0.0, 0.0]
Newcastle 1993	11/34	12/33		0.84 [0.31, 2.28]
Subtotal (95% CI)	**332**	**298**		**0.91 [0.58, 1.42]**
Total events: 49 (Treatment), 51 (Control)				
Heterogeneity: Chi^2 = 0.86, df = 3 (P = 0.84); I^2 =0.0%				
Test for overall effect: Z = 0.43 (P = 0.67)				
Total (95% CI)	**2501**	**2090**		**0.81 [0.69, 0.94]**
Total events: 458 (Treatment), 488 (Control)				
Heterogeneity: Chi^2 = 28.67, df = 20 (P = 0.09); I^2 =30%				
Test for overall effect: Z = 2.78 (P = 0.0054)				
Test for subgroup differences: Chi^2 = 2.95, df = 3 (P = 0.40), I^2 =0.0%				

Analysis 2.2. Comparison 2 Organised stroke unit care versus general medical wards, Outcome 2 Death or institutional care by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 2 Organised stroke unit care versus general medical wards

Outcome: 2 Death or institutional care by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Comprehensive stroke ward versus general medical ward					
Athens 1995	107/302	138/302		17.6 %	0.65 [0.47, 0.90]
Beijing 2004	23/195	27/197		5.3 %	0.84 [0.47, 1.52]
Edinburgh 1980	66/155	78/156		9.3 %	0.74 [0.48, 1.16]
Goteborg-Ostra 1988	49/215	43/202		8.6 %	1.09 [0.69, 1.73]
Goteborg-Sahlgren 1994	64/166	34/83		6.4 %	0.90 [0.53, 1.55]
Joinville 2003	9/35	12/39		1.8 %	0.78 [0.29, 2.14]
Perth 1997	6/29	14/30		1.6 %	0.32 [0.11, 0.93]
Svendborg 1995	18/31	20/34		1.9 %	0.97 [0.36, 2.58]
Trondheim 1991	41/110	61/110		6.6 %	0.48 [0.28, 0.82]
Subtotal (95% CI)	**1238**	**1153**		**59.2 %**	**0.74 [0.62, 0.88]**
Total events: 383 (Treatment), 427 (Control)					
Heterogeneity: Chi^2 = 9.15, df = 8 (P = 0.33); I^2 =13%					
Test for overall effect: Z = 3.41 (P = 0.00065)					
2 Rehabilitation stroke ward versus general medical ward					
Dover 1984 (GMW)	50/98	48/89		5.6 %	0.89 [0.50, 1.58]
Nottingham 1996 (GMW)	28/98	21/76		4.2 %	1.05 [0.54, 2.03]
Orpington 1993 (GMW)	9/53	12/48		2.0 %	0.62 [0.24, 1.61]
Orpington 1995	18/34	30/37		1.9 %	0.28 [0.10, 0.76]
Subtotal (95% CI)	**283**	**250**		**13.7 %**	**0.76 [0.52, 1.09]**
Total events: 105 (Treatment), 111 (Control)					
Heterogeneity: Chi^2 = 5.24, df = 3 (P = 0.15); I^2 =43%					
Test for overall effect: Z = 1.49 (P = 0.14)					
3 Mobile stroke team versus general medical ward					
Manchester 2003	60/157	52/151		8.6 %	1.18 [0.74, 1.87]
Montreal 1985	57/65	52/65		2.1 %	1.76 [0.69, 4.46]
Subtotal (95% CI)	**222**	**216**		**10.7 %**	**1.27 [0.84, 1.93]**
Total events: 117 (Treatment), 104 (Control)					
Heterogeneity: Chi^2 = 0.57, df = 1 (P = 0.45); I^2 =0.0%					

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Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Test for overall effect: Z = 1.15 (P = 0.25)					
4 Mixed rehabilitation ward versus general medical ward					
Helsinki 1995	36/121	46/122		6.6 %	0.70 [0.41, 1.19]
Illinois 1966	22/56	17/35		2.6 %	0.69 [0.29, 1.61]
Kuopio 1985	22/50	23/45		2.9 %	0.75 [0.34, 1.68]
New York 1962	15/42	17/40		2.4 %	0.75 [0.31, 1.82]
Newcastle 1993	18/34	21/33		2.0 %	0.65 [0.25, 1.70]
Subtotal (95% CI)	**303**	**275**		**16.4 %**	**0.71 [0.51, 0.99]**
Total events: 113 (Treatment), 124 (Control)					
Heterogeneity: Chi^2 = 0.08, df = 4 (P = 1.00); I^2 =0.0%					
Test for overall effect: Z = 2.01 (P = 0.045)					
Total (95% CI)	**2046**	**1894**		**100.0 %**	**0.78 [0.68, 0.89]**
Total events: 718 (Treatment), 766 (Control)					
Heterogeneity: Chi^2 = 21.19, df = 19 (P = 0.33); I^2 =10%					
Test for overall effect: Z = 3.61 (P = 0.00031)					
Test for subgroup differences: Chi^2 = 6.14, df = 3 (P = 0.10), I^2 =51%					

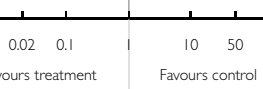
Analysis 2.3. Comparison 2 Organised stroke unit care versus general medical wards, Outcome 3 Death or dependency by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 2 Organised stroke unit care versus general medical wards

Outcome: 3 Death or dependency by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Peto Odds Ratio Peto,Fixed,95% CI
1 Comprehensive stroke ward versus general medical ward				
Athens 1995	138/302	145/302		0.91 [0.66, 1.25]
Beijing 2004	113/195	118/197		0.92 [0.62, 1.38]
Edinburgh 1980	93/155	94/156		0.99 [0.63, 1.56]
Goteborg-Sahlgren 1994	108/166	54/83		1.00 [0.58, 1.74]
Joinville 2003	18/35	23/39		0.74 [0.30, 1.84]
Perth 1997	10/29	15/30		0.54 [0.19, 1.49]
Trondheim 1991	54/110	81/110		0.36 [0.21, 0.61]
Subtotal (95% CI)	**992**	**917**		**0.82 [0.68, 0.98]**
Total events: 534 (Treatment), 530 (Control)				
Heterogeneity: Chi^2 = 11.69, df = 6 (P = 0.07); I^2 =49%				
Test for overall effect: Z = 2.13 (P = 0.033)				
2 Rehabilitation stroke ward versus general medical ward				
Dover 1984 (GMW)	54/98	50/89		0.96 [0.54, 1.70]
Nottingham 1996 (GMW)	63/98	52/76		0.83 [0.44, 1.56]
Orpington 1993 (GMW)	38/53	39/48		0.59 [0.24, 1.48]
Orpington 1995	34/34	37/37		0.0 [0.0, 0.0]
Subtotal (95% CI)	**283**	**250**		**0.83 [0.57, 1.23]**
Total events: 189 (Treatment), 178 (Control)				
Heterogeneity: Chi^2 = 0.76, df = 2 (P = 0.69); I^2 =0.0%				
Test for overall effect: Z = 0.92 (P = 0.36)				
3 Mobile stroke team versus general medical ward				
Manchester 2003	91/157	95/151		0.81 [0.52, 1.28]
Montreal 1985	58/65	60/65		0.69 [0.21, 2.27]
Subtotal (95% CI)	**222**	**216**		**0.80 [0.52, 1.22]**
Total events: 149 (Treatment), 155 (Control)				
Heterogeneity: Chi^2 = 0.06, df = 1 (P = 0.81); I^2 =0.0%				
Test for overall effect: Z = 1.04 (P = 0.30)				
4 Mixed rehabilitation ward versus general medical ward				



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Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Peto Odds Ratio Peto,Fixed,95% CI
Birmingham 1972	8/29	7/23		0.87 [0.26, 2.89]
Helsinki 1995	47/121	65/122		0.56 [0.34, 0.93]
Illinois 1966	20/56	17/35		0.59 [0.25, 1.39]
Kuopio 1985	31/50	31/45		0.74 [0.32, 1.72]
New York 1962	23/42	23/40		0.90 [0.38, 2.13]
Newcastle 1993	26/34	28/33		0.59 [0.18, 1.96]
Subtotal (95% CI)	**332**	**298**		**0.65 [0.47, 0.90]**
Total events: 155 (Treatment), 171 (Control)				
Heterogeneity: Chi^2 = 1.26, df = 5 (P = 0.94); I^2 =0.0%				
Test for overall effect: Z = 2.57 (P = 0.010)				
Total (95% CI)	**1829**	**1681**		**0.79 [0.68, 0.90]**
Total events: 1027 (Treatment), 1034 (Control)				
Heterogeneity: Chi^2 = 15.31, df = 17 (P = 0.57); I^2 =0.0%				
Test for overall effect: Z = 3.40 (P = 0.00067)				
Test for subgroup differences: Chi^2 = 1.55, df = 3 (P = 0.67), I^2 =0.0%				

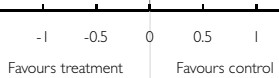
Analysis 2.4. Comparison 2 Organised stroke unit care versus general medical wards, Outcome 4 Length of stay (days) in a hospital or institution.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 2 Organised stroke unit care versus general medical wards

Outcome: 4 Length of stay (days) in a hospital or institution

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Comprehensive stroke ward versus general medical ward							
Athens 1995	302	11.23 (6.3)	302	12.1 (7.49)		10.6 %	-0.13 [-0.29, 0.03]
Beijing 2004	195	20.6 (10.4)	197	22.3 (19.7)		9.9 %	-0.11 [-0.31, 0.09]
Edinburgh 1980	155	54.6 (42.3)	152	75.1 (92.5)		9.4 %	-0.29 [-0.51, -0.06]
Goteborg-Ostra 1988	215	16.2 (10.6)	202	13.9 (9)		10.0 %	0.23 [0.04, 0.43]
Goteborg-Sahlgren 1994	166	28 (17)	83	36 (17)		8.6 %	-0.47 [-0.74, -0.20]
Joinville 2003	35	11 (8.51)	39	12.6 (10.8)		5.5 %	-0.16 [-0.62, 0.30]
Perth 1997	29	24 (30)	30	26.7 (30)		4.8 %	-0.09 [-0.60, 0.42]
Svendborg 1995	31	12 (22)	34	23 (34)		5.1 %	-0.38 [-0.87, 0.12]
Trondheim 1991	102	75 (114.8)	104	123 (145.8)		8.4 %	-0.36 [-0.64, -0.09]
Subtotal (95% CI)	**1230**		**1143**			**72.4 %**	**-0.18 [-0.34, -0.02]**
Heterogeneity: Tau^2 = 0.04; Chi^2 = 25.45, df = 8 (P = 0.001); I^2 =69%							
Test for overall effect: Z = 2.22 (P = 0.026)							
2 Rehabilitation stroke ward versus general medical ward							
Nottingham 1996 (GMW)	98	76.72 (39.73)	76	60.38 (48.91)		8.0 %	0.37 [0.07, 0.67]
Subtotal (95% CI)	**98**		**76**			**8.0 %**	**0.37 [0.07, 0.67]**
Heterogeneity: not applicable							
Test for overall effect: Z = 2.40 (P = 0.016)							
3 Mobile stroke team versus general medical ward							
Subtotal (95% CI)	**0**		**0**			**0.0 %**	**0.0 [0.0, 0.0]**
Heterogeneity: not applicable							
Test for overall effect: not applicable							
4 Mixed rehabilitation ward versus general ward							
Helsinki 1995	121	23.6 (38.8)	122	30.5 (70.6)		8.9 %	-0.12 [-0.37, 0.13]
Kuopio 1985	42	162.5 (125)	35	129.5 (119)		5.6 %	0.27 [-0.18, 0.72]
Newcastle 1993	34	52 (45)	33	41 (34)		5.2 %	0.27 [-0.21, 0.75]
Subtotal (95% CI)	**197**		**190**			**19.7 %**	**0.08 [-0.21, 0.37]**
Heterogeneity: Tau^2 = 0.03; Chi^2 = 3.41, df = 2 (P = 0.18); I^2 =41%							



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Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
Test for overall effect: Z = 0.54 (P = 0.59)							
Total (95% CI)	**1525**		**1409**			**100.0 %**	**-0.08 [-0.23, 0.06]**
Heterogeneity: Tau^2 = 0.04; Chi^2 = 40.41, df = 12 (P = 0.00006); I^2 =70%							
Test for overall effect: Z = 1.13 (P = 0.26)							
Test for subgroup differences: Chi^2 = 10.69, df = 2 (P = 0.00), I^2 =81%							

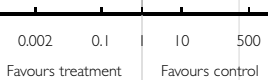
Analysis 3.1. Comparison 3 Different systems of organised care: acute stroke ward versus alternative service, Outcome 1 Death by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 3 Different systems of organised care: acute stroke ward versus alternative service

Outcome: 1 Death by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
1 Acute (semi-intensive) ward versus comprehensive ward					
Groningen 2003	1/27	7/27		41.5 %	0.11 [0.01, 0.97]
Subtotal (95% CI)	**27**	**27**		**41.5 %**	**0.11 [0.01, 0.97]**
Total events: 1 (Treatment), 7 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.99 (P = 0.047)					
2 Acute (semi-intensive) ward versus mixed rehabilitation ward					
Tampere 1993	30/98	27/113		58.5 %	1.41 [0.76, 2.58]
Subtotal (95% CI)	**98**	**113**		**58.5 %**	**1.41 [0.76, 2.58]**
Total events: 30 (Treatment), 27 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.09 (P = 0.27)					
Total (95% CI)	**125**	**140**		**100.0 %**	**0.49 [0.04, 5.92]**
Total events: 31 (Treatment), 34 (Control)					



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Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Heterogeneity: Tau² = 2.68; Chi² = 5.03, df = 1 (P = 0.02); I² =80%					
Test for overall effect: Z = 0.56 (P = 0.57)					
Test for subgroup differences: Chi² = 4.89, df = 1 (P = 0.03), I² =80%					

Analysis 3.2. Comparison 3 Different systems of organised care: acute stroke ward versus alternative service, Outcome 2 Death or institutional care by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 3 Different systems of organised care: acute stroke ward versus alternative service

Outcome: 2 Death or institutional care by the end of scheduled follow-up

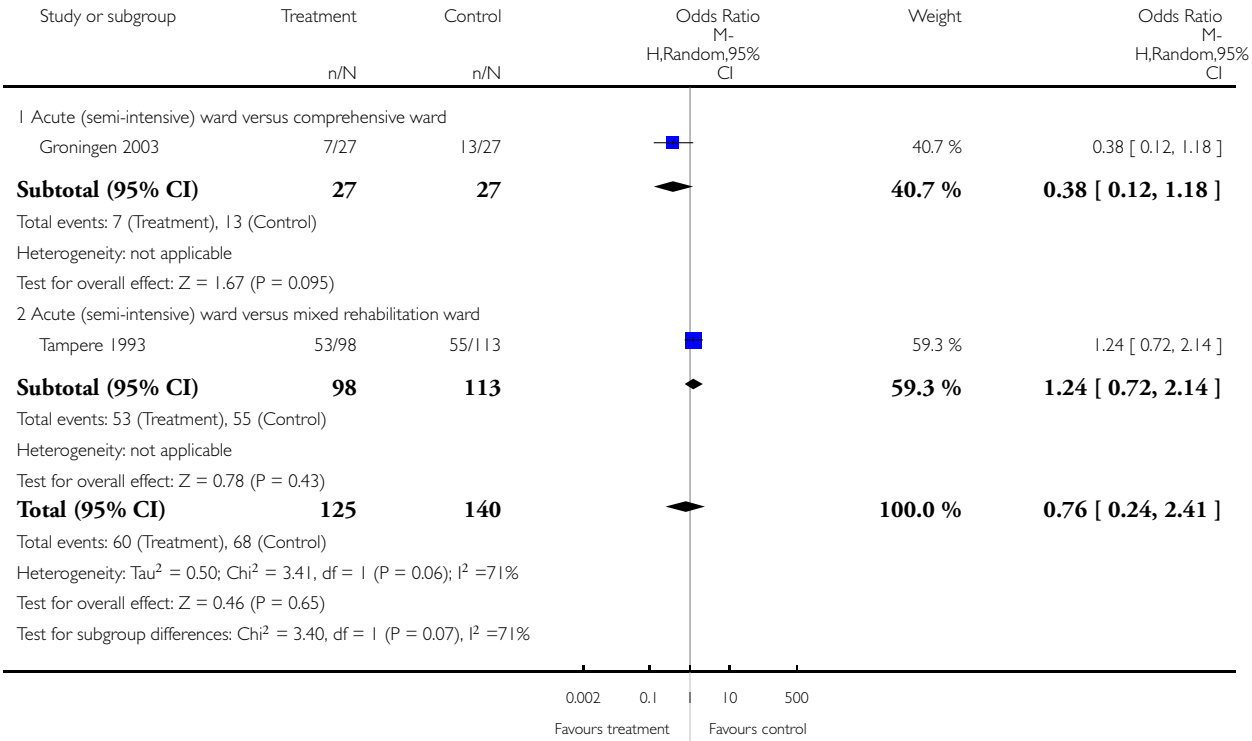
Study or subgroup	Treatment n/N	Control n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
1 Acute (semi-intensive) ward versus comprehensive ward					
Groningen 2003	13/27	18/27		39.2 %	0.46 [0.15, 1.39]
Subtotal (95% CI)	**27**	**27**		**39.2 %**	**0.46 [0.15, 1.39]**
Total events: 13 (Treatment), 18 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.37 (P = 0.17)					
2 Acute (semi-intensive) ward versus mixed rehabilitation ward					
Tampere 1993	43/98	42/113		60.8 %	1.32 [0.76, 2.30]
Subtotal (95% CI)	**98**	**113**		**60.8 %**	**1.32 [0.76, 2.30]**
Total events: 43 (Treatment), 42 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.99 (P = 0.32)					
Total (95% CI)	**125**	**140**		**100.0 %**	**0.88 [0.32, 2.39]**
Total events: 56 (Treatment), 60 (Control)					
Heterogeneity: Tau² = 0.35; Chi² = 2.78, df = 1 (P = 0.10); I² =64%					
Test for overall effect: Z = 0.26 (P = 0.80)					
Test for subgroup differences: Chi² = 2.78, df = 1 (P = 0.10), I² =64%					

Analysis 3.3. Comparison 3 Different systems of organised care: acute stroke ward versus alternative service, Outcome 3 Death or dependency by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 3 Different systems of organised care: acute stroke ward versus alternative service

Outcome: 3 Death or dependency by the end of scheduled follow-up

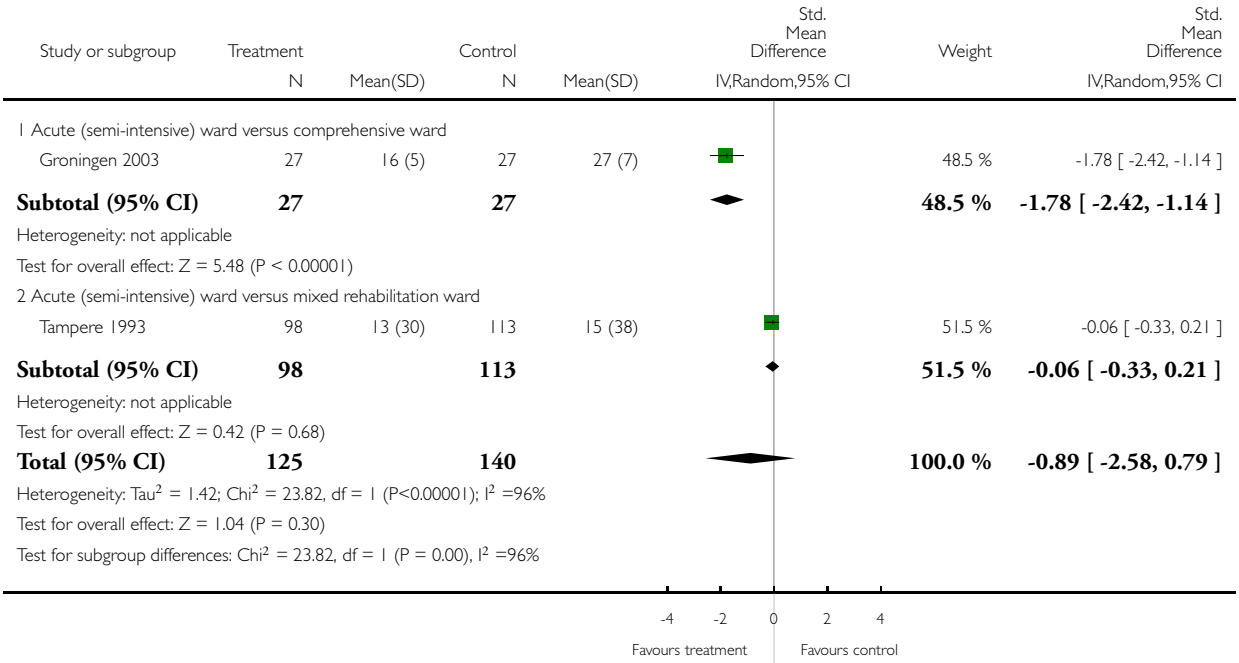


Analysis 3.4. Comparison 3 Different systems of organised care: acute stroke ward versus alternative service, Outcome 4 Length of stay (days) in a hospital or institution.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 3 Different systems of organised care: acute stroke ward versus alternative service

Outcome: 4 Length of stay (days) in a hospital or institution



Analysis 4.1. Comparison 4 Different systems of organised care: comprehensive stroke ward versus alternative service, Outcome 1 Death by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 4 Different systems of organised care: comprehensive stroke ward versus alternative service

Outcome: 1 Death by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Comprehensive stroke ward versus mobile stroke team					
Orpington 2000	13/152	34/152		100.0 %	0.35 [0.19, 0.65]
Total (95% CI)	**152**	**152**		**100.0 %**	**0.35 [0.19, 0.65]**
Total events: 13 (Treatment), 34 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 3.33 (P = 0.00088)					
Test for subgroup differences: Not applicable					

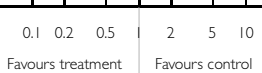
Analysis 4.2. Comparison 4 Different systems of organised care: comprehensive stroke ward versus alternative service, Outcome 2 Death or institutional care by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 4 Different systems of organised care: comprehensive stroke ward versus alternative service

Outcome: 2 Death or institutional care by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Comprehensive stroke ward versus mobile stroke team					
Orpington 2000	21/152	45/152		100.0 %	0.40 [0.23, 0.68]
Total (95% CI)	**152**	**152**		**100.0 %**	**0.40 [0.23, 0.68]**
Total events: 21 (Treatment), 45 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 3.33 (P = 0.00086)					
Test for subgroup differences: Not applicable					



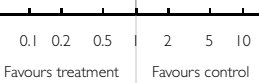
Analysis 4.3. Comparison 4 Different systems of organised care: comprehensive stroke ward versus alternative service, Outcome 3 Death or dependency by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 4 Different systems of organised care: comprehensive stroke ward versus alternative service

Outcome: 3 Death or dependency by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Comprehensive stroke ward versus mobile stroke team					
Orpington 2000	61/152	73/152		100.0 %	0.73 [0.46, 1.14]
Total (95% CI)	**152**	**152**		**100.0 %**	**0.73 [0.46, 1.14]**
Total events: 61 (Treatment), 73 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.38 (P = 0.17)					
Test for subgroup differences: Not applicable					



Analysis 4.4. Comparison 4 Different systems of organised care: comprehensive stroke ward versus alternative service, Outcome 4 Length of stay (days) in a hospital or institution.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 4 Different systems of organised care: comprehensive stroke ward versus alternative service

Outcome: 4 Length of stay (days) in a hospital or institution

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Comprehensive stroke ward versus mobile stroke team							
Orpington 2000	152	32 (29.6)	149	29.5 (40.1)		100.0 %	0.07 [-0.16, 0.30]
Total (95% CI)	**152**		**149**			**100.0 %**	**0.07 [-0.16, 0.30]**

Heterogeneity: not applicable

Test for overall effect: Z = 0.61 (P = 0.54)

Test for subgroup differences: Not applicable

Analysis 5.1. Comparison 5 Different systems of organised care: rehabilitation stroke ward versus alternative service, Outcome 1 Death by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 5 Different systems of organised care: rehabilitation stroke ward versus alternative service

Outcome: 1 Death by the end of scheduled follow-up

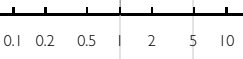
Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Rehabilitation stroke ward versus mixed rehabilitation ward					
Dover 1984 (MRW)	5/18	11/28		21.3 %	0.61 [0.18, 2.08]
Nottingham 1996 (MRW)	11/78	16/63		45.5 %	0.48 [0.21, 1.12]
Orpington 1993 (MRW)	6/71	12/73		33.2 %	0.48 [0.18, 1.30]
Total (95% CI)	**167**	**164**		**100.0 %**	**0.51 [0.29, 0.90]**

Total events: 22 (Treatment), 39 (Control)

Heterogeneity: Chi^2 = 0.10, df = 2 (P = 0.95); I^2 =0.0%

Test for overall effect: Z = 2.34 (P = 0.019)

Test for subgroup differences: Not applicable



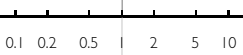
Analysis 5.2. Comparison 5 Different systems of organised care: rehabilitation stroke ward versus alternative service, Outcome 2 Death or institutional care by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 5 Different systems of organised care: rehabilitation stroke ward versus alternative service

Outcome: 2 Death or institutional care by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Rehabilitation stroke ward versus mixed rehabilitation ward					
Dover 1984 (MRW)	11/18	18/28		13.0 %	0.88 [0.26, 2.94]
Nottingham 1996 (MRW)	34/78	32/63		43.7 %	0.75 [0.39, 1.46]
Orpington 1993 (MRW)	24/71	33/73		43.3 %	0.62 [0.32, 1.21]
Total (95% CI)	**167**	**164**		**100.0 %**	**0.71 [0.46, 1.09]**
Total events: 69 (Treatment), 83 (Control)					
Heterogeneity: Chi^2 = 0.29, df = 2 (P = 0.87); I^2 =0.0%					
Test for overall effect: Z = 1.56 (P = 0.12)					
Test for subgroup differences: Not applicable					



Analysis 5.3. Comparison 5 Different systems of organised care: rehabilitation stroke ward versus alternative service, Outcome 3 Death or dependency by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 5 Different systems of organised care: rehabilitation stroke ward versus alternative service

Outcome: 3 Death or dependency by the end of scheduled follow-up

Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Rehabilitation stroke ward versus mixed rehabilitation stroke ward					
Dover 1984 (MRW)	11/18	19/28		21.9 %	0.75 [0.22, 2.56]
Nottingham 1996 (MRW)	60/78	48/63		54.2 %	1.04 [0.48, 2.27]
Orpington 1993 (MRW)	63/71	69/73		23.9 %	0.47 [0.15, 1.53]
Total (95% CI)	**167**	**164**		**100.0 %**	**0.80 [0.45, 1.42]**
Total events: 134 (Treatment), 136 (Control)					
Heterogeneity: Chi^2 = 1.22, df = 2 (P = 0.54); I^2 =0.0%					
Test for overall effect: Z = 0.75 (P = 0.45)					
Test for subgroup differences: Not applicable					

Analysis 5.4. Comparison 5 Different systems of organised care: rehabilitation stroke ward versus alternative service, Outcome 4 Length of stay (days) in a hospital or institution.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 5 Different systems of organised care: rehabilitation stroke ward versus alternative service

Outcome: 4 Length of stay (days) in a hospital or institution

Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
1 Rehabilitation stroke ward versus mixed rehabilitation ward							
Dover 1984 (MRW)	18	181 (132)	28	80 (107)		30.5 %	0.85 [0.23, 1.47]
Nottingham 1996 (MRW)	78	86.74 (43.72)	63	66.71 (44.66)		34.7 %	0.45 [0.12, 0.79]
Orpington 1993 (MRW)	71	36 (84)	73	84 (84)		34.7 %	-0.57 [-0.90, -0.24]
Total (95% CI)	**167**		**164**			**100.0 %**	**0.22 [-0.61, 1.05]**

Heterogeneity: $Tau^2 = 0.49$; $Chi^2 = 25.04$, df = 2 ($P<0.00001$); $I^2 = 92\%$

Test for overall effect: Z = 0.51 (P = 0.61)

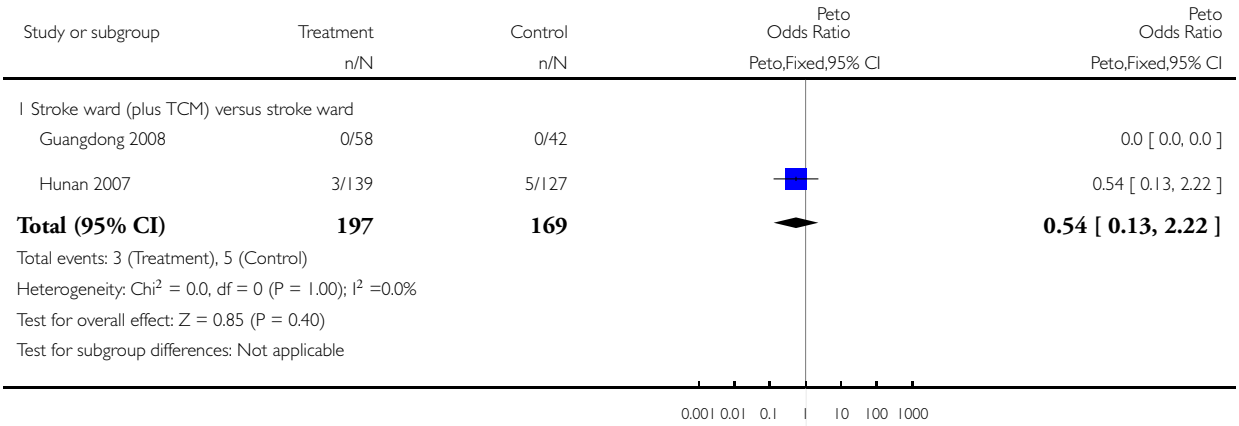
Test for subgroup differences: Not applicable

Analysis 6.1. Comparison 6 Different systems of organised care: stroke ward (plus TCM) versus stroke ward, Outcome 1 Death by the end of scheduled follow-up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 6 Different systems of organised care: stroke ward (plus TCM) versus stroke ward

Outcome: 1 Death by the end of scheduled follow-up



ADDITIONAL TABLES

Table 1. Typical characteristics of different models of organised (stroke unit) care

Type	Admission	Discharge	Features
Acute, intensive	Acute (hours)	Days	High nurse staffing; life support facilities
Acute, semi-intensive	Acute (hours)	Days	Close physiological monitoring
Comprehensive	Acute (hours)	Days to weeks	Acute care/rehabilitation; conventional staffing
Integrated TCM	Acute (hours)	Days	Comprehensive stroke unit with integrated TCM (eg acupuncture)
Rehabilitation	Delayed (days)	Weeks	Rehabilitation
Mobile team	Variable	Days to weeks	Medical/rehabilitation advice
Mixed rehabilitation	Variable	Weeks	Mixed patient group; rehabilitation

TCM: traditional Chinese medicine

Table 2. Service comparisons in outcome data

Trials	Participants	Index (stroke unit) care	Less-organised care
15	3521	Stroke ward	General medical ward
6	630	Mixed rehabilitation ward	General medical ward
2	438	Mobile stroke team (peripatetic care)	General medical ward
4	542	Stroke ward	Mixed rehabilitation ward
1	304	Stroke ward	Mobile stroke team
1	54	Stroke ward (semi-intensive unit)	Stroke ward (comprehensive unit)
2	366	Stroke ward (plus TCM)	Stroke ward

TCM: traditional Chinese medicine

APPENDICES

Appendix 1. MEDLINE search strategy

MEDLINE (Ovid) search strategy

1. cerebrovascular disorders/ or exp basal ganglia cerebrovascular disease/ or exp brain ischemia/ or exp carotid artery diseases/ or exp intracranial arterial diseases/ or exp "intracranial embolism and thrombosis"/ or exp intracranial hemorrhages/ or stroke/ or exp brain infarction/ or exp vertebral artery dissection/
2. (stroke or cerebrovasc$ or brain vasc$ or cerebral vasc$ or cva$ or apoplex$).tw.
3. ((brain$ or cerebr$ or cerebell$ or vertebrobasilar or hemispher$ or intracran$ or intracerebral or infratentorial or supratentorial or MCA or anterior circulation or posterior circulation or basal ganglia) adj5 (isch?emi$ or infarct$ or thrombo$ or emboli$)).tw.
4. ((brain$ or cerebr$ or cerebell$ or intracerebral or intracran$ or parenchymal or intraventricular or infratentorial or supratentorial or basal gangli$) adj5 (haemorrhage$ or hemorrhage$ or haematoma$ or hematoma$ or bleed$)).tw.
5. 1 or 2 or 3 or 4
6. hospital units/ or patient care team/
7. (stroke adj3 (unit or units or ward or wards or hospital or hospitals or centre$ or team or teams)).tw.
8. ((organi?ed or structured) adj3 care).tw.
9. (rehabilitation adj3 (unit or units or ward or wards or hospital or hospitals or centre$ or team or teams)).tw.
10. (multidisciplinary adj3 (team or teams or staff$ or care or rehabilitation or unit or units or ward or wards)).tw.
11. ((dedicated or discrete or comprehensive) adj5 (ward or wards or unit or units or stroke care)).tw.
12. ((specialist or specialized or specialised) adj5 (nurs$ or staff$ or care or unit or units or ward or wards)).tw.
13. (organi?ed adj3 (unit or units or ward or wards)).tw.
14. focus$ care.tw.
15. (package$ adj care).tw.
16. (intensive adj3 stroke adj3 care).tw.

17. Intensive Care Units/ or critical care/ or intensive care/
18. or/6-17
19. 5 and 18
20. Randomized Controlled Trials as Topic/
21. random allocation/
22. Controlled Clinical Trials as Topic/
23. control groups/
24. clinical trials as topic/
25. double-blind method/
26. single-blind method/
27. Research Design/
28. Program Evaluation/
29. randomised controlled trial.pt.
30. controlled clinical trial.pt.
31. clinical trial.pt.
32. random$.tw.
33. (controlled adj5 (trial$ or stud$)).tw.
34. (clinical$ adj5 trial$).tw.
35. ((control or treatment or experiment$ or intervention) adj5 (group$ or subject$ or patient$)).tw.
36. (quasi-random$ or quasi random$ or pseudo-random$ or pseudo random$).tw.
37. ((control or experiment$ or conservative) adj5 (treatment or therapy or procedure or manage$)).tw.
38. ((singl$ or doubl$ or tripl$ or trebl$) adj5 (blind$ or mask$)).tw.
39. (assign$ or allocat$).tw.
40. controls.tw.
41. trial.ti.
42. or/20-41
43. 19 and 42
44. exp animals/ not humans.sh.
45. 43 not 44
46. limit 45 to ed=20080101-20120904

Appendix 2. EMBASE search strategy

EMBASE (Ovid) search strategy

1. cerebrovascular disease/ or basal ganglion hemorrhage/ or exp brain hematoma/ or exp brain hemorrhage/ or exp brain infarction/ or exp brain ischemia/ or exp carotid artery disease/ or cerebral artery disease/ or cerebrovascular accident/ or exp intracranial aneurysm/ or exp occlusive cerebrovascular disease/ or stroke/
2. stroke patient/
3. (stroke or cerebrovasc$ or brain vasc$ or cerebral vasc$ or cva$ or apoplex$).tw.
4. ((brain$ or cerebr$ or cerebell$ or vertebrobasilar or hemispher$ or intracran$ or intracerebral or infratentorial or supratentorial or MCA or anterior circulation or posterior circulation or basal ganglia) adj5 (isch?emi$ or infarct$ or thrombo$ or emboli$)).tw.
5. ((brain$ or cerebr$ or cerebell$ or intracerebral or intracran$ or parenchymal or intraventricular or infratentorial or supratentorial or basal gangli$) adj5 (haemorrhage$ or hemorrhage$ or haematoma$ or hematoma$ or bleed$)).tw.
6. 1 or 2 or 3 or 4 or 5
7. “hospital subdivisions and components”/
8. ward/ or emergency ward/ or nursing unit/
9. intensive care unit/
10. exp intensive care/
11. (stroke adj3 (unit or units or ward or wards or hospital or hospitals or centre$ or team or teams)).tw.
12. ((organi?ed or structured) adj3 care).tw.
13. (rehabilitation adj3 (unit or units or ward or wards or hospital or hospitals or centre$ or team or teams)).tw.
14. (multidisciplinary adj3 (team or teams or staff$ or care or rehabilitation or unit or units or ward or wards)).tw.

15. ((dedicated or discrete or comprehensive) adj5 (ward or wards or unit or units or stroke care)).tw.
16. ((specialist or specialized or specialised) adj5 (nurs$ or staff$ or care or unit or units or ward or wards)).tw.
17. (organi?ed adj3 (unit or units or ward or wards)).tw.
18. focus$ care.tw.
19. (package$ adj care).tw.
20. (intensive adj3 stroke adj3 care).tw.
21. or/7-20
22. 6 and 21
23. stroke unit/
24. 22 or 23
25. Randomized Controlled Trial/
26. Randomization/
27. Controlled Study/
28. control group/
29. clinical trial/
30. Double Blind Procedure/
31. Single Blind Procedure/ or triple blind procedure/
32. Parallel Design/
33. random$.tw.
34. (controlled adj5 (trial$ or stud$)).tw.
35. (clinical$ adj5 trial$).tw.
36. ((control or treatment or experiment$ or intervention) adj5 (group$ or subject$ or patient$)).tw.
37. (quasi-random$ or quasi random$ or pseudo-random$ or pseudo random$).tw.
38. ((control or experiment$ or conservative) adj5 (treatment or therapy or procedure or manage$)).tw.
39. ((singl$ or doubl$ or tripl$ or trebl$) adj5 (blind$ or mask$)).tw.
40. (assign$ or alternate or allocat$ or counterbalance$ or multiple baseline).tw.
41. controls.tw.
42. trial.ti.
43. or/25-42
44. 24 and 43
45. heart stroke volume/ or heat stroke/ or stroke volume.tw. or heat stroke.tw.
46. 44 not 45
47. limit 46 to em=200801-201249
48. limit 47 to human

Appendix 3. CINAHL search strategy

CINAHL search strategy (1982 to September 2012)

S44 .S28 and S43
S43 .S29 or S30 or S31 or S32 or S33 or S34 or S35 or S36 or S38 or S39 or S40 or S41 or S42
S42 .TI trial
S41 .TI controls OR AB controls
S40 .TI (assign* or allocat*) OR AB (assign* or allocat*)
S39 .TI ((singl* or doubl* or tripl* or trebl*) N5 (blind* or mask*)) OR AB ((singl* or doubl* or tripl* or trebl*) N5 (blind* or mask*))
S38 .TI ((control or experiment* or conservative) N5 (treatment or therapy or procedure or manage*)) OR AB ((control or experiment* or conservative) N5 (treatment or therapy or procedure or manage*))
S37 .TI (quasi-random* or quasi random* or pseudo-random* or pseudo random*) OR AB (quasi-random* or quasi random* or pseudo-random* or pseudo random*)
S36 .TI ((control or treatment or experiment* or intervention) N5 (group* or subject* or patient*)) OR AB ((control or treatment or experiment* or intervention) N5 (group* or subject* or patient*))
S35 .TI clinical* N5 trial* OR AB clinical* N5 trial*

S34 .TI (controlled N5 (trial* or stud*)) OR AB (controlled N5 (trial* or stud*))
S33 .TI random* OR AB random*
S32 .(MH "Program Evaluation")
S31 .(MH "Random Assignment")
S30 .(ZT "clinical trial") or (ZT "randomised controlled trial")
S29 .(MH "Clinical Trials") OR (MH "Double-Blind Studies") OR (MH "Intervention Trials") OR (MH "Randomized Controlled Trials") OR (MH "Single-Blind Studies") OR (MH "Therapeutic Trials") OR (MH "Triple-Blind Studies")
S28 .S1 or S27
S27 .S11 and S26
S26 .S12 or S13 or S14 or S15 or S16 or S17 or S18 or S19 or S20 or S21 or S22 or S23 or S24 or S25
S25 .TI intensive N3 stroke N3 care OR AB intensive N3 stroke N3 care
S24 .TI package* N3 care OR AB package* N3 care
S23 .TI focus* care OR AB focus* care
S22 .TI (organi?ed N3 (unit or units or ward or wards)) OR AB (organi?ed N3 (unit or units or ward or wards))
S21 .TI ((specialist or specialized or specialised) N5 (nurs* or staff* or care or unit or units or ward or wards)) OR AB ((specialist or specialized or specialised) N5 (nurs* or staff* or care or unit or units or ward or wards))
S20 .TI ((dedicated or discrete or comprehensive) N5 (ward or wards or unit or units or stroke care)) OR AB ((dedicated or discrete or comprehensive) N5 (ward or wards or unit or units or stroke care))
S19 .TI (multidisciplinary N3 (team or teams or staff* or care or rehabilitation or unit or units or ward or wards)) OR AB (multidisciplinary N3 (team or teams or staff* or care or rehabilitation or unit or units or ward or wards))
S18 .TI (rehabilitation N3 (unit or units or ward or wards or hospital or hospitals or centre* or team or teams)) OR AB (rehabilitation N3 (unit or units or ward or wards or hospital or hospitals or centre* or team or teams))
S17 .TI ((organi?ed or structured) N3 care) OR AB ((organi?ed or structured) N3 care)
S16 .TI (stroke N3 (unit or units or ward or wards or hospital or hospitals or centre* or team or teams)) OR AB (stroke N3 (unit or units or ward or wards or hospital or hospitals or centre* or team or teams))
S15 .(MH "Critical Care Nursing")
S14 .(MH "Critical Care")
S13 .(MH "Multidisciplinary Care Team")
S12 .(MH "Hospital Units") OR (MH "Intensive Care Units")
S11 .S2 or S3 or S4 or S7 or S10
S10 .S8 and S9
S9 .TI (haemorrhage* or hemorrhage* or haematoma* or hematoma* or bleed*) or AB (haemorrhage* or hemorrhage* or haematoma* or hematoma* or bleed*)
S8 .TI (brain brain* or cerebr* or cerebell* or intracerebral or intracran* or parenchymal or intraventricular or infratentorial or supratentorial or basal gangli*) or AB (brain* or cerebr* or cerebell* or intracerebral or intracran* or parenchymal or intraventricular or infratentorial or supratentorial or basal gangli*)
S7 .S5 and S6
S6 .TI (ischemi* or ischaemi* or infarct* or thrombo* or emboli*) or AB (ischemi* or ischaemi* or infarct* or thrombo* or emboli*)
S5 .TI (brain* or cerebr* or cerebell* or vertebrobasilar or hemispher* or intracran* or intracerebral or infratentorial or supratentorial or MCA or anterior circulation or posterior circulation or basal ganglia) or AB (brain* or cerebr* or cerebell* or vertebrobasilar or hemispher* or intracran* or intracerebral or infratentorial or supratentorial or MCA or anterior circulation or posterior circulation or basal ganglia)
S4 .TI (stroke or cerebrovasc* or brain vasc* or cerebral vasc* or cva* or apoplex*) or AB (stroke or cerebrovasc* or brain vasc* or cerebral vasc* or cva* or apoplex*)
S3 .(MH "Stroke Patients")
S2 .(MH "Cerebrovascular Disorders") OR (MH "Basal Ganglia Cerebrovascular Disease+") OR (MH "Carotid Artery Diseases+") OR (MH "Cerebral Ischemia+") OR (MH "Cerebral Vasospasm") OR (MH "Intracranial Arterial Diseases+") OR (MH "Intracranial Embolism and Thrombosis") OR (MH "Intracranial Hemorrhage+") OR (MH "Stroke") OR (MH "Vertebral Artery Dissections")
S1 .(MH "Stroke Units")

FEEDBACK

Patient subgroups

Summary

The 95% CI includes 1.0 for patients with mild stroke. I would conclude that for this subgroup, there is no significant benefit insofar as preventing death or institutional care. I certify that I have no affiliations with or involvement in any organisation or entity with a direct financial interest in the subject matter of my criticisms.
Don Hess 2000-09-12 16:05
Criticism editor summary
Regarding the outcome 'death or institutional care' for patients with mild stroke, the 95% CIs around the odds ratio suggest that stroke unit care is not beneficial in this subgroup of patients. This is not made clear in the review's abstract, results and discussion.

Reply

Thank you for your comment. The proper test in a subgroup analysis is not whether a subgroup result is statistically different from zero but whether there is statistically significant heterogeneity between the estimates of effect in each of the relevant subgroups. In our subgroup analysis the mild stroke patient group does indeed have CIs which include no effect (odds ratio = 1.0). However, we do not believe we can at present conclude that this subgroup of patients have a different result from the totality of patients. First, the statistical power of this analysis is limited because the mild stroke subgroup had relatively few outcome events (death or institutional care). Second, the mild stroke subgroup result is not significantly different from that of the moderate and severe subgroups. These analyses are explored in more detail in Stroke Unit Trialists' Collaboration. How do stroke units improve patient outcomes? A collaborative systematic review of the randomised trials. Stroke 1997;28:2139-44.

Contributors

Peter Langhorne 07/03/2001

WHAT'S NEW

Last assessed as up-to-date: 28 February 2013.

Date	Event	Description
29 January 2013	New search has been performed	This updated review identified four new trials (763 participants). We have excluded seven previously included quasi-randomised prospective controlled clinical trials. This review now incorporates an individual patient data meta-analysis of 28 randomised controlled trials (5855 participants). More recent stroke unit trials have addressed different ways of providing organised care. This update contains data from trials comparing stroke unit care with that given in general medical wards and comparing two different forms of organised (stroke unit) care
29 January 2013	New citation required but conclusions have not changed	The conclusions of the review have not changed.

HISTORY

Protocol first published: Issue 1, 1995

Review first published: Issue 1, 1995

Date	Event	Description
9 September 2008	Amended	Converted to new review format.
28 November 2006	New search has been performed	New data on 2027 participants have become available from eight new trials (Athens, Beijing, Cape Town, Groningen, Joinville, Manchester, Osaka and Pavia). More recent stroke unit trials have addressed different ways of providing organised care. This update contains new information and data from trials comparing stroke unit care with general medical wards and comparing two different forms of organised (stroke unit) care

CONTRIBUTIONS OF AUTHORS

For this version of the review, Patricia Fearon performed the updated literature searches, reanalysed the data and redrafted the manuscript.

Peter Langhorne initiated and co-ordinated the review project, was principal grant holder and revised the updated report.

Peter Langhorne and Patricia Fearon formed the writing committee that was responsible for the re-drafting of the report.

The following collaborators provided original data, advice and comment, and assisted with the redrafting of the report: C Blomstrand (Goteborg, Sweden); NL Cabral (Joinville, Brazil); A Cavallini (Pavia, Italy); P Dey (Manchester, England); E Hamrin (Uppsala, Sweden); G Hankey (Perth, Australia); B Indredavik (Trondheim, Norway); L Kalra (Orpington, England); M Kaste (Helsinki, Finland); SO Laursen (Svendborg, Denmark); RH Ma (Beijing, China); N Patel (Cape Town, South Africa); H Rodgers (Newcastle, England); MO Ronning (Akershus, Norway); J Sivenius (Kuopio, Finland); G Sulter (Groningen, Netherlands); A Svensson (Goteborg, Sweden); K Vemmos (Athens, Greece); S Wood-Dauphinee (Montreal, Canada); H Yagura (Osaka, Japan).

Previous versions of the review also received data, advice and comment from: K Asplund (Umea, Sweden); P Berman (Nottingham, England); M Britton (Stockholm, Sweden); J Douglas (Administrator); T Erila (Tampere, Finland); M Garraway (Edinburgh, Scotland); M Ilmavirta (Tampere, Finland); R Stevens (Dover, England); SP Stone (London, England); Brian Williams (Glasgow, Scotland).

Important contributions were also made by the following who supplied useful information and comment: D Deleo (Perth, Australia); A Drummond (Nottingham, England); R Fogelholm (Jyvaskyla, Finland); N Lincoln (Nottingham, England); H Palomaki (Helsinki, Finland); J Slattery (London, England); T Strand (Umea, Sweden); CP Warlow (Edinburgh, Scotland); L Wilhelmsen (Goteborg, Sweden).

DECLARATIONS OF INTEREST

Most of the Stroke Unit Trialists Collaboration members carried out trials that are included in the review.

SOURCES OF SUPPORT

Internal sources

- University of Glasgow, UK.
- University of Edinburgh, UK.

External sources

- Chest, Heart and Stroke Scotland, UK.

INDEX TERMS

Medical Subject Headings (MeSH)

*Hospital Units; *Hospitalization; *Patient Care Team; Outcome Assessment (Health Care); Prognosis; Randomized Controlled Trials as Topic; Stroke [mortality; *therapy]

MeSH check words

Humans