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

Stroke Unit Trialists' Collaboration

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[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 dedicated ward (stroke, acute, rehabilitation, comprehensive), 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 patients following a stroke.

Search methods

We searched the Cochrane Stroke Group trials register (last searched April 2006), the reference lists of relevant articles, and contacted researchers in the field.

Selection criteria

Randomised and prospective controlled clinical trials comparing organised inpatient stroke unit care with an alternative service.

Data collection and analysis

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

Main results

Thirty-one trials, involving 6936 participants, compared stroke unit care with an alternative service; more organised care was consistently associated with improved outcomes. Twenty-six trials (5592 participants) compared stroke unit care with general wards. Stroke unit care showed reductions in the odds of death recorded at final (median one year) follow up (odds ratio (OR) 0.86; 95% confidence interval (CI) 0.76 to 0.98; P = 0.02), the odds of death or institutionalised care (OR 0.82; 95% CI 0.73 to 0.92; P = 0.0006) and death or dependency (OR 0.82; 95% CI 0.73 to 0.92; P = 0.001). Sensitivity analyses indicated that the observed benefits remained when the analysis was restricted to trials that used formal randomisation procedures with blinded outcome assessment. Outcomes were independent of patient age, sex or stroke severity, but 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. No systematic increase was observed in the length of inpatient stay.

PLAIN LANGUAGE SUMMARY

Organised inpatient (stroke unit) care for stroke

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 31 trials, involving 6936 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

Stroke patients are frequently admitted to hospital during their initial illness 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. 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). 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? 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.

OBJECTIVES

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 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 which are addressing 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 prospective trials that used some form of random allocation of stroke patients to an organised system of inpatient (stroke unit) care or 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'). Trials were included if treatment allocation was

carried out on a strictly random basis or with a quasi-random procedure (such as bed availability or date of admission).

Types of participants

Any patients admitted to hospital who had suffered a stroke were 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 as 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: a multidisciplinary team including specialist nursing staff based in a discrete ward caring exclusively for stroke patients. This category included the following sub-divisions:

(a) acute stroke units which accept patients acutely but discharge early (usually within seven days). These appear to fall into three broad subcategories:

(i) 'intensive' model of care with continuous monitoring, high nurse staffing levels and the potential for life support;

(ii) 'semi-intensive' with continuous monitoring, high nurse staffing but no life support facilities; and

(iii) 'non-intensive' with none of the above.

(b) rehabilitation stroke units that accept patients after a delay, usually of seven days or more, and focus on rehabilitation; and

(c) comprehensive (that is, combined acute and rehabilitation) stroke units which accept patients acutely but also provide rehabilitation for at least several weeks if necessary.

Both the rehabilitation unit and comprehensive unit models offered prolonged periods of rehabilitation.

(2) Mixed rehabilitation ward: a multidisciplinary team including specialist nursing staff in a ward providing a generic rehabilitation service but not exclusively caring for stroke patients.

(3) Mobile stroke team: a multidisciplinary team (excluding specialist nursing staff) providing care in a variety of settings.

(4) General medical ward: care in an acute medical or neurology ward without routine multidisciplinary input.

Types of outcome measures

The primary analysis examined death, dependency and the requirement for institutional care at the end of scheduled follow up of the original trial (two trials subsequently extended follow up). Dependency was categorised into two groups where 'independent' was taken to mean that an individual did not require physical assistance for transfers, mobility, dressing, feeding or toileting. Individuals who failed any of these criteria were considered 'dependent'. The criteria for independence were approximately equivalent to a modified Rankin score of 0 to 2, a Barthel Index of more than 18 out of 20 (Wade 1992) or an Activity Index (AI) of more than 83 (Uppsala). The requirement for long-term institutional care was taken to mean care in a residential home, nursing home, or hospital at the end of scheduled follow up.

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: 'Specialized register' section in Cochrane Stroke Group

We searched the Cochrane Stroke Group Trials Register, which was last searched by the Review Group Co-ordinator in April 2006. In an effort to identify further published, unpublished and ongoing trials, we scanned the reference lists of relevant articles, contacted colleagues and researchers and publicised our preliminary findings at stroke conferences in the UK, Scandinavia, Germany, Netherlands, Switzerland, Spain, Canada, South America, Australia, Belgium, USA, and Hong Kong. The search was not restricted by date, language or any other criteria to the best of our knowledge.

Data collection and analysis

Selection of trials

Published trials were initially scrutinised by two review authors who assessed their eligibility and methodological quality. We established the characteristics of unpublished trials through discussion with the trial co-ordinator prior to analysis of results.

Assessment of methodological quality

We did not use a formal scoring system to record methodological quality but recorded the method of allocation concealment, completeness of follow up, presence of an intention-to-treat analysis, and the presence of a blinded assessment of outcome.

Data extraction

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. Trials were then allocated to service subgroups. Outcome data from published sources were confirmed and supplemented with unpublished information provided by the co-ordinator of each individual trial. We asked trialists to provide information on the number of patients who were dead, dependent, requiring institutional care, and missing at the end of scheduled follow up. We sought subgroup information primarily for the combined outcome of death or requiring institutional care. We obtained unpublished aggregated data for the 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 patient 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):

(a) mild stroke: equivalent to a Barthel Index of 10 to 20 out of 20 during the first week;

(b) moderate stroke: equivalent to a Barthel Index of 3 to 9 out of 20 during the first week;

(c) severe stroke: equivalent to a Barthel Index of 0 to 2 out of 20 during the first week.

Methods of analysis

We analysed dichotomous outcomes as the odds ratio (OR) with 95% confidence interval (CI) of an adverse outcome. We used a fixed-effect approach unless there was statistically significant heterogeneity, in which case results were confirmed using a random-effects statistical model. Subgroup analyses involved a re-analysis stratified by patient or service subgroup using tabular subgroup data provided by the trialists. We analysed data on length of stay in a hospital or institution using standardised mean difference with random effects.

RESULTS

Description of studies

A total of 48 trials were identified by April 2006, of which 13 were excluded (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), and two are awaiting assessment (HAMLET; Pearson 1988). We have detailed descriptive information on the remaining 33 trials: two are ongoing (Beijing 2004; London) and the remaining 31 contained outcome information on a total of 6936 participants (Akershus; Athens; Beijing; Birmingham; Cape Town; Dover; Edinburgh; Goteborg-Ostra; Goteborg-Sahlgren; Groningen; Helsinki; Illinois; Joinville; Kuopio; Manchester; Montreal; New York; Newcastle; Nottingham; Orpington 1993; Orpington 1995; Orpington 2000; Osaka; Pavia; Perth; Stockholm; Svendborg; Tampere; Trondheim; Umea; Uppsala).

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

Descriptive information was available for all trials: in four trials we had access to published information only (Birmingham; Illinois; New York; Stockholm), in four trials we has detailed unpublished information (Akershus; Beijing; Joinville; Osaka), and in the remaining 23 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. The core characteristics (SUTC 1997a) which 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 31 trials with outcome data are detailed in Table 1. The total number of comparisons is greater than the number of trials because in three trials patients could be randomised to one of two alternatives to stroke unit care; two of these trials used a stratified randomisation procedure (Nottingham; Orpington 1993) and one did not (Dover). In two small trials the conventional care (general medical) group also received some input from a specialist nurse (Illinois; New York). 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 al-

ter the conclusions of the systematic review substantially. In one trial, some patients appear to have been treated outside the rehabilitation wards (that is, peripatetic team care) but the number is unclear (New York). This trial is currently classified as a mixed rehabilitation ward.

Of the 31 trials, 28 incorporated rehabilitation lasting several weeks if required; 19 of these units admitted patients acutely and nine after a delay of one or two weeks. Three 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). It is classified here as a comprehensive stroke unit. No trials evaluated an 'intensive care' model of stroke unit.

Risk of bias in included studies

Of the 31 trials able to provide data at present, 16 were formally randomised using random numbers, sequentially numbered sealed envelopes or central randomisation, eight used an unclear method of randomisation, and seven trials used informal procedures based on bed availability (Osaka; Pavia; Stockholm; Umea), strict admission rota (Cape Town; Uppsala) or patient date of birth (Akershus). These seven trials were evaluated separately to exclude significant bias in the conclusions.

Nine trials had minor omissions of death and place of residence data (32 stroke unit patients and 52 controls in total) (Akershus; Birmingham; Dover; Edinburgh; Goteborg-Sahlgren; New York; Orpington 1995; Orpington 2000; Umea). For the purpose of our analysis these patients were assumed to be alive and living at home, which may have introduced a minor bias in favour of the control group. Only 10 trials used an unequivocally blinded final assessment for all patients (Goteborg-Sahlgren; Groningen; Helsinki; Joinville; Kuopio; Manchester; Montreal; Nottingham; Orpington 2000; Umea).

Effects of interventions

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

Section 1: Organised inpatient (stroke unit) care versus alternative care. Firstly 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 commonest comparison of organised stroke unit care versus a general medical ward. This section includes analyses of different subgroups of patient and service type.

Sections 3, 4, and 5: 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

The first outcome summarises the data from all 31 trials in which a novel organised inpatient (stroke unit) intervention was compared with an alternative (less organised) service. 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 in 22 of the 31 trial comparisons. The overall estimate gave an odds ratio of 0.82 (95% CI 0.73 to 0.92; P = 0.001), which was not complicated by statistically significant heterogeneity between trials. The odds ratio for death was essentially unchanged when the analysis was restricted to trials in which scheduled follow up was continued for a fixed period of six months or one year. The exclusion of seven trials with an informal randomisation procedure (Akershus; Cape Town; Osaka; Pavia; Stockholm; Umea; Uppsala) did not affect the conclusions.

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

The second outcome examined was the odds of death or requiring institutional care at the end of scheduled follow up (median one year after stroke). The summary result (OR 0.81, 95% CI 0.74 to 0.90; P < 0.0001) was highly statistically significant and no statistically significant heterogeneity existed between trials. We excluded trials that had a very short or variable period of follow up (Beijing; Cape Town; Goteborg-Ostra; Illinois; Montreal; New York; Orpington 1993; Orpington 1995; Osaka; Pavia; Stockholm) but found that the estimate of apparent benefits was unaffected. This was also true if we excluded those trials that were informally randomised.

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

The third outcome examined was the combined adverse outcome of being dead or dependent in activities of daily living at the end of scheduled follow up. The summary odds ratio for being dead or dependent if receiving organised (stroke unit) care rather than alternative (less organised) services was 0.79 (95% CI 0.71 to 0.88; P < 0.0001), indicating a significant reduction in odds of death or dependency in the organised (stroke unit) care group.

There was no statistically significant heterogeneity between trials. The conclusions were not altered by the exclusion of trials with a variable follow-up period or informal randomisation procedure. 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 0.75; 95% CI 0.62 to 0.90; P = 0.002) when restricted to the trials that used an unequivocally blinded final assessment for all patients (Goteborg-Sahlgren; Groningen; Helsinki; Joinville; Kuopio; Manchester; Montreal; Nottingham; Orpington 2000; Umea).

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

Length of stay data were available for 26 individual trials that compared organised inpatient (stroke unit) care with an alternative service. Mean (or median) length of stay ranged from eight to 162 days in the stroke unit groups and 10 to 129 days in controls. Sixteen trials reported a shorter length of stay in the stroke unit group and 10 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 standard deviation had to be inferred from the P value or from the results of similar trials. Overall, using a random-effects model, there was a modest reduction in the length of stay in the stroke unit group (standardised mean difference (SMD) -0.17; 95% CI -0.32 to -0.03; P = 0.02), which is approximately equivalent to a reduction of four (two to six) days. Both the summary estimates were complicated by considerable heterogeneity which limits the extent to which more general conclusions can be inferred.

Comparisons 1.5, 1.6, and 1.7: Death, death or institutional care, death or dependency at five-year follow up

Three trials carried out supplementary studies extending patient follow up to five years post stroke (Athens; Nottingham; Trondheim). The odds ratios for adverse outcomes continued to favour stroke unit care: death 0.74 (95% CI 0.59 to 0.94; P = 0.01), death or institutional care 0.62 (95% CI 0.43 to 0.89; P = 0.01), death or dependency 0.59 (95% CI 0.38 to 0.92; P = 0.02).

Comparisons 1.8, 1.9, and 1.10: Death, death or institutional care, death or dependency at 10-year follow up

Two trials extended follow up to ten years post stroke and found a similar pattern of results: odds ratio for death 0.53 (95% CI 0.36 to 0.80); death or institutional care 0.57 (95% CI 0.37 to 0.88); death or dependency 0.77 (95% CI 0.45 to 1.31) (Nottingham; Trondheim) .

Patient satisfaction and quality of life

Only three trials recorded outcome measures related to patient quality of life (Nottingham Health Profile, EuroQol Quality of Life Scale) (Manchester; Nottingham; Trondheim). In the Nottingham and Trondheim cases there was a pattern of improved results within the stroke unit survivors with the results attaining statistical significance in the trial. However, for the Manchester trial there was no statistically significant difference between the study groups. We could not find any systematically gathered information on patient 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 are known to have met all of these criteria (Goteborg-Sahlgren; Groningen; Helsinki; Kuopio; Manchester; Nottingham; 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

In previous versions of this review (SUTC 1997a), pre-defined subgroup analysis including data from the majority of trials (at least 2500 patients randomised) was carried out based on the patients' age, sex, and initial stroke severity:

Patient subgroup for death or institutional care

Age up to 75 years: OR 0.77 (95% CI 0.63 to 0.94)
Age more than 75 years: OR 0.69 (95% CI 0.56 to 0.85)
Male: OR 0.66 (95% CI 0.51 to 0.85)
Female: OR 0.77 (95% CI 0.60 to 0.98)
Mild stroke: OR 0.80 (95% CI 0.59 to 1.08)
Moderate stroke: OR 0.86 (95% CI 0.74 to 1.01)
Severe stroke: OR 0.49 (95% CI 0.36 to 0.69)

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 stroke unit benefits are apparent across a range of patient subgroups, i.e. age, sex and severity. Further analysis by stroke severity confirmed that there was no statistically significant reduction in case fatality in mild stroke patients (OR 0.92; 95% CI 0.64 to 1.32). However, mild stroke patients managed in stroke units had a reduced risk of dependency (OR 0.75; 95% CI 0.58

to 0.96; P = 0.02). It should be noted that these results do not include additional data from new trials found.

Section 2: Organised stroke unit care versus general medical wards

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

A variety of pre-defined subgroup analyses were carried out based on service characteristics. Three different models of care (comprehensive stroke ward, rehabilitation stroke ward, mixed assessment/rehabilitation ward) tended to be more effective than general medical ward care. However, for the comparison of 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 (odds ratio (OR) 0.86; 95% confidence interval (CI) 0.76 to 0.98; P = 0.02), the odds of death or institutionalised care (OR 0.82; 95% CI 0.73 to 0.92; P = 0.0006) and death or dependency (OR 0.82; 95% CI 0.73 to 0.92; P = 0.001).

Sections 3, 4 and 5: 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) which 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 which met the basic descriptive criteria of stroke unit care (*see* 'Description of Studies'), that is multidisciplinary staffing co-ordinated through regular team meetings.

Of the eight trials identified for which outcome data are available, two compared an acute (semi-intensive) stroke ward with a comprehensive stroke ward (Groningen; Pavia), one compared an acute (semi-intensive) stroke ward with a mixed rehabilitation ward (Tampere), one compared a stroke ward which 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), 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; Nottingham; Orpington 1993). Data were available for both these subgroups of patients. The final comparison was of admission to a stroke rehabilitation ward or to a mixed rehabilitation ward (Osaka).

Section 3: Acute stroke ward versus alternative service

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

Acute (monitoring) units did not have statistically significant different odds of death, or death or requiring institutional care when compared with acute (non-intensive) units. For death or dependency there was statistically significant heterogeneity in the results. A random-effects model was used resulting in no statistically significant difference in odds between the services.

Section 4: Comprehensive stroke ward versus alternative service

Comparisons 4.1, 4.2, 4.3 and 4.4: Death, death or institutional care, death or dependency by the end of scheduled follow up, 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 patients 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 need confirmation.

Section 5: Rehabilitation stroke ward versus alternative service

Comparisons 5.1, 5.2, 5.3 and 5.4: Death, death or institutional care, death or dependency by the end of scheduled follow up, 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 < 0.05) and a statistically non-significant trend for fewer patients 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.

DISCUSSION

Main analysis

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 of the current review 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) which was not strictly conventional care. This approach to analysis allows one to view all service comparisons before focusing on various subgroup comparisons.

The updated information in Section 1 confirms our previous observations that patients 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 though 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 which have extended follow up for five or ten 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 which 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 baseline 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.

Methodological limitations may have influenced the analysis of descriptive information about service organisation (SUTC 1997a). Service descriptions were collated 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. One further limitation of this study is that some of the included trials are relatively old, possibly with different standards of care from those used currently. However, all the older trials were randomised, therefore any differences in the standard of care between older and newer trials should not have had a confounding effect on the final conclusions. In addition to this, the majority of trials within this review were relatively recent and so these studies should not have affected our conclusions.

The current analysis does not explain why stroke units may improve patient outcomes. This could be due to better diagnostic procedures, better nursing care, early mobilisation, the prevention of complications, or more effective rehabilitation procedures (Langhorne 1998).

Subgroup analyses

In any discussion of 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 the 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 patients of both sexes, aged under and over 75 years, and across a range of stroke severities. The apparent relationship between stroke severity and outcome must be interpreted with caution. Patients with more severe stroke symptoms are at greater risk of death or requiring institutional care and hence stand to gain more from treatment. The mild stroke group appeared to benefit from stroke unit care when death or dependency was the chosen outcome (SUTC 1997b) 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 5 of the review focused on those trials which directly compared two different forms of care, both of which met our basic definition of organised inpatient (stroke unit) care - that is multidisciplinary team care co-ordinated through regular meetings. The results of this analysis indicate statistically signifi-

cantly improved results from a dedicated stroke ward over a mobile stroke team. There were also trends towards better outcomes within the dedicated 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. Only one trial has evaluated the comparison of an acute (semi-intensive) ward with a mixed rehabilitation unit and no firm conclusions could be drawn.

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 2000) have shown that fixed costs (particularly nursing staff salaries) account for over 90% of spending on patients 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.

AUTHORS' CONCLUSIONS

Implications for practice

Acute stroke patients 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, which can offer a substantial period of rehabilitation if required. There are no firm grounds for restricting access according to a patient's age, sex, or stroke severity. Stroke units should aim to replicate those core service characteristics identified in the randomised trials. The absolute benefits of organised inpatient (stroke unit) care appear to be sufficiently large to justify the reorganisation of services.

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. Outcome measures should not only include the outcomes of death, dependency and institutionalisation, but also domains of patient satisfaction, quality of life and cost. Pre-planned collaboration between comparable trials could alleviate some of the problems of retrospective systematic reviews such as ensuring that similar variables/outcomes are recorded in any new trial. Anyone carrying out a randomised trial of any 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 and Richard Stevens.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Akershus

Methods	CCT Allocated by date of birth (day of the month)
Participants	Acute stroke patients within 24 hours of symptoms Age 60 years or more All levels of stroke severity and co-morbidity
Interventions	Dedicated stroke ward (10 beds) located within Neurology department (n = 271) vs conventional care in 5 general medical wards (n = 279) Care in the stroke unit was provided for up to 4 weeks After the initial care subsequent rehabilitation was similar between the two groups
Outcomes	Death, dependency, place of residence and length of hospital stay recorded at 7 months after randomisation
Notes	Dependency defined here as Barthel index < 15/20

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	High risk	C - Inadequate

Athens

Methods	RCT Sealed envelopes Unblinded follow up
Participants	Acute stroke patients 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 multi-disciplinary 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

Athens (*Continued*)

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Beijing

Methods	RCT Divided randomly using SPSS software package
Participants	Stroke patients admitted to hospital with first or recurrent stroke Subarachnoid haemorrhage or tumour were excluded
Interventions	New comprehensive stroke unit early multidisciplinary rehabilitation Control patients 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
Allocation concealment?	Unclear risk	B - Unclear

Birmingham

Methods	RCT
Participants	Stroke patients within 2 weeks of stroke onset Able to tolerate active rehabilitation
Interventions	Intensive rehabilitation in rehabilitation centre (mixed rehabilitation unit) (n = 29) vs 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 patients lost to follow up

Risk of bias

Bias	Authors' judgement	Support for judgement

Birmingham (*Continued*)

Allocation concealment?	Unclear risk	B - Unclear

Cape Town

Methods	CCT Allocated by day of admission
Participants	Acute stroke patients admitted from medical admissions ward
Interventions	Three medical firms provided care: (1) Stroke intervention ward (ward with 4 stroke beds, designated nurse, stroke doctor, clerking proforma, team care plan), included multidisciplinary care (2) Guidelines ward (encouraged to use clerking proforma and team care plan) (3) Control wards (conventional care in general medical wards)
Outcomes	Death, institutional care, dependency Process of care recorded at discharge
Notes	19 patients (3 intervention, 7 guideline, 9 controls) were lost to follow up The Guidelines ward data are not used in this review

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	High risk	C - Inadequate

Dover

Methods	RCT
Participants	Stroke patients 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) vs 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 patients in the control group Numbers differ slightly from the published report after re-analysis of original data 2 control patients lost to follow up.

Risk of bias

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

Dover (*Continued*)

Allocation concealment?	Unclear risk	B - Unclear

Dover (GMW)

Methods	RCT Subgroup of Dover (stroke unit vs general medical ward)
Participants	Stroke patients 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) vs 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**
Allocation concealment?	Unclear risk	B - Unclear

Dover (MRW)

Methods	RCT Subgroup of Dover (stroke unit vs mixed rehabilitation ward)
Participants	Stroke patients 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) vs 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**
Allocation concealment?	Unclear risk	B - Unclear

Edinburgh

Methods	RCT
Participants	Acute stroke patients within 7 days of stroke onset Strokes of moderate severity
Interventions	Comprehensive stroke ward (dedicated stroke unit) (n = 155) vs general medical wards (n = 156) Organised care provided for a maximum of 16 weeks
Outcomes	Death, dependency, place of residence and length of initial hospital admission up to 1 year after stroke
Notes	6 intervention and 10 control patients lost to follow up

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	Low risk	A - Adequate

Goteborg-Ostra

Methods	RCT
Participants	Acute stroke patients within 7 days of stroke
Interventions	Comprehensive stroke ward (n = 215) within general medical service vs 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**
Allocation concealment?	Unclear risk	B - Unclear

Goteborg-Sahlgren

Methods	RCT
Participants	Acute stroke patients within 7 days of onset
Interventions	Combined service continuum linking 2 acute and 2 rehabilitation stroke wards (n = 166) vs 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

Goteborg-Sahlgren (*Continued*)

Notes		
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	Unclear risk	B - Unclear

Groningen

Methods	RCT Blinded assessment of outcomes	
Participants	Acute ischaemic stroke patients admitting 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**
Allocation concealment?	Unclear risk	B - Unclear

Helsinki

Methods	RCT Blinded assessment of outcomes	
Participants	Acute stroke patients within 7 days of stroke Unselected patients over the age of 65 years	
Interventions	Mixed rehabilitation unit within neurology ward (n = 121) vs 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	

Helsinki (*Continued*)

Notes		
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	Low risk	A - Adequate

Illinois

Methods	RCT with 3:2 allocation to intervention:control	
Participants	Stroke patients up to 1 year after stroke onset Appropriate for rehabilitation service	
Interventions	Rehabilitation service (mixed rehabilitation unit) (n = 56) vs 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**
Allocation concealment?	Unclear risk	B - Unclear

Joinville

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) vs conventional care in general medical wards
Outcomes	Death, Rankin score, length of stay up to six months
Notes	
Risk of bias	

Joinville (*Continued*)

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Kuopio

Methods	RCT Blinded assessment of outcome
Participants	Stroke patients within 7 days of stroke onset Able to tolerate intensive rehabilitation
Interventions	Intensive rehabilitation in neurological rehabilitation unit (mixed rehabilitation ward) (n = 50) vs general wards (n = 45) Organised care provided for months if required
Outcomes	Death, Lehman (disability) score, place of residence and total time in hospital up to 1 year after stroke
Notes	Majority of patients screened failed to meet inclusion criteria for the trial

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Manchester

Methods	RCT Telephone randomisation and blinded follow up
Participants	Acute stroke patients 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 patients underwent secondary randomisation in trial of early supported discharge team

Risk of bias

Manchester (*Continued*)

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Montreal

Methods	RCT Blinded assessment of outcome
Participants	Unselected stroke patients within 7 days of stroke onset
Interventions	Mobile stroke team (dedicated stroke unit) (n = 65) vs 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
Allocation concealment?	Low risk	A - Adequate

New York

Methods	RCT
Participants	Stroke patients up to 2 months after stroke Appropriate for rehabilitation centre
Interventions	Mixed rehabilitation team working in rehabilitation centre or attending patients in other wards (n = 42) vs 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 patients were managed in a peripatetic way

Risk of bias

Bias	Authors' judgement	Support for judgement

New York (*Continued*)

Allocation concealment?	Unclear risk	B - Unclear

Newcastle

Methods	RCT
Participants	Stroke patients within 3 days of stroke onset
Interventions	Mixed rehabilitation ward in geriatric medicine department (n = 34) vs 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**
Allocation concealment?	Low risk	A - Adequate

Nottingham

Methods	RCT with 5:4 allocation of intervention:control Blinded assessment of outcome
Participants	Stroke patients at 2 weeks after stroke Able to participate actively in rehabilitation
Interventions	Stroke rehabilitation ward in department of geriatric medicine (n = 176) vs 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
Notes	Some crossover from general medical wards to geriatric medicine department 3 intervention and 4 control patients lost to follow up

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	Low risk	A - Adequate

Nottingham (GMW)

Methods	RCT Subgroup of Nottingham (stroke unit vs general medical ward)	
Participants	Stroke patients at 2 weeks after stroke Able to participate actively in rehabilitation	
Interventions	Stroke rehabilitation ward in department of geriatric medicine (n = 78) vs 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**
Allocation concealment?	Low risk	A - Adequate

Nottingham (MRW)

Methods	RCT Subgroup of Nottingham (stroke unit vs mixed rehabilitation ward)	
Participants	Stroke patients at 2 weeks after stroke Able to participate actively in rehabilitation	
Interventions	Stroke rehabilitation ward in department of geriatric medicine (n = 98) vs conventional care 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**
Allocation concealment?	Low risk	A - Adequate

Orpington 1993

Methods	RCT	
Participants	Stroke patients who had survived 2 weeks Suitable for transfer to rehabilitation ward	
Interventions	Stroke rehabilitation ward (n = 124) vs 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	
Notes	Variable duration of follow up (hospital discharge)	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	Low risk	A - Adequate

Orpington 1993 (GMW)

Methods	RCT Subgroup of Orpington 1993 (stroke unit vs general medical ward)	
Participants	Stroke patients who had survived 2 weeks Suitable for transfer to rehabilitation ward	
Interventions	Stroke rehabilitation ward (n = 53) vs 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 the whole group	
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	Low risk	A - Adequate

Orpington 1993 (MRW)

Methods	RCT Subgroup of Orpington 1993 (stroke unit vs mixed rehabilitation ward)
Participants	Stroke patients who had survived 2 weeks Suitable for transfer to rehabilitation ward

Orpington 1993 (MRW) (*Continued*)

Interventions	Stroke rehabilitation ward (n = 71) vs 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 the whole group

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	Low risk	A - Adequate

Orpington 1995

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

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	Low risk	A - Adequate

Orpington 2000

Methods	RCT Blinded outcome assessment
Participants	Acute stroke patients (meeting WHO definition of stroke) from a community stroke register Intermediate stroke severity
Interventions	Three-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);

Orpington 2000 (*Continued*)

	(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
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Osaka

Methods	CCT Allocation by bed availability (by an independent professional) Unblinded outcome assessment
Participants	Patients with stroke in the previous 3 months (average 54 to 60 days post stroke) Excluded those requiring physical assistance prior to the stroke
Interventions	Stroke rehabilitation ward with weekly multidisciplinary meetings Control patients were admitted to a mixed rehabilitation ward (with less regular multidisciplinary communication) in the same rehabilitation hospital
Outcomes	Death, discharge destination, Functional Independence Measure, Stroke Impairment Assessment, length of hospital stay recorded at discharge
Notes	

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	High risk	C - Inadequate

Pavia

Methods	CCT Allocation by bed availability with blinded data extraction
Participants	Acute stroke patients (first stroke within 36 hours of symptoms)
Interventions	Acute (semi-intensive) stroke ward (6 beds) with continuous monitoring of BP, ECG, oxygen saturation, respiration, temperature, EEG Controls admitted to cerebrovascular ward (comprehensive stroke ward) Multidisciplinary team care and medical treatment protocols were the same for both units

Pavia (*Continued*)

Outcomes	Death, dependency (Rankin 4 to 5) complications, length of stay, recorded at discharge
Notes	Baseline imbalance in neurological impairment score (in favour of control) Dependency defined as Rankin 4 to 5

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	High risk	C - Inadequate

Perth

Methods	RCT
Participants	Acute stroke patients within 7 days of stroke
Interventions	Comprehensive stroke ward (dedicated stroke unit) (n = 29) vs 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 patients screened did not enter trial

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Unclear risk	B - Unclear

Stockholm

Methods	CCT Treatment allocated according to bed availability
Participants	Acute stroke patients within 7 days of stroke (also included some TIA patients)
Interventions	Comprehensive stroke ward (n = 269) vs general medical wards (n = 225)
Outcomes	Death, place of residence, length of hospital stay, treatment and investigations carried out, recorded at discharge
Notes	No longer-term follow up

Risk of bias

Stockholm (*Continued*)

Bias	Authors' judgement	Support for judgement
Allocation concealment?	High risk	C - Inadequate

Svendborg

Methods	RCT by means of sealed envelopes (stratified by age and side of lesion)
Participants	Acute stroke patients (within 8 days of symptoms) meeting WHO diagnostic criteria
Interventions	Comprehensive stroke ward (n = 31) vs 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

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Tampere

Methods	RCT
Participants	Acute stroke patients within 7 days of stroke (usually earlier)
Interventions	Acute (semi-intensive) stroke ward in neurology department (n = 98) vs 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
Notes	Short duration (1 week) in stroke unit before transfer to conventional service

Risk of bias

Bias	Authors' judgement	Support for judgement
Allocation concealment?	Low risk	A - Adequate

Trondheim

Methods	RCT	
Participants	Stroke patients 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) vs 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**
Allocation concealment?	Low risk	A - Adequate

Umea

Methods	CCT Blinded assessment of outcome Treatment allocation according to bed availability	
Participants	Stroke patients within 7 days of stroke onset	
Interventions	Comprehensive stroke ward (n = 110) vs general medical wards (n = 183) Organised care provided for several weeks if required	
Outcomes	Death, functional status, place of residence and length of initial stay in hospital up to 1 year after stroke	
Notes		
Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	High risk	C - Inadequate

Uppsala

Methods	CCT Treatment allocation according to admission rota
Participants	Stroke patients admitted to general medical wards within 3 days stroke onset

Uppsala (*Continued*)

Interventions	Organised care within general medical wards (mobile team) (n = 60) vs conventional care in general medical wards (n = 52) Organised care provided for a maximum of 4 weeks, but a few patients received a longer of treatment
Outcomes	Death, disability score and place of residence up to 1 year after stroke and length of stay in acute hospital up to the end of scheduled follow up
Notes	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Allocation concealment?	High risk	C - Inadequate

ADL: activities of daily living
BP: blood pressure
CCT: controlled clinical trial
CT: computerised tomography
ECG: electrocardiogram
EEG: electroencephalograph
NIHSS: National Institutes of Health Stroke Scale
RCT: randomised controlled trial
TIA: transient ischaemic attack
vs: versus
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
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
Durastanti 2005	Quasi-randomised treatment allocation
Koton 2005	Treatment allocated by selection criteria

(*Continued*)

Langhorne 2001	Study tested a care plan protocol only No other aspect of organisation was under evaluation
Moloney 1999	Care pathway study only
Ricauda 2004	Trial comparing home care team versus general medical wards
Ronning 1998a	A portion of the data were collected retrospectively All the prospective data are included in the Akershus study (see 'Characteristics of included studies' table)
Ronning 1998b	Comparison of stroke rehabilitation ward with discharge to community-based stroke rehabilitation
Silva 2004	Treatment allocated by the study neurologist
Walter 2005	Non-randomised treatment allocation

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

Beijing 2004

Trial name or title	Beijing Organized Stroke Care Study
Methods	
Participants	Not known
Interventions	Not known
Outcomes	Not known
Starting date	Not known
Contact information	Not known
Notes	Study in progress, awaiting information

London

Trial name or title	A trial of SU vs CGS management of all stroke patients
Methods	
Participants	All acute stroke patients with a clinical diagnosis of stroke

London (*Continued*)

Interventions	Comprehensive stroke ward (4 bed stroke bay and 11 bed stroke rehabilitation ward with geriatric medical service) vs GDS (8 acute high dependency beds and 44 generic rehabilitation beds) Both services entail co-ordinated multidisciplinary team care
Outcomes	Death, dependency (Barthel index, Nottingham extended ADL scale), place of residence, London Handicap scale, patient and carer satisfaction, length of stay, resource use
Starting date	1999
Contact information	Dr SP Stone
Notes	Randomised controlled trial Blinded assessment of outcome

ADL: activities of daily living
CGS: comprehensive geriatric service
GDS: generic disability service
SU: stroke unit
vs: versus

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	34		Peto Odds Ratio (Peto, Fixed, 95% CI)	Subtotals only
1.1 Stroke ward versus general medical ward	16	4261	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.83 [0.71, 0.96]
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	4	699	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.03 [0.74, 1.42]
1.4 Stroke ward versus mixed rehabilitation ward	5	720	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	2	322	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.45 [0.19, 1.08]
2 Death or institutional care by the end of scheduled follow up	33		Peto Odds Ratio (Peto, Fixed, 95% CI)	Subtotals only
2.1 Stroke ward versus general medical ward	16	4261	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.80 [0.70, 0.90]
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	4	699	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.16 [0.84, 1.60]
2.4 Stroke ward versus mixed rehabilitation ward	5	720	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.89 [0.65, 1.20]
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	2	322	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.93 [0.60, 1.44]
3 Death or dependency by the end of scheduled follow up	31		Peto Odds Ratio (Peto, Fixed, 95% CI)	Subtotals only
3.1 Stroke ward versus general medical ward	13	3285	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.83 [0.72, 0.96]
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	4	699	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.96 [0.69, 1.34]
3.4 Stroke ward versus mixed rehabilitation ward	5	720	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.98 [0.71, 1.37]
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	2	322	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.29 [0.18, 0.46]

4 Length of stay (days) in a hospital or institution or both	26	6159	Std. Mean Difference (IV, Random, 95% CI)	-0.17 [-0.32, -0.03]
4.1 Stroke ward	21	5511	Std. Mean Difference (IV, Random, 95% CI)	-0.22 [-0.38, -0.05]
4.2 Mixed rehabilitation ward	3	387	Std. Mean Difference (IV, Random, 95% CI)	0.08 [-0.21, 0.37]
4.3 Mobile stroke team	2	261	Std. Mean Difference (IV, Random, 95% CI)	-0.04 [-0.67, 0.59]
5 Death at five-year follow up	3	1139	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.74 [0.59, 0.94]
6 Death or institutional care at five-year follow up	2	535	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.62 [0.43, 0.89]
7 Death or dependency at five-year follow up	2	535	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.59 [0.38, 0.92]
8 Death at 10-year follow up	2	535	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.53 [0.36, 0.80]
9 Death or institutional care at 10-year follow up	2	535	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.57 [0.37, 0.88]
10 Death or dependency at 10-year follow up	2	535	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.77 [0.45, 1.31]

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	26	5592	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.86 [0.76, 0.98]
1.1 Comprehensive stroke ward versus general medical ward	12	3728	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.85 [0.72, 0.99]
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	4	699	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.03 [0.74, 1.42]
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	25	5538	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.82 [0.73, 0.92]
2.1 Comprehensive stroke ward versus general medical ward	12	3728	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.80 [0.70, 0.92]
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	4	699	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.16 [0.84, 1.60]
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	23	4614	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.82 [0.73, 0.92]
3.1 Comprehensive stroke ward versus general medical ward	9	2752	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.83 [0.71, 0.97]

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	4	699	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.96 [0.69, 1.34]
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	20	4536	Std. Mean Difference (IV, Random, 95% CI)	-0.11 [-0.23, 0.01]
4.1 Comprehensive stroke ward versus general medical ward	12	3710	Std. Mean Difference (IV, Random, 95% CI)	-0.19 [-0.31, -0.06]
4.2 Rehabilitation stroke ward versus general medical ward	3	178	Std. Mean Difference (IV, Random, 95% CI)	0.37 [0.07, 0.67]
4.3 Mobile stroke team versus general medical ward	2	261	Std. Mean Difference (IV, Random, 95% CI)	-0.04 [-0.67, 0.59]
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	3	533	Odds Ratio (M-H, Random, 95% CI)	0.72 [0.24, 2.14]
1.1 Acute (semi-intensive) ward versus comprehensive ward	2	322	Odds Ratio (M-H, Random, 95% CI)	0.36 [0.06, 2.26]
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	3	533	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.06 [0.75, 1.50]
2.1 Acute (semi-intensive) ward versus comprehensive ward	2	322	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.93 [0.60, 1.44]
2.2 Acute (semi-intensive) ward versus mixed rehabilitation ward	1	211	Peto Odds Ratio (Peto, Fixed, 95% CI)	1.32 [0.76, 2.29]
3 Death or dependency by the end of scheduled follow up	3	533	Odds Ratio (M-H, Random, 95% CI)	0.50 [0.15, 1.59]
3.1 Acute (semi-intensive) ward versus comprehensive ward	2	322	Odds Ratio (M-H, Random, 95% CI)	0.27 [0.16, 0.45]
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	3	533	Std. Mean Difference (IV, Random, 95% CI)	-0.88 [-1.70, -0.06]

4.1 Acute (semi-intensive) ward versus comprehensive ward	2	322	Std. Mean Difference (IV, Random, 95% CI)	-1.31 [-2.13, -0.49]
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	4	509	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.51 [0.29, 0.90]
1.1 Rehabilitation stroke ward versus mixed rehabilitation ward	4	509	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	4	509	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.74 [0.52, 1.07]
2.1 Rehabilitation stroke ward versus mixed rehabilitation ward	4	509	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.74 [0.52, 1.07]
3 Death or dependency by the end of scheduled follow up	4	509	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.86 [0.57, 1.30]

3.1 Rehabilitation stroke ward versus mixed rehabilitation stroke ward	4	509	Peto Odds Ratio (Peto, Fixed, 95% CI)	0.86 [0.57, 1.30]
4 Length of stay (days) in a hospital or institution	4	509	Std. Mean Difference (IV, Random, 95% CI)	0.18 [-0.35, 0.72]
4.1 Rehabilitation stroke ward versus mixed rehabilitation ward	4	509	Std. Mean Difference (IV, Random, 95% CI)	0.18 [-0.35, 0.72]

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	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Stroke ward versus general medical ward					
Akershus	61/271	70/279		13.8 %	0.87 [0.59, 1.28]
Athens	103/302	127/302		19.7 %	0.71 [0.51, 0.99]
Beijing	12/195	19/197		4.0 %	0.62 [0.30, 1.29]
Dover (GMW)	34/98	35/89		6.0 %	0.82 [0.45, 1.48]
Edinburgh	48/155	55/156		9.5 %	0.82 [0.51, 1.32]
Goteborg-Ostra	16/215	12/202		3.6 %	1.27 [0.59, 2.73]
Goteborg-Sahlgren	45/166	19/83		5.9 %	1.25 [0.68, 2.27]
Joinville	9/35	12/39		2.1 %	0.78 [0.29, 2.14]
Nottingham (GMW)	14/98	10/76		2.8 %	1.10 [0.46, 2.61]
Orpington 1993 (GMW)	3/53	6/48		1.1 %	0.43 [0.11, 1.70]
Orpington 1995	7/34	17/37		2.2 %	0.33 [0.12, 0.87]
Perth	4/29	6/30		1.2 %	0.65 [0.17, 2.50]
Stockholm	49/269	45/225		10.4 %	0.89 [0.57, 1.40]
Svendborg	14/31	12/34		2.2 %	1.50 [0.56, 4.02]
Trondheim	27/110	36/110		6.2 %	0.67 [0.37, 1.20]
Umea	43/110	75/183		9.2 %	0.92 [0.57, 1.50]

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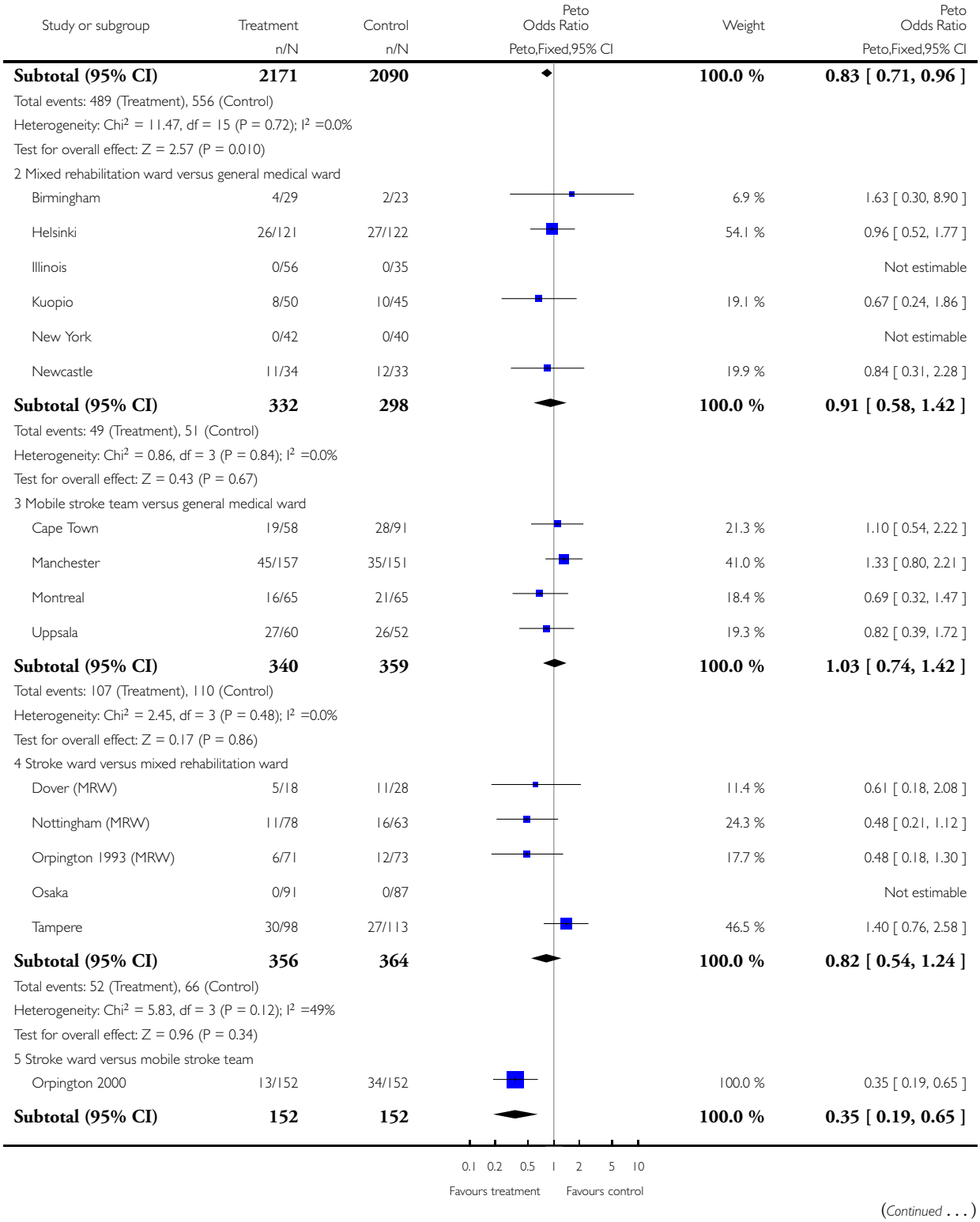

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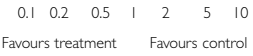
Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Total events: 13 (Treatment), 34 (Control)					
Heterogeneity: not applicable					
Test for overall effect: Z = 3.33 (P = 0.00088)					
6 Stroke ward versus stroke ward					
Groningen	1/27	7/27		34.3 %	0.18 [0.04, 0.79]
Pavia	6/134	8/134		65.7 %	0.74 [0.25, 2.17]
Subtotal (95% CI)	**161**	**161**		**100.0 %**	**0.45 [0.19, 1.08]**
Total events: 7 (Treatment), 15 (Control)					
Heterogeneity: Chi^2 = 2.33, df = 1 (P = 0.13); I^2 =57%					
Test for overall effect: Z = 1.78 (P = 0.076)					
Test for subgroup differences: Chi^2 = 11.13, df = 5 (P = 0.05), I^2 =55%					



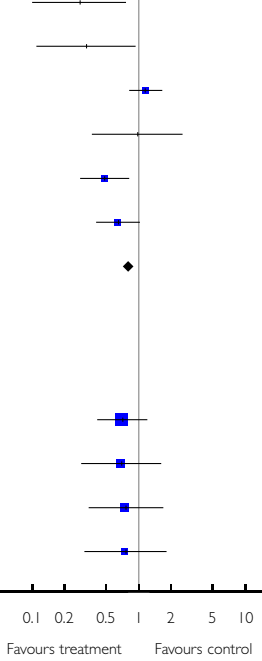
Analysis 1.2. Comparison 1 Organised stroke unit care versus alternative service, Outcome 2 Death or institutional care by the end of scheduled follow up.

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					
Akershus	101/271	113/279		14.1 %	0.87 [0.62, 1.23]
Athens	107/302	138/302		15.7 %	0.65 [0.47, 0.90]
Beijing	23/195	27/197		4.7 %	0.84 [0.47, 1.52]
Dover (GMW)	50/98	48/89		5.0 %	0.89 [0.50, 1.58]
Edinburgh	66/155	78/156		8.4 %	0.74 [0.48, 1.16]
Goteborg-Ostra	49/215	43/202		7.7 %	1.09 [0.69, 1.73]
Goteborg-Sahlgren	64/166	34/83		5.7 %	0.90 [0.53, 1.55]
Joinville	9/35	12/39		1.6 %	0.78 [0.29, 2.14]
Nottingham (GMW)	28/98	21/76		3.8 %	1.05 [0.54, 2.03]
Orpington 1993 (GMW)	9/53	12/48		1.8 %	0.62 [0.24, 1.61]
Orpington 1995	18/34	30/37		1.7 %	0.28 [0.10, 0.76]
Perth	6/29	14/30		1.4 %	0.32 [0.11, 0.93]
Stockholm	150/269	117/225		13.2 %	1.16 [0.82, 1.66]
Svendborg	18/31	20/34		1.7 %	0.97 [0.36, 2.58]
Trondheim	41/110	61/110		5.9 %	0.48 [0.28, 0.82]
Umea	51/110	105/183		7.4 %	0.64 [0.40, 1.03]
Subtotal (95% CI)	**2171**	**2090**		**100.0 %**	**0.80 [0.70, 0.90]**
Total events: 790 (Treatment), 873 (Control)					
Heterogeneity: Chi² = 20.69, df = 15 (P = 0.15); I² =27%					
Test for overall effect: Z = 3.49 (P = 0.00048)					
2 Mixed rehabilitation ward versus general medical ward					
Helsinki	36/121	46/122		40.1 %	0.70 [0.41, 1.19]
Illinois	22/56	17/35		15.7 %	0.69 [0.29, 1.61]
Kuopio	22/50	23/45		17.5 %	0.75 [0.34, 1.68]
New York	15/42	17/40		14.5 %	0.75 [0.31, 1.82]



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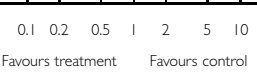
Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Newcastle	18/34	21/33		12.2 %	0.65 [0.25, 1.70]
Subtotal (95% CI)	**303**	**275**		**100.0 %**	**0.71 [0.51, 0.99]**
Total events: 113 (Treatment), 124 (Control)					
Heterogeneity: Chi² = 0.08, df = 4 (P = 1.00); I² =0.0%					
Test for overall effect: Z = 2.01 (P = 0.045)					
3 Mobile stroke team versus general medical ward					
Cape Town	22/58	34/91		22.7 %	1.02 [0.52, 2.02]
Manchester	60/157	52/151		48.4 %	1.18 [0.74, 1.87]
Montreal	57/65	52/65		12.0 %	1.76 [0.69, 4.46]
Uppsala	40/60	35/52		16.9 %	0.97 [0.44, 2.13]
Subtotal (95% CI)	**340**	**359**		**100.0 %**	**1.16 [0.84, 1.60]**
Total events: 179 (Treatment), 173 (Control)					
Heterogeneity: Chi² = 1.09, df = 3 (P = 0.78); I² =0.0%					
Test for overall effect: Z = 0.89 (P = 0.37)					
4 Stroke ward versus mixed rehabilitation ward					
Dover (MRW)	11/18	18/28		6.3 %	0.88 [0.26, 2.94]
Nottingham (MRW)	34/78	32/63		21.1 %	0.75 [0.39, 1.46]
Orpington 1993 (MRW)	24/71	33/73		20.9 %	0.62 [0.32, 1.21]
Osaka	23/91	25/87		21.2 %	0.84 [0.43, 1.63]
Tampere	43/98	42/113		30.6 %	1.32 [0.76, 2.29]
Subtotal (95% CI)	**356**	**364**		**100.0 %**	**0.89 [0.65, 1.20]**
Total events: 135 (Treatment), 150 (Control)					
Heterogeneity: Chi² = 3.36, df = 4 (P = 0.50); I² =0.0%					
Test for overall effect: Z = 0.77 (P = 0.44)					
5 Stroke ward versus mobile stroke team					
Orpington 2000	21/152	45/152		100.0 %	0.40 [0.23, 0.68]
Subtotal (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)					
6 Stroke ward versus stroke ward					
Groningen	13/27	18/27		16.9 %	0.48 [0.16, 1.38]
Pavia	60/134	58/134		83.1 %	1.06 [0.66, 1.72]
Subtotal (95% CI)	**161**	**161**		**100.0 %**	**0.93 [0.60, 1.44]**
Total events: 73 (Treatment), 76 (Control)					
Heterogeneity: Chi² = 1.81, df = 1 (P = 0.18); I² =45%					
Test for overall effect: Z = 0.34 (P = 0.74)					
Test for subgroup differences: Chi² = 12.74, df = 5 (P = 0.03), I² =61%					



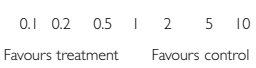
Analysis 1.3. Comparison 1 Organised stroke unit care versus alternative service, Outcome 3 Death or dependency by the end of scheduled follow up.

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	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Stroke ward versus general medical ward					
Akershus	103/271	110/279		17.2 %	0.94 [0.67, 1.33]
Athens	138/302	145/302		19.8 %	0.91 [0.66, 1.25]
Beijing	113/195	118/197		12.5 %	0.92 [0.62, 1.38]
Dover (GMW)	54/98	50/89		6.1 %	0.96 [0.54, 1.70]
Edinburgh	93/155	94/156		9.8 %	0.99 [0.63, 1.56]
Goteborg-Sahlgren	108/166	54/83		6.7 %	1.00 [0.58, 1.74]
Joinville	18/35	23/39		2.4 %	0.74 [0.30, 1.84]
Nottingham (GMW)	63/98	52/76		5.1 %	0.83 [0.44, 1.56]
Orpington 1993 (GMW)	38/53	39/48		2.4 %	0.59 [0.24, 1.48]
Orpington 1995	34/34	37/37			Not estimable
Perth	10/29	15/30		1.9 %	0.54 [0.19, 1.49]
Trondheim	54/110	81/110		6.9 %	0.36 [0.21, 0.61]
Umea	52/110	102/183		9.1 %	0.71 [0.44, 1.14]
Subtotal (95% CI)	**1656**	**1629**		**100.0 %**	**0.83 [0.72, 0.96]**
Total events: 878 (Treatment), 920 (Control)					
Heterogeneity: Chi^2 = 13.39, df = 11 (P = 0.27); I^2 =18%					
Test for overall effect: Z = 2.56 (P = 0.011)					
2 Mixed rehabilitation ward versus general medical ward					
Birmingham	8/29	7/23		7.4 %	0.87 [0.26, 2.89]
Helsinki	47/121	65/122		41.8 %	0.56 [0.34, 0.93]
Illinois	20/56	17/35		14.5 %	0.59 [0.25, 1.39]
Kuopio	31/50	31/45		15.0 %	0.74 [0.32, 1.72]



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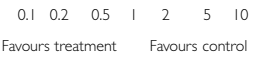
Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
New York	23/42	23/40		14.1 %	0.90 [0.38, 2.13]
Newcastle	26/34	28/33		7.3 %	0.59 [0.18, 1.96]
Subtotal (95% CI)	**332**	**298**		**100.0 %**	**0.65 [0.47, 0.90]**
Total events: 155 (Treatment), 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					
Cape Town	43/58	62/91		21.2 %	1.33 [0.65, 2.74]
Manchester	91/157	95/151		52.9 %	0.81 [0.52, 1.28]
Montreal	58/65	60/65		7.9 %	0.69 [0.21, 2.27]
Uppsala	41/60	33/52		18.0 %	1.24 [0.57, 2.71]
Subtotal (95% CI)	**340**	**359**		**100.0 %**	**0.96 [0.69, 1.34]**
Total events: 233 (Treatment), 250 (Control)					
Heterogeneity: Chi² = 2.00, df = 3 (P = 0.57); I² =0.0%					
Test for overall effect: Z = 0.22 (P = 0.82)					
4 Stroke ward versus mixed rehabilitation ward					
Dover (MRW)	11/18	19/28		7.1 %	0.75 [0.22, 2.56]
Nottingham (MRW)	60/78	48/63		17.7 %	1.04 [0.48, 2.27]
Orpington 1993 (MRW)	63/71	69/73		7.8 %	0.47 [0.15, 1.53]
Osaka	37/91	37/87		30.5 %	0.93 [0.51, 1.68]
Tampere	53/98	55/113		37.0 %	1.24 [0.72, 2.13]
Subtotal (95% CI)	**356**	**364**		**100.0 %**	**0.98 [0.71, 1.37]**
Total events: 224 (Treatment), 228 (Control)					
Heterogeneity: Chi² = 2.46, df = 4 (P = 0.65); I² =0.0%					
Test for overall effect: Z = 0.09 (P = 0.93)					
5 Stroke ward versus mobile stroke team					
Orpington 2000	61/152	73/152		100.0 %	0.73 [0.46, 1.14]
Subtotal (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)					
6 Stroke ward versus stroke ward					
Groningen	7/27	13/27		19.0 %	0.39 [0.13, 1.17]
Pavia	20/134	56/134		81.0 %	0.27 [0.16, 0.46]
Subtotal (95% CI)	**161**	**161**		**100.0 %**	**0.29 [0.18, 0.46]**
Total events: 27 (Treatment), 69 (Control)					
Heterogeneity: Chi² = 0.38, df = 1 (P = 0.54); I² =0.0%					
Test for overall effect: Z = 5.11 (P < 0.00001)					



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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 subgroup differences: Chi^2 = 22.20, df = 5 (P = 0.00), I^2 =77%					

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							
Akershus	271	7.7 (6.2)	279	9.5 (6.9)		4.4 %	-0.27 [-0.44, -0.11]
Athens	302	11.23 (6.3)	302	12.1 (7.49)		4.4 %	-0.13 [-0.29, 0.03]
Beijing	195	20.6 (10.4)	197	22.3 (19.7)		4.3 %	-0.11 [-0.31, 0.09]
Dover	112	116 (99)	117	113 (96)		4.1 %	0.03 [-0.23, 0.29]
Edinburgh	155	54.6 (42.3)	152	75.1 (92.5)		4.2 %	-0.29 [-0.51, -0.06]
Goteborg-Ostra	215	16.2 (10.6)	202	13.9 (9)		4.3 %	0.23 [0.04, 0.43]
Goteborg-Sahlgren	166	28 (17)	83	36 (17)		4.1 %	-0.47 [-0.74, -0.20]
Groningen	27	16 (5)	27	27 (7)		2.5 %	-1.78 [-2.42, -1.14]
Joinville	35	11 (8.51)	39	12.6 (10.8)		3.2 %	-0.16 [-0.62, 0.30]
Nottingham (GMW)	98	76.72 (39.73)	76	60.38 (48.91)		3.9 %	0.37 [0.07, 0.67]
Nottingham (MRW)	78	86.74 (43.72)	63	66.71 (44.66)		3.8 %	0.45 [0.12, 0.79]
Orpington 1993	124	55 (30)	121	98 (50)		4.1 %	-1.04 [-1.31, -0.78]
Orpington 2000	152	32 (30)	149	30 (40)		4.2 %	0.06 [-0.17, 0.28]

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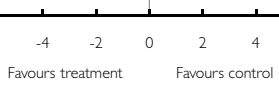
Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
Osaka	91	97.7 (18)	87	95.2 (17)		3.9 %	0.14 [-0.15, 0.44]
Pavia	134	9.2 (4.9)	134	17.1 (10.8)		4.1 %	-0.94 [-1.19, -0.69]
Perth	29	24 (30)	30	26.7 (30)		3.0 %	-0.09 [-0.60, 0.42]
Stockholm	269	21 (20)	225	20 (20)		4.4 %	0.05 [-0.13, 0.23]
Svendborg	31	12 (22)	34	23 (34)		3.1 %	-0.38 [-0.87, 0.12]
Tampere	98	13 (30)	113	15 (38)		4.0 %	-0.06 [-0.33, 0.21]
Trondheim	102	75 (114.8)	104	123 (145.8)		4.0 %	-0.36 [-0.64, -0.09]
Umea	110	21 (16)	183	31 (27)		4.2 %	-0.42 [-0.66, -0.19]
Subtotal (95% CI)	**2794**		**2717**			**82.2 %**	**-0.22 [-0.38, -0.05]**
Heterogeneity: Tau² = 0.12; Chi² = 175.48, df = 20 (P<0.00001); I² =89%							
Test for overall effect: Z = 2.61 (P = 0.0091)							
2 Mixed rehabilitation ward							
Helsinki	121	23.6 (38.8)	122	30.5 (70.6)		4.1 %	-0.12 [-0.37, 0.13]
Kuopio	42	162.5 (125)	35	129.5 (119)		3.2 %	0.27 [-0.18, 0.72]
Newcastle	34	52 (45)	33	41 (34)		3.1 %	0.27 [-0.21, 0.75]
Subtotal (95% CI)	**197**		**190**			**10.4 %**	**0.08 [-0.21, 0.37]**
Heterogeneity: Tau² = 0.03; Chi² = 3.41, df = 2 (P = 0.18); I² =41%							
Test for overall effect: Z = 0.54 (P = 0.59)							
3 Mobile stroke team							
Cape Town	58	7.5 (3.9)	91	9.9 (7.9)		3.8 %	-0.36 [-0.69, -0.03]
Uppsala	60	29.5 (26.7)	52	22.7 (20)		3.6 %	0.28 [-0.09, 0.66]
Subtotal (95% CI)	**118**		**143**			**7.4 %**	**-0.04 [-0.67, 0.59]**
Heterogeneity: Tau² = 0.17; Chi² = 6.36, df = 1 (P = 0.01); I² =84%							
Test for overall effect: Z = 0.14 (P = 0.89)							
Total (95% CI)	**3109**		**3050**			**100.0 %**	**-0.17 [-0.32, -0.03]**
Heterogeneity: Tau² = 0.12; Chi² = 189.10, df = 25 (P<0.00001); I² =87%							
Test for overall effect: Z = 2.31 (P = 0.021)							



Analysis 1.5. Comparison 1 Organised stroke unit care versus alternative service, Outcome 5 Death at five-year follow up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 5 Death at five-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	163/302	175/302		53.8 %	0.85 [0.62, 1.17]
Nottingham	79/176	77/139		28.1 %	0.66 [0.42, 1.03]
Trondheim	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 1.6. Comparison 1 Organised stroke unit care versus alternative service, Outcome 6 Death or institutional care at five-year follow up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 6 Death or institutional care at five-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	100/176	88/139		63.6 %	0.76 [0.49, 1.20]
Trondheim	72/110	90/110		36.4 %	0.43 [0.24, 0.79]
Total (95% CI)	**286**	**249**		**100.0 %**	**0.62 [0.43, 0.89]**
Total events: 172 (Treatment), 178 (Control)					
Heterogeneity: Chi² = 2.22, df = 1 (P = 0.14); I² =55%					
Test for overall effect: Z = 2.59 (P = 0.0097)					
Test for subgroup differences: Not applicable					

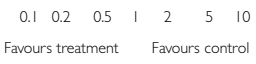
Analysis 1.7. Comparison 1 Organised stroke unit care versus alternative service, Outcome 7 Death or dependency at five-year follow up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 7 Death or dependency at five-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	139/176	114/139		62.0 %	0.83 [0.47, 1.44]
Trondheim	84/110	100/110		38.0 %	0.35 [0.17, 0.71]
Total (95% CI)	**286**	**249**		**100.0 %**	**0.59 [0.38, 0.92]**
Total events: 223 (Treatment), 214 (Control)					
Heterogeneity: Chi² = 3.52, df = 1 (P = 0.06); I² =72%					
Test for overall effect: Z = 2.32 (P = 0.020)					
Test for subgroup differences: Not applicable					



Analysis 1.8. Comparison 1 Organised stroke unit care versus alternative service, Outcome 8 Death at 10-year follow up.

Review: Organised inpatient (stroke unit) care for stroke

Comparison: 1 Organised stroke unit care versus alternative service

Outcome: 8 Death 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	122/176	111/139		64.2 %	0.58 [0.35, 0.96]
Trondheim	83/110	96/110		35.8 %	0.46 [0.23, 0.91]
Total (95% CI)	**286**	**249**		**100.0 %**	**0.53 [0.36, 0.80]**

Total events: 205 (Treatment), 207 (Control)

Heterogeneity: Chi^2 = 0.29, df = 1 (P = 0.59); I^2 =0.0%

Test for overall effect: Z = 3.04 (P = 0.0024)

Test for subgroup differences: Not applicable

Analysis 1.9. Comparison 1 Organised stroke unit care versus alternative service, Outcome 9 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: 9 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	131/176	113/139		67.6 %	0.68 [0.40, 1.15]
Trondheim	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: Chi² = 1.24, df = 1 (P = 0.27); I² =19%

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

Test for subgroup differences: Not applicable

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

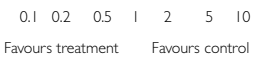
Study or subgroup	Treatment n/N	Control n/N	Peto Odds Ratio Peto,Fixed,95% CI	Weight	Peto Odds Ratio Peto,Fixed,95% CI
Nottingham	153/176	120/139		66.3 %	1.05 [0.55, 2.02]
Trondheim	96/110	104/110		33.7 %	0.42 [0.17, 1.04]
Total (95% CI)	**286**	**249**		**100.0 %**	**0.77 [0.45, 1.31]**

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

Heterogeneity: Chi² = 2.61, df = 1 (P = 0.11); I² =62%

Test for overall effect: Z = 0.96 (P = 0.34)

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	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Comprehensive stroke ward versus general medical ward					
Akershus	61/271	70/279		10.6 %	0.87 [0.59, 1.28]
Athens	103/302	127/302		15.1 %	0.71 [0.51, 0.99]
Beijing	12/195	19/197		3.0 %	0.62 [0.30, 1.29]
Edinburgh	48/155	55/156		7.3 %	0.82 [0.51, 1.32]
Goteborg-Ostra	16/215	12/202		2.8 %	1.27 [0.59, 2.73]
Goteborg-Sahlgren	45/166	19/83		4.5 %	1.25 [0.68, 2.27]
Joinville	9/35	12/39		1.6 %	0.78 [0.29, 2.14]
Perth	4/29	6/30		0.9 %	0.65 [0.17, 2.50]
Stockholm	49/269	45/225		8.0 %	0.89 [0.57, 1.40]
Svendborg	14/31	12/34		1.7 %	1.50 [0.56, 4.02]
Trondheim	27/110	36/110		4.8 %	0.67 [0.37, 1.20]
Umea	43/110	75/183		7.0 %	0.92 [0.57, 1.50]
Subtotal (95% CI)	**1888**	**1840**		**67.2 %**	**0.85 [0.72, 0.99]**
Total events: 431 (Treatment), 488 (Control)					
Heterogeneity: Chi² = 6.66, df = 11 (P = 0.83); I² =0.0%					
Test for overall effect: Z = 2.11 (P = 0.035)					
2 Rehabilitation stroke ward versus general medical ward					
Dover (GMW)	34/98	35/89		4.6 %	0.82 [0.45, 1.48]
Nottingham (GMW)	14/98	10/76		2.2 %	1.10 [0.46, 2.61]
Orpington 1993 (GMW)	3/53	6/48		0.9 %	0.43 [0.11, 1.70]
Orpington 1995	7/36	17/37		1.7 %	0.31 [0.12, 0.81]

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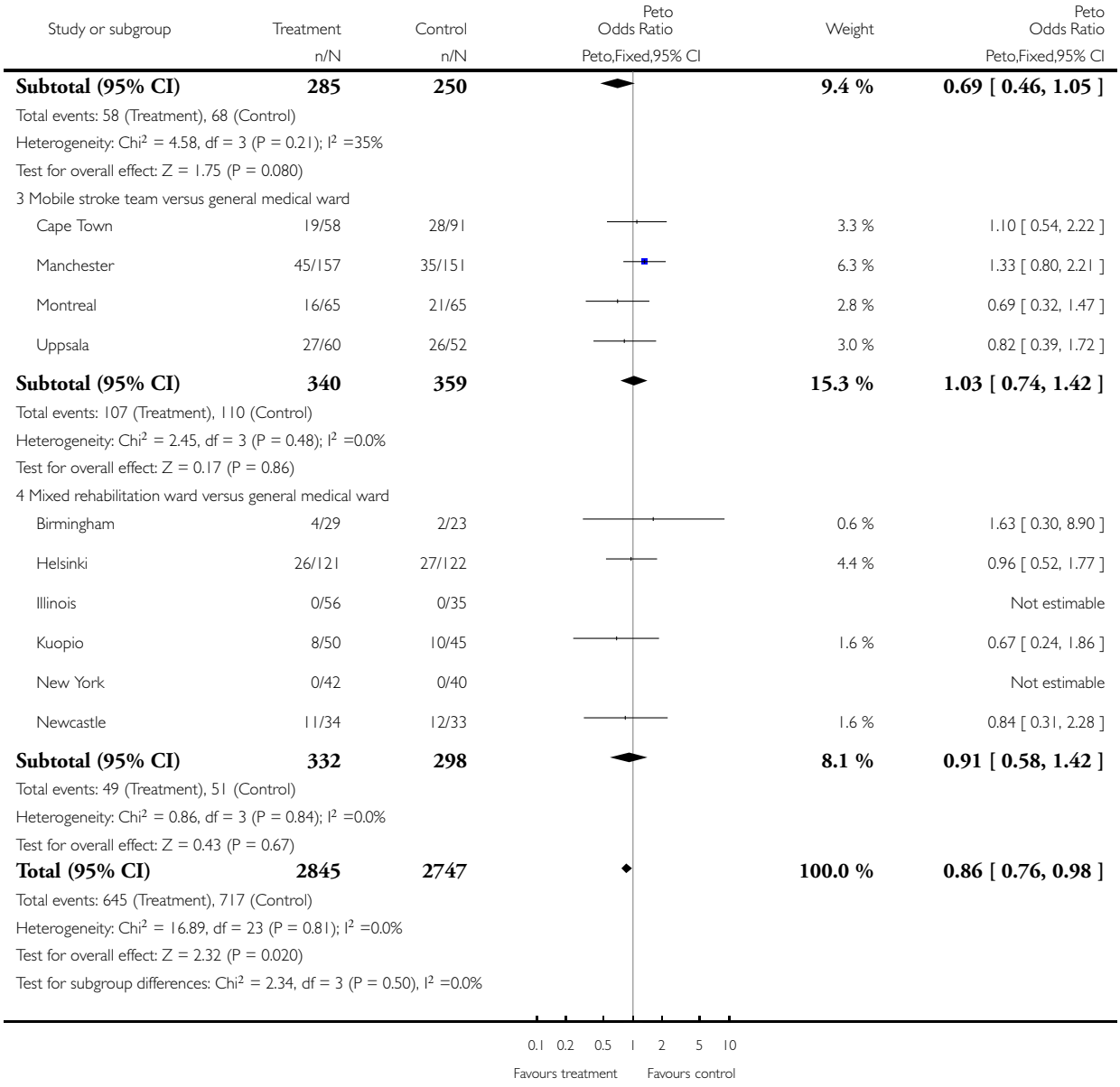

Analysis 2.2. Comparison 2 Organised stroke unit care versus general medical wards, Outcome 2 Death or institutional care by the end of scheduled follow up.

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					
Akershus	101/271	113/279		10.8 %	0.87 [0.62, 1.23]
Athens	107/302	138/302		12.0 %	0.65 [0.47, 0.90]
Beijing	23/195	27/197		3.6 %	0.84 [0.47, 1.52]
Edinburgh	66/155	78/156		6.4 %	0.74 [0.48, 1.16]
Goteborg-Ostra	49/215	43/202		5.9 %	1.09 [0.69, 1.73]
Goteborg-Sahlgren	64/166	34/83		4.4 %	0.90 [0.53, 1.55]
Joinville	9/35	12/39		1.3 %	0.78 [0.29, 2.14]
Perth	6/29	14/30		1.1 %	0.32 [0.11, 0.93]
Stockholm	150/269	117/225		10.1 %	1.16 [0.82, 1.66]
Svendborg	18/31	20/34		1.3 %	0.97 [0.36, 2.58]
Trondheim	41/110	61/110		4.5 %	0.48 [0.28, 0.82]
Umea	51/110	105/183		5.7 %	0.64 [0.40, 1.03]
Subtotal (95% CI)	**1888**	**1840**		**67.2 %**	**0.80 [0.70, 0.92]**
Total events: 685 (Treatment), 762 (Control)					
Heterogeneity: Chi² = 15.36, df = 11 (P = 0.17); I² =28%					
Test for overall effect: Z = 3.17 (P = 0.0015)					
2 Rehabilitation stroke ward versus general medical ward					
Dover (GMW)	50/98	48/89		3.9 %	0.89 [0.50, 1.58]
Nottingham (GMW)	28/98	21/76		2.9 %	1.05 [0.54, 2.03]
Orpington 1993 (GMW)	9/53	12/48		1.4 %	0.62 [0.24, 1.61]
Orpington 1995	18/34	30/37		1.3 %	0.28 [0.10, 0.76]
Subtotal (95% CI)	**283**	**250**		**9.4 %**	**0.76 [0.52, 1.09]**
Total events: 105 (Treatment), 111 (Control)					
Heterogeneity: Chi² = 5.24, df = 3 (P = 0.15); I² =43%					
Test for overall effect: Z = 1.49 (P = 0.14)					
3 Mobile stroke team versus general medical ward					
Cape Town	22/58	34/91		2.8 %	1.02 [0.52, 2.02]

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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
Manchester	60/157	52/151		5.9 %	1.18 [0.74, 1.87]
Montreal	57/65	52/65		1.5 %	1.76 [0.69, 4.46]
Uppsala	40/60	35/52		2.1 %	0.97 [0.44, 2.13]
Subtotal (95% CI)	**340**	**359**		**12.2 %**	**1.16 [0.84, 1.60]**
Total events: 179 (Treatment), 173 (Control)					
Heterogeneity: Chi^2 = 1.09, df = 3 (P = 0.78); I^2 =0.0%					
Test for overall effect: Z = 0.89 (P = 0.37)					
4 Mixed rehabilitation ward versus general medical ward					
Helsinki	36/121	46/122		4.5 %	0.70 [0.41, 1.19]
Illinois	22/56	17/35		1.8 %	0.69 [0.29, 1.61]
Kuopio	22/50	23/45		2.0 %	0.75 [0.34, 1.68]
New York	15/42	17/40		1.6 %	0.75 [0.31, 1.82]
Newcastle	18/34	21/33		1.4 %	0.65 [0.25, 1.70]
Subtotal (95% CI)	**303**	**275**		**11.2 %**	**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)	**2814**	**2724**		**100.0 %**	**0.82 [0.73, 0.92]**
Total events: 1082 (Treatment), 1170 (Control)					
Heterogeneity: Chi^2 = 27.21, df = 24 (P = 0.29); I^2 =12%					
Test for overall effect: Z = 3.42 (P = 0.00064)					
Test for subgroup differences: Chi^2 = 5.43, df = 3 (P = 0.14), I^2 =45%					

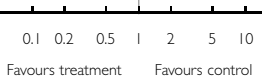
Analysis 2.3. Comparison 2 Organised stroke unit care versus general medical wards, Outcome 3 Death or dependency by the end of scheduled follow up.

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	Weight	Peto Odds Ratio Peto,Fixed,95% CI
1 Comprehensive stroke ward versus general medical ward					
Akershus	103/271	110/279		12.5 %	0.94 [0.67, 1.33]
Athens	138/302	145/302		14.4 %	0.91 [0.66, 1.25]
Beijing	113/195	118/197		9.1 %	0.92 [0.62, 1.38]
Edinburgh	93/155	94/156		7.2 %	0.99 [0.63, 1.56]
Goteborg-Sahlgren	108/166	54/83		4.8 %	1.00 [0.58, 1.74]
Joinville	18/35	23/39		1.8 %	0.74 [0.30, 1.84]
Perth	10/29	15/30		1.4 %	0.54 [0.19, 1.49]
Trondheim	54/110	81/110		5.0 %	0.36 [0.21, 0.61]
Umea	52/110	102/183		6.6 %	0.71 [0.44, 1.14]
Subtotal (95% CI)	**1373**	**1379**		**62.8 %**	**0.83 [0.71, 0.97]**
Total events: 689 (Treatment), 742 (Control)					
Heterogeneity: Chi^2 = 12.63, df = 8 (P = 0.13); I^2 =37%					
Test for overall effect: Z = 2.39 (P = 0.017)					
2 Rehabilitation stroke ward versus general medical ward					
Dover (GMW)	54/98	50/89		4.4 %	0.96 [0.54, 1.70]
Nottingham (GMW)	63/98	52/76		3.7 %	0.83 [0.44, 1.56]
Orpington 1993 (GMW)	38/53	39/48		1.8 %	0.59 [0.24, 1.48]
Orpington 1995	34/34	37/37			Not estimable
Subtotal (95% CI)	**283**	**250**		**9.9 %**	**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					
Cape Town	43/58	62/91		2.8 %	1.33 [0.65, 2.74]
Manchester	91/157	95/151		7.1 %	0.81 [0.52, 1.28]
Montreal	58/65	60/65		1.1 %	0.69 [0.21, 2.27]
Uppsala	41/60	33/52		2.4 %	1.24 [0.57, 2.71]



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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
Subtotal (95% CI)	**340**	**359**		**13.4 %**	**0.96 [0.69, 1.34]**
Total events: 233 (Treatment), 250 (Control)					
Heterogeneity: Chi^2 = 2.00, df = 3 (P = 0.57); I^2 =0.0%					
Test for overall effect: Z = 0.22 (P = 0.82)					
4 Mixed rehabilitation ward versus general medical ward					
Birmingham	8/29	7/23		1.0 %	0.87 [0.26, 2.89]
Helsinki	47/121	65/122		5.8 %	0.56 [0.34, 0.93]
Illinois	20/56	17/35		2.0 %	0.59 [0.25, 1.39]
Kuopio	31/50	31/45		2.1 %	0.74 [0.32, 1.72]
New York	23/42	23/40		2.0 %	0.90 [0.38, 2.13]
Newcastle	26/34	28/33		1.0 %	0.59 [0.18, 1.96]
Subtotal (95% CI)	**332**	**298**		**13.9 %**	**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)	**2328**	**2286**		**100.0 %**	**0.82 [0.73, 0.92]**
Total events: 1266 (Treatment), 1341 (Control)					
Heterogeneity: Chi^2 = 19.48, df = 21 (P = 0.55); I^2 =0.0%					
Test for overall effect: Z = 3.22 (P = 0.0013)					
Test for subgroup differences: Chi^2 = 2.83, df = 3 (P = 0.42), I^2 =0.0%					

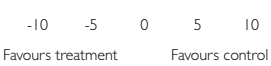
Analysis 2.4. Comparison 2 Organised stroke unit care versus general medical wards, Outcome 4 Length of stay (days) in a hospital or institution.

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							
Akershus	271	7.7 (6.2)	279	9.5 (6.9)		7.3 %	-0.27 [-0.44, -0.11]
Athens	302	11.23 (6.3)	302	12.1 (7.49)		7.4 %	-0.13 [-0.29, 0.03]
Beijing	195	20.6 (10.4)	197	22.3 (19.7)		6.9 %	-0.11 [-0.31, 0.09]
Edinburgh	155	54.6 (42.3)	152	75.1 (92.5)		6.6 %	-0.29 [-0.51, -0.06]
Goteborg-Ostra	215	16.2 (10.6)	202	13.9 (9)		7.0 %	0.23 [0.04, 0.43]
Goteborg-Sahlgren	166	28 (17)	83	36 (17)		6.0 %	-0.47 [-0.74, -0.20]
Joinville	35	11 (8.51)	39	12.6 (10.8)		3.8 %	-0.16 [-0.62, 0.30]
Perth	29	24 (30)	30	26.7 (30)		3.3 %	-0.09 [-0.60, 0.42]
Stockholm	269	21 (20)	225	20 (20)		7.2 %	0.05 [-0.13, 0.23]
Svendborg	31	12 (22)	34	23 (34)		3.5 %	-0.38 [-0.87, 0.12]
Trondheim	102	75 (114.8)	104	123 (145.8)		5.9 %	-0.36 [-0.64, -0.09]
Umea	110	21 (16)	183	31 (27)		6.4 %	-0.42 [-0.66, -0.19]
Subtotal (95% CI)	**1880**		**1830**			**71.1 %**	**-0.19 [-0.31, -0.06]**
Heterogeneity: $Tau^2 = 0.03$; $Chi^2 = 37.54$, df = 11 (P = 0.00009); $I^2 = 71\%$							
Test for overall effect: Z = 2.85 (P = 0.0044)							
2 Rehabilitation stroke ward versus general medical ward							
Dover (GMW)	1	0 (0)	1	0 (0)			Not estimable
Nottingham (GMW)	98	76.72 (39.73)	76	60.38 (48.91)		5.5 %	0.37 [0.07, 0.67]
Orpington 1993 (GMW)	1	0 (0)	1	0 (0)			Not estimable
Subtotal (95% CI)	**100**		**78**			**5.5 %**	**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							
Cape Town	58	7.5 (3.9)	91	9.9 (7.9)		5.1 %	-0.36 [-0.69, -0.03]
Uppsala	60	29.5 (26.7)	52	22.7 (20)		4.6 %	0.28 [-0.09, 0.66]
Subtotal (95% CI)	**118**		**143**			**9.8 %**	**-0.04 [-0.67, 0.59]**



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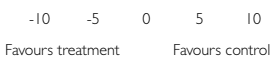
Study or subgroup	Treatment N	Mean(SD)	Control N	Mean(SD)	Std. Mean Difference IV,Random,95% CI	Weight	Std. Mean Difference IV,Random,95% CI
Heterogeneity: Tau^2 = 0.17; Chi^2 = 6.36, df = 1 (P = 0.01); I^2 =84%							
Test for overall effect: Z = 0.14 (P = 0.89)							
4 Mixed rehabilitation ward versus general ward							
Helsinki	121	23.6 (38.8)	122	30.5 (70.6)		6.2 %	-0.12 [-0.37, 0.13]
Kuopio	42	162.5 (125)	35	129.5 (119)		3.8 %	0.27 [-0.18, 0.72]
Newcastle	34	52 (45)	33	41 (34)		3.6 %	0.27 [-0.21, 0.75]
Subtotal (95% CI)	**197**		**190**			**13.6 %**	**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)	**2295**		**2241**			**100.0 %**	**-0.11 [-0.23, 0.01]**
Heterogeneity: Tau^2 = 0.04; Chi^2 = 60.61, df = 17 (P<0.00001); I^2 =72%							
Test for overall effect: Z = 1.76 (P = 0.079)							

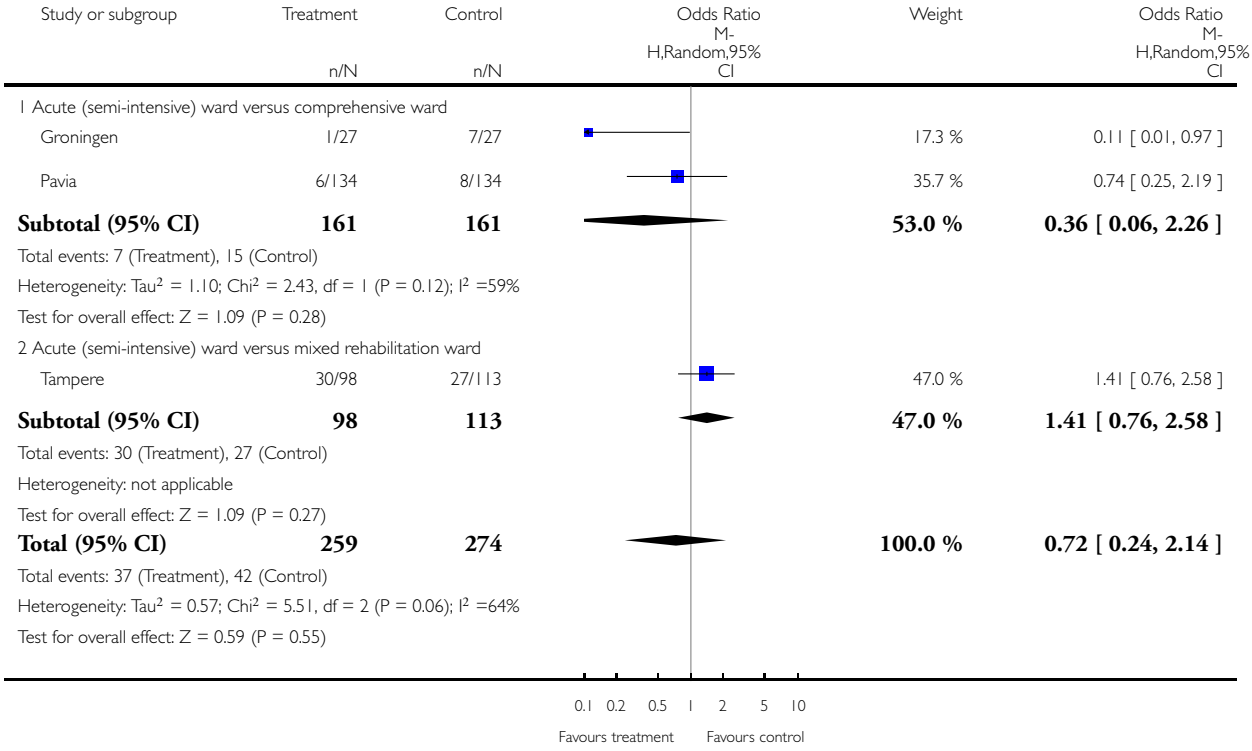


Analysis 3.1. Comparison 3 Different systems of organised care: acute stroke ward versus alternative service, Outcome 1 Death by the end of scheduled follow up.

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

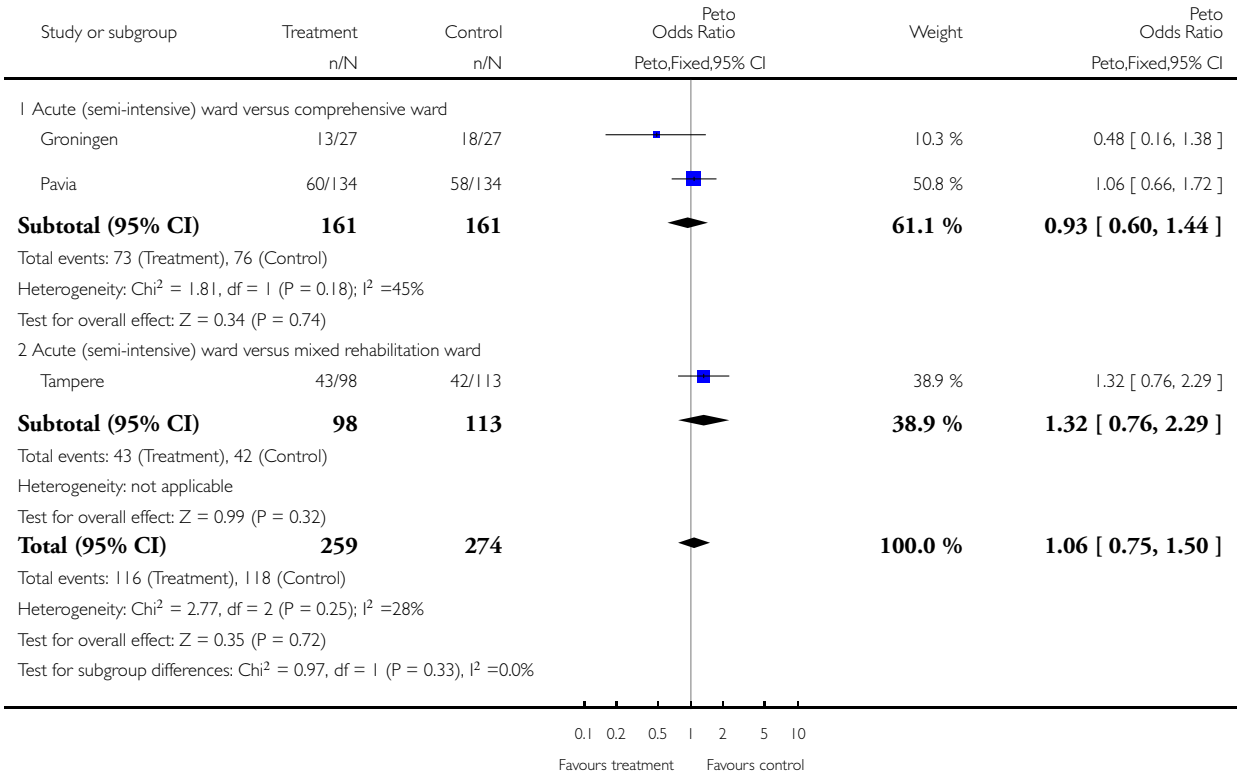


Analysis 3.2. Comparison 3 Different systems of organised care: acute stroke ward versus alternative service, Outcome 2 Death or institutional care by the end of scheduled follow up.

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

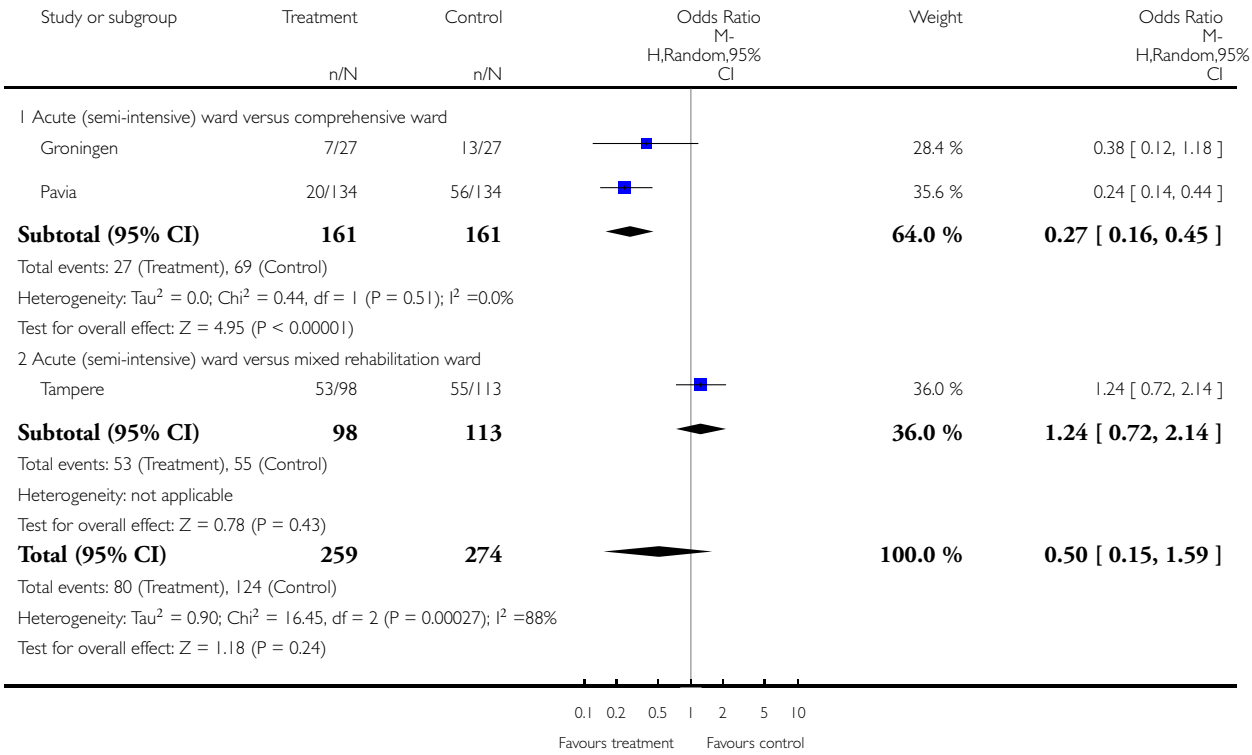


Analysis 3.3. Comparison 3 Different systems of organised care: acute stroke ward versus alternative service, Outcome 3 Death or dependency by the end of scheduled follow up.

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

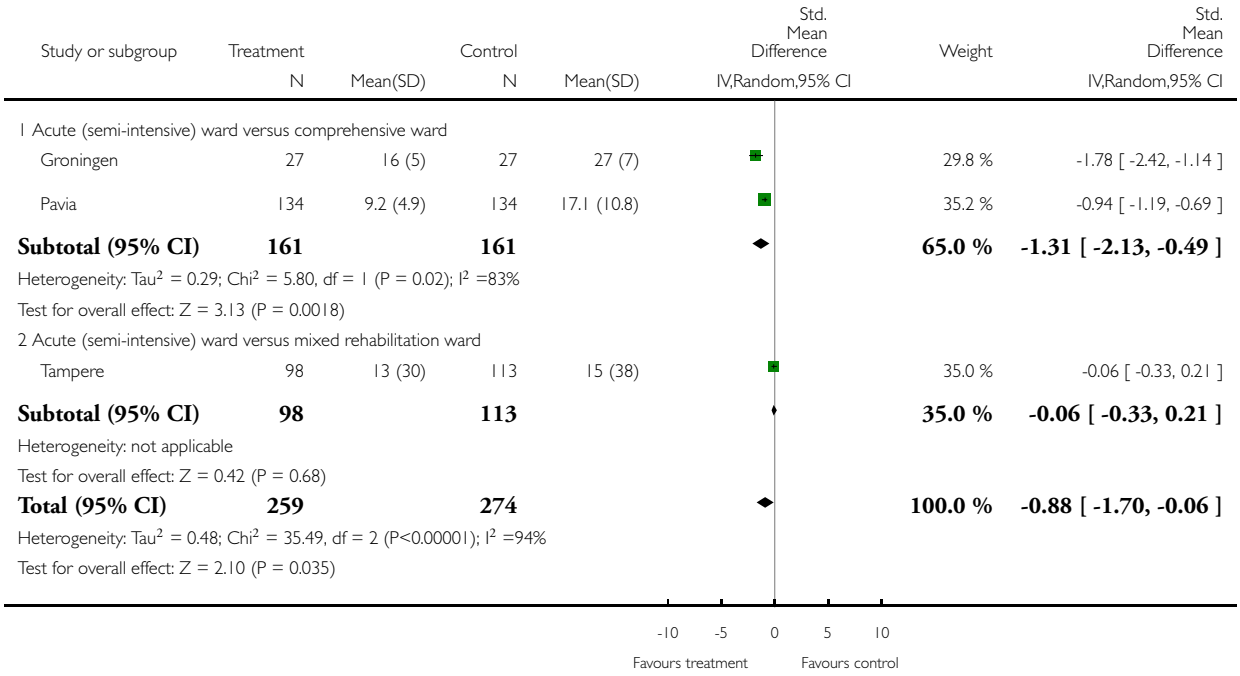


Analysis 3.4. Comparison 3 Different systems of organised care: acute stroke ward versus alternative service, Outcome 4 Length of stay (days) in a hospital or institution.

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					

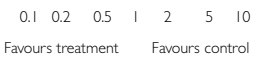
Analysis 4.2. Comparison 4 Different systems of organised care: comprehensive stroke ward versus alternative service, Outcome 2 Death or institutional care by the end of scheduled follow up.

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					

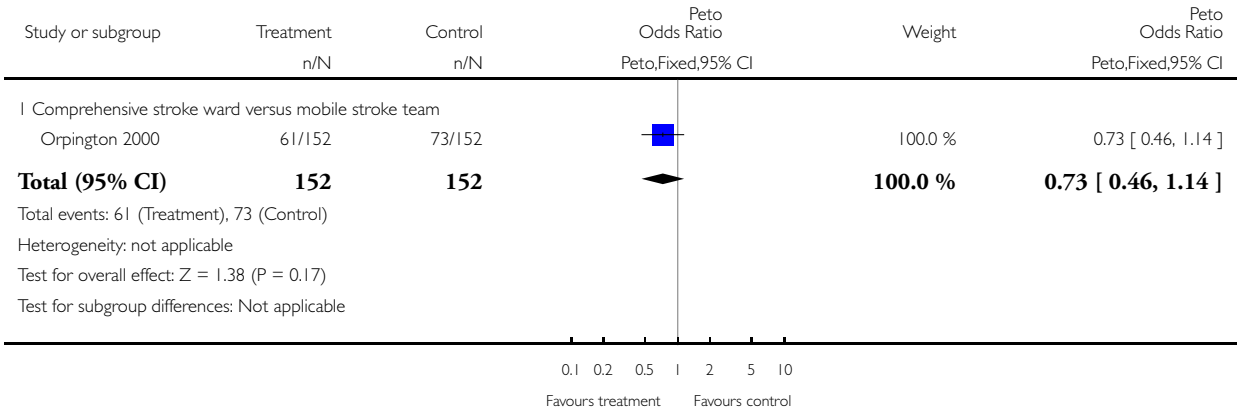


Analysis 4.3. Comparison 4 Different systems of organised care: comprehensive stroke ward versus alternative service, Outcome 3 Death or dependency by the end of scheduled follow up.

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



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)							

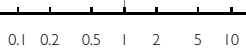
Analysis 5.1. Comparison 5 Different systems of organised care: rehabilitation stroke ward versus alternative service, Outcome 1 Death by the end of scheduled follow up.

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 (MRW)	5/18	11/28		21.3 %	0.61 [0.18, 2.08]
Nottingham (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]
Osaka	0/91	0/87			Not estimable
Total (95% CI)	**258**	**251**		**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					



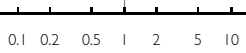
Analysis 5.2. Comparison 5 Different systems of organised care: rehabilitation stroke ward versus alternative service, Outcome 2 Death or institutional care by the end of scheduled follow up.

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 (MRW)	11/18	18/28		9.1 %	0.88 [0.26, 2.94]
Nottingham (MRW)	34/78	32/63		30.3 %	0.75 [0.39, 1.46]
Orpington 1993 (MRW)	24/71	33/73		30.1 %	0.62 [0.32, 1.21]
Osaka	23/91	25/87		30.6 %	0.84 [0.43, 1.63]
Total (95% CI)	**258**	**251**		**100.0 %**	**0.74 [0.52, 1.07]**
Total events: 92 (Treatment), 108 (Control)					
Heterogeneity: Chi^2 = 0.47, df = 3 (P = 0.92); I^2 =0.0%					
Test for overall effect: Z = 1.58 (P = 0.11)					
Test for subgroup differences: Not applicable					



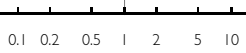
Analysis 5.3. Comparison 5 Different systems of organised care: rehabilitation stroke ward versus alternative service, Outcome 3 Death or dependency by the end of scheduled follow up.

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 (MRW)	11/18	19/28		11.3 %	0.75 [0.22, 2.56]
Nottingham (MRW)	60/78	48/63		28.0 %	1.04 [0.48, 2.27]
Orpington 1993 (MRW)	63/71	69/73		12.3 %	0.47 [0.15, 1.53]
Osaka	37/91	37/87		48.4 %	0.93 [0.51, 1.68]
Total (95% CI)	**258**	**251**		**100.0 %**	**0.86 [0.57, 1.30]**
Total events: 171 (Treatment), 173 (Control)					
Heterogeneity: Chi^2 = 1.34, df = 3 (P = 0.72); I^2 =0.0%					
Test for overall effect: Z = 0.72 (P = 0.47)					
Test for subgroup differences: Not applicable					

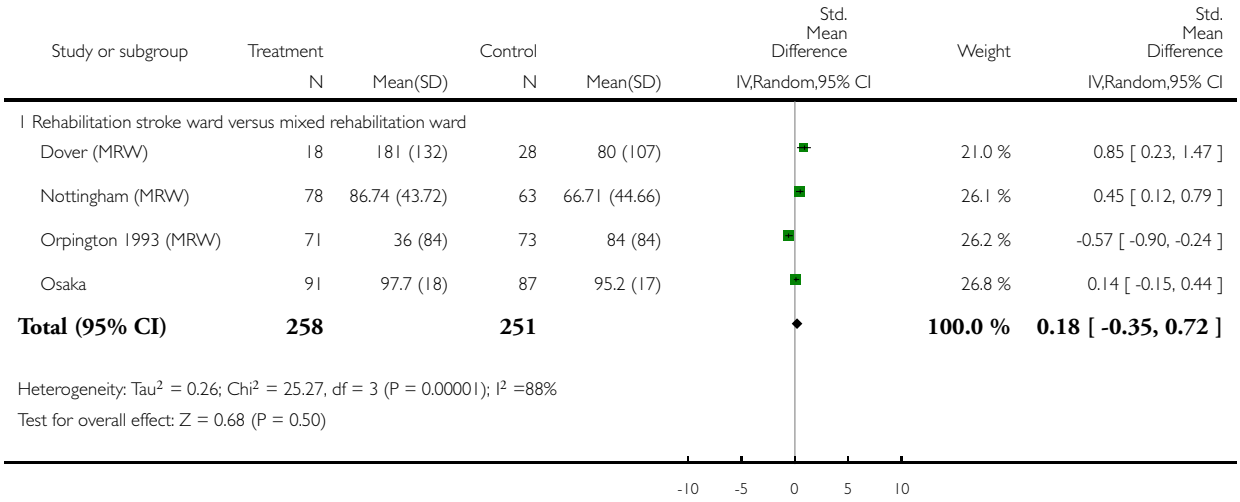


Analysis 5.4. Comparison 5 Different systems of organised care: rehabilitation stroke ward versus alternative service, Outcome 4 Length of stay (days) in a hospital or institution.

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



ADDITIONAL TABLES

Table 1. Service comparisons in outcome data

Trials	Patients	Index (SU) Care	Less Organised Care
16	4261	Stroke ward	General medical ward
6	630	Mixed rehabilitation ward	General medical ward
4	679	Mobile stroke team (peripatetic care)	General medical ward
5	720	Stroke ward	Mixed rehabilitation ward
1	304	Stroke ward	Mobile stroke team
2	322	Stroke ward (semi-intensive unit)	Stroke ward (comprehensive unit)

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% confidence intervals around the odds ratio suggest that stroke unit care is not beneficial in this sub-group 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 confidence intervals 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. Firstly, the statistical power of this analysis is limited because the mild stroke subgroup had relatively few outcome events (death or institutional care). Secondly, 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 randomized trials. Stroke 1997;28:2139-2144.

Contributors

Peter Langhorne 07/03/2001

WHAT'S NEW

Last assessed as up-to-date: 27 November 2006.

Date	Event	Description
9 September 2008	Amended	Converted to new review format.

HISTORY

Protocol first published: Issue 1, 1995

Review first published: Issue 1, 1995

Date	Event	Description
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 both comparing stroke-unit care with general medical wards and comparing two different forms of organised (stroke unit) care

CONTRIBUTIONS OF AUTHORS

Lindsay Govan updated the review and drafted the updated report.

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

Peter Langhorne, Martin Dennis, Graeme Hankey, Chris Weir and Brian Williams formed the writing committee which was responsible for the re-drafting of the report.

The following collaborators provided original data, advice and comment, and assisted with the re-drafting of the report: K Asplund (Umea, Sweden); P Berman (Nottingham, England); C Blomstrand (Goteborg, Sweden); M Britton (Stockholm, 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: J Douglas (Administrator); T Erila (Tampere, Finland); M Garraway (Edinburgh, Scotland); M Ilmavirta (Tampere, Finland); R Stevens (Dover, England); SP Stone (London, England).

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