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Interventions for improving modifiable risk factor control in the secondary prevention of stroke (Review)

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[Intervention Review]

Interventions for improving modifiable risk factor control in the secondary prevention of stroke

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ABSTRACT

Background

People with stroke or transient ischaemic attack (TIA) are at increased risk of future stroke and other cardiovascular events. Stroke services need to be configured to maximise the adoption of evidence-based strategies for secondary stroke prevention. Smoking-related interventions were examined in a separate review so were not considered in this review. This is an update of our 2014 review.

Objectives

To assess the effects of stroke service interventions for implementing secondary stroke prevention strategies on modifiable risk factor control, including patient adherence to prescribed medications, and the occurrence of secondary cardiovascular events.

Search methods

We searched the Cochrane Stroke Group Trials Register (April 2017), the Cochrane Effective Practice and Organisation of Care Group Trials Register (April 2017), CENTRAL (the Cochrane Library 2017, issue 3), MEDLINE (1950 to April 2017), Embase (1981 to April 2017) and 10 additional databases including clinical trials registers. We located further studies by searching reference lists of articles and contacting authors of included studies.

Selection criteria

We included randomised controlled trials (RCTs) that evaluated the effects of organisational or educational and behavioural interventions (compared with usual care) on modifiable risk factor control for secondary stroke prevention.

Data collection and analysis

Four review authors selected studies for inclusion and independently extracted data. The quality of the evidence as 'high', 'moderate', 'low' or 'very low' according to the GRADE approach (GRADEpro GDT).Three review authors assessed the risk of bias for the included studies. We sought missing data from trialists.The results are presented in 'Summary of findings' tables.

Main results

The updated review included 16 new studies involving 25,819 participants, resulting in a total of 42 studies including 33,840 participants. We used the Cochrane risk of bias tool and assessed three studies at high risk of bias; the remainder were considered to have a low risk of bias. We included 26 studies that predominantly evaluated organisational interventions and 16 that evaluated educational and behavioural interventions for participants. We pooled results where appropriate, although some clinical and methodological heterogeneity was present.

Educational and behavioural interventions showed no clear differences on any of the review outcomes, which include mean systolic and diastolic blood pressure, mean body mass index, achievement of HbA1c target, lipid profile, mean HbA1c level, medication adherence, or recurrent cardiovascular events. There was moderate-quality evidence that organisational interventions resulted in improved blood pressure control, in particular an improvement in achieving target blood pressure (odds ratio (OR) 1.44, 95% confidence interval (CI) 1.09 to1.90; 13 studies; 23,631 participants). However, there were no significant changes in mean systolic blood pressure (mean difference (MD), -1.58 mmHg 95% CI -4.66 to 1.51; 16 studies; 17,490 participants) and mean diastolic blood pressure (MD -0.91 mmHg 95% CI -2.75 to 0.93; 14 studies; 17,178 participants). There were no significant changes in the remaining review outcomes.

Authors' conclusions

We found that organisational interventions may be associated with an improvement in achieving blood pressure target but we did not find any clear evidence that these interventions improve other modifiable risk factors (lipid profile, HbA1c, medication adherence) or reduce the incidence of recurrent cardiovascular events. Interventions, including patient education alone, did not lead to improvements in modifiable risk factor control or the prevention of recurrent cardiovascular events.

PLAIN LANGUAGE SUMMARY

Healthcare interventions for reducing the risk of future stroke in people with previous stroke or transient ischaemic attack (TIA)

Review question

How effective are healthcare interventions for preventing a recurrent stroke or other cardiovascular events in people who have had a stroke or a transient ischaemic attack (TIA: also known as a mini-stroke)?

Background

Stroke and TIA are diseases caused by interruptions in the blood supply to the brain. People who experience a stroke or TIA are at risk of future stroke. Several medications and lifestyle changes can be used to lower stroke risk by improving the control of modifiable risk factors such as blood pressure, blood fats, being overweight, raised blood sugar, and the use of preventive medications. These risk factors are often not managed effectively following a stroke or TIA. It is important to identify healthcare interventions that can help prevent stroke by improving these risk factors. Interventions in this review targeted patients or clinicians, or both (aimed at education or changing behaviour, or both); and organisations (e.g. changing the way services were provided).

This is an update of our review published in 2014.

Search date

We searched for studies up to April 2017.

Study characteristics

This updated review included 16 new studies involving 25,819 participants, resulting in a total of 42 studies including 33,840 with stroke or TIA whose average age ranged from 60 to 74.3 years. Most studies took place in primary care or community settings. Sixteen studies involved educational or behavioural interventions for participants and 26 studies mostly involved organisational interventions. Most interventions lasted for between three and 12 months, with follow-up from three months up to three years.

Key results

Changes to healthcare services that looked at patient education or behaviour only, without any alterations in the organisation of patient care, showed no clear evidence of improvements in risk factors for stroke. Changes in the organisation of healthcare services resulted in

improvements in blood pressure control. The effects of these interventions on changes in blood fats, blood sugar, body weight, or use of medicines were not conclusive.

We identified 24 ongoing studies suggesting that research in this area is increasing.

Quality of the evidence

The available evidence was assessed as moderate- or low-quality because of variations in methods used and results reported.

SUMMARY OF FINDINGS FOR THE MAIN COMPARISON [Explanation]

Educational or behavioural interventions for patients compared to usual care for improving modifiable risk factor control in the secondary prevention of stroke

Patient or population: The trials included a total of 33,840 participants with cerebrovascular disease. The mean or median age of participants ranged from 60 years to 74.3 years. Nine studies included participants with diagnoses of ischaemic stroke; six studies included participants with either ischaemic or haemorrhagic stroke; one focused on lacunar strokes; two did not specify stroke subtype; four included participants with TIA only and 19 trials included a broader range of participants with a diagnosis of either stroke or TIA
Settings: Primary or secondary care
Intervention: Educational or behavioural interventions for patients
Comparison: Usual care

Outcomes	№ of participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)	
				Risk with usual care	Risk difference with Educational or behavioural interventions for patients
Mean systolic blood pressure	1398 (11 RCTs)	⊕⊕⊕◯ MODERATE [1]	-	The mean systolic blood pressure was 135.59 mmHg	MD 2.81 mmHg lower (7.02 lower to 1.39 higher)
Mean diastolic blood pressure	1398 (11 RCTs)	⊕⊕⊕◯ MODERATE [1]	-	The mean diastolic blood pressure was 78.28 mmHg	MD 0.83 mmHg lower (2.8 lower to 1.13 higher)
Blood pressure target achievement	266 (3 RCTs)	⊕⊕⊕◯ MODERATE [1]	OR 1.34 (0.70 to 2.59)	**Study population**	
				385 per 1000	71 more per 1000 (80 fewer to 234 more)
				Low	
				260 per 1000	60 more per 1000 (63 fewer to 216 more)
				High	

				430 per 1000	73 more per 1000 (84 fewer to 231 more)
Medication adherence	33,762 (13 RCTs)	⊕⊕◯◯ LOW [1,2,3]	-	Most studies measuring medication adherence outcomes found no significant differences between the intervention and control groups on any indicator of adherence	
Mean low density lipoprotein	495 (4 RCTs)	⊕⊕⊕◯ MODERATE [4]	-	The mean low density lipoprotein was 2.62 mmol/L	MD 0.13 mmol/L lower (0.28 lower to 0.02 higher)
Mean HbA1c	70 (1 RCT)	⊕⊕◯◯ LOW [4,5]	-	The mean HbA1c was 5.98	MD 0.11 lower (0.39 lower to 0.17 higher)
Mean BMI	127 (2 RCTs)	⊕⊕⊕◯ MODERATE [4]	-	The mean BMI was 24.01 kg/m²	MD 0.22 kg/m² higher (0.85 lower to 1.29 higher)

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the __relative effect__ of the intervention (and its 95% CI).
CI: Confidence interval; **OR:** Odds ratio;

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

[1] The methods used in these studies were heterogenous which made these difficult to directly correlate
[2] Contains at least one study that scores 'high' using the Cochrane risk analysis and thus down graded by one level
[3] Results were inconsistent across the studies
[4] Secondary outcome
[5] One study provided evidence for this outcome

BACKGROUND

Description of the condition

Stroke is defined as a rapidly developing neurological deficit of presumed vascular origin, lasting for over 24 hours or leading to death (WHO 1978). Transient ischaemic attack (TIA) is an expression used traditionally to describe comparable neurological deficits lasting for fewer than 24 hours (Albers 2002). More recently, a new definition of TIA has been proposed, omitting the arbitrary 24-hour time frame and identifying a TIA as a "transient episode of neurological dysfunction caused by focal brain, spinal cord, or retinal ischaemia, without acute infarction" (Easton 2009).

The World Health Organization (WHO) has reported that cerebrovascular disease (stroke) is the second leading cause of mortality and disease burden among adults aged 60 years and over (Feigin 2014; Feigin 2016; Fourth SSNAP Annual Report 2016/17; Stroke Association 2018; WHO 2017). Following a TIA or minor stroke people have a 5.1% risk of stroke recurrence in the next year (Amarenco 2016). Long-term cohort studies have demonstrated that the risk of cardiovascular events remains high for at least 10 years after stroke or TIA (Touze 2005; Van Wijk 2005). Secondary prevention strategies aim to prevent recurrent events by improving modifiable risk factor control. National stroke guidelines identify clinical conditions (hypertension, hyperlipidaemia, atrial fibrillation, diabetes, and obesity) and lifestyle factors (smoking, physical inactivity, unhealthy diet, and excess alcohol consumption) as significant modifiable risk factors that should be targeted for secondary prevention (Canadian Stroke Best Practices 2017; ESO 2008; Kernan 2014; National Stroke Foundation 2017; SIGN 2008; Stroke Audit 2016). The strength of evidence for benefit from modifying risk factors varies: there is direct clinical trial evidence for treatment of hypertension and raised lipids, anti-platelet drugs, anticoagulation for atrial fibrillation, surgery for carotid stenosis and, more recently, insulin resistance (Kernan 2016). The evidence for lifestyle interventions such as improving control of diabetes, weight loss, smoking cessation, and alcohol reduction relies on observational studies (Hankey 2014).

Description of the intervention

For the purposes of this review, we considered stroke services to include all services responsible for providing acute and follow-up care to people with stroke and TIA. Stroke services exist as part of diverse healthcare systems, with specific treatment goals varying according to national clinical guidelines. Acute stroke services include organised inpatient (stroke unit) care and specialist TIA clinics (RCP 2016; Stroke Unit Trialists' Collaboration 2013). Recommendations for secondary prevention can be initiated as part of a co-ordinated treatment programme during acute hospitalisation (Ovbiagele 2004). However, primary care services are well placed to monitor patient risk factors, encourage lifestyle change and review secondary prevention medications on an ongoing basis (RCP 2016). Primary care aims to be characterised by person-centred, comprehensiveness, continuity of care, and community participation (Starfield 2002; WHO 2008). Social care services and voluntary sector organisations can also work in partnership with primary care to deliver healthy living support (NAO 2005). Stroke service interventions are considered complex interventions since they often contain several interacting components and may require complex behaviours, organisational change, or the assessment of numerous outcome measures (Craig 2008; Redfern 2008).

How the intervention might work

Stroke services addressing secondary prevention aim to improve patient adherence with medication regimens and lifestyle advice. Several classes of medication reduce stroke incidence by modifying cardiovascular risk. For example, long-term antiplatelet medication in those with a history of stroke or TIA is associated with a significant 25% reduction in secondary vascular events (Antithrombotic Trialists' Collaboration 2002; Barber 2016). Similarly, antihypertensive and statin medications are associated with improvements in secondary prevention (Collins 2016; Ettehad 2016; Logue 2015; Preiss 2015; Sundström 2014;). Meta-analyses report that moderate to high physical activity (Bennett 2017; Fan 2017), moderate alcohol consumption (Holmes 2014; Reynolds 2003), reduction of salt intake (Aburto 2013; He 2013), and specific dietary changes (He 2004; He 2006) can also facilitate stroke prevention and cardiovascular risk reduction. An international case-control study identified five modifiable risk factors accounting for 83% of the population attributable risk (PAR) for stroke (O'Donnell 2010; Perk 2012). Targeting multiple risk factors may have additive benefits for secondary prevention, for example, a modelling study predicted that a 80% cumulative risk reduction in recurrent vascular events could be achieved by combining dietary modification, exercise, aspirin, a statin, and an antihypertensive agent (Hackam 2007; Perk 2012).

Why it is important to do this review

Most people with stroke have at least one cardiovascular risk factor and hypertension, hyperlipidaemia, diabetes, smoking, and obesity are often inadequately managed during follow-up (Hankey 2014; Herttua 2016; Kernan 2014; Perreault 2012; Xu 2017). Although the effectiveness of secondary prevention medications is well-established, non-treatment rates for antithrombotic, antihypertensive, and statin therapies remain high after stroke (Hankey 2014; Raine 2009) and TIA (Lager 2012). This includes a large proportion due to behavioural factors such as smoking and low

physical activity (Feigin 2016). Only 31% of people with stroke and 35% of people with TIA receive combination treatment with all three medication classes (Ramsay 2007). Furthermore, adherence to secondary prevention medications falls progressively as time since the primary stroke elapses (Glader 2010). As strategies for stroke prevention are not optimally implemented, substantial benefits stand to be gained from improving the use of evidence-based interventions (Goldstein 2008).

Several studies have revealed inequalities in the provision of stroke care with older people being less likely to receive or adhere to secondary prevention medication (De Schryver 2005; Raine 2009; Ramsay 2007). Similarly, people with stroke who have more severe disability (Barthel scores of 14 or less) are less likely to receive appropriate secondary prevention than those with mild disability (Barthel score 15 to 20) (Rudd 2004). Ethnic groups are also reported to differ with respect to patterns in behavioural risk factors for stroke (Dundas 2001). These subgroups of people may require targeted interventions to improve risk factor control.

Service interventions used for other conditions, particularly secondary prevention of ischaemic heart disease, may be relevant to the secondary prevention of stroke (Buckley 2010; Kernan 2014). However, more direct evidence is needed to guide improvements in follow-up care after stroke or TIA. For example, stroke commonly results in cognitive impairments or physical disabilities that are likely to influence both intervention design and outcomes. To date, there are no systematic reviews that have considered the impact of stroke service interventions on cardiovascular risk factor control or adherence to secondary prevention medications. An assessment of the quality and outcomes of previous studies in this field will inform the development of new interventions.

OBJECTIVES

To assess the effects of stroke service interventions for implementing secondary stroke prevention strategies on modifiable risk factor control, including patient adherence to prescribed medications, and the occurrence of secondary cardiovascular events.

METHODS

Criteria for considering studies for this review

Types of studies

We included published or unpublished randomised controlled trials (RCTs) with a minimum follow-up of three months after the start of the intervention. Parallel group trials, cluster-randomised trials and cross-over trials were eligible for inclusion in the review.

Types of participants

We included adults (aged 18 years and over) with a confirmed diagnosis of ischaemic stroke, haemorrhagic stroke, or transient ischaemic attack (TIA).

Types of interventions

For the purposes of this review, we defined stroke service educational or organisational interventions as alternative models of care that are implemented to improve patient outcomes following stroke or TIA. We included stroke service interventions that were intended to improve modifiable risk factor control. We focused on interventions that aimed to improve modifiable risk factor control through increased adherence to existing recommendations for secondary stroke prevention (e.g. recommendations in international stroke guidelines). We did not consider smoking-related interventions which have been extensively reported elsewhere (Critchley 2012; Stead 2013a; Stead 2013b; Stead 2017; Taylor 2017; Whittaker 2016).

Following EPOC guidelines (EPOC 2015) we considered the following intervention categories (pre-specified in the review protocol). Because educational and organisational interventions differ in their theoretical frameworks, the protocol stated these would be analysed separately (Lager 2011).

- Educational and behavioural interventions for stroke patients.
- Educational and behavioural interventions for stroke service providers.
- Organisational interventions (subdivided into the following categories developed by Wensing 2006):
    - revision of professional roles, e.g. involvement of non-physician staff in prevention clinics;
    - collaboration between multidisciplinary teams, e.g. interventions promoting effective liaison between primary and secondary care teams;
    - integrated care services, e.g. disease and case management programs where patient care follows protocols for screening, education and treatment or monitoring;
    - knowledge management systems, e.g. computerised decision support on medication prescribing, shared medical records;
    - quality management, e.g. guideline and protocol development;
    - financial incentives, e.g. the UK Quality and Outcomes Framework (NHS 2014).

We excluded interventions that were intended to improve physical rehabilitation or knowledge of stroke in general, surgical interventions, and interventions testing new pharmacological therapies. We also excluded exercise training programs for people with stroke or TIA which are the subject of other Cochrane Reviews (MacKay-Lyons 2013; Saunders 2016).

Types of outcome measures

Primary outcomes

- Target achievement or mean reductions, or both, for blood pressure, lipid profile (total cholesterol), high density lipoprotein (HDL), low density lipoprotein (LDL), triglycerides (TG), glycaemic control (HbA1c), body mass index (BMI), or validated cardiovascular risk score.
- Any indicator of patient adherence to secondary prevention medications, e.g. self-reported medication adherence or medication persistence, medication possession, individual patient data on prescriptions, pharmacy claims, electronic monitoring, drug tracers in blood or urine. Secondary prevention medications include those to lower causal risk factors (blood pressure, lipids, etc.) as well as antithrombotics to directly reduce the risk of a cerebrovascular event.

Secondary outcomes

- Secondary cardiovascular events: stroke, myocardial infarction, or vascular death or composites. Because this review focused on long-term prevention, we did not include surgical interventions for carotid stenosis nor identification and management of atrial fibrillation. We also excluded other more recently identified risk factors, such as insulin resistance.

Search methods for identification of studies

See the 'Specialised register' section in the Cochrane Stroke Group module. We searched for trials in all languages and arranged for translation of relevant papers where necessary.

Electronic searches

We searched the following electronic databases to identify relevant trials:

- Cochrane Stroke Group Trials Register (to April 2017);
- Cochrane Effective Practice and Organisation of Care Group Trials Register (to April 2017);
- Cochrane Central Register of Controlled Trials (CENTRAL; 2017, Issue 5) in the Cochrane Library (searched May 2017) (Appendix 1);
- MEDLINE in Ovid (1950 to April 2017) (Appendix 2);
- Embase in Ovid (1981 to April 2017) (Appendix 3);
- CINAHL in EBSCO (Cumulative Index to Nursing and Allied Health Literature; 1982 to April 2017) (Appendix 4);
- AMED in Ovid (Allied and Complementary Medicine Database; 1985 to April 2017) (Appendix 5);
- British Nursing Index (BNI) in Ovid (1985 to April 2017) (Appendix 6);
- Web of Science Conference Proceedings Citation Index - Science (1970 to April 2017) (Appendix 7); and
- BiblioMap (health promotion research) (April 2017) (www.eppi.ioe.ac.uk/webdatabases/Intro.aspx?ID=7).

We also searched the following databases of ongoing trials and grants registers:

- US National Institutes of Health Ongoing Trials Register (ClinicalTrials.gov (www.clinicaltrials.gov; searched April 2017) (Appendix 8);
- ISRCTN Registry (www.isrctn.com; searched April 2017) (Appendix 9);
- Stroke Trials Registry (www.strokecenter.org/trials/; searched April 2017) (Appendix 10); and
- World Health Organization (WHO) International Clinical Trials Registry Platform (www.apps.who.int/trialsearch/; searched April 2017) (Appendix 11)

Searching other resources

We used the Science Citation Index Cited Reference Search to search for studies citing included trials. We also checked the reference lists of included trials, relevant systematic reviews, and relevant meta-analyses. We contacted authors and trialists involved in included trials to facilitate identification of ongoing trials and unpublished studies.

Data collection and analysis

Selection of studies

For the previous version of this review, two review authors (KL and a second review author) independently assessed the titles, abstracts and keywords of all records retrieved from the electronic searches and excluded obviously irrelevant studies (Lager 2014). We resolved any disagreements regarding study eligibility by discussion among all review authors. For this search update in April 2017, two review authors (BB and AW) undertook the same process, identifying relevant studies published since the original review. A third author (PM) validated the results and edited the review. We obtained the full texts of the remaining studies and two review authors independently selected studies for inclusion based on the following criteria.

The study:

- was an RCT;
- restricted participants to people with TIA or stroke, or reported outcomes separately for TIA or stroke patient subgroups;
- evaluated a stroke service intervention;
- stated or clearly implied that the intention of an intervention was to improve modifiable risk factor control;
- assessed one or more of the defined outcome measures; and
- did not include physical rehabilitation programs, new pharmacological therapies, surgical procedures, exercise training

programmes, or educational programmes intended to improve knowledge of stroke in general.

Data extraction and management

For the previous version of this review, two review authors independently extracted outcome data for each eligible trial using a pre-specified data extraction form (Lager 2014). One review author extracted data for all eligible studies (KL) and a second review author (AKS and VH) independently repeated data extraction for each study. We resolved disagreements by discussion to reach consensus, with review authors referring back to the original article. For this update, this method was repeated by BB, AW and PM respectively.

We recorded the following information for each study.

- General information: published or unpublished, title, authors, journal or source, publication date, country of origin, publication language.
- Study methods: unit of randomisation (and method), allocation concealment (and method), blinding (outcome assessors), validation of questionnaires.
- Participants: sampling (random or convenience), place of recruitment, total sample size, numbers randomised, inclusion criteria, exclusion criteria, demographic characteristics (age, gender, ethnicity, socio-economic or socio-demographic status), disability (modified Rankin score, Barthel score), co-morbidities, similarity between groups at baseline, dropout and withdrawal rates.
- Intervention details: components, length, frequency, location, mode of delivery, personnel responsible for delivery, timing post-stroke, details of control protocol.
- Outcomes: pre-specified outcomes (see Selection of studies), follow-up intervals from start of intervention, units of measurement, missing data.
- Results: results for pre-specified outcomes, number of participants assessed, method of analysis (intention-to-treat analysis, per protocol analysis).
- Intervention category: pre-specified in the review protocol.

Assessment of risk of bias in included studies

Three review authors (KL, BB, AW) independently assessed the risk of bias for each included study, using the 'Risk of bias' tool described in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011a). We resolved any disagreements by discussion. We assessed the risk of bias according to the following domains.

- Random sequence generation.
- Allocation concealment.
- Blinding of participants and personnel.
- Blinding of outcome assessment.
- Incomplete outcome data.
- Selective outcome reporting.
- Other bias.

We graded the risk of bias for each domain as of high, low, or unclear risk of bias and entered this information into the 'Risk of bias' table produced for each study in the Characteristics of included studies section, along with the reason for each decision. We contacted study authors to retrieve missing information. If study authors did not provide the requested information, we recorded the relevant items on the risk of bias assessment as 'unclear'.

We summarised the risk of bias according to the following criteria (Higgins 2011a).

- Low risk of bias: low risk of bias for all domains.
- Unclear risk of bias: unclear risk of bias for one or more domains.
- High risk of bias: high risk of bias for one or more domains.

Measures of treatment effect

A mixture of continuous outcomes and dichotomous outcomes were reported by studies included in this review. Where possible, we reported data in terms of mean difference (MD) and 95% confidence interval (CI) for continuous data. For dichotomous data, we reported risk ratios (RR) or odds ratios (OR) and 95% CIs. If individual studies reported continuous and dichotomous data for the same outcome, we included both variables in the review. We used RevMan 5 to carry out statistical analyses (RevMan 2014).

Unit of analysis issues

We analysed cluster-RCTs by reporting effect estimates from analyses that accounted for the cluster design. Where necessary, we calculated effective sample sizes for cluster-RCTs and combined these with parallel RCTs in meta-analyses (Higgins 2011b). When examining recurrent events we aimed to analyse the number of people with one or more events rather than number of events. Where studies included repeated measurements for participants at several time points, we reported the outcomes recorded at the end of the study per protocol.

Dealing with missing data

We proposed to contact study authors if necessary to request any missing data and to input missing summary data (e.g. standard deviations) based on recommendations in the *Cochrane Handbook for Systematic Reviews of Interventions* (Deeks 2011; Higgins 2011b). There was an apparent inconsistency with the standard deviation values reported for MacKenzie 2013. We attempted to contact the author to clarify; however, we did not receive a response, so we used the published standard deviation values.

Assessment of heterogeneity

We identified heterogeneity from forest plots using the Chi² test and a significance level of alpha = 0.1. We also quantified heterogeneity using the I² statistic, where I² values of 50% or more indicate a substantial level of heterogeneity (Higgins 2002; Higgins 2003). Where appropriate, we assessed possible sources of heterogeneity using sensitivity analyses.

Assessment of reporting biases

We used funnel plots to assess publication bias.

Data synthesis

Included studies were heterogeneous in terms of interventions, settings, participant characteristics, and outcome measurements. Where there were sufficient comparable data we combined results for each outcome to give an overall estimate of treatment effect. We conducted meta-analyses separately for each intervention category to reduce clinical heterogeneity among the studies that were combined to produce pooled estimates using random-effects models. We pre-specified intervention categories in the review protocol. Where meta-analysis was not possible or appropriate, we presented results as a qualitative synthesis of intervention effects.

Subgroup analysis and investigation of heterogeneity

We planned to analyse outcomes according to the following subgroups.

- Participant age (under 65 years, 65 years and over).
- Condition (ischaemic stroke, haemorrhagic stroke, or TIA).
- Stroke severity (e.g. according to the National Institute of Health Stroke Scale (NIHSS)) or disability (e.g. according to the Barthel score or modified Rankin Score (mRS)).
- Specific risk factor management strategy (e.g. blood pressure lowering interventions).

However, subgroup analyses were not possible because relevant data were not available from the included studies. We were, however, able to undertake subgroup analysis for studies involving multidisciplinary team members.

Sensitivity analysis

We undertook sensitivity analysis for achievement of blood pressure targets using the following criteria.

- Repeating analyses excluding unpublished studies.
- Repeating analyses excluding studies at high or unclear risk of bias.
- Repeating analyses excluding very large studies to investigate the extent to which they dominated the results.
- Repeating analyses using different measures of effect size (risk difference, odds ratio etc.) and different statistical models (fixed-effect and random-effects models).

GRADE and 'Summary of findings' tables

We used GRADEpro GDT to import data from Review Manager 5 (RevMan 2014) in order to create 'Summary of findings' tables. Within these tables, we presented a summary of the evidence for educational and behavioural interventions for participants receiving treatment compared with those in the control group for secondary stroke prevention (Summary of findings for the main comparison), and organisational interventions for participants receiving treatment compared with those in the control group for secondary stroke prevention (Summary of findings table 2). We included the following outcomes: mean systolic and diastolic blood pressure, blood pressure target achievement, medication adherence, mean low density lipoprotein, mean HbA1c and mean BMI.

We justified judgements about the quality of the evidence (high, moderate, low, or very low) according to the GRADE approach (Higgins 2011c), which we documented and incorporated into the reporting of results for each outcome. The quality of evidence could be downgraded by one level (serious concern) or two levels (very serious concerns) due to concerns raised within: risk of bias; inconsistency (unexplained heterogeneity, inconsistency of results); indirectness (indirect population, intervention, control, outcomes) and due to imprecision (wide CIs, single trials). Grade outcomes are presented in the 'Summary of findings' tables (Summary of findings for the main comparison; Summary of findings 2).

RESULTS

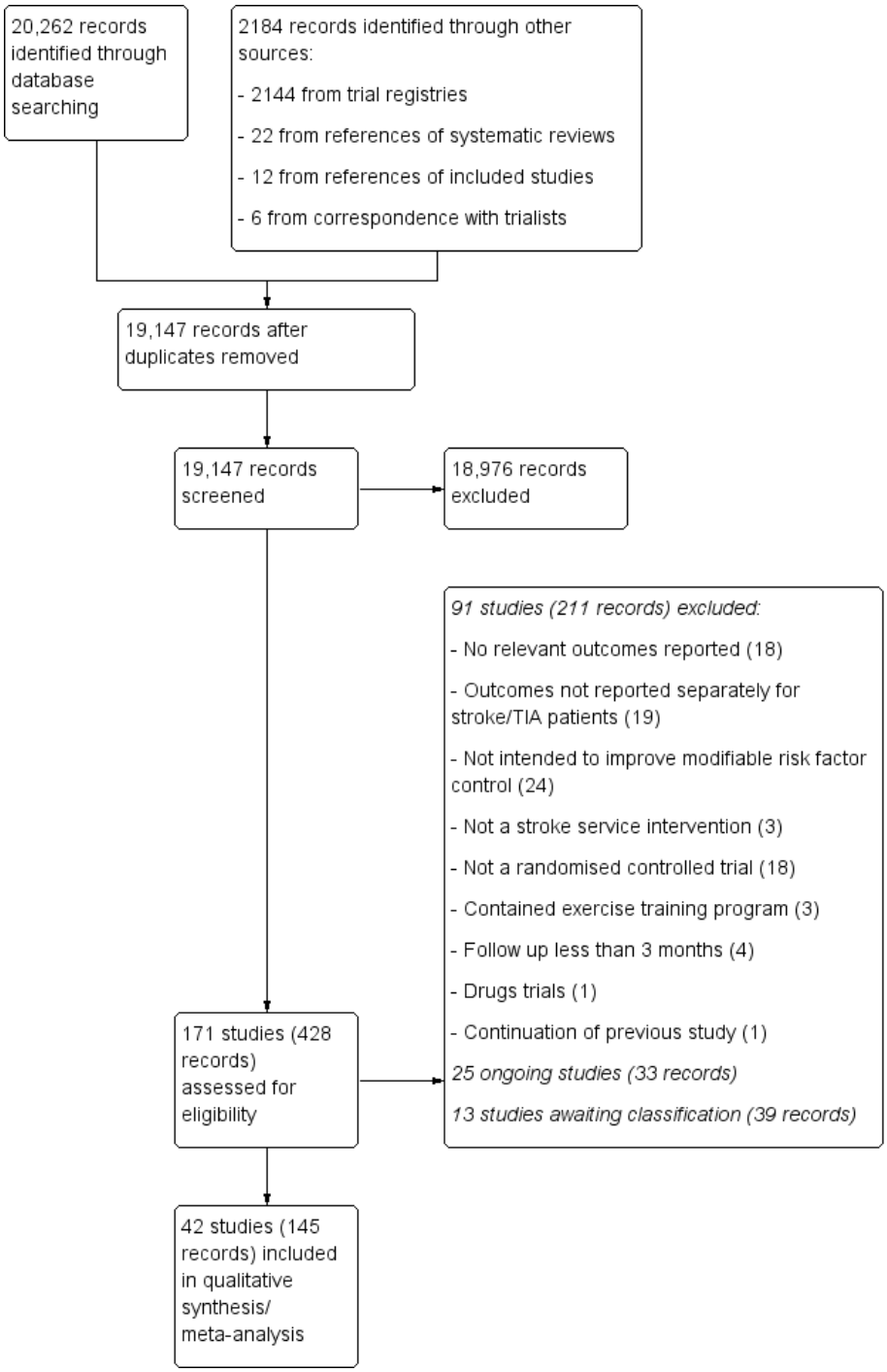
Description of studies

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

Results of the search

We carried out searches in April 2013 and updated the search in April 2017 and identified a total of 19,147 records after the removal of duplicates (Figure 1). Title and abstract screening identified 171 studies (82 in the first review (Lager 2014) and 89 in this update, consisting of 428 records collectively) that were potentially eligible for this review.

Figure 1. Study flow diagram.



We found 10 potentially eligible studies that reported collective outcome data for participants with a broad range of cardiovascular diseases (Amariles 2012; Brotons 2011; Evans 2010; Goessens 2006; Ma 2009; McManus 2014; Palanco 2011; Spassova 2016; Strandberg 2006; Vernooij 2012). We contacted study authors to request outcome data separately for participants with stroke and transient ischaemic attack (TIA). We received responses from four study authors who provided unpublished outcome data for participants with stroke and TIA; these studies were included in the review (Brotons 2011; Evans 2010; Jönsson 2014; McManus 2014). The authors of one study reported that separate outcome data for participants with stroke and TIA were unavailable (Vernooij 2012). The authors of six studies did not respond to requests for additional data and these studies were excluded from the review (Amariles 2012; Goessens 2006; Ma 2009; Palanco 2011; Spassova 2016; Strandberg 2006).

We identified a further 47 studies of potential relevance to this review, if unpublished outcome data were available. We therefore attempted to obtain information about these studies by emailing the main study contacts. Seven authors supplied unpublished data, for example blood pressure or body mass index (BMI). We included these studies in the review (Eames 2013; Flemming 2013; Lowrie 2010; Jönsson 2014; McManus 2014; O'Carroll 2011; Slark 2013).

Included studies

We added 16 new studies (25,819 participants), to the 26 studies (8021 participants) in the previous version of the review, resulting in a total of 42 studies including 33,840 participants in this update. Of these 36 used a parallel group design (Adie 2010; Allen 2002; Allen 2009; MIST 2014; Boter 2004; Boysen 2009; Chanruengvanich 2006; Chiu 2008; Damush 2015; Eames 2013; Ellis 2005; Evans 2010; Flemming 2013; Hanley 2015; Hedegaard 2014; Hornnes 2011; Nailed Stroke 2010; Jönsson 2014; Joubert 2009; Kerry 2013; Kim 2013; Kono 2013; Kronish 2014; Lowe 2007; Maasland 2007; MacKenzie 2013; Markle-Reid 2011; Mant 2016; McAlister 2014; McManus 2014; O'Carroll 2011; Pergola 2014; Slark 2013; Wan 2016; Wang 2005; Welin 2010) and six used a cluster design (Brotons 2011; Dregan 2014; Johnston 2010; Lowrie 2010; Ranta 2015; Peng 2014). Visual inspection of funnel plots to detect possible reporting bias suggested no asymmetry. Detailed information on each study is provided in Characteristics of included studies.

Participants

The trials included a total of 33,840 participants with cerebrovascular disease. The mean or median age of participants ranged from 60 years to 74.3 years. Nine studies included participants with a diagnosis of ischaemic stroke (Allen 2009; Boysen 2009; Chiu 2008; Hedegaard 2014; Johnston 2010; Kim 2013; Kono 2013; Slark 2013; Wan 2016), whereas six studies included participants with either ischaemic or haemorrhagic stroke (MIST 2014; Dregan 2014; Jönsson 2014; Lowe 2007; Lowe 2007; Welin 2010), one focused on lacunar strokes (Pergola 2014) and two did not specify stroke subtype (McManus 2014; Wang 2005). Nineteen trials included a broader range of participants with a diagnosis of either stroke or TIA (Allen 2002; Boter 2004; Damush 2015; Eames 2013; Ellis 2005; Flemming 2013; Hanley 2015; Hornnes 2011; Nailed Stroke 2010; Joubert 2009; Kronish 2014; MacKenzie 2013; McManus 2014; Mant 2016; Markle-Reid 2011; McAlister 2014; O'Carroll 2011; Peng 2014; Ranta 2015). The proportion of TIA participants ranged from 1% (Eames 2013) to 46% (Flemming 2013). Four studies focused only on individuals with minor stroke or TIA (Adie 2010; Chanruengvanich 2006; Kerry 2013; Maasland 2007). Other studies included participants with a history of cardiovascular disease or elevated cardiovascular risk factors, and provided separate unpublished data for stroke and TIA participants (Brotons 2011; Evans 2010; Lowrie 2010).

Location

Seven included trials were conducted in the USA (Allen 2002; Allen 2009; Damush 2015; Flemming 2013; Johnston 2010; Kronish 2014; Pergola 2014), four in Canada (Evans 2010; McAlister 2014; MacKenzie 2013; Markle-Reid 2011), nine in the UK (Adie 2010; Dregan 2014; Ellis 2005; Hanley 2015; Lowe 2007; Lowrie 2010; Mant 2016; McManus 2014; O'Carroll 2011), 10 in other European countries (Boter 2004; Brotons 2011; Hedegaard 2014; Hornnes 2011; Nailed Stroke 2010; Jönsson 2014; Kerry 2013; Maasland 2007; Slark 2013; Welin 2010), four in Australasia (MIST 2014; Eames 2013; Joubert 2009; Ranta 2015), and seven in Asia (Chanruengvanich 2006; Chiu 2008; Kim 2013; Kono 2013; Peng 2014; Wan 2016; Wang 2005). One study was a multicentre trial conducted in five centres in China and Europe (Boysen 2009).

Setting

Most studies were set in primary care or community settings (Adie 2010; Allen 2002; Allen 2009; Boter 2004; Boysen 2009; Brotons 2011; Chanruengvanich 2006; Dregan 2014; Evans 2010; Hanley 2015; Hornnes 2011; Nailed Stroke 2010; Kerry 2013; Kim 2013; Kono 2013; Kronish 2014; MacKenzie 2013; Mant 2016; Markle-Reid 2011; McManus 2014; O'Carroll 2011; Pergola 2014; Ranta 2015; Wan 2016; Wang 2005). Seven studies were set in outpatient clinics (Chiu 2008; Damush 2015; Ellis 2005; Flemming 2013; Hedegaard 2014; Jönsson 2014; Welin 2010). One study was incorporated into a TIA service that provided

screening and diagnostic work-up in a single day (Maasland 2007). One study was based at a stroke prevention centre (McAlister 2014), and another at a veterans' medical centre (Damush 2015). A further two interventions were performed during hospitalisation for acute stroke (Johnston 2010; Slark 2013). Five studies were initiated in the hospital setting (Eames 2013; Joubert 2009; Lowe 2007) with two subsequently continuing the intervention in the community (Eames 2013; Joubert 2009) and one was undertaken either in a hospital (if the participant was still an inpatient), or in the community if discharged (MIST 2014).

Interventions

See Characteristics of included studies for details of interventions (components, length, frequency).

Intervention categories

To facilitate analysis and interpretation of study results, we described interventions according to categories pre-specified in the review protocol (educational and behavioural interventions for patients; educational and behavioural interventions for healthcare providers; organisational interventions as defined according to the taxonomy developed by Wensing 2006). Most interventions were multifaceted and contained components that were associated with more than one category, for example studies included organisational elements with varying amounts of education (directed for patients or healthcare professionals). However, to summarise evidence effectively, we categorised interventions according to their predominant components. For example, if organisational elements were considered to have facilitated or permitted the delivery of education (e.g. patient education is often a component of multidisciplinary team services (Wensing 2006)) these were classified as organisational. We decided final category assignments by discussion among review authors to reach consensus.

Sixteen studies included educational or behavioural interventions for participants. Nineteen studies included multidisciplinary team services where patient care was delivered according to protocols for screening, education, and treatment or monitoring. Fourteen studies included educational or behavioural interventions for healthcare providers, which usually involved the provision of guidelines or specification of individual patient targets. Less common intervention elements included revision of professional roles (changes in the tasks carried out by pharmacists), collaboration among multidisciplinary teams, knowledge management systems, and quality management. No studies included financial interventions. Just under half of the studies included multidisciplinary teams where patient care was delivered according to protocols for screening, education, and treatment or monitoring. After review and discussion, we agreed that the interventions were categorised predominately as educational or behavioural interventions for patients and organisational interventions. Predominant intervention categories are highlighted in Table 1.

Educational or behavioural interventions for patients

Sixteen studies involved educational and behavioural interventions for participants (Adie 2010; Boysen 2009; Chanruengvanich 2006; Chiu 2008; Eames 2013; Kim 2013; Kono 2013; Kronish 2014; Lowe 2007; Maasland 2007; MacKenzie 2013; MIST 2014; O'Carroll 2011; Peng 2014; Slark 2013; Wan 2016). None of the interventions investigated by these studies incorporated organisational elements.

The content of 11 studies was largely focused on modifiable risk factors for stroke (Adie 2010; MIST 2014; Boysen 2009; Chanruengvanich 2006; Chiu 2008; Kim 2013; Kono 2013; Maasland 2007; MacKenzie 2013; O'Carroll 2011; Slark 2013). Five interventions delivered education about secondary stroke prevention as part of broader stroke education programmes (Eames 2013; Kronish 2014; Lowe 2007; Peng 2014; Wan 2016).

Organisational interventions

We included 26 studies that involved predominantly organisational interventions (Allen 2002; Allen 2009; Boter 2004; Brotons 2011; Damush 2015; Dregan 2014; Ellis 2005; Evans 2010; Flemming 2013; Hanley 2015; Hedegaard 2014; Hornnes 2011; Nailed Stroke 2010; Johnston 2010; Jönsson 2014; Joubert 2009; Kerry 2013; Lowrie 2010; Mant 2016; Markle-Reid 2011; McAlister 2014; McManus 2014; Pergola 2014; Ranta 2015; Wang 2005; Welin 2010). Seven interventions addressed secondary stroke prevention as part of a wider set of study aims encompassing post-stroke rehabilitation (interventions with a broad focus) (Allen 2002; Allen 2009; Boter 2004; Damush 2015; Jönsson 2014; Markle-Reid 2011; Welin 2010). Although these organisational interventions generally provided some patient education about secondary stroke prevention, this appeared to be delivered on only one occasion (Allen 2002; Allen 2009) or on an opportunistic basis (Boter 2004; Welin 2010). Conversely, secondary prevention was the main aim of the remaining 18 organisational interventions (interventions specifically targeting secondary prevention). Nine of these interventions included an element of patient education or behavioural counselling directed towards secondary stroke prevention (Brotons 2011; Ellis 2005; Evans 2010; Flemming 2013; Hornnes 2011; Joubert 2009; Kerry 2013; McAlister 2014; Wang 2005). Three studies did not specify the inclusion of patient education elements but directed secondary prevention education for healthcare professionals (Johnston 2010; Kronish 2014; Lowrie 2010).

Control comparators

Usual care, described as standard care provided by the managing medical team without any enhancement, was used as the control comparator in 30 studies (Adie 2010; Allen 2002; Allen 2009; Boter 2004; Brotons 2011; Chanruengvanich 2006; Chiu

2008; Eames 2013; Ellis 2005; Flemming 2013; Hanley 2015; Hedegaard 2014; Hornnes 2011; Johnston 2010; Jönsson 2014; Joubert 2009; Kerry 2013; Kim 2013; Kono 2013; Lowrie 2010; MacKenzie 2013; Markle-Reid 2011; McManus 2014; MIST 2014; Nailed Stroke 2010; Peng 2014; Ranta 2015; Slark 2013; Wang 2005; Welin 2010).

Seven studies provided control participants with the same initial information and educational advice as the intervention group, without any individualised advice (Boysen 2009; Damush 2015; Evans 2010; Kronish 2014; Lowe 2007; Maasland 2007; Wan 2016).

Dregan 2014 reminded practices in the control group to record all stroke-related consultations and adverse events.

An active control group was used in four studies. Control group participants in O'Carroll 2011 received visits from a research fellow, where a generalised, non medication-related discussion was provided. McAlister 2014 used a nurse-led management control group. Mant 2016 randomised participants into either an intensive blood pressure target (< 130 mmHg or a 10 mmHg reduction if baseline pressure was < 140 mm Hg) (active group) or a standard target (< 140 mmHg) (control arm). Pergola 2014 used a similar model whereby patients with recent symptomatic lacunar stroke were randomised to one of two levels of systolic BP (SBP) targets: lower: < 130 mmHg (intervention group), or higher: 130 to 149 mmHg (control group).

Timing

We included 24 studies that recruited participants immediately following diagnosis of an acute stoke or TIA. These studies initiated interventions following symptoms of an event (Ranta 2015), before hospital discharge (Eames 2013; Hedegaard 2014; Johnston 2010; Joubert 2009; Lowe 2007; MacKenzie 2013; Maasland 2007; Slark 2013), within one week post-discharge (Allen 2002; Allen 2009; Boter 2004; Wang 2005), within one month post-discharge (Adie 2010; MIST 2014; Nailed Stroke 2010; Wan 2016), within three months post-discharge (Boysen 2009; Chanruengvanich 2006; Ellis 2005; Flemming 2013; Jönsson 2014; O'Carroll 2011; Welin 2010), or within 12 months post-discharge (Damush 2015). Twelve studies recruited participants from primary care, outpatient or community settings, within three months (Hanley 2015; Kono 2013; Peng 2014; Ranta 2015), six months (Pergola 2014), nine months (Kerry 2013), 12 months (Brotons 2011; Kim 2013; McAlister 2014), 18 months (Markle-Reid 2011), up to five years (Kronish 2014) post stroke or TIA diagnosis; or ever had a stroke or TIA (Dregan 2014). One study initiated the intervention when participants had been attending an outpatient clinic for at least 12 months (Chiu 2008). Four studies did not specify intervention timing (Evans 2010; Lowrie 2010; Mant 2016; McManus 2014).

Five studies involved interventions that were delivered on a single occasion (Lowe 2007; Maasland 2007; Ranta 2015; Slark 2013) or on two occasions (O'Carroll 2011). The remaining studies implemented interventions over a time frame ranging from three months to 36 months. Most interventions studied by trials had durations of between three months and 12 months.

Outcomes

Details of outcomes are provided in the Characteristics of included studies table.

Funding sources

Sources of funding were reported by 38 studies (90%). Most studies were either funded by charities (45%) or government sources (24%). Other funding sources included universities, fellowships, industry, and the NHS. Three studies had multiple funding sources and two did not receive any funding.

Excluded studies

We excluded eight studies that did not report separately on TIA and stroke participants (Amariles 2012; Goessens 2006; Joshi 2012; Ma 2009; Palanco 2011; Spassova 2016; Strandberg 2006; Vernooij 2012); six with no relevant outcomes (Banet 1997; Bokemark 1996; Gillham 2010; Green 2007; Middleton 2004; Nir 2006); three did not present a stroke service intervention (FIMDM˙CVD 2010; Johnston 2000; Ornstein 2004); two were not intended to improve modifiable risk factor control (Harrington 2007; Ross 2007), two contained an exercise training program (Rimmer 2000; UMIN000001865) and one was not a RCT (Sides 2012). We will consider these studies for inclusion in a future update. We have provided a summary in the Characteristics of excluded studies table.

Studies awaiting classification

There were 13 completed trials for which further study information was unavailable (see Characteristics of studies awaiting classification).

Ongoing studies

We identified 24 eligible studies: 17 were currently recruiting, 2 were not yet recruiting, 3 were classified as ongoing, 1 was active but not recruiting, and one was unknown (see Characteristics of ongoing studies).

Risk of bias in included studies

We assessed the risk of bias according to Cochrane's tool for assessing risk of bias. We extracted information about methods of randomisation and allocation concealment, blinding of outcome assessors, incomplete outcome data, selective outcome reporting,

and any other potential sources of bias for each included study. We assessed three studies at high risk of bias; the remainder were considered to have a low risk of bias. Detailed assessments of risk of bias for each study is presented in Characteristics of included studies. Summary assessments are shown in Figure 2 and Figure 3.

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

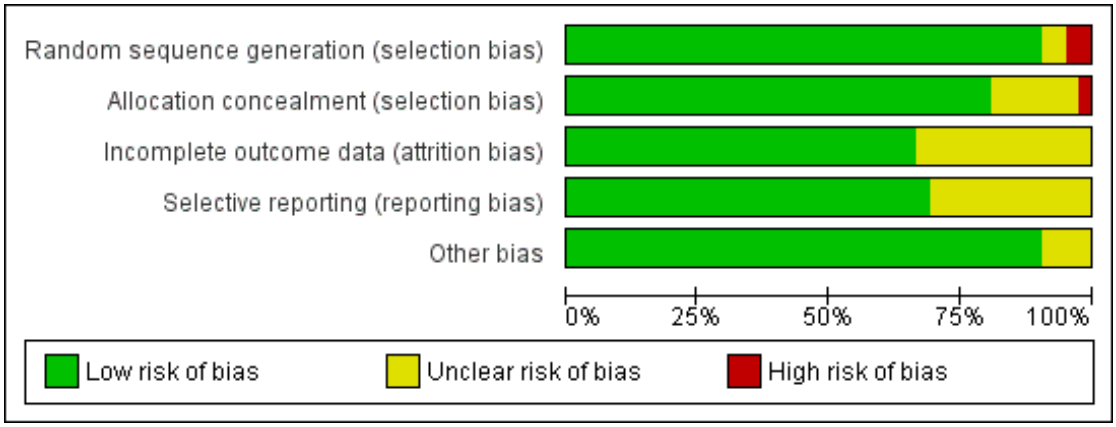
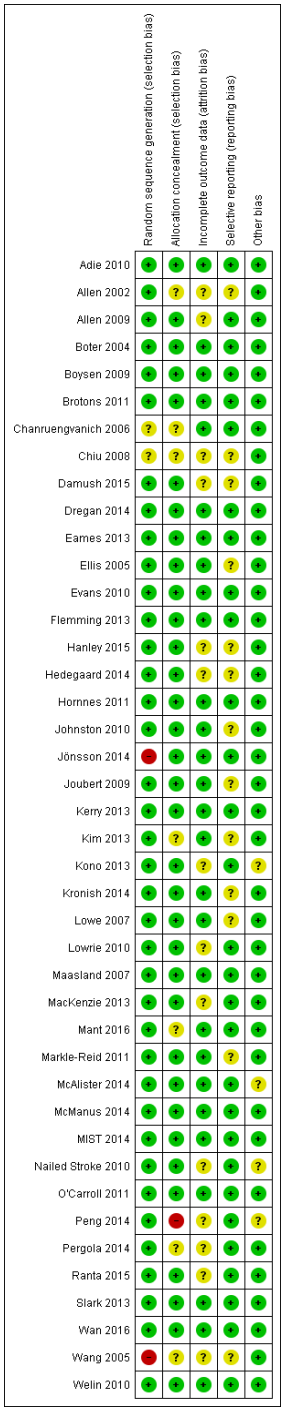


Figure 3. Risk of bias summary: review authors' judgements about each risk of bias item from each study



Allocation

Inclusion criteria for this review required studies to be randomised. All but four studies reported adequate generation of allocation sequence. Two studies were reported as RCTs but did not provide details of randomisation methods (Chanruengvanich 2006; Chiu 2008). Wang 2005 reported that participants were "randomly divided into intervention group (146 cases) and control group (52 cases)". Although the use of randomised methods can be inferred from this statement, the large imbalances in group size were not explained and this included study was considered at high risk of bias. In the study by Jönsson 2014, allocation was undertaken by an administration secretary using lists made by a second study author. Although computer randomisation was used initially, it was deemed that there was high potential for possible bias (Jönsson 2014).

Criteria for adequate allocation concealment were met by all but eight studies. Three trials that did not report randomisation methods also provided insufficient information about allocation concealment (Chanruengvanich 2006; Chiu 2008; Wang 2005). Another five studies with adequate sequence generation contained no information about allocation concealment (Allen 2002; Kim 2013; Mant 2016; Peng 2014; Pergola 2014).

Blinding

We found that 14 studies reported blinding of outcome assessors for all outcomes (Allen 2009; Boter 2004; Boysen 2009; Chanruengvanich 2006; Eames 2013; Ellis 2005; Hanley 2015; Hedegaard 2014; Hornnes 2011; Kerry 2013; Kronish 2014; Markle-Reid 2011; MIST 2014; Wan 2016). A further three studies reported blinding during assessment of selected outcomes (Allen 2002; Johnston 2010; Welin 2010). There were 25 studies for which at least some data were collected by unblinded outcome assessors (Adie 2010; Allen 2002; Brotons 2011; Chiu 2008; Damush 2015; Dregan 2014; Evans 2010; Flemming 2013; Nailed Stroke 2010; Jönsson 2014; Joubert 2009; Kim 2013; Kono 2013; Lowrie 2010; Maasland 2007; MacKenzie 2013; Mant 2016; McAlister 2014; McManus 2014; O'Carroll 2011; Peng 2014; Pergola 2014; Ranta 2015; Slark 2013; Wang 2005). Following consideration of these 25 studies, we judged that non-blinding of outcome assessors was unlikely to affect the measurement of objective outcomes such as physiological data (e.g. blood pressure), information extracted from medical records, or information measured using validated questionnaires. However, it was unclear whether non-blinding could have affected outcomes obtained from participants via self-reporting (e.g. adherence to medication and self-reported cardiovascular events) (Flemming 2013; Joubert 2009; Kim 2013; Maasland 2007; MacKenzie 2013; MIST 2014; Slark 2013).

Incomplete outcome data

The proportion of study participants completing follow-up ranged from 70% (Brotons 2011) to 100% (Adie 2010; MacKenzie 2013). Two studies did not report the proportion of participants who completed follow-up (Chiu 2008; Wang 2005). In Lowrie 2010, information was only available for those participants with baseline and follow-up data. No missing outcome data were reported for three studies (Adie 2010; MacKenzie 2013; Ranta 2015). We found that 27 studies reported reasons for missing outcome data and we judged these were unlikely to be related to the study outcomes (Boter 2004; Boysen 2009; Brotons 2011; Chanruengvanich 2006; Dregan 2014; Eames 2013; Ellis 2005; Evans 2010; Flemming 2013; Hornnes 2011; Johnston 2010; Kerry 2013; Kim 2013; Kronish 2014; Lowe 2007; Maasland 2007; MacKenzie 2013; Mant 2016; Markle-Reid 2011; McAlister 2014; McManus 2014; MIST 2014; O'Carroll 2011; Ranta 2015; Slark 2013; Wan 2016; Welin 2010). The 13 remaining studies did not provide enough information about missing outcome data to permit judgement (Allen 2002; Allen 2009; Chiu 2008; Damush 2015; Hanley 2015; Hedegaard 2014; Nailed Stroke 2010; Joubert 2009; Kono 2013; Lowrie 2010; Peng 2014; Pergola 2014; Wang 2005).

Selective reporting

Protocols were available for 41 studies, and 31 appeared to be free of selective outcome reporting (Adie 2010; Allen 2009; MIST 2014; Boter 2004; Boysen 2009; Brotons 2011; Chanruengvanich 2006; Dregan 2014; Eames 2013; Evans 2010; Flemming 2013; Hanley 2015; Hedegaard 2014; Hornnes 2011; Nailed Stroke 2010; Jönsson 2014; Kerry 2013; Kono 2013; Lowrie 2010; Maasland 2007; MacKenzie 2013; Mant 2016; McAlister 2014; McManus 2014; O'Carroll 2011; Peng 2014; Pergola 2014; Ranta 2015; Slark 2013; Wan 2016; Welin 2010). Johnston 2010 reported primary outcomes as pre-specified, although some secondary outcomes were not reported.

Other potential sources of bias

It was unclear in some studies if recurrent events were presented as number of events rather than number of people with one or more event (Kono 2013; McAlister 2014; Nailed Stroke 2010; Peng 2014).

Effects of interventions

See: **Summary of findings for the main comparison** Educational or behavioural interventions for patients compared to usual care for improving modifiable risk factor control in the secondary

prevention of stroke; **Summary of findings 2** Organisational interventions compared to usual care for improving modifiable risk factor control in the secondary prevention of stroke

Primary outcomes

Target achievement of mean reductions, or both

Blood pressure

We included 30 studies that reported data on differences in mean systolic or diastolic blood pressure, or both, including where blood pressure target was achieved. Of these, 10 studies evaluated educational or behavioural interventions for participants (Adie 2010; Chanruengvanich 2006; Chiu 2008; Kono 2013; Lowe 2007; Maasland 2007; MacKenzie 2013; MIST 2014; O'Carroll 2011; Slark 2013) and 20 evaluated organisational interventions (Allen 2002; Allen 2009; Brotons 2011; Dregan 2014; Ellis 2005; Evans 2010; Flemming 2013; Hanley 2015; Hornnes 2011; Nailed Stroke 2010; Johnston 2010; Jönsson 2014; Joubert 2009; Kerry 2013; Mant 2016; McAlister 2014; McManus 2014; Pergola 2014; Wang 2005; Welin 2010).

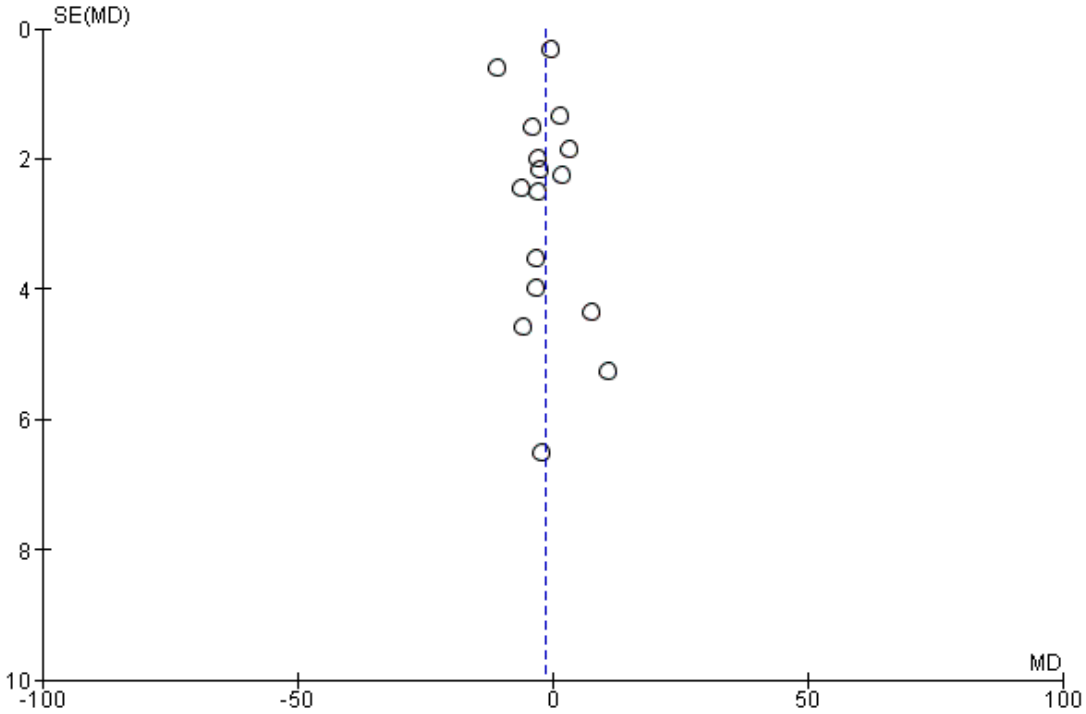
Educational and behavioural interventions for patients

Pooled data from 11 studies (Adie 2010; Chanruengvanich 2006; Chiu 2008; Kono 2013; Lowe 2007; Maasland 2007; MacKenzie 2013; Mant 2016; MIST 2014; O'Carroll 2011; Slark 2013; N = 1398) indicated that educational and behavioural interventions for participants were not associated with significant changes in mean systolic blood pressure (MD -2.81, 95% CI -7.02 to 1.39; Analysis 1.1) or mean diastolic blood pressure (MD -0.83, 95% CI -2.80 to 1.13; Analysis 1.2). However, the analyses included one large study that was independently associated with reductions in systolic and diastolic blood pressure (Chiu 2008, N = 160) (Analysis 1.1; Analysis 1.2). Chiu 2008 reported outcome data only for a subgroup of participants with hypertension, so baseline blood pressure levels were higher and therefore easier to improve upon. Kono 2013, a smaller study that involved 70 participants, was associated with a significant reduction in both systolic and diastolic blood pressure within home and clinic readings. The pooled results were associated with a substantial level of statistical heterogeneity (I^2 = 79%). When Chiu 2008 was removed from the analyses, pooled data from the remaining 10 studies did not indicate any intervention effects and statistical heterogeneity was reduced (I^2 = 72%). The three studies that reported data on achieving blood pressure targets (< 140/90 mmHg or < 130/80 mmHg) indicated that educational and behavioural interventions for patients were not associated with a significant change in the proportion of participants who attained adequate blood pressure control (Adie 2010; Chiu 2008; MacKenzie 2013) (OR 0.74, 95% CI 0.39 to 1.44; N = 266; Analysis 1.3; moderate-quality evidence).

Organisational interventions

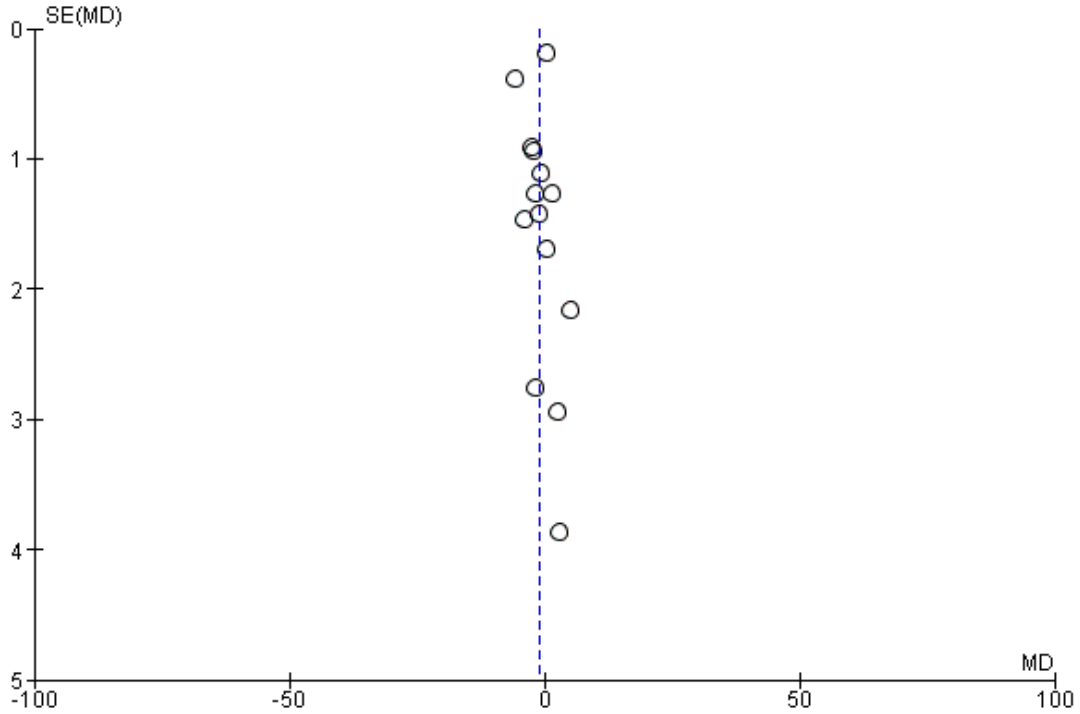
Pooled data from 16 studies indicated that organisational interventions were associated with a non-statistically significant reduction in mean systolic blood pressure reduction (MD -1.58, 95% CI -4.66 to 1.51; N = 17,490; Analysis 2.1) (Brotons 2011; Dregan 2014; Ellis 2005; Evans 2010; Flemming 2013; Hanley 2015; Hornnes 2011; Nailed Stroke 2010; Jönsson 2014; Joubert 2009; Kerry 2013; Mant 2016; McAlister 2014; McManus 2014; Pergola 2014; Welin 2010) (Figure 4; Summary of findings 2).

Figure 4. Funnel plot of comparison: 2 Organisational interventions versus usual care, outcome: 2.1 Mean systolic blood pressure.



Pooled data from 14 studies indicated that organisational interventions were also associated with a non-statistically significant reduction in mean diastolic blood pressure reduction (MD -0.91, 95% CI -2.75 to 0.93; N = 17,178; Analysis 2.2) (Brotons 2011; Dregan 2014; Ellis 2005; Evans 2010; Hanley 2015; Hornnes 2011; Nailed Stroke 2010; Jönsson 2014; Joubert 2009; Kerry 2013; Mant 2016; McManus 2014; Pergola 2014; Welin 2010) (Figure 5; Summary of findings 2).

Figure 5. Funnel plot of comparison: 2 Organisational interventions versus usual care, outcome: 2.2 Mean diastolic blood pressure.

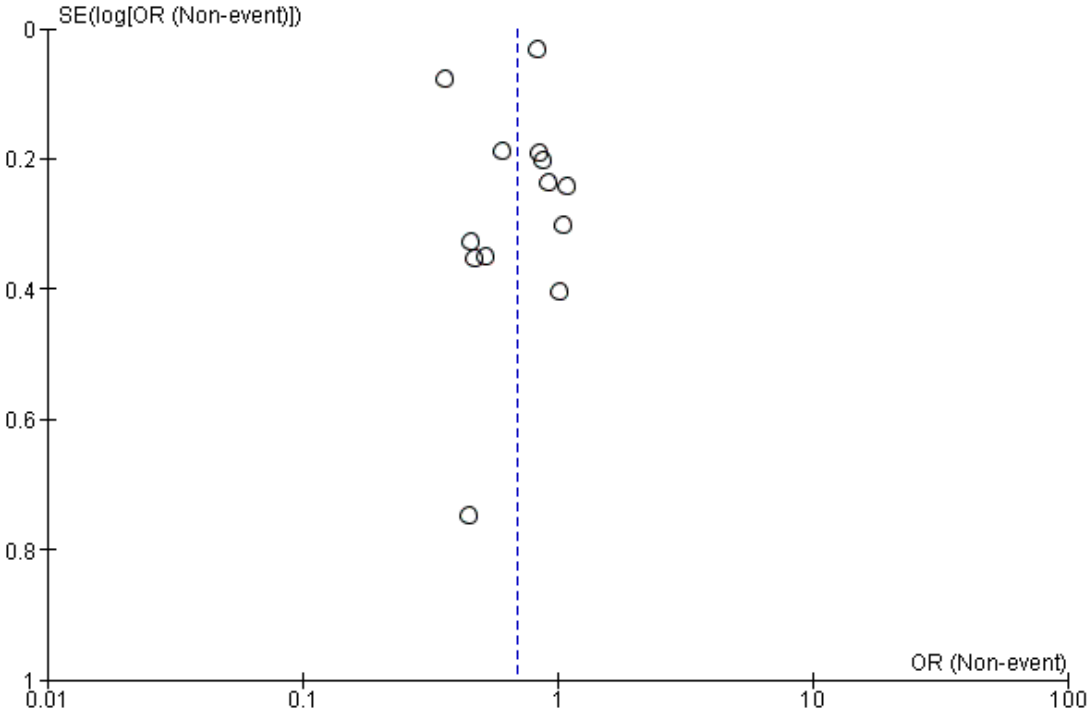


The five studies that were associated with the greatest reductions in mean systolic blood pressure (values ranged from -3.10 mmHg to -12.09 mmHg) combined multidisciplinary team approaches with comprehensive patient education (involving promotion and tracking of adherence to medications and healthy lifestyle behaviours for secondary stroke prevention). These studies focused specifically on secondary stroke prevention and involved regular patient appointments (with a nurse, pharmacist or general practitioner (GP)) and review of multiple stroke risk factors (by a nurse case manager) (Ellis 2005; Flemming 2013; Nailed Stroke 2010; Joubert 2009; Pergola 2014). Nurse case managers informed participants (Ellis 2005; Nailed Stroke 2010) or their GPs (Flemming 2013; Joubert 2009; Pergola 2014) if risk factors deviated from recommended targets (although nurses themselves did not influence medication prescribing).

Consideration of other studies included in the meta-analysis of systolic blood pressure data showed that most interventions were not focused specifically on secondary stroke prevention due to wider study aims (Allen 2002; Welin 2010) or the inclusion of participants with a range of other cardiovascular diseases (Brotons 2011; Evans 2010). Six studies that focused specifically on secondary stroke prevention had a more narrow objective; these largely considered blood pressure control rather than multiple risk factor reduction (Hanley 2015; Hornnes 2011; Kerry 2013; Mant 2016; McManus 2014; Pergola 2014).

Thirteen studies evaluating organisational interventions reported data on achievement of blood pressure targets (Allen 2009; Brotons 2011; Dregan 2014; Flemming 2013; Hanley 2015; Hornnes 2011; Nailed Stroke 2010; Johnston 2010; Jönsson 2014; Joubert 2009; McAlister 2014; Pergola 2014; Wang 2005). Targets varied by study and according to participant co-morbidities; most studies specified a blood pressure target of $\leq$ 140/90 mmHg or $\leq$ 130/80 mmHg for participants with diabetes. Some studies defined alternative blood pressure targets unrelated to co-morbidities of systolic values between 130 mmHg and 140 mmHg and diastolic values of 70 mmHg to 90 mmHg. Pergola 2014 allocated participants to achieve a systolic blood pressure target of either < 130 mmHg or 130 to 149 mmHg. Pooled data indicated that organisational interventions were associated with a significant increase in the proportion of participants who attained blood pressure targets (OR 0.70, 95% CI 0.53 to 0.92; N = 23,631; P = 0.01; Analysis 2.3; Figure 6; Summary of findings 2). Sensitivity analysis was undertaken for target blood pressure. A statistically significant result was observed for all results (Summary of findings 2).

Figure 6. Funnel plot of comparison: 2 Organisational interventions versus usual care, outcome: 2.3 Blood pressure target achievement.



Seven studies reported involving multidisciplinary team members that included nurses, pharmacists able to prescribe, stroke specialist, care co-ordinator, GP, and a neurologist (Allen 2009; Flemming 2013; Hornnes 2011; Nailed Stroke 2010; Jönsson 2014; Joubert 2009; McAlister 2014). Sensitivity analysis of this subgroup revealed a significant effect of involving multidisciplinary team members on target achievement (OR 1.28, 95% CI 1.02 to 1.62; P = 0.04). Heterogeneity was moderate (I^2 = 26%). A further subgroup analysis of nurse led care again identified a significant effect (OR 1.39, 95% CI 1.09 to1.78; P = 0.008) with little difference in heterogeneity (I^2 = 15%) (Allen 2002; Flemming 2013; Hornnes 2011; Nailed Stroke 2010; Jönsson 2014; McAlister 2014). McAlister 2014 involved pharmacists who were able to prescribe. This group showed a significant percentage of participants who achieved the targets for blood pressure and LDL cholesterol. Multivariate analyses confirmed there was greater attainment of the guideline-recommended targets in the pharmacist-led group compared with the nurse-led group (OR 2.12, 95% CI 1.06 to 4.23; P = 0.03). It is noted that no control group comparison was made.

Cholesterol

Total cholesterol

We included 17 studies that reported cholesterol data, of which seven included educational and behavioural interventions for patients (Adie 2010; Chanruengvanich 2006; Chiu 2008; Kim 2013; Maasland 2007; MIST 2014; Slark 2013) and 10 included predominantly organisational interventions (Allen 2002; Brotons 2011; Dregan 2014; Ellis 2005; Evans 2010; Jönsson 2014; Joubert 2009; Lowrie 2010; McAlister 2014; Wang 2005).

Educational and behavioural interventions for patients

Pooled data from seven studies indicated that educational and behavioural interventions for patients were not associated with changes in mean total cholesterol levels (MD 0.10, 95% CI -0.28 to 0.47; N = 721; Analysis 1.4) (Adie 2010; Chanruengvanich 2006; Chiu 2008; Kim 2013; Maasland 2007; MIST 2014; Slark 2013). Only Adie 2010 reported achievement of total cholesterol targets (total cholesterol $\leq$ 4 mmol/L) and found no significant difference between the intervention and control groups (OR 1.78, 95% CI 0.60 to 5.30; N = 56; Analysis 1.5).

Organisational interventions

Organisational interventions were not associated with changes in mean total cholesterol levels (Brotons 2011; Dregan 2014; Ellis 2005; Evans 2010; Joubert 2009; Lowrie 2010; McAlister 2014) (MD -0.00, 95% CI -0.04 to 0.03; N = 11,955; Analysis 2.4). Pooled data from six studies indicated that organisational interventions were also associated with changes in the achievement of total cholesterol targets, although the substantial level of statistical heterogeneity observed in this analysis meant that results should be interpreted with caution (OR 0.78, 95% CI 0.53 to 1.17; N = 12,539; I^2 = 80%; Analysis 2.5) (Allen 2009; Dregan 2014; Jönsson 2014; Joubert 2009; Lowrie 2010; Wang 2005). It should be noted that in this meta-analysis we considered the outlying study with the largest effect size to be at high risk of bias due to concerns about the adequacy of the randomisation procedures (Wang 2005). Furthermore, the authors of this trial did not specify risk factor targets, stating instead that the results of blood fat tests were either classified as qualified or disqualified. When we removed this study from the meta-analysis, there were no changes in the achievement of total cholesterol targets (varying from < 4.0 to < 5.0 mmol/L) when we pooled the data from the remaining five studies, and statistical heterogeneity was absent (I^2 = 0%).

Low density lipoprotein (LDL)

We included 11 studies that reported LDL data, of which four evaluated educational and behavioural interventions for patients (Chiu 2008; Kono 2013; Maasland 2007; MIST 2014) and seven evaluated organisational interventions (Brotons 2011; Evans 2010; Flemming 2013; Nailed Stroke 2010; Jönsson 2014; Kronish 2014; McAlister 2014).

Educational and behavioural interventions for patients

Pooled data from four studies indicated that educational and behavioural interventions for patients were not associated with changes in mean LDL levels (Summary of findings for the main comparison) (Chiu 2008; Kono 2013; Maasland 2007; MIST 2014). A low level of statistical heterogeneity was observed (MD -0.13, 95% CI -0.28 to 0.02; N = 495; I^2 = 12%; Analysis 1.6). Chiu 2008 reported improvements in LDL levels (MD -0.13 mmol/L; 95% CI -0.28 to 0.02; P = 0.1). Data, however, were only presented for a subgroup of participants with hypercholesterolaemia (i.e. those with the greatest potential for improvement). Maasland 2007 reported significant reductions in LDL for both the intervention and control groups, with no significant differences between the groups. Only Chiu 2008 presented data on the achievement of LDL targets (LDL < 2.6 mmol/L or, if LDL was not available, total cholesterol < 4.1 mmol/L) and no significant improvements were reported (Chiu 2008). Neither of the two other studies identified a significant effect on LDL.

Organisational interventions

Pooled data from five studies indicated that organisational interventions were associated with a significant reduction in mean LDL levels (Analysis 2.6) (MD -0.19mmol/L, 95% CI -0.30 to -0.09; n = 1154) (Summary of findings 2) (Brotons 2011; Evans 2010; Flemming 2013; Nailed Stroke 2010; McAlister 2014). There was, however, no statistically significant improvement in achieving LDL targets (OR 0.73, 95% CI 0.47 to 1.13; N = 1790; P = 0.15; Analysis 2.7; Summary of findings 2). Heterogeneity was high (I^2 = 75%). Sensitivity analysis of a subgroup of nurse-led care to achieve LDL levels were not associated with achieving LDL targets (OR 0.73, 95% CI 0.47 to 1.13; N = 1790; Analysis 2.7) (Flemming 2013; Jönsson 2014; Nailed Stroke 2010). One study that involved prescribing pharmacists identified a greater association with achieving LDL target levels (fasting LDL $\leq$ 2 mmol/L) (OR 2.04, 95% CI 1.26 to 3.31; P = 0.004) than non-prescribing healthcare practitioners. However, no control was compared.

High density lipoprotein (HDL)

Seven studies reported data on HDL, of which three evaluated an educational or behavioural intervention for patients (Chanruengvanich 2006; Kono 2013; MIST 2014), and four evaluated organisational interventions (Brotons 2011; Evans 2010; Flemming 2013; McAlister 2014). To ensure homogeneous data presentation, we multiplied the mean values by -1 to ensure that all scales pointed in the same direction for both educational and behavioural interventions for patients and for organisations interventions (Analysis 1.7; Analysis 2.8). This is in accordance with guidance from the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011c).

Educational and behavioural interventions for patients

Three studies reported mean HDL levels; no significant intervention effect was observed (Chanruengvanich 2006; Kono 2013; MIST 2014) (MD -0.03, 95% CI -0.11 to 0.05; N = 452; Analysis 1.7). Kono 2013 reported a significant increase in HDL six months after the intervention (control = 56.3 mg/dL versus intervention 62.6 mg/dL). No studies reported data on HDL target achievement.

Organisational interventions

We observed no significant intervention effects on mean HDL levels when we pooled data from four studies (Brotons 2011; Evans 2010; Flemming 2013; McAlister 2014) (MD -0.02, 95% CI -0.09 to 0.04; N = 522; Analysis 2.8). Flemming 2013 reported data on HDL target achievement (fasting HDL > 1.0 mmol/L in men; > 1.3 mmol/L in women) and we observed no significant differences between the intervention and control groups (OR 0.79, 95% CI 0.20 to 3.07; N = 36; Analysis 2.9).

Triglycerides

Seven studies reported data on triglycerides. Three studies involved educational and behavioural interventions for patients (Chiu 2008; Kim 2013; Maasland 2007), and four involved organisational interventions (Brotons 2011; Evans 2010; Flemming 2013; McAlister 2014).

Educational and behavioural interventions for patients

There were no effects of patient educational and behavioural interventions on mean triglyceride levels (Chanruengvanich 2006; Kim 2013; Maasland 2007) (MD -0.01, 95% CI -0.31 to 0.30; N = 182; Analysis 1.8). No studies reported data on triglyceride target achievement.

Organisational interventions

There were no effects of organisational interventions on mean triglyceride levels (Brotons 2011; Evans 2010; Flemming 2013; McAlister 2014) (MD -0.08, 95% CI -0.21 to 0.04; N = 485; Analysis 2.10). Flemming 2013 reported data on the achievement of triglyceride targets (fasting triglycerides < 1.7 mmol/L) and no significant differences were observed between the intervention and control groups (OR 4.00, 95% CI 0.85 to 18.84; N = 36; Analysis 2.11).

Mean HbA1c

Eight studies reported data on HbA1c outcomes. Studies were not restricted to participants with diabetes. Two studies evaluated a patient educational or behavioural intervention (Chiu 2008; Kono 2013) and six studies evaluated organisational interventions (Allen 2009; Ellis 2005; Evans 2010; Flemming 2013; Jönsson 2014; Wang 2005).

Educational and behavioural interventions for patient

Kono 2013 reported mean HbA1c; however, no significant difference was identified between the control and intervention groups, despite individual lifestyle education (MD -0.11, 95% CI -0.39 to 0.17; N = 70; Analysis 1.9; Summary of findings for the main comparison). Chiu 2008 reported an outcome relating to HbA1c target achievement (HbA1c < 7% or fasting blood glucose < 7.0 mmol/L or random postprandial blood glucose < 11.1 mmol/L) and no significant differences between the intervention and control groups were observed (OR 1.53, 95% CI 0.57 to 4.08; N = 67; Analysis 1.10).

Organisational interventions

Pooled data from four studies indicated no effects of organisational interventions on mean HbA1c levels (Analysis 2.12) (Ellis 2005; Evans 2010; Flemming 2013; Jönsson 2014). No significant intervention effect was observed and a considerable level of statistical heterogeneity was present (I^2 = 98%) (OR 0.25, 95% CI 0.02 to 3.33; N = 553; Analysis 2.13).

Body mass index (BMI)

Eight studies reported BMI results, of which two evaluated a patient educational or behavioural intervention (Kono 2013; Maasland 2007), and six evaluated organisational interventions (Brotons 2011; Flemming 2013; Jönsson 2014; Joubert 2009; McAlister 2014; Wang 2005).

Educational and behavioural interventions for patients

Two studies reported data on mean BMI. No significant intervention effects were observed (Kono 2013; Maasland 2007) (MD 0.22, 95% CI -0.85 to 1.29; N = 127; Analysis 1.11; Summary of findings for the main comparison).

Organisational interventions

Pooled data from five studies indicated no significant effect (Brotons 2011; Flemming 2013; Jönsson 2014; Joubert 2009; McAlister 2014). Heterogeneity was moderate (I^2 = 48%). However, when Jönsson 2014, assessed at high risk of bias, was removed from the analysis, heterogeneity was low (I^2 = 0) and there was a statistically significant reduction in mean BMI levels (MD -0.83 kg/m², 95% CI -1.47 to -0.19; P = 0.01; Analysis 2.14; Summary of findings 2).

Two studies measured the achievement of BMI targets (Flemming 2013; Wang 2005) (OR 0.58, 95% CI 0.31 to 1.08; N = 234; Analysis 2.15). In Wang 2005, the intervention was associated with improvements in BMI target achievement that bordered on statistical significance (OR 1.73, 95% CI 0.93 to 3.25; P = 0.08). However, the study was considered at high risk of bias and the BMI target was not specified. In Flemming 2013, no significant differences in the achievement of the specified BMI target (< 25 kg/m²) were observed between the intervention and control groups.

Cardiovascular risk score

Organisational interventions

Flemming 2013 reported data on the Framingham cardiovascular risk scores. The Framingham point score can be used to provide an estimate of an individual's 10-year risk of developing cardiovascular disease (Anderson 1991; Wilson 1998). Flemming 2013 reported that the intervention group demonstrated a significantly greater reduction in Framingham cardiovascular risk score when compared with the control group (MD -6.50; 95% CI -10.22 to -2.78; P < 0.05; Analysis 2.16), although the available study data

were insufficient to discern the magnitude of cardiovascular risk reduction.

Adherence to secondary prevention medications

We included 21 studies that measured adherence to secondary prevention medications. Of these, 13 involved educational and behavioural interventions for participants (Damush 2015; Dregan 2014; Eames 2013; Hedegaard 2014; Kim 2013; Kronish 2014; Maasland 2007; MacKenzie 2013; MIST 2014; O'Carroll 2011; Peng 2014; Slark 2013; Wan 2016), and eight involved organisational interventions (Allen 2009; Boter 2004; Ellis 2005; Flemming 2013; Hornnes 2011; Johnston 2010; Joubert 2009; McAlister 2014).

Educational and behavioural interventions for patients

We included 13 studies that reported the effects of patient education on adherence to secondary prevention medications (Damush 2015; Dregan 2014; Eames 2013; Hedegaard 2014; Kim 2013; Kronish 2014; Maasland 2007; MacKenzie 2013; MIST 2014; O'Carroll 2011; Peng 2014; Slark 2013; Wan 2016). Data could not be pooled due to methodological heterogeneity (differences in outcome measurements). Only Eames 2013 reported adequate blinding of outcome assessors. We assessed that non-blinding of outcome assessors may have influenced the data collected by 10 studies that assessed participants' self-reported medication adherence during face-to-face or telephone interviews with outcome assessors (Damush 2015; Hedegaard 2014; Kim 2013; Kronish 2014; Maasland 2007; MacKenzie 2013; MIST 2014; O'Carroll 2011; Peng 2014; Slark 2013). However, non-blinding of outcome assessors was unlikely to affect the adherence outcome data collected by O'Carroll 2011 because data were obtained using a previously validated questionnaire that was administered to participants, and electronic pill containers. Similarly, non-blinding of outcome assessors was unlikely to affect adherence outcome data obtained via a pharmacist review of prescription renewal patterns (MacKenzie 2013), and another study that modified a previously validated questionnaire (Wan 2016). Please see Characteristics of included studies for full evaluations of the risk of bias for the included studies.

Most studies measuring medication adherence outcomes found no significant differences between the intervention and control groups on any indicator of adherence (Summary of findings for the main comparison). The studies by Damush 2015, Dregan 2014, Eames 2013, Hedegaard 2014, Kim 2013, Kronish 2014, Maasland 2007, MIST 2014, and Slark 2013 found no significant differences between the intervention and control groups in participants' self-reported adherence to secondary prevention medications. MacKenzie 2013 evaluated adherence to antihypertensive medication through participants' self-reported missed medication doses and a pharmacist-led review of participants' prescription renewal patterns. No significant differences in the number of missed pills or prescription renewals were observed between the intervention and control groups.

Three studies reported significant differences in medication adherence between the participants in the intervention and control groups (O'Carroll 2011; Peng 2014; Wan 2016). O'Carroll 2011 conducted a repeated measures analysis of self-reported adherence to antihypertensive medication over a time frame of three months, assessed using the Medication Adherence Report Scale (Horne 2006). Here, O'Carroll 2011 reported that a "significantly greater improvement in the intervention group" with regards to total medication adherence (P = 0.027), although the clinical implications of this effect could not be discerned from the available study data. O'Carroll 2011 also evaluated antihypertensive medication adherence by obtaining data from electronic pill containers to determine the "percentage of doses taken", "percentage of days on which the correct dose was taken" and "percentage of doses taken on schedule". The trialists reported that "the intervention group had higher adherence on all measures than the control group, although this was only significant for percentage doses taken on schedule (P = 0.048)". More specifically, it was reported that the intervention group took 9.79% (SD 16.59) more doses on schedule when compared with the control group (O'Carroll 2011).

Peng 2014 reported a significant difference in adherence to statin use between the participants in the intervention and control groups at 12 months, measured by review of medical records. Peng 2014 conducted a trial using the SMART structured program, which compared usual care with a guideline-recommended medication regimen with algorithmic lifestyle modification, in addition to online accessible educational material. It was reported that the SMART group achieved 56% adherence compared to 33% (P = 0.006) in the usual treatment group. However, there were no significant differences reported in the adherence of other measures between the groups: antiplatelet drug use, antihypertensive drug use and antidiabetic drug use.

Wan 2016 also reported a significantly higher medication adherence which was adjusted over time within the intervention. In this study, stroke nurses engaged participants in self-identified goal setting, encouraged via telephone follow-up. Wan 2016 reported 92.3% adherence at three-months follow-up, increasing to 96% adherence at six months, compared to 89% and 87% at three and six months respectively (P < 0.001).

Organisational interventions

Four studies reported data on the proportion of participants who were compliant with warfarin therapy (Johnston 2010; Joubert 2009), anticoagulants (Allen 2009), or antithrombotic medication (Flemming 2013). Three studies measured compliance with antihypertensive medication (Hornnes 2011; Johnston 2010; McAlister 2014) and three measured compliance with statin medication (Flemming 2013; Johnston 2010; McAlister 2014). Two further studies reported the proportion of participants using sec-

ondary prevention medications as prescribed (Boter 2004; Ellis 2005). Medication compliance was either measured through participant self-report (Allen 2009; Boter 2004; Ellis 2005; Flemming 2013; Hornnes 2011; Joubert 2009) or an analysis of filled prescription data and International Normalised Ratio (INR) blood test records (Johnston 2010; McAlister 2014). Five of the six studies reported blinding of outcome assessors when collecting data on medication compliance (Boter 2004; Ellis 2005; Hornnes 2011; Johnston 2010; McAlister 2014), whereas Joubert 2009 did not provide any information regarding this outcome. Data were not pooled because there was substantial heterogeneity in the methods used to obtain outcome data.

Where results were provided for self-reported medication adherence, no difference was seen between the control and intervention groups in four studies (Allen 2009; Boter 2004; Flemming 2013; Johnston 2010). Hornnes 2011 noted an improvement in antihypertension compliance without an improvement in consequent blood pressure.

McAlister 2014 identified that most participants were documented to be receiving secondary prevention medication at baseline. However, none met guideline targets for parameters such as blood pressure. In this study, a nurse led one intervention group and a pharmacist led a second. It was noted that there was a significant improvement in medication compliance between the intervention groups with improvements in blood pressure and LDL levels at six months.

Secondary outcomes

Secondary stroke

Educational and behavioural interventions for patients

Four studies reported data on the proportion of participants who experienced a recurrent stroke or TIA (Kono 2013; MacKenzie 2013; MIST 2014; Peng 2014) (OR 0.82, 95% CI 0.37 to 1.84; N = 4333; Analysis 1.12). Blinding of outcome assessors was not reported in any study. MacKenzie 2013 observed no significant difference in the number of recurrent strokes (assessed from clinical record review) between the intervention and control groups. Both MIST 2014 and Peng 2014 observed no significant difference in the number of strokes or TIAs at 12 months between the intervention and control groups (OR 1.09, 95% CI 0.52 to 2.30; N = 4207; Analysis 1.13). Kono 2013 reported a reduction in further strokes or TIAs when a multifaceted approach was taken in secondary prevention (OR 0.08; 95% CI 0.00 to 1.47; P = 0.09). This approach provided education on exercise, salt intake, and addressed blood pressure. It is noted that the sample size was small and based at a single hospital.

Organisational interventions

Four studies recorded the proportion of participants who experienced at least one recurrent stroke or TIA (Allen 2002; Kerry 2013; Wang 2005; Welin 2010) (OR 0.66, 95% CI 0.23 to 1.86; N = 791; Analysis 2.17). Results were presented as the percentage of participants who had experienced a secondary stroke. In three studies, data on the incidence of recurrent stroke were obtained by blinded outcome assessors from clinical record review (Allen 2002; Welin 2010) or administration of patient questionnaires (Kerry 2013). Wang 2005 did not specify the method used to determine recurrent stroke events and no blinding of outcome assessors was reported. Pooled data from all four studies suggested that organisational interventions were not associated with changes in the proportion of participants who experienced at least one recurrent stroke (OR 0.66, 95% CI 0.23 to 1.86; N = 791; Analysis 2.17). However, the analysis was associated with substantial statistical heterogeneity (I^2 = 77%) due to an outlying study that was assessed at high risk of bias (Wang 2005). When Wang 2005 was removed from the analysis no intervention effect was observed among the three remaining studies.

Five studies provided data on the number of participants with secondary strokes or TIAs that occurred during follow-up (measured at end of study per protocol) (Boysen 2009; Ellis 2005; Hornnes 2011; Markle-Reid 2011; Ranta 2015). Data on secondary stroke events were obtained by blinded outcome assessors following a review of clinical records (Boysen 2009; Hornnes 2011) or face-to-face interviews with study participants (Markle-Reid 2011). Ranta 2015 observed vascular events (either stroke or stroke and TIA) at 90 days and observed a non-significant reduction in participants with one or more events (Analysis 2.18; Analysis 2.20). Results were presented as the number or percentage of participants who had experienced a secondary stroke, except for Ellis 2005 where it was unclear whether the results were for individual participants or total event numbers.

Secondary cardiovascular events

We included 16 studies that reported data on secondary vascular events. Of these, four studies evaluated educational and behavioural interventions for patients (Kono 2013; MacKenzie 2013; MIST 2014; Peng 2014) and 12 evaluated organisational interventions (Allen 2002; Boysen 2009; Brotons 2011; Ellis 2005; Flemming 2013; Hornnes 2011; Kerry 2013; Markle-Reid 2011; McAlister 2014; Ranta 2015; Wang 2005; Welin 2010).

Educational and behavioural interventions

Three studies reported data on the proportion of participants who experienced a secondary cardiovascular event during follow-up (Kono 2013; MIST 2014; Peng 2014). These were presented as the percentage of participants who had experienced a secondary stroke. Kono 2013 reported a significantly lower number of people

with cardiovascular events in the intervention group compared with the control at the end of the study (OR 0.12, 95% CI 0.01 to 1.01; P = 0.05). MIST 2014 and Peng 2014 observed no significant difference in the number of people with cardiovascular events at 12 months between the intervention and control groups (OR 0.82, 95% CI 0.28 to 2.37; P = 0.71).

Organisational interventions

Brotons 2011 reported data on the proportion of participants who experienced a secondary cardiovascular event during follow-up. The data were collected by non-blinded outcome assessors following a review of clinical records and interviews with study participants. No significant intervention effect was observed (OR 1.48, 95% CI 0.79 to 2.77; N = 324; Analysis 2.21).

Ellis 2005 and McAlister 2014 reported data on the number of people with secondary cardiovascular events that occurred before the end of the study. A non-significant improvement was observed (OR 1.48, 95% CI 0.79 to 2.77; P = 0.56).

Myocardial infarction and ischaemic heart disease

Educational and behavioural interventions

Three studies reported the number of myocardial infarctions that occurred after educational and behavioural interventions in individual participants (Kono 2013; MIST 2014; Peng 2014). Two studies did not observe an improvement in the number of cardiovascular deaths (MIST 2014; Peng 2014). Kono 2013 observed significantly less rates of myocardial infarction and angina after a median follow-up period of 2.9 years (OR 0.53, 95% CI 0.17 to 1.65; Analysis 1.14).

Organisational interventions

Ellis 2005 observed no significant differences in the number of ischaemic heart disease events after a mean follow-up duration of 3.6 years (MD -0.91, 95% CI -2.75 to 0.93; N = 17,178; Analysis 2.22). Two studies reported the number or percentage of myocardial infarctions that occurred during follow-up (Boysen 2009; McAlister 2014) and no significant intervention effect was seen (Analysis 2.22; Analysis 2.23). Data were collected by blinded outcome assessors in both studies following clinical record review (Boysen 2009; McAlister 2014) or interviews with study participants (Ellis 2005).

Vascular death

Educational and behavioural interventions

MIST 2014 reported data on the number of cardiovascular deaths. No improvement was observed (OR 1.34, 95% CI 0.30 to 6.07; N = 386; Analysis 1.15).

Organisational interventions

Boysen 2009 and Ranta 2015 reported data on vascular deaths. Boysen 2009 reported data on vascular death obtained by blinded outcome assessors following clinical record review. Boysen 2009 observed no significant differences in the number of vascular deaths occurring in the intervention and control groups (OR 0.38, 95% CI 0.15 to 0.97; N = 605; Analysis 2.24). Ranta 2015 reported single blinded data which identified a significant effect on vascular deaths (OR 0.27, 95% CI 0.1 to 0.73; P = 0.01). When these studies were combined the difference remained significant but both had small numbers of events so no firm conclusions could be drawn.

ADDITIONAL SUMMARY OF FINDINGS *[Explanation]*

Organisational interventions compared to usual care for improving modifiable risk factor control in the secondary prevention of stroke

Patient or population: The trials included a total of 33,840 participants with cerebrovascular disease. The mean or median age of participants ranged from 60 years to 74.3 years. Nine studies included participants with diagnoses of ischaemic stroke; six studies included participants with either ischaemic or haemorrhagic stroke; one focused on lacunar strokes; two did not specify stroke subtype; four included participants with TIA only and 19 trials included a broader range of participants with a diagnosis of either stroke or TIA
Settings: Primary or secondary care
Intervention: Organisational derived interventions
Comparison: Usual care

Outcomes	№ of participants (studies) Follow up	Quality of the evidence (GRADE)	Relative effect (95% CI)	Anticipated absolute effects* (95% CI)	
				Risk with usual care	Risk difference with Organisational interventions
Mean systolic blood pressure	17,490 (16 RCTs)	⊕⊕⊕◯ MODERATE[2]	-	The mean mean systolic blood pressure was 133.85 mmHg	MD 1.58 mmHg lower (-4.66 lower to 1.51 higher)
Mean diastolic blood pressure	17,178 (14 RCTs)	⊕⊕⊕◯ MODERATE[2]	-	The mean mean diastolic blood pressure was 75.12 mmHg	MD 0.91 mmHg lower (-2.75 lower to 0.93 higher)
Blood pressure target achievement	23,631 (13 RCTs)	⊕⊕⊕◯ MODERATE[2]	OR 1.44 (1.09 to 1.90)	**Study population**	
				391 per 1000	89 more per 1000 (21 more to 159 more)
				Low	
				220 per 1000	69 more per 1000 (15 more to 129 more)
				High	

				800 per 1000	52 more per 1000 (13 more to 84 more)
	Sensitivity analysis 1. Repeating analyses excluding unpublished studies: no unpublished results included 2. Repeating analyses excluding studies at high risk of bias (OR 1.44, 95% CI 1.05 to 1.97, P = 0.02) or unclear risk of bias (OR 1.20, 95% CI 1.11 to 1.29, P < 0.05) 3. Repeating analyses excluding very large studies to investigate the extent to which they dominated the results (OR 1.31, 95% CI 1.09 to 1.57, P < 0.05) 4. Repeating analyses using different statistical models (fixed-effect OR 1.35, 95% CI 1.28 to 1.57, P < 0.05)				
Medication adherence	5384 (8 RCTs)	⊕⊕◯◯ LOW [123]	-	Most studies measuring medication adherence outcomes found no significant differences between the intervention and control groups on any indicator of adherence	
Mean low density lipoprotein	1008 (5 RCTs)	⊕⊕⊕◯ MODERATE [4]	-	The mean mean low density lipoprotein was 2.60 mmol/L	MD 0.21 mmol/L lower (-0.31 to -0.11)
Mean HbA1C	554 (4 RCTs)	⊕⊕◯◯ LOW [34]	-	The mean mean HbA1c was 5.71	MD 0.2 lower (-0.98 to 0.59)
Mean BMI	1089 (5 RCTs)	⊕⊕◯◯ LOW [34]	-	The mean mean BMI was 27.89 kg/m²	MD 0.47 kg/m² lower (-1.24 to 0.30)

*__The risk in the intervention group__ (and its 95% confidence interval) is based on the assumed risk in the comparison group and the __relative effect__ of the intervention (and its 95% CI).
CI: Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio;

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

[1] One included study did not include an explanation of blinding

[2] The methods and outcome measures used in these studies were heterogenous which made these difficult to directly correlate

[3] One study deemed high risk when assessed using Cochrane risk of bias tool Contains at least one study thus down graded by one level

[4] The methods used in these studies were heterogenous which made these difficult to directly correlate

DISCUSSION

Summary of main results

This review produced mixed findings regarding the effectiveness of stroke service interventions for the secondary prevention of stroke. We performed meta-analyses where appropriate for the outcomes of blood pressure, lipid profile, HbA1c, body mass index (BMI) and recurrent cardiovascular events. We carried out a qualitative analysis for medication adherence outcomes.

We assessed the quality of the evidence in this review using GRADEpro software and have presented this information in 'Summary of findings' tables. Overall, the evidence for educational or behavioural interventions for patients compared to usual care for improving modifiable risk factor control in the secondary prevention of stroke ranged from low to moderate. The evidence for organisational interventions compared to usual care for improving modifiable risk factor control in the secondary prevention of stroke also ranged from low to moderate. We downgraded evidence due to the small number of studies included and hence wide confidence intervals.

Pooled data for educational and behavioural interventions for participants were not associated with clear differences in any of the review outcomes. Some improvement was observed for medication adherence. O'Carroll 2011 demonstrated significant differences between the intervention and control groups in adherence to secondary prevention medications. MIST 2014 improved self-reported medication adherence using motivational interviewing. Furthermore, Peng 2014 used structured guidelines to statistically improve statin adherence. However, the same treatment protocol did not evoke a similar response in antihypertensive or antiplatelet medication. Interestingly, Kono 2013 developed an intensive lifestyle modification program delivered by healthcare professionals and physical therapists. Kono 2013 documented a statistically significant reduction in blood pressure, HDL and salt intake, and an increase in physical activity. It must be noted this was a small study of 70 participants. It was identified that the pharmacist education program evaluated by Chiu 2008 was associated with significant improvements in mean systolic blood pressure, mean diastolic blood pressure, and mean LDL levels. However, Chiu 2008 only presented data for a subgroup of participants with hypertension or hypercholesterolaemia who, therefore, had the greatest potential for improvement. It may be that educational interventions are more effective for participants with uncontrolled risk factors, and these participants could be targeted in future studies.

The estimated effects of organisational interventions included statistically significant trends towards improving blood pressure target achievement (OR 1.44, 95% CI 1.09 to 1.90; P = 0.01) but not in mean blood pressure (systolic: MD -1.58 mmHg, 95% CI -4.66 to 1.51; P = 0.32, diastolic: MD -0.91 mmHg, 95% CI -2.75 to 0.93; P = 0.33).

In the meta-analysis of systolic blood pressure data presented in this review, the largest blood pressure reductions were associated with five interventions, all of which included integrated care with input from multidisciplinary teams and provision of comprehensive patient education. This involved promotion and tracking of behaviours for secondary stroke prevention.

During this review, it was noted that multidisciplinary team members were usually involved when an intervention was associated with an improved outcome on secondary prevention. This often included an element of patient education and regular monitoring. For example, a nurse-led educational intervention or a pharmacist checking compliance of prescribed medications (Flemming 2013; Hedegaard 2014). There are many reported benefits of working within an effective multidisciplinary team, who individually bring a variation in knowledge, specialisation and experience, consider different elements of patient care and collectively considers the 'whole' patient (Health Foundation 2014; Institute of Public Care 2013; Lemieux-Charles 2006). These include more patient-centred decision making (Emberson 2003; Rose 1981) and more effective use of resources including increased awareness of resources available (British Cardiac Society 1998; Cappuccio 2002; Rice 2017). It is proposed that patient participation and adherence to educational information and medication could be improved through reinforcement of information by different team members, with varying levels of clinical expertise (Health Foundation 2014; Lemieux-Charles 2006; Swientozielskyj 2015). Some team members may have more time to consider and address any specific patient-related issues (Swientozielskyj 2015). Recognition for continued learning to increase knowledge and skills is more evident within multidisciplinary teams, through shared learning opportunities and experience (Lindson-Hawley 2015). Furthermore, the cohesion and support of the team may lead to greater team member satisfaction, clearer leadership and accountability, and greater inter-professional collaboration (Beswick 1996; Dawber 1951; Lemieux-Charles 2006). It is expected that a proactive team who are motivated to help and support a patient and provide focused patient-centred care will provide this high level of patient support to enable a beneficial outcome on secondary stroke prevention (Health Foundation 2014; Swientozielskyj 2015).

Overall completeness and applicability of evidence

A limitation of the included studies was the lack of consistently used outcome measures. For example, some studies measured mean blood pressure whereas some measured target achievement with a variety of acceptable ranges. A similar discrepancy was also seen for weight, weight reduction, BMI and percentage body weight. Combining all results in meta-analyses was therefore problematic. A second limitation was related to variations in study follow-up duration. This review pooled data collected at the end of the study per protocol. However, follow-up duration varied from

three to 43 months. The results should therefore be interpreted with some caution since shorter studies may not provide enough time for the interventions to produce an impact on modifiable risk factors. Conversely, medication adherence or compliance would be expected to be better over shorter durations.

Quality of the evidence

We analysed data from 42 trials involving 33,840 participants with stroke or TIA. Studies were published between 2002 and 2016. The review authors were not blinded to study details (e.g. study authors, journal and results) when assessing the methods. We assessed the quality of each RCT according to Cochrane's tool for assessing risk of bias. We excluded blinding of participants and healthcare providers from assessment because these criteria were unlikely to be met given the nature of the interventions under consideration. We assessed the risk of bias across six domains including sequence generation, allocation concealment, blinding of outcome assessment, incomplete outcome data, selective outcome reporting, and other sources of bias.

Protocols were available for 41 studies and the analysis was described in 28 studies. Wang 2005 did not report randomisation methods (but had unequal group sizes) and Jönsson 2014 used a randomisation method which the review authors felt may introduce bias. Two further studies discussed randomly allocating participants; however, the full method was not available (Chanruengvanich 2006; Chiu 2008). These areas of potential bias raised questions about the validity of these findings.

We assessed the quality of the evidence in this review using GRADEpro GDT software and have presented this information in 'Summary of findings' tables. Overall, the evidence for educational or behavioural interventions for patients compared to usual care for improving modifiable risk factor control in the secondary prevention of stroke ranged from low to moderate (Summary of findings for the main comparison). The evidence for organisational interventions compared to usual care for improving modifiable risk factor control in the secondary prevention of stroke also ranged from low to moderate (Summary of findings 2). We downgraded evidence due to the small number of studies included and hence wide confidence intervals.

Potential biases in the review process

We attempted to identify all RCTs of potential relevance to the review. In addition to a comprehensive search strategy, we attempted to contact the authors of all included trials to identify further published, unpublished and ongoing studies. Visual inspection of funnel plots did not raise any concerns regarding publication bias. We included all eligible RCTs regardless of publication language; we arranged for translation of one study not published in English. It is acknowledged that for secondary events, study authors did not always clarify whether single events in an individual rather than the total number of events over the total number of participants were reported, leading to overestimation of differences between groups.

Agreements and disagreements with other studies or reviews

Buckley 2010 conducted a systematic review of the effects of service organisation interventions for the secondary prevention of ischaemic heart disease. Only interventions delivered in primary care were included. The review found that interventions involving certain elements (regular planned patient appointments, patient education and monitoring of medication and risk factors) may be associated with improved control of total cholesterol and blood pressure levels. However, the authors recommended that results should be interpreted with caution due to significant clinical and statistical heterogeneity.

In contrast to Buckley 2010, this systematic review included interventions that were not delivered in primary care and therefore different types of interventions were included (e.g. implementation of discharge orders). The conclusions of this review, however, are in accordance with Buckley 2010 since organisational interventions, including elements of a multidisciplinary team approach and patient education, were associated with the greatest improvements in blood pressure control.

The possible effects of multidisciplinary team services in this review are also supported by the findings of another review of organisational interventions. Wensing 2006 reported that "integrated care services are particularly promising" when considering strategies to improve patient care. This is attributed to the typical multifaceted nature of these interventions. The authors suggested that the incorporation of numerous intervention components may "address a wide range of potential barriers for change". They also stated that "further work should focus on analysing the contributions of the specific components in integrated care services, to identify which particularly contribute to their effectiveness" (Wensing 2006).

AUTHORS' CONCLUSIONS

Implications for practice

This review highlighted possible benefits of organisational interventions on the achievement of blood pressure targets. However, we found no clear evidence that organisational interventions can improve other modifiable risk factors (lipid profile, HbA1c, weight, medication adherence) or reduce the incidence of recurrent cardiovascular events. Results also suggest that interventions

including patient education alone are unlikely to lead to improvements in modifiable risk factor control or the prevention of recurrent cardiovascular events.

Implications for research

Future research should focus on the development of more effective interventions to translate secondary prevention recommendations into practice. The findings from this review suggest that educational and behavioural interventions for patients delivered in the absence of organisational change may not be an effective means of achieving this aim. Future research should evaluate the effects of specific components of organisational interventions, including the characteristics of an effective multidisciplinary team. We identified 24 ongoing studies and 11 studies that are awaiting assessment, so a future review update may lead to more robust conclusions.

The stroke service interventions included in this review were found to differ considerably in terms of aims (e.g. degree of focus on secondary stroke prevention), duration, components and mode of delivery. Pre-determined strategies for categorising interventions and their intensity may facilitate the synthesis of future research findings.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Adie 2010

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: hospital stroke clinic and hospital neurovascular clinic Numbers randomised: total: 56; (I: 29; C: 27) % Completing final follow-up: 100% Inclusion criteria: < 1 month since minor stroke or TIA; > 18 years; clinic SBP ≥ 140 mmHg; living at home at time of follow-up Exclusion criteria: known dementia, "significant disability or co-morbidity which would impair ability to consent or cause undue distress" Type of stroke: minor stroke (57%); TIA (43%) Mean age (SD): 72.5 (8.9) Gender (% men): 50% Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): motivational telephone follow-up intervention based on social cognitive theory. Participants received a 20 minute telephone call at 7 days, 1, 2 and 4 months to review risk factors, medication and goal setting; participants provided with tailored educational material; participants with high blood pressure encouraged to visit their GP Location: community Mode of delivery: telephone follow-up Personnel responsible for delivery: 1 researcher Timing post-stroke: < 1 month Control: usual care (participants received instructions for follow-up with their GP; no follow-up visits arranged in secondary care)
Outcomes	6 months: SBP (clinic and ambulatory); DBP (clinic and ambulatory); total cholesterol; BP ≤ 130/80 mmHg; total cholesterol ≤ 4 mmol/L
General Information	Funding:author was funded by a Clinical Fellowship from the UK Stroke Association Country of origin: UK Publication language: English
Notes	Analysis method: not stated Risk of bias: low Comments: definition of minor stroke not stated

Risk of bias

Bias	Authors' judgement	Support for judgement

Adie 2010 (*Continued*)

Random sequence generation (selection bias)	Low risk	Envelope method: "participants were randomized … at the end of their first study visit (baseline; month 0) by sequential opaque envelopes stratified by stroke or TIA"
Allocation concealment (selection bias)	Low risk	Envelope method
Incomplete outcome data (attrition bias) All outcomes	Low risk	No missing outcome data
Selective reporting (reporting bias)	Low risk	Protocol available and outcomes are reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Allen 2002

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: hospital acute stroke department Numbers randomised: total: 96 (I: 47; C: 46) % Completing final follow-up: 76% Inclusion criteria: ischaemic stroke or TIA; discharged to home or short-term rehabilitation facility (for < 1 month); no other illnesses that would dominate post-discharge care; Rankin Scale score ≤ 3; Exclusion criteria: Rankin score of 4 or 5; discharged to long-term care facility Type of stroke: ischaemic stroke (I: 70%; C: 71%); TIA (I: 30%; C: 29%) Mean age (SE): I: 69 (1.7); C: 72 (1.5) Gender (% women): I: 57; C: 54 Ethnicity (% African-American): I: 30%; C: 20% Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): APN telephoned patients 3 to 7 days post-discharge to assess needs and deliver education; APN conducted home assessment within 1 month post-discharge; individualised patient care plans developed by interdisciplinary team using evidence-based recommendations; APN implemented treatment plan and conducted follow-up assessments; primary care physicians provided with care plans/evidence-based recommendations Location: community Mode of delivery: home visits Personnel responsible for delivery: advanced practice nurse and interdisciplinary team Timing post-stroke: discharge home Control: usual care provided by primary care physician Pre-discharge care (I and C): interdisciplinary care and stroke education

Allen 2002 (*Continued*)

Outcomes	3 months: BP: mean mmHg BP > 140/90; proportion of participants re-hospitalised for stroke
General Information	Funding: not reported Country of origin: USA Publication language: English
Notes	Analysis method: not stated Risk of bias: unclear

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"Patients were assigned to the intervention or to usual postdischarge care by drawing consecutive concealed tickets that were randomized within permuted blocks of 10"
Allocation concealment (selection bias)	Unclear risk	Not reported
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Missing data not reported by group Attrition: 1 became cognitively impaired; 2 moved out of state; 3 moved to nursing home; 5 died; 12 refused follow up visit Judgement: not enough information to permit judgement (missing data not reported by group)
Selective reporting (reporting bias)	Unclear risk	Insufficient information (protocol not obtained)
Other bias	Low risk	The study appears to be free of other sources of bias

Allen 2009

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: hospital acute stroke department Numbers randomised: total: 380 (I: 190; C: 190) % Completing final follow-up: 84% to 100% depending on outcome measure Inclusion criteria: ischaemic stroke; NIHSS $\geq$ 1; discharged to home or short-term rehabilitation/nursing facility (for < 8 weeks); no other illnesses that would dominate post-discharge care; English-speaking; no planned carotid endarterectomy Type of stroke: ischaemic (100%) Mean age (SE): I: 68 (1); C: 69 (1)

	Gender (% men): I: 48%; C: 52% Ethnicity (% African American): I: 17%; C: 15% Socio-economic or socio-demographic status (% married): I: 47%; C: 46%
Interventions	Intervention details: participant received home assessment at 1 week from APN; individualised patient care plans developed by interdisciplinary team using evidence-based recommendations; ongoing care management provided by APN for 6 months (telephone contact every week for first month and monthly thereafter; home visits as needed; physical therapist visits arranged as needed; liaison with social services; participants provided with personalised health record and pill organisers for risk factor management); primary care physicians provided with care plans/evidence-based recommendations Location: community Mode of delivery: home visits and telephone follow-up Personnel responsible for delivery: APN and interdisciplinary team Timing post-stroke: discharge home Control: usual care provided by primary care physician; received postal stroke-related educational materials every 2 months Usual care before discharge (I and C): organised stroke department care with enhanced discharge planning. Involved physical and psychological evaluation using standardised assessment tools; initiation of appropriate medication; development of individualised discharge plan; discharge summary sent to primary care physician
Outcomes	6 months: SBP > 140 mmHg; DBP > 90 mmHg; total cholesterol > 180 mg/dL; Hb1Ac > 6.5%; proportion of participants on anticoagulant; proportion of participants using method for medication compliance
General Information	Funding: not reported Country of origin: USA Publication language: English
Notes	Analysis method: stated intention-to-treat Risk of bias: unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"The randomization sequence was by permuted blocks of fixed size (10) generated by study biostatisticians"
Allocation concealment (selection bias)	Low risk	"Group assignment was made by a research assistant using the sealed envelope method"
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Missing data reported by group but reasons not fully described Attrition (dependent on outcome): I: range 0/90 to 25/190 (reasons unclear); C: range 0/190 to 36/190 (reasons unclear)

Allen 2009 (*Continued*)

		Judgement: not enough information to permit judgement (reasons for missing data not provided)
Selective reporting (reporting bias)	Low risk	Examination of study reports suggests that all outcomes were reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Boter 2004

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: 2 university hospitals; 10 general hospitals Numbers randomised: total: 536 (I: 263; C: 273) % Completing final follow-up: 91% Inclusion criteria: TIA, ischaemic stroke, primary intracerebral haemorrhage, or subarachnoid haemorrhage; Dutch-speaking; ≥ 18 years; first admission for stroke or TIA; hospitalisation within 72 hours after onset of symptoms; life expectancy > 1 year; Rankin grade 0 to 3; discharged home Type of stroke: TIA (I: 9%; C: 8%); ischaemic stroke (I: 53%; C: 55%); haemorrhagic stroke (I: 10%; C: 9%); subarachnoid haemorrhage (I: 19%; C: 19%) Median age (IQR): I: 66 (52 to 76); C: 63 (51 to 74) Gender (% women): I: 51%; C: 52% Ethnicity (% African American): I: 17%; C: 15% Socio-economic or socio-demographic status: • Education level: I: primary school or less - 24%, secondary school - 60%, higher education or university - 15, unknown - 1%; C: primary school or less - 27%, secondary school - 58%, higher education or university - 15%, unknown < 1% • Living alone: I: 30%, C: 26%
Interventions	Intervention details (components, length, frequency): participants and their carers received 3 telephone calls from a stroke nurse at 1 to 4, 4 to 8 and 18 to 24 weeks; participants received 1 home visit from a stroke nurse at 10 to 14 weeks; checklists used to address stroke risk factors, stroke consequences and unmet needs in terms of stroke services; nurses supported participants and carers according to their individual needs Location: community Mode of delivery: home visits and telephone follow-up Personnel responsible for delivery: stroke nurses trained for 2 days on "secondary prevention of stroke, rehabilitation, therapies, prognosis and knowledge of local care facilities" Timing post-stroke: post-discharge Control: standard care
Outcomes	6 months: proportion of participants using secondary prevention drugs (anticoagulants or antiplatelets)

Boter 2004 (*Continued*)

General Information	Funding: clinical investigator grant from the Netherlands Heart Foundation (grant D98.014), by a grant from the Netherlands Heart Foundation and the Netherlands Organization for Health Research and Development (940-32014), and by a grant from the University Medical Center Utrecht Country of origin: Netherlands Publication language: English
Notes	Analysis method: stated intention-to-treat Risk of bias: low

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Allocation was done by means of a central telephone service"
Allocation concealment (selection bias)	Low risk	"Allocation was done by means of a central telephone service"
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 32/263 (7 died; 25 declined follow-up); C:18/273 (5 died; 13 declined follow-up) Judgement: reasons for missing data reported and review authors judged that they were unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Study protocol available and all outcomes are reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Boysen 2009

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: stroke units Numbers randomised: total: 314 (I: 157; C: 157) % Completing final follow-up: 88% Inclusion criteria: ischaemic stroke; aged > 40 years; able to walk Exclusion criteria: contraindications to exercise; modified Rankin scale of 4 or 5 pre-stroke; cognitive impairment; discharge to nursing home; severe neurological deficit Type of stroke: ischaemic (100%) Median age (IQR): I: 69.7 (60.0 to 77.7); C: 69.4 (59.6 to 75.8) Gender (% women): I: 43%; C: 44%

	Ethnicity: not reported Socio-economic or socio-demographic status: • Years of education (%): I: ≤ 8 (45%), 9 to 12 (34%), ≥ 13 (21%); C: ≤ 8 (47%), 9 to 12 (40%), ≥ 13 (13%)
Interventions	Intervention details (components, length, frequency): repeated verbal instructions about physical activity over 2 years; first meeting (30 to 60 minutes) to develop individualised plan for physical activity; follow-up visits (20 to 30 minutes) every 3 months for the first year and every 6 months thereafter to provide repeated instructions and readjust physical activity plan; between-visit reminder telephone calls Location: community Mode of delivery: home visits and telephone follow-up Personnel responsible for delivery: physiotherapist in 8 centres, neurologist in 1 centre Timing post-stroke: beginning < 90 days post-stroke Control: received information about physical activity; received follow-up visits at same frequency as intervention group but without instructions about physical activity
Outcomes	24 months: number of secondary strokes; number of myocardial infarctions; number of vascular deaths
General Information	Funding: the Ex Stroke Pilot Trial was funded by the Ludvig and Sara Elsass' Foundation, Hede Nielsen Foundation, Eva and Henry Frænkel's Foundation, Søren and Helene Hempel's Foundation, and King Christian X Foundation Country of origin: Denmark, China, Poland and Estonia Publication language: English
Notes	Analysis method: stated intention-to-treat; per protocol Risk of bias: low

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Central randomisation: "generation of allocation sequences was computer based"
Allocation concealment (selection bias)	Low risk	"Allocation concealment was achieved through centralised randomization by telephone or email."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 24/157 (11 died; 3 withdrawn due to severe neurological deficits caused by recurrent stroke; 10 lost to follow-up); C: 14/157 (9 died; 2 withdrawn due to severe neurological deficits caused by recurrent stroke; 2 lost to follow-up) Judgement: reasons for missing data reported and review authors judge that they

Boysen 2009 (*Continued*)

		are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Study protocol available and all outcomes are reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Brotons 2011

Methods	RCT Unit of randomisation: general practice
Participants	Place of recruitment: 42 primary care centres in 8 regions of Spain Numbers randomised: total: 1224 (414 stroke/TIA); I: 624 (203 stroke/TIA); C: 600 (211 stroke/TIA) % Completing final follow-up: 70% Inclusion criteria: cardiovascular disease (ischaemic heart disease, stroke /TIA and peripheral arterial disease); ≤ 80 years Exclusion criteria: cardio-embolic stroke or subarachnoid haemorrhage as a result of valvulopathy; serious disease or terminal illness; bed bound Type of stroke (%): not stated Mean age (SE): I: 68 (11); C: 69 (11) Gender (% men): I: 64%; C: 64% Ethnicity: not reported Socio-economic or socio-demographic status: • Employment status: employed - 11%, unemployed - 2%, sick leave/invalidity - 10%, retired 61%, Other - 16% • Education level: illiterate - 4%, uneducated, literate - 36%, primary education - 39%, secondary education - 13%, higher education - 6%, university 3%
Interventions	Intervention details (components, length, frequency): comprehensive secondary prevention program including tailored patient education, promotion of medication adherence and review of secondary prevention medication; participants attended appointment every 4 months for 2.75 years; health professionals delivering the intervention followed protocols for patient care and attended training sessions on secondary prevention of cardiovascular disease Location: primary care Mode of delivery: outpatient appointment Personnel responsible for delivery: nurses with specific training in the secondary prevention of cardiovascular disease Timing post-stroke: < 1 year Control: usual care
Outcomes	3 years: SBP; DBP; total cholesterol; LDL; HDL; triglycerides; BMI; BP < 140/90 in non-diabetics or BP < 130/80 in diabetics/ patients with chronic renal failure; cardiovascular readmissions; cardiovascular fatal events

Brotons 2011 (*Continued*)

General Information	Funding: project co-ordinated and funded by the FIS (PI031421), Instituto de Salud Carlos III, Ministry of Health and Consumer Affairs Country of origin: Spain Publication language: English
Notes	Analysis method: intention-to-treat Risk of bias: low

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Random numbers generated using a validated computer program
Allocation concealment (selection bias)	Low risk	Central allocation service, stratified by region ("the randomization sequence was not revealed until the intervention was assigned")
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 11 died; 51 lost to follow-up (reasons provided); 6 unknown; C: 13 died; 69 lost to follow-up (reasons provided); 41 unknown* *study authors explain that it was difficult to recover reasons for losses in control group because they were visited only at baseline and at end of follow-up Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Study protocol available and outcomes are reported in pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Chanruengvanich 2006

Methods	Unit of randomisation: participant
Participants	Place of recruitment: hospital (centre specialising in neurology) Numbers randomised: total: 72; I: 36; C: 36 % Completing final follow-up: 86% Inclusion criteria: > 6 weeks since TIA or minor stroke; energy expenditure < 1000 Kcal/week; age > 45 years; no cognitive impairment; able to exercise; BP ≤ 180/100 mmHg;

	fasting blood sugar ≤ 150 mg% Exclusion criteria: complications e.g. heart attack or chest pain Type of stroke (%): not reported Mean age (SD): I: 62.8 (7.4); C: 63.1 (7.1) Gender (% women): I: 68%; C: 68% Ethnicity: not reported Socio-economic or socio-demographic status: • Marital status: single - 11%, couple - 63%, separated - 26% • Educational level: elementary - 53%, high school - 21%, vocational/college - 15%, bachelor degree - 10%, master degree - 1.6% • Income (Baht): < 5000 - 63%, 5001 to 10,000 - 16%, 10,001 to 15,000- 8%, 15, 001 to 20,000 - 8%, > 20,000 - 5%
Interventions	Intervention details (components, length, frequency): 12 week self-regulated exercise program; first week - educational meeting (topics included disease management, diet, exercise and stress management); second week - instruction in self-regulation techniques and recommended exercises (using group demonstration and video); third week - home visit from researcher to identify problems; second to twelfth weeks - moderate exercise for a minimum of 15 minutes 2 to 3 times per day (recorded in exercise diary) with energy expenditure target 1000 kcal per week; researcher made weekly telephone calls to encourage participants to adhere to the exercise program Location: community Mode of delivery: patient education, home visit and telephone follow-up Personnel responsible for delivery: researcher/investigator Timing post-stroke: > 6 weeks Control: usual care
Outcomes	12 weeks: SBP; DBP; total cholesterol; HDL
General Information	Funding: this research was supported by the Thai Health Promotion Foundation Country of origin: Thailand Publication language: English
Notes	Analysis method: not stated (per protocol) Risk of bias: unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	"Each patient was randomly assigned" - method not reported
Allocation concealment (selection bias)	Unclear risk	Not reported
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 5/36 (1 withdrew; 4 illness prohibited exercise); C: 3/36 (3 withdrew) Excluded from analysis: I: 0; C: 2/36 (2 excluded

		to balance the groups) Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Study protocol available and all outcomes are reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Chiu 2008

Methods	Unit of randomisation: participant
Participants	Place of recruitment: tertiary referral hospital (outpatients) Numbers randomised: total: 160 (I: 80; C: 80) % Completing final follow-up: not reported Inclusion criteria: ischaemic stroke; national health insurance (coverage: 95%); attending outpatient clinics for > 12 months Exclusion criteria: currently enrolled in other trials; terminal illness Type of stroke: ischaemic stroke (100%) Mean age (SD): I: 65.7 (10.0); C: 64.8 (10.6) Gender (% women) I: 50%; C: 50% Ethnicity: not reported Socio-economic or socio-demographic status: • Education (%): I: illiterate - 45%, educated - 55%; C: illiterate - 46%, educated - 54%
Interventions	Intervention details (components, length, frequency): monthly 1 hour pharmacist-led educational program conducted over 6 months; topics included drug effects, treatment goals, lifestyle modification, compliance and adverse effects; no scheduled monitoring of modifiable risk factors Location: hospital Mode of delivery: outpatient appointment Personnel responsible for delivery: pharmacist Timing post-stroke: > 12 months Control: usual care (attendance at outpatient clinics)
Outcomes	6 months: SBP; DBP; total cholesterol; LDL; triglycerides; BP < 140/90 mmHg; LDL < 100 mg/dL or TC < 160 mg/dL; HbA1c < 7% or fasting blood glucose < 126 mg/dL or random postprandial blood glucose < 200 mg/dL
General Information	Funding: not reported Country of origin: Taiwan Publication language: English

Chiu 2008 (*Continued*)

Notes	Analysis method: not stated Risk of bias: unclear

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	"Simple random sampling"
Allocation concealment (selection bias)	Unclear risk	Not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Missing data not reported
Selective reporting (reporting bias)	Unclear risk	Insufficient information (protocol not obtained)
Other bias	Low risk	The study appears to be free of other sources of bias

Damush 2015

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: tertiary referral hospital (outpatients) Numbers randomised: total: 160 (I: 80; C: 80) % Completing final follow-up: not reported Inclusion criteria: ischaemic stroke; National Health Insurance (coverage: 95%); attending outpatient clinics for > 12 months Exclusion criteria: currently enrolled in other trials; terminal illness Type of stroke: stroke (I: 76% C: 77%) TIA (I: 24% C:23%) Mean age (SD): I: 60.4 (9.5); C: 62.1 (9.4) Gender (% men) I: 96.6%; C: 97.7% Ethnicity: American Indian/Alaska native (I: 1.2% C: 1.2%), Native Hawaiian or other Pacific islander (I: 0% C: 1.2%), Black or African-American (I: 27.6% C: 33.3%), White (I: 62.1% C: 58.6%), more than 1 race (I: 1.2% C: 0%), Hispanic (I: 12.6% C: 4.6%) Socio-economic or socio-demographic: • Education level: Less than high school (I: 8.1% C: 11.5%), high school/GED (I: 8.1% C: 11.5%), some college or trade (I: 29.9% C: 37.9%), college graduate (I: 13.8% C: 9.2%), graduate school or more (I: 4.6% C: 5.8%), missing (I: 8.1% C:9.2%)
Interventions	Intervention details (components, length, frequency): Up to 6 bi-weekly telephone services to deliver a stroke self management program, based on Stanford chronic disease self-management program Location: outpatient Mode of delivery: telephone Personnel responsible for delivery: nurse case manager

Damush 2015 (*Continued*)

	Timing post-stroke: 6 months Control: usual care
Outcomes	6 months: medication adherence
General Information	Funding: this study was funded by the VA HSRD Investigator Initiated Research Grant IAB 05-297-2 and by the HSRD VA Stroke QUERI Center Country of origin: USA Publication language: English
Notes	Analysis method: repeated measured logistic regression Risk of bias: unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer-generated assignment, stratified by stroke versus TIAs
Allocation concealment (selection bias)	Low risk	Central allocation
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	The study did not address this outcome
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement
Other bias	Low risk	The study appears to be free of other sources of bias

Dregan 2014

Methods	RCT Unit of randomisation: family practices
Participants	Place of recruitment: primary care Numbers randomised: total: 11,391 (I: 5875; C: 5516) Completing final follow-up: 90% Inclusion criteria: ≥ 18 years, included on the practice stroke register Exclusion criteria: none stated Type of stroke (%): haemorrhagic (I: 18 C: 16), ischaemic (I: 26 C: 21), undefined (I: 56 C: 63) Mean age (SD): I: 72.9 (14.1); C: 72.2 (13.9) Gender (% women) I: 49 C: 47 Ethnicity: not stated Socio-economic or socio-demographic: not stated

Interventions	Intervention details (components, length, frequency): educational and decision support tools for primary care healthcare providers, taken from evidence summarised from guidelines, including clinical trials, meta-analysis and observational analysis - prompts for BP/cholesterol level/statins/anticoagulant assessment Mode of delivery: delivered remotely via point of care software for use in the community Personnel responsible for delivery: software system Timing post-stroke: unlimited Control: usual care
Outcomes	12 months: BP and total cholesterol levels
General Information	Funding: the study was supported by the Joint Initiative in Electronic Patient Records and Databases in Research, a partnership between the Wellcome Trust, Medical Research Council, Economics and Social Research Council, and Engineering and Physical Sciences Research Council Country of origin: UK Publication language: English
Notes	Analysis method: marginal methods estimated using the method of generalised estimating equations Risk of bias: Low risk

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"The allocation is by minimization controlling for region in England (North (North-East and North-West), Midlands (East and West Midlands), South-East (South-East and East of England), South-West, and London) and country in the UK (Scotland, Wales, England) and list size (number of registered patients). This list size was dichotomized for the minimization using 7,500 as the cut-point. The allocation is performed at King's College London using anonymised practice identifiers supplied by the recruitment team at GPRD/MHRA"
Allocation concealment (selection bias)	Low risk	Allocation was performed using anonymised practice identifiers
Incomplete outcome data (attrition bias) All outcomes	Low risk	Risk of bias is acceptable - no added value is obvious from the results. Sensitivity analysis was also undertaken
Selective reporting (reporting bias)	Low risk	The study protocol was clear and had been published prior to the study

Dregan 2014 (*Continued*)

Other bias	Low risk	The study appeared to be free of other sources of bias

Eames 2013

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: 2 acute stroke units in metropolitan hospitals Numbers randomised: total: 77 (I :37; C: 40) % Completing final follow-up: 86% Inclusion criteria: ischaemic stroke, haemorrhagic stroke or TIA; admitted to hospital for stroke or TIA; living in a residential care facility prior to admission and it was not a planned discharge destination; adequate spoken English, cognition, communication and corrected vision and hearing to complete the outcome measures Exclusion criteria: poor medical prognosis (i.e. medically unstable patients or those undergoing palliative treatment) Type of stroke: ischaemic (I: 73%; C: 84%); haemorrhagic (I: 25%; C: 14%), TIA (I : 3%, C: 0%) Mean age (SD): I: 57.0 (16.6); C: 64.1 (14.3) Gender (% men) I: 55%; C: 51% Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): tailored written stroke information (stroke booklet) and verbal reinforcement of this information by a health professional (verbal reinforcement was offered face-to-face up to 3 times prior to discharge and over the telephone up to 3 times following discharge). Participants could tailor the content of the information booklet and the verbal sessions Location: acute stroke unit (prior to discharge) and community/inpatient rehabilitation ward (post-discharge) Mode of delivery: outpatient appointment Personnel responsible for delivery: occupational therapist Timing post-stroke: approximately 1 week prior to acute stroke unit discharge Control: usual care (stroke unit care included usual medical, nursing, and allied health management)
Outcomes	3 months: adherence to secondary prevention medications
General Information	Funding: none received Country of origin: Australia Publication language: English
Notes	Analysis method: unknown Risk of bias: low

Risk of bias

Eames 2013 (*Continued*)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"Concealed, random allocation was achieved via sequentially numbered envelopes containing computer-generated random numbers prepared by a person not involved in the study"
Allocation concealment (selection bias)	Low risk	"Baselines outcome measures were obtained prior to randomization and therefore by a blinded assessor. Administration of outcome measures at the follow-up interview was undertaken by a blinded assessor. Once completed, the assessor opened a sealed section of the form to determine group allocation and asked intervention group participants additional questions regarding the intervention. " (Unpublished information provided by trialists)
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 5/40 (4 unable to be contacted; 1 cognition impairment too severe for interview follow-up; C:6/37 (2 withdrew; 3 unable to be contacted; 1 admitted to residential care Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Protocol is available and outcomes are reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Ellis 2005

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: hospital TIA clinic or geriatric medical day hospital Numbers randomised: total: 205 (I: 100; C: 105) % Completing final follow-up: 94% Inclusion criteria: < 3 months since stroke, TIA or amaurosis fugax; ambulant patients; one of more cardiovascular risk factor (high BP, history of current smoking, high cholesterol, diabetes) Exclusion criteria: cognitive impairment (AMT < 5 on screening)

	Type of stroke: TIA (I: 29%; C: 26%); stroke (I: 61%; C: 65%) Mean age (95% CI): I: 64.3 (62.4 to 66.1), C: 65.8 (64.0 to 67.5) Gender (% men): I: 54%; C: 50% Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): monthly reviews (approximately 3) with a stroke nurse specialist; participants received tailored verbal and written information addressing medication compliance, lifestyle modification, interaction with medical services, risk factor status and risk factor targets; participants advised to visit their GP if risk factors poorly controlled Location: hospital outpatient setting Mode of delivery: outpatient appointment Personnel responsible for delivery: stroke nurse specialist Timing post-stroke: first review at 3 months Control: usual care (1 review in hospital outpatient setting where patients received standard outpatient advise on risk factors and secondary prevention; discharged to general practice care)
Outcomes	5 months (per protocol): SBP; DBP; total cholesterol; HbA1c; combined risk factor control 3.6 years (additional follow-up): SBP; DBP; total cholesterol; HbA1c; persistence with therapy; self-reported adherence; recurrent cardiovascular events; percentage of patients meetings target for combined risk factor control
General Information	Funding: educational grant from Servier Laboratories Country of origin: UK Publication language: English
Notes	Analysis method: stated intention-to-treat Risk of bias: unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Patients were randomly allocated to treatment or control groups using a computer-generated random sequence"
Allocation concealment (selection bias)	Low risk	"Concealed in sequentially numbered opaque sealed envelopes"
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 6 lost to follow-up (reasons unclear); C: 7 lost to follow-up (reasons unclear) Excluded from analysis: I: 3 patients entered twice by error: duplicate results ex-

Ellis 2005 (*Continued*)

		cluded from the analysis; C: 1 patient found to be ineligible: results included in the analysis (intention-to-treat) Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Unclear risk	Insufficient information (protocol not obtained)
Other bias	Low risk	The study appears to be free of other sources of bias

Evans 2010

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: primary care medical clinic Numbers randomised: total: 176 (8 stroke/TIA); I: 88 (4 stroke/TIA); C: 88 (4 stroke/TIA) % Completing final follow-up: 89% Inclusion criteria: Framingham risk score ≥ 15% or coronary artery disease risk equivalent (coronary artery disease, peripheral artery disease, cerebrovascular disease, diabetes mellitus) Exclusion criteria: severe psychiatric conditions or demential symptomatic heart failure; terminal illness Type of stroke (%): not stated Mean age (SD): 62.5 (10.5) Gender (% men): 87.5% Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): pharmacist-delivered secondary prevention program involving cardiovascular risk stratification, monitoring of cardiovascular risk factors and drug adherence support; participants were contacted approximately every 8 weeks for minimum of 6 months (telephone call, appointment, mailed letters); mean duration of follow-up was 380 days; participants and their primary care physicians were informed if risk factors were uncontrolled Location: primary care medical clinic Mode of delivery: primary care appointment Personnel responsible for delivery: pharmacist (intervention designed for non-specialist pharmacists to facilitate collaborative partnerships without the need for advanced training) Timing post-stroke: unknown Usual care (I and C): general counselling about cardiovascular disease (1 hour pharmacist appointment)

Evans 2010 (*Continued*)

Outcomes	12 months: SBP; DBP; total cholesterol; LDL; HDL; triglycerides; HbA1C; 10 year Framingham risk score
General Information	Funding: funding through a Canadian Institute of Health Research (CIHR) Clinical Research Initiative Fellowship and funding for salary support award from the Alberta Heritage Foundation for Medical Research Country of origin: Canada Publication language: English
Notes	Analysis method: stated intention-to-treat Risk of bias: low

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Randomisation lists were stratified by each physician and were created by using a table of random numbers in permuted blocks of four"
Allocation concealment (selection bias)	Low risk	"Randomisation codes were kept in individually sealed envelopes and opened by the study pharmacist at the end of the initial visit"
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 11/88 (9 laboratory data not available; 1 moved; 1 died); C: 9/88 (8 laboratory data not available; 1 withdrew due to unrelated illness) Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Protocol available and outcomes reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Flemming 2013

Methods	RCT Unit of randomisation: participant

Flemming 2013 (*Continued*)

Participants	Place of recruitment: hospital Numbers randomised: total: 41 (I: 20; C: 21) % Completing final follow-up: 88% Inclusion criteria: ischaemic stroke or TIA and at least one uncontrolled stroke risk factor (hypertension, hyperlipidaemia, diabetes or tobacco use); > 55 years old Exclusion criteria: NIHSS > 7; prior enrolment in cardiovascular prevention clinic; life expectancy < 1 year Type of stroke (%): TIA (I: 40%, C: 52%); ischaemic stroke (I: 60%, C: 48%) Mean age (SD): I: 70 (13); C: 71 (9) Gender (% men): I: 50%; C: 66% Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): nurses were trained in stroke risk factors and motivational interviewing; participants attended nurse-led appointments for risk factor review (baseline, 6 weeks, 6 months and 1 year) and received additional nurse-led telephone follow-up; nurses followed standardised protocols for the assessment and management of stroke risk factors; participants attended consultations with dietician and exercise physiologist; secondary stroke prevention recommendations and participants' risk factor assessments were sent to their GP/neurologist Location: outpatient clinic Mode of delivery: outpatient appointment and telephone follow-up Personnel responsible for delivery: nurses Timing post-stroke: < 12 weeks Usual care (I and C): usual care: baseline risk factor assessment and follow-up appointment (1 year); usual follow-up by primary care/neurology
Outcomes	12 months: change in cardiovascular risk factors (SBP; LDL; HDL; triglycerides; HbA1c; BMI; Framingham cardiovascular risk score); achievement of targets for cardiovascular risk factors; number of vascular events; adherence to secondary prevention medication
General Information	Funding: this research was funded by the American Heart Association (Scientist Development Grant). This research was partially funded by the Center for Translational Science Activities (CTSA) at Mayo Clinic Country of origin: USA Publication language: English
Notes	Analysis method: available case analysis Risk of bias: low

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Shuffling envelopes
Allocation concealment (selection bias)	Low risk	Envelope method

Flemming 2013 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 2/20 (1 died; 1 lost to follow-up); C:3/21 (2 died; lost to follow-up) Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Protocol available and outcomes reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Hanley 2015

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: GP surgery Numbers randomised: total: 55 (I: 40; C: 15) % Completing final follow-up: 95% Inclusion criteria: all stroke and TIA, > 18 years, systolic BP > 130mmHg Exclusion criteria: secondary hypertension, hypertension managed by secondary care, surgery BP < 120/60 or > 220 systolic at baseline, major surgery in last 3 months, unable to give consent, unable to use home blood pressure monitor, terminal illness, major concurrent illness, AF, stroke within the last 3 months Type of stroke (%): TIA (I: 50%, C: 47%); ischaemic stroke (I: 50%, C: 53%) Mean age (SD): I: 69.9 (12.6); C: 73.5 (11.7) Gender (% men): I: 68%; C: 40% Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): participants measured their own BP, including reminders to self monitor, sent readings to GP via Bluetooth, checked by practice nurse, with telephone or face-to-face appointments made as needed. Participants were given information on lifestyle measures to reduce BP Location: community Mode of delivery: remote Personnel responsible for delivery: nurse Timing post-stroke: > 3 months after a stroke/TIA Control: usual care
Outcomes	6 months: ambulatory BP
General Information	Funding: this study was funded by the Chief Scientist Office (CSO), Scottish Government Country of origin: UK Publication language: English

Hanley 2015 (*Continued*)

Notes	Analysis method: as this was a feasibility study, no statistical analysis was undertaken Risk of bias: unclear

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Randomisation undertaken using a 3:1 ratio using a remote Internet-based system provided by the Edinburgh Clinical Trials Unit
Allocation concealment (selection bias)	Low risk	Central allocation
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	The study did not address this risk of bias
Selective reporting (reporting bias)	Unclear risk	As this was a pilot, the methods are described but not published elsewhere with pre-specified outcomes
Other bias	Low risk	The study appears to be free of other sources of bias

Hedegaard 2014

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: emergency ward or from 5 locations - 2 inpatient wards,1 patient hotel, 1 rehabilitation centre and 1 TIA outpatient clinic Numbers randomised: total: 211 (I: 104; C: 107) % Completing final follow-up: 96% Inclusion criteria: ischaemic stroke or TIA within the previous 30 days, acute first stroke, > 18 years of age, prescribed at least 1 antiplatelet or anticoagulant medication, participant or co-habiting relatives dispensed the participant's medications Exclusion criteria: lives in a care home or institution, dose dispersed medications from a pharmacy, if medication was dispensed by a home nurse, terminal illness or cognitive/physical impairment Type of stroke: TIA (I: 47%; C: 49%); ischaemic stroke (I: 52%; C: 50%) Mean age (range): I: 64 (56-73), C: 68 (61-73) Gender (% men): I: 59.8; C: 62.4 Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): clinical pharmacists were trained in providing 1) a focused medication review followed by dialogue based on motivational interviewing to support adherence and lifestyle changes; 2) a patient interview followed by a list of their own goals and agreed actions; 3) 3 follow-up telephone calls to the

	participant (1 week, 2 months and 6 months) where participants were given a written summary of their goals and plans after the second and third calls Location: outpatient clinic Mode of delivery: outpatient appointment and telephone follow-up Personnel responsible for delivery: pharmacists Timing post-stroke: within 30 days Usual care (I and C): usual care without the clinical pharmacist. 2 months after the start of the study, a secondary prevention clinic was initiated for all participants with follow-up from a stroke specialist nurse, including baseline risk factor assessment, medication adherence and lifestyle behaviour at day 14 and 3 months
Outcomes	Overall adherence to thrombo-preventative regimen in the year after hospitalisation based on the medication adherence ratio
General Information	Funding: the work was funded by grants from Odense University Hospital, the University of Southern Denmark, the hospital pharmacies and the Amgros I/S Reserach development foundation as well as Actavais Foundation Country of origin: Denmark Publication language: English
Notes	Analysis method: exploratory per-protocol analysis Risk of bias: unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Performed by clinical trial group at hospital pharmacy. 1:1 allocation, randomised in blocks of 4 and 6 by computer prior to enrolment and concealed in opaque envelopes
Allocation concealment (selection bias)	Low risk	Central allocation with opaque envelopes
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	The study did not address this outcome
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement. Protocol available
Other bias	Low risk	The study appears to be free of other sources of bias

Hornnes 2011

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: hospital Numbers randomised: total: 349 (I: 172; C: 177) % Completing final follow-up: 87% Inclusion criteria: ischaemic stroke, intracerebral haemorrhage or TIA Exclusion criteria: discharged to a nursing home; cognitive deficits prohibiting informed consent; life expectancy < 2 years Type of stroke (%): ischaemic (I: 71%; C: 73%); intracerebral haemorrhage (I: 3%; C: 5%); TIA: (I: 26%; C: 22%) Mean age (SD): I: 70.2 (13.7); C: 68.5 (12.2) Gender (% women): I: 48%; C: 50% Ethnicity: not reported Socio-economic or socio-demographic status: • Living alone (%): I: 52%; C: 52% • Educational level (%): I: low - 31%, medium - 26%, high - 43%; C: low - 32%, medium - 26%, high - 42%
Interventions	Intervention details (components, length, frequency): 4 home visits from a nurse at 1, 4, 7 and 10 months; each visit included blood pressure monitoring, tailored lifestyle counselling and promotion of medication compliance; hypertensive participants encouraged to visit their GP Location: community Mode of delivery: home visits Personnel responsible for delivery: nurse Timing post-stroke: randomised at time of discharge Control: usual care (neurologist outpatient visit 3 months post-stroke)
Outcomes	12 months: SBP; DBP; proportion of participants meeting BP targets; proportion of participants adhering antihypertensive therapy
General Information	Funding: funding support from Servier Danmark A/S and the Lundbeck Foundation Country of origin: Denmark Publication language: English
Notes	Analysis method: not reported Risk of bias: low

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Used a computer-generated, block randomization procedure"
Allocation concealment (selection bias)	Low risk	"The allocation sequence was concealed … the study nurses who administered the intervention had access to a computer pro-

Hornnes 2011 (*Continued*)

		gram … entering the patient's Central Person Registry number, BP value, and hospital yielded a printout of the patient's randomization number and allocation"
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 27/172 (13 dropped out; 3 diagnosis revised; 10 died; 1 too ill); C: 19/177 (9 dropped out; 5 died; 2 too ill; 2 diagnosis revised; 1 other reason) Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Outcomes pre-specified (trial registry: www.clinicaltrials.gov/ct2/show/NCT00253097)
Other bias	Low risk	The study appears to be free of other sources of bias

Johnston 2010

Methods	RCT Unit of randomisation: hospital
Participants	Place of recruitment: 12 hospitals Numbers randomised: total: 3361 (I: 1464; C: 1897) % Completing final follow-up: 80% Inclusion criteria: ischaemic stroke; Kaiser Permanente Medical Care Plan members with pharmacy benefits; age ≥ 40 years; acute hospitalisation for stroke Exclusion criteria: haemorrhagic stroke; discharged to hospice Type of stroke: ischaemic (100%) Mean age (SD): 72.9 (12.6) Gender (% women): 53% Ethnicity: non-Hispanic white 66%; African American 14%; Asian/Pacific Islander 11%; Hispanic 7%; other/unknown 1% Socio-economic or socio-demographic status: members of Kaiser Permanente Medical Care Plan with "under-representation of the very poor and wealthy"
Interventions	Intervention details (components, length, frequency): hospitals received support from a central coordinator in the development and implementation of standardised stroke discharge orders (discharge orders based on American Heart Association recurrent stroke prevention guidelines and included 1) statin prescription for all patients irrespective of cholesterol levels; 2) antihypertensive prescriptions for hypertensive patients; 3) warfarin prescription for patients with atrial fibrillation); 2 physician 'champions' (from neurology and hospital-based medicine) from each hospital tailored discharge order and supervised implementation; 2 educational presentations delivered to healthcare providers (timing: development of discharge orders and 3 months post-implementation)

	Location: Kaiser Permanente Medical Care Plan hospitals Mode of delivery: health provider education and pre-printed stroke discharge orders Personnel responsible for delivery: central co-ordinator and 2 physicians supervised implementation Timing post-stroke: discharge from hospital Control: usual care without contact from study staff; some hospitals implemented their own discharge orders
Outcomes	6 months: BP < 140/90 mmHg; combined cardiovascular risk factor control; adherence to secondary prevention medications
General Information	Funding: Centres for Disease Control and Prevention, administered through the Association of American Medical Colleges Country of origin: USA Publication language: English
Notes	Analysis method: stated intention-to-treat Risk of bias: unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Participating hospitals were paired based on characteristics that could have impacted the success of the intervention, including patient demographics, hospital size, number of enrollees, and presence of a motivated stroke expert. Then, using a random number generator, 1 hospital in each pair was randomized to receive the intervention, whereas the other was randomized to usual care."
Allocation concealment (selection bias)	Low risk	"Participating hospitals were paired based on characteristics that could have impacted the success of the intervention, including patient demographics, hospital size, number of enrollees, and presence of a motivated stroke expert. Then, using a random number generator, 1 hospital in each pair was randomized to receive the intervention, whereas the other was randomized to usual care."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 1149/1464 (237 died; 78 lost to follow-up); C: 1533/1897 (277 died; 87 lost to follow-up) Judgement: reasons for missing data reported and review authors judge that they are unlikely

Johnston 2010 (*Continued*)

		to be related to study outcomes
Selective reporting (reporting bias)	Unclear risk	Protocol available and primary outcomes are reported in the pre-specified way; some secondary outcomes not reported
Other bias	Low risk	The study appears to be free of other sources of bias

Joubert 2009

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: hospital Numbers randomised: total: 233 (I: 123; C: 110) % Completing final follow-up: 80% Inclusion criteria: ischaemic stroke, parenchymal haemorrhage or TIA; aged ≥ 20 years Exclusion criteria: not managed by GP; discharged to nursing home; serious co-morbidities; non-English speaking; serious cognitive impairment; significantly aphasic Type of stroke (%): ischaemic (I: 73%; C: 80%); haemorrhagic (I: 10%: C: 7%); TIA (I: 17%; C: 13%) Mean age (SD): I: 63.4 (13.7); C: 68.2 (12.7) Gender (% men): I: 58%; C: 52% Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): "shared care" program; risk factor targets derived from National guidelines and consensus statements; medication initiated in hospital; lifestyle education provided by nurse coordinator; GP appointments pre-arranged for 2 weeks, 3 months, 6 months, 9 months and 12 months post-discharge; recommendations and evidence-based guidelines sent to GP; nurse co-ordinator telephoned participants before and after every GP visit to screen for depression; risk factor data collected at each GP visit and faxed to nurse co-ordinator; nurse co-ordinator facilitated transfer of information and recommendations between stroke specialists and GPs; GPs able to telephone stroke specialist for advice Location: community Mode of delivery: telephone follow-up; information management Personnel responsible for delivery: stroke specialists, a nurse co-ordinator and participants' GPs Timing post-stroke: intervention initiated before hospital discharge Control: standard care from GP
Outcomes	12 months: SBP; DBP, total cholesterol, BMI, systolic BP < 140 mmHg; total cholesterol < 5.18 mmol/L; proportion of AF patients taking warfarin
General Information	Funding: this research was funded by a Commonwealth of Australia General Practice Evaluation Program grant

	Country of origin: Australia Publication language: English	
Notes	Analysis method: not stated Risk of bias: unclear	

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Computer-generated process" "At a later stage, the coordinator checked the patient's GP, and if this GP was also responsible for a different patient already in the trial, the current patient was assigned to the same group as the previous patient"
Allocation concealment (selection bias)	Low risk	"The allocation to group was undertaken after consent, so the coordinator was unaware of treatment allocation prior to consent"
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 32/123 (7 unwilling to participate; 2 withdrew due to other medical problems, 2 changed GP; 11 withdrew for unknown reasons; 3 did not have stroke; 3 not contactable; 2 died; 1 moved to nursing home; 1 GP refused); C: 15/110 (2 unwilling to participate; 1 left country; 3 withdrew for unknown reasons; 2 did not have stroke; 1 not contactable; 6 died) Judgement: imbalances in missing data between the groups; however the review authors judged that this was unlikely to be related to study outcomes
Selective reporting (reporting bias)	Unclear risk	Insufficient information (protocol not obtained)
Other bias	Low risk	The study appears to be free of other sources of bias

Jönsson 2014

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: a hospital and a stroke unit Numbers randomised: total: 459 (I: 232; C: 227) % Completing final follow-up: 85% Inclusion criteria: first ever stroke or recurrent stroke admitted in the study period (1 February 2008 - 31 January 2009) Exclusion criteria: not stated Type of stroke (%): cerebral infarct (I: 88 C: 89), intracerebral haemorrhage (I: 12 C: 11) Mean age: I: 73.4 C: 73.2 Gender (% women): I: 51 C: 51 Ethnicity: not stated Socio-economic or socio-demographic status: • Working - full time (I: 5.5% C: 7%), part-time (I: 4% C: 2.5%), sick leave > 6 months (I: 7% C: 7%), early retirement (I: 5.5% C: 4%), retired (I: 77% C: 78%), unemployed (I: 1% C: 1%), student (I: 0% C: 0.5%)
Interventions	Intervention details (components, length, frequency): participants were invited to an outpatient clinic twice to have BP/LDL undertaken at 3 months and at 1 year. The nurse offered supportive counselling regarding stroke disease, treatment, medication adherence and lifestyle advice in addition to time given for an open discussion/any questions/ queries. Further interventions and referrals were made by the nurse 1) if symptoms were judged to need an acute assessment by an on-call physician including initiating treatment, 2) a non-urgent referral was needed - this was made to the GP for assessment and follow-up, 3) if the participant was a nursing home resident, further information was gained from the home nurse and appropriate referrals made to the GP Location: Skåne Hospital Malmö Mode of delivery: outpatient clinic Personnel responsible for delivery: nurse Timing post-stroke: 3 months after the event Control: usual care - no outlined follow-up after hospital discharge until 1 year after stroke
Outcomes	3 and 12 months values for BP, cholesterol and LDL levels, body weight, HbA1, smoking status
General Information	Funding: the study was financed by the National Board of Health and Welfare to support a health development program in Skane Regional Council, Sweden Country of origin: Sweden Publication language: English
Notes	Analysis method: stated Mann-Whitney test Risk of bias: high

Risk of bias

Bias	Authors' judgement	Support for judgement

Jönsson 2014 (*Continued*)

Random sequence generation (selection bias)	High risk	Allocation was undertaken by an administration secretary using lists made by a second author who used a computer generated randomised procedure with stratification for age and gender
Allocation concealment (selection bias)	Low risk	Centrally allocated computer-generated lists were used
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data was addressed in additional information provided
Selective reporting (reporting bias)	Low risk	Protocol registered at Clinicaltrials.gov
Other bias	Low risk	The study appears to be free of other sources of bias

Kerry 2013

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: outpatient and inpatient stroke clinics Numbers randomised: total: 381 (I: 187; C: 194) % Completing final follow-up: 88% Inclusion criteria: ≤ 9 months since stroke or TIA and hypertension (BP > 140/85 mmHg or treatment with antihypertensive medications) Exclusion criteria: enrolled in another trial; severely ill or too frail; already using a blood pressure monitor; severe cognitive impairment; non-English speaking Type of stroke (%): ischaemic (I: 58%; C: 64%); haemorrhagic (I: 7%; C: 5%); TIA (I: 34%; C: 30%); both types of stroke or unknown (I: 1%; C: 2%) Mean age (SD): I: 71.1 (12.6); C: 72.6 (11.4) Gender (% men): I: 59%; C: 56% Ethnicity: White (I: 80%; C: 73%); Black (I: 11%; C: 15%); Asian (I: 4%; C: 7%); other (I: 5%; C: 5%) Socio-economic or socio-demographic status: • Index of Multiple Deprivation score* (mean ± SD): I: 17.5 ± 10.7; C: 19.3 ± 10.1
Interventions	Intervention details (components, length, frequency): participants provided with a home blood pressure monitor, brief training and ongoing nurse-led telephone support targeting BP reduction (average of 3.8 telephone calls over 12 months); participants with consistent blood pressure readings ≥ 130/80 mmHg advised to consult their GP and received intensified nurse-led telephone follow-up until the target was reached (i.e. implementation of protocols for BP reduction) Location: community Mode of delivery: home visits and telephone follow-up Personnel responsible for delivery: nurse Timing post-stroke: ≤ 9 months

	Control: baseline assessment conducted during home visit and all participants with BP > 150/90 mmHg were advised to see their GP; usual care provided by GP (all GPs sent information about the study and a recommended target for home blood pressure of < 130/80 mmHg); participants in the control group received telephone calls after 3 and 9 months to check on their well-being
Outcomes	12 months: SBP; DBP, proportion of participants with recurrent stroke
General Information	Funding: the main study was funded by The Stroke Association (grant no. TSA 2006/05). The feasibility study was funded by The Isaac Schapera Research Trust Country of origin: UK Publication language: English
Notes	Analysis method: available case analysis Risk of bias: low *Trialists state that "the Index of Multiple Deprivation 2007 scale is a measure of poverty and is based on postal codes and ranges from 0.37 to 85.46. A higher score indicates higher deprivation. Further information can be found at www.communities.gov.uk/communities/research/indicesdeprivation/deprivation10/"

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"A computer-generated randomization sequence to implement stratified randomization … with a 1:1 allocation using random block sizes of 4 and 6"
Allocation concealment (selection bias)	Low risk	"Allocation to the intervention or control group was contained within a sealed, numbered envelope and assigned to the participant by the trial administrator before the baseline visit. The research nurse opened the envelope after she completed the home baseline assessment."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 18/187 (9 died, 5 lost contact, 1 moved away, 3 declined); C: 25/194 (10 died, 6 lost contact, 5 withdrew because of illness, 2 moved away, 2 declined) Excluded from analysis: I: 1/187 (reason not provided); C: 0 Judgement: reasons for missing data reported and review authors judged that they were unlikely to be related to study outcomes

Kerry 2013 (*Continued*)

Selective reporting (reporting bias)	Low risk	Protocol is available and outcomes are reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Kim 2013

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: neurology clinic Numbers randomised: total: 36 (I: 18; C: 18) % Completing final follow-up: 94% Inclusion criteria: < 12 months since ischaemic stroke; visited a neurology clinic for stroke treatment; normal cognitive function (Mini Mental State Examination > 19); living at home; Internet access Exclusion criteria: n/a Type of stroke (%): ischaemic (100%) Mean age (SD): I: 67.4 (7.3); C: 63.9 (7.4) Gender (% men): I: 73%; C: 56% Ethnicity: not stated Socio-economic or socio-demographic status (% graduated the middle school): I: 61%; C: 56%
Interventions	Intervention details (components, length, frequency): 9-week web-based education program focusing on secondary prevention (9 weekly sessions involving video lectures/ quizzes, website links to stroke-related information, automated feedback about self-reported health behaviours and the opportunity to email health professionals); guidebook for the programme was provided to participants; research assistant provided telephone-based technical support for the Internet program Location: participants' homes Mode of delivery: internet-based education Personnel responsible for delivery: web-based education program was developed by healthcare professionals Timing post-stroke: < 12 months Control: usual care provided by physicians
Outcomes	3 months: total cholesterol, triglycerides, medication adherence
General Information	Funding: this work was supported by Basic Science Research Program through the National Research Foundation of Korea (NRF) funded by the Ministry of Education, Science and Technology (20110003345) Country of origin: South Korea Publication language: English
Notes	Analysis method: stated intention-to-treat Risk of bias: unclear

Kim 2013 (*Continued*)

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"The participants were randomly assigned to an experimental or control group in a 1: 1 ratio, using a computer-generated random code"
Allocation concealment (selection bias)	Unclear risk	Not stated
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 1/18 (1 lost to follow-up as a result of poor health); C: 1/19 (1 declined to complete follow-up assessment) Judgement: reasons for missing data reported and review authors judged that they were unlikely to be related to study outcomes
Selective reporting (reporting bias)	Unclear risk	Insufficient information (protocol not obtained)
Other bias	Low risk	The study appears to be free of other sources of bias

Kono 2013

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: secondary care Numbers randomised: total: 70 (I: 35; C: 35) % Completing final follow-up: 97% Inclusion criteria: non-cardioembolic stroke confirmed by MRI, ischaemic stroke with large and small vessel diseases, > 20 years old, mRS 0-2 (independent in mobility), discharge directly to home Exclusion criteria: cardioembolic stroke, cognitive disorders (MMSE < 18), psychiatric disorder, unable to communicate, extracorporeal dialysis hypercoagulable state, lack of motivation to participate Type of stroke (%): not stated Mean age (SD): I: 63.5 (7.0); C: 63.4 (11.4) Gender (% men): I: 60%; C: 77.1% Ethnicity: not stated Socio-economic or socio-demographic status: not stated
Interventions	Intervention details (components, length, frequency): participants were provided with advice and counselling about lifestyle modification (increase in physical activity, reduction in salt intake, smoking cessation, alcohol reduction and dietary modification) at

Kono 2013 (*Continued*)

	baseline, 3 and 6 months. Participants also followed a lifestyle modification program consisting of exercise training and salt restriction once or twice weekly for 24 weeks and a home exercise program Location: university and home Mode of delivery: face to face Personnel responsible for delivery: healthcare interventionist/physical therapists Timing post-stroke: not stated Control: participants were provided with advice to facilitate healthy lifestyle modification at baseline 3 and 6 months and the usual medical care
Outcomes	6 months: SBP, LDL, HDL, HbA1c, Waist circumference, BMI, salt intake, physical activity
General Information	Funding: supported by grant-in-aid for challenging exploratory research from the Japan Society for the promotion of science (21650135) Country of origin: Japan Publication language: English
Notes	Analysis method: stated intention-to-treat Risk of bias: unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer-generated random number sequence using a 1:1 basis to lifestyle modification
Allocation concealment (selection bias)	Low risk	Random computer-generated method applied
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	There is no discussion regarding missing data
Selective reporting (reporting bias)	Low risk	The study protocol was registered prior to the study initiation
Other bias	Unclear risk	Unclear if recurrent events were presented as number of events rather than number of people with one or more event

Kronish 2014

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: senior centres, churches, health fairs, from hospital registries of an academic centre, a federally funded health centre, a home care nursing program, community organisations, through advertising in clinics newspaper adverts Numbers randomised: total: 600 (I: 301; C: 299) % Completing final follow-up: I: 80% C: 89% Inclusion criteria: stroke or mini stroke within the past 5 years, ≥ 40 years Exclusion criteria: lacked capacity to consent, lacked physical or mental capacity to participate meaningfully in workshops, non-English/non-Spanish speaking, institutionalised resident Type of stroke (%): ischaemic (100%) Mean age (SD): I: 63 (11); C: 64 (11) Gender (% women): I: 60%; C: 59% Ethnicity: Black (I: 40% C: 43%), Latino (I: 42% C: 37%), White (I: 13% C: 14%), other (I: 4% C: 6%) Socio-economic or socio-demographic status • Annual income ≤ 15,000 dollars/year (%) (I: 56 C: 58) • Less than high school education (%) (I: 31 C: 30)
Interventions	Intervention details (components, length, frequency): Weekly peer-led workshops models on chronic disease self-management program. Also received culturally sensitive educational material at randomisation and encouraged to discuss results with a health care provider Location: community Mode of delivery: peer-based education Personnel responsible for delivery: peers Timing post-stroke: up to 5 years post event Control: usual care plus the same educational materials at randomisation, a list of local health providers and advice to seek GP. Informed would become involved in intervention after waiting for 1 year
Outcomes	6 months: BP (< 140/90 mmHg) LDL cholesterol < 100mg/dl and antithrombotic use
General Information	Funding: funding received from the National Heart, Lung and Blood Institute (K23 HL098359) and the National Center for Advancing Translational Science (UL1TR000040), the National Institute of Minority Health and Health Disparities (P60MD00270) and National Center for Research Resources Country of origin: USA Publication language: English
Notes	Analysis method: intention-to-treat Risk of bias: unclear risk

Risk of bias

Bias	Authors' judgement	Support for judgement

Kronish 2014 (*Continued*)

Random sequence generation (selection bias)	Low risk	Randomisation generated by a computerised random number sequence in blocks of 2, 4, or 6
Allocation concealment (selection bias)	Low risk	Central allocation
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing values were imputed using multiple imputations under the assumption that values were missing at random
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement
Other bias	Low risk	The study appears to be free of other sources of bias

Lowe 2007

Methods	Unit of randomisation: participant
Participants	Place of recruitment: hospital stroke unit Numbers randomised: total: 100; I: 50; C: 50 % Completing final follow-up: 84% Inclusion criteria: stroke; discharged home; able to complete questionnaire or who had carer who could complete questionnaire Exclusion criteria: severe cognitive impairment or communication difficulties; discharged to institutional care Type of stroke (%): ischaemic (I: 96%; C: 94%) Median age (IQR): I: 68 (62 to 74); C: 73 (65 to 80) Gender (% men): I: 58%; C: 62% Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): information book (CareFile) containing general information about stroke and tailored information about stroke risk factors; researcher explained contents of book to participants/carers during 15 to 20 minute discussion; participants advised to take the CareFile to GP and stroke review clinic appointments Location: hospital Mode of delivery: educational materials Personnel responsible for delivery: researcher (stroke research registrar) Timing post-stroke: before discharge Control: usual care ("usual stroke information leaflets (Stroke Association leaflets) provided by the stroke unit and follow-up in a stroke review clinic")
Outcomes	3 months and 6 months: SBP; DBP

Lowe 2007 (*Continued*)

General Information	Funding: the study was supported by a £5000 research grant from Bristol Myers Squibb Country of origin: UK Publication language: English
Notes	Analysis method: not stated Risk of bias: unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Shuffling envelopes
Allocation concealment (selection bias)	Low risk	"When a diagnosis of stroke was confirmed, eligible patients were randomized by the researcher into the control or intervention group (using sealed opaque envelopes containing blocks of 10 names, in a one-to-one ratio)."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 6/50 (2 could not be contacted; 4 died); C: 10/50 (4 could not be contacted; 6 died) Judgement: reasons for missing data reported and review authors judged that they were unlikely to be related to study outcomes
Selective reporting (reporting bias)	Unclear risk	Insufficient information (protocol not available)
Other bias	Low risk	The study appears to be free of other sources of bias

Lowrie 2010

Methods	RCT Unit of randomisation: general practice
Participants	Place of recruitment: 31 general practices Numbers randomised: total: 4040 (461 stroke/TIA); I: 2373 (289 stroke/TIA); C: 1667 (172 stroke/TIA) % Completing final follow-up: information only provided for participant with baseline and follow-up data Inclusion criteria: previous diagnosis associated with vascular disease ("myocardial infarction, coronary artery bypass graft/angioplasty, angina, angiographic coronary artery disease, stroke/transient ischaemic attack, peripheral ischaemic arterial disease/intermittent claudication or, diabetic patients aged over 45 years") Type of stroke among participants with a history of stroke/TIA (%): stroke (66%); stroke only (56%); TIA (44%); TIA only (34%); stroke and TIA (10%)

	Mean age (SD): I: 68 (11); C: 72 (11) Gender (% men): I: 47%; C: 47% Ethnicity: not reported Socio-economic or socio-demographic status: • Mean Modified Scottish Index of Multiple Deprivation (SD): I: 46.8 (15.1); C: 35.3 (12.4)
Interventions	Intervention details (components, length, frequency): "pharmacist-led educational outreach directed at general practices, aiming to improve statin prescription for community dwelling patients with vascular disease"; pharmacists received specific training relevant to the delivery of the intervention (5.5 training days); pharmacists delivered 3 educational outreach meetings at each general practice at 4 monthly intervals; pharmacists worked in practices on 1 day per week for 44 weeks to identify participants who were eligible to receive Simvastatin 40 mg and encourage GPs/nurses to systematically contact/follow-up participants Location: general practices Mode of delivery: pharmacist-led outreach visits Personnel responsible for delivery: pharmacists Timing post-stroke: not reported Control: practices did not receive pharmacist-led prescribing support
Outcomes	5 to 13 months (mean 8.8 months): total cholesterol; total cholesterol < 5.0 mmol/L
General Information	Funding: the study was funded and sponsored by NHS Greater Glasgow and Clyde Country of origin: UK Publication language: English
Notes	Analysis method: n/a (available case data used in this review) Risk of bias: unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Random number table"
Allocation concealment (selection bias)	Low risk	N/A: all clusters were randomised at once
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Reasons for missing data not available since results were only presented for participants with baseline and follow-up data (confirmed via correspondence with trialists)
Selective reporting (reporting bias)	Low risk	Study protocol available and outcomes are reported in the pre-specified way

Lowrie 2010 (*Continued*)

Other bias	Low risk	The study appears to be free of other sources of bias

Maasland 2007

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: TIA service ("provides a rapid diagnostic work-up of patients with TIA or minor stroke in a single day") Numbers randomised: total: 65 (I: 33; C: 32) % Completing final follow-up: 88% Inclusion criteria: < 3 months since TIA or minor ischaemic stroke; ≥ 18 years; fluent in spoken and written Dutch; modified Rankin score < 4 Exclusion criteria: involved in cardiovascular health education; aphasia, dementia (diagnosis based on DSM-Iv criteria); visual impairment that would affect health education Type of stroke: TIA (I: 57%; C: 52%); minor stroke (I: 43%; C: 46%) Mean age (SD): I: 65 (12); C: 63 (13) Gender (% men): I: 57%; C: 63% Ethnicity: not reported Socio-economic or socio-demographic status: • Educational level (%): I: primary school - 27%, secondary school - 37%, college - 20%, university - 17%; C: primary school - 15%, secondary school - 41%, college - 26%, university - 19%
Interventions	Intervention details (components, length, frequency): 20 to 25 minute computerised education program about TIA and stroke, antiplatelet and anticoagulant medication and modifiable risk factor control; information tailored according to the impact of each risk factor on secondary prevention (calculated using algorithm) and each patient's current risk factor status, treatment status, educational level and age; participants received a printed summary of the information Location: TIA service Mode of delivery: computer-based education Personnel responsible for delivery: n/a Timing post-stroke: acute TIA or minor stroke Control: usual care (health education by a neurologist as part of the TIA service)
Outcomes	12 weeks: SBP; DBP; total cholesterol; LDL, triglycerides; BMI; compliance with anticoagulants; compliance with lipid-lowering medication; compliance with antihypertensive medication
General Information	Funding: this project was funded by the Revolving Fund of the Erasmus Medical Center Country of origin: Netherlands Publication language: not stated
Notes	Analysis method: available case analysis Risk of bias: low

Maasland 2007 (*Continued*)

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Treatment allocation was random, and based on computer-generated random numbers"
Allocation concealment (selection bias)	Low risk	"The randomization was blocked in lots of 10; block size was unknown to the investigators at the time of the trial"
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 2/33 lost to follow-up; C: 5/32 lost to follow-up Excluded from analysis: I: 1/33 professional health worker (ineligible); C: 0/32 Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Protocol available and primary outcomes were reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

MacKenzie 2013

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: 4 urban stroke prevention clinics Numbers randomised: total: 56 (I: 29; C: 27) % Completing final follow-up: 100% Inclusion criteria: probable TIA or confirmed stroke; aged > 18 years; psychological/cognitive deficits (Montreal Cognitive Score < 26) OR < 100% medication self efficacy or self-reported medication non-adherence; uncontrolled hypertension (BP > 140/90 mmHg or > 130/80 mmHg for individuals with diabetes or chronic renal insufficiency Exclusion criteria: inability to speak/read English; reliant on others to administer medications Type of stroke: stroke (64%); TIA (36%) Age: > 65 years: 59% Gender (% men): 68% Ethnicity: not reported Socio-economic or socio-demographic status: • living alone (21%); • education < 9 years (16%)

MacKenzie 2013 (*Continued*)

Interventions	Intervention details (components, length, frequency): nurse-led intervention targeting participants at high risk of sub-optimal BP control or non-adherence to antihypertensive medication: involved medication counselling, provision of home BP monitoring equipment and medication Dosette, and nurse-led telephone calls (monthly intervals for 6 months) to deliver motivational interviewing for secondary prevention behaviours (nurses responsible for delivering the intervention received training in motivational interviewing techniques) Location: community Mode of delivery: outpatient appointment and telephone follow-up Personnel responsible for delivery: nurse practitioner/clinical nurse specialist Timing post-stroke: not reported Control: usual care - "stroke physician specialist assessment, initiation and titration of BP medication, adherence and risk factor counselling at clinic visits and follow-up by family physicians"
Outcomes	6 months: stroke recurrence, SBP, DBP, BP < 140/90 mmHg; adherence to antihypertensive medication
General Information	Funding: this research was funded by a grant from the Ontario Stroke System (2010-2011) Country of origin: Canada Publication language: not stated
Notes	Analysis method: intention-to-treat Risk of bias: low

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Centralized telephone randomization system"
Allocation concealment (selection bias)	Low risk	"Centralized telephone randomization system"
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	There was an apparent inconsistency with the standard deviation values reported. Email contact was attempted clarify; however, we did not receive a response, so we used the published standard deviation values
Selective reporting (reporting bias)	Low risk	Examination of study reports suggests that all outcomes were reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Mant 2016

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: general practice Numbers randomised: total: 529 (I: 266; C: 263) % Completing final follow-up: 72% Inclusion criteria: stroke or TIA Exclusion criteria: BP < 125 mmHg, patient taking more than 3 anti-hypertensive medications, postural drop of 20 mmHg or more, already treated to BP of 130 mmHg, unable to give consent, insufficient corroborative evidence of stroke or TIA Type of stroke: stroke (47%); TIA (53%) Mean age (SD) : I: 71.9 (9.1) I: 71.1 (9.4) Gender (% men): 59% Ethnicity: white ethnicity I: 260 (98%) C: 259 (98%) Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): participants were randomised to achieving a BP target of either < 130 mmHg (or a 10 mmHg reduction if baseline pressure was < 140 mmHg) or a standard target (< 140 mmHg). A practise nurse would see intervention participants at 3 month intervals (if previous BP was below target) or after 1 month (if previous BP was above target). GPs were given a protocol that reflected national guidelines for lowering BP Location: community Mode of delivery: nurse-led monitoring Personnel responsible for delivery: practice nurse Timing post-stroke: not reported Control: usual care - whereby the BP target was < 149 mmHG, irrespective of baseline BP with the same practice nurse monitoring as the intervention group
Outcomes	Primary outcome was change in systolic BP between baseline and 1 year
General Information	Funding: funded by the National Institute for Health Research (NIHR; Stroke Prevention in Primary Care, Programme Grant for Applied Research, RP-PG-06061153) and by an NIHR Professorship Country of origin: UK Publication language: not stated
Notes	Analysis method: mixed models, adjusting for baseline BP, age group, sex, diabetes, AF and practice Risk of bias: unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Minimisation based on age, sex, diabetes, AF and baseline BP

Mant 2016 (*Continued*)

Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing values were assessed using by three approaches
Selective reporting (reporting bias)	Low risk	Protocol used has been previously published
Other bias	Low risk	The study appears to be free of other sources of bias

Markle-Reid 2011

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: community care access centre Numbers randomised: total: 101 (I: 52; C: 49) % Completing final follow-up: 81% Inclusion criteria: < 18 months since stroke or TIA; living in community; newly referred (< 2 weeks) to home care services; competent to give informed consent or substitute decision maker available; competent in English or with an interpreter available Type of stroke (%): not reported Mean age (SD): I: 75.8 (12.4); C: 70.6 (14.5) Gender (% men): I: 49%; C: 62% Ethnicity: not reported Socio-economic or socio-demographic status: • married (%): I: 40%; C: 51% • living with others (%): I: 54%; C: 64%
Interventions	Intervention details (components, length, frequency): usual home care services plus organised home visits from an inter-professional team (care co-ordinator, nurse, physiotherapist, occupational therapist, speech language pathologist, dietician, social worker, physiotherapist, personal support worker) over a 12-month period; rehabilitation followed evidence-based rehabilitation protocols addressing community reintegration and stroke prevention; use of standardised screening tools e.g. stroke risk assessment tool; members of interdisciplinary team met at monthly case conferences and attended training sessions delivered by the study investigators Location: community Mode of delivery: home visits; healthcare provider meetings Personnel responsible for delivery: inter-professional team Timing post-stroke: < 18 months Control: usual home care services (follow-up by a care coordinator who provided in-home assessments and coordinated home support services)
Outcomes	12 months: number of secondary strokes

Markle-Reid 2011 (*Continued*)

General Information	Funding: this study was supported by grants from the Canadian Institutes of Health Research (CIHR) Institute of Health Services and Policy Research, the CIHR Knowledge Translation Branch (GrantNo.:78692) and the Ontario Ministry of Health and Long-Term Care. Additional funding was provided byMcMaster University System-Linked Research Unit,Toronto Central CCAC, Bridgepoint Health, Ontario Heart and Stroke Foundation, and the GTA Rehabilitation Network Country of origin: Canada Publication language: English
Notes	Analysis method: not stated Risk of bias: unclear

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	"Randomly generated numbers constructed by a biostatistician who was not involved in the recruitment process"
Allocation concealment (selection bias)	Low risk	"Consecutively numbered, sealed, opaque envelopes"
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 9/52 (I: 4 died; 4 refused; 1 unable to contact); C: 10/49 (C: 3 died; 7 refused) Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Unclear risk	Insufficient information (protocol not obtained)
Other bias	Low risk	The study appears to be free of other sources of bias

McAlister 2014

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: outpatient clinic Numbers randomised: total: 279 (I: 143; C: 136) % Completing final follow-up: 86% Inclusion criteria: ischaemic stroke or TIA confirmed by a stroke specialist at one of 3 clinics in Edmonton Canada, > 18 years age, systolic BP or LDL cholesterol above guideline-recommended targets (average systolic BP over 2 visits > 140 mmHg, fasting

	LDL cholesterol > 2.0mmol/L or total: HDL cholesterol > 4.0) Type of stroke (%): stroke (I: 45.4% C: 40.4%), TIA (I: 51.1% C: 55.9%), ocular (I: 3.5% C: 3.7%) Mean age (SD): I: 68.8 (11.1); C: 66.6 (11.3) Gender (% men): I: 60.8%; C: 55.2% Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): the intervention group was managed by prescribing pharmacists who gave advice on lifestyle (exercise/low salt diet/smoking cessation/medication adherence), checked BP and LDL and initiated or titrated antihypertensive medication and/or lipid lowering therapy Location: community Mode of delivery: community Personnel responsible for delivery: nurse and a prescribing pharmacist Timing post-stroke: not stated Control: the intervention group was compared to a group managed by a nurse who gave advice on lifestyle (exercise/low salt diet/smoking cessation/medication adherence) , checked BP and LDL and then sent a list of the findings to the patients GP after each visit
Outcomes	Proportion of participants at 6 months who attained optimal blood pressure (≤ 140 mmHg systolic BP) and fasting LDL cholesterol ≤ 2.0 mmol/L
General Information	Funding: project-specific funding for this trial was provided by the Heart and Stroke Foundation of Alberta, the Alberta Heritage Foundation for Medical Research, and Knowledge Translation Canada Country of origin: Canada Publication language: English
Notes	Analysis method: intention-to -treat Risk of bias: low risk

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer generated random numbers with variable sized blocked randomisation stratified by stroke prevention clinic to preserve allocation concealment
Allocation concealment (selection bias)	Low risk	Central allocation
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data were imputed with a last observation carried forward strategy - assumed no change in BP or lipid level. Missing data has been imputed using appropriate methods

McAlister 2014 (*Continued*)

Selective reporting (reporting bias)	Low risk	The protocol has been published previously
Other bias	Unclear risk	Unclear if recurrent events were presented as number of events rather than number of people with one or more event

McManus 2014

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: general practice patient records Numbers randomised: total: 555 (I: 277; C: 278) % Completing final follow-up: 81% Inclusion criteria: > 35 years of age, at least 1 high risk conditions (including previous stroke/diabetes/stage 3 chronic kidney disease/cardiovascular disease), BP ≥ 130/80 Type of stroke (%): not reported Mean age (SD): I: 75.8 (12.4); C: 70.6 (14.5) Gender (% men): I: 49%; C: 62% Ethnicity: I: white 96% C: white 96% Socio-economic or socio-demographic status: not given
Interventions	Intervention details: participants were trained how to take their own BP. They were also given a protocol of how to titrate antihypertensive medication. Participants were asked to take their BP twice daily and followed a protocol if not in range Location: community Mode of delivery: community Personnel responsible for delivery: not reported Timing post-stroke: not reported Control: usual care without any specific BP targets
Outcomes	BP differences at 1 year for stroke subgroup analysis
General Information	Funding: research funded by the National Institute for Health Research (NIHR) under its Programme Grants for Applied Research Programme (Grant Reference Number RP-PG 0606-1153), by the NIHR National School of Primary Care Research (NSPCR16) , and by an NIHR career development fellowship Country of origin: UK Publication language: English
Notes	Analysis method: mixed model adjusted for baseline BP, practise, sex and high risk group Risk of bias: low

Risk of bias

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

McManus 2014 (*Continued*)

Random sequence generation (selection bias)	Low risk	Minimisation used - adaptive stratified sampling that balances different groups or clinical trials simultaneously
Allocation concealment (selection bias)	Low risk	Central allocation
Incomplete outcome data (attrition bias) All outcomes	Low risk	Multiple imputations for missing values showed a marginally lower mean difference in systolic BP. Sensitivity analysis did not show any effect on the primary outcome
Selective reporting (reporting bias)	Low risk	Based on a previously peer reviewed publication
Other bias	Low risk	The study appears to be free of other sources of bias

MIST 2014

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: inpatient ward Numbers randomised: total: 386 (I: 193; C: 193) Completing final follow-up: 86% for systolic BP, 61% for LDL Inclusion criteria: first ever stroke Exclusion criteria: impairment precluding participation (e.g. aphasia, psychiatric conditions, cognitive impairment), unable to converse in English, unable to give consent, other condition likely to affect participation (e.g. significant aphasia), receiving psychiatric/psychological treatment, discharged to hospital/nursing home where medications given by staff or if participation likely to overburden individual Type of stroke: not stated Mean age (SE): not stated Gender (% men): not stated Ethnicity (%) : Maori (I: 10.3 C: 7.2), Pacific Islander (I: 8.8 C: 4.7), Asian (I: 2.1% C: 4.7%), New Zealand European/other (I: 78.8 C: 83.4) Socio-economic or socio-demographic status (%): • marital status: married/civil union/de facto (I: 69.9 C: 72.5), never married (I: 4.7 C: 5.2), separated/divorced/widowed (I: 25.4 C: 22.3) • prior living situation: living with family (I: 73.1 C 76.7), living with others (I: 3.1 C: 4.1), living alone (I: 23.8 C: 19.2) • prior dwelling place: own home (I: 64.2 C: 73.1), rented (I: 20.7 C: 16.1), living with family/friends (I: 5.2 C 3.1), retirement village/similar (I: 8.3 C: 5.2), rest home/private hospital (I: 0.5 C: 0.5), other (I: 1 C: 0.5), missing (I: 0 C: 0.5) • completed high school: yes (I: 80.3 C: 82.4), no (I: 19.2 C: 17.1), missing (I: 0.5 C: 0.5) • highest further qualification: degree (I: 17.6 C: 21.8), diploma/certificate (I: 17.1 C: 21.8), trade/technical (I: 16.1 C: 14), other (I:3.1 C: 6.2), missing (I: 46.1 C: 36.3)

	• employment type: professional (I: 7.8 C: 9.3), manager/technical (I: 18.1 C: 19.7), skilled non-manual (I: 10.4 C: 4.7), skilled manual (I: 8.8 C: 8.3), partly skilled (I: 3.6 C: 3.1), unskilled (I: 5.2 C: 4.1), armed forces (I: 0.5 C: 0.5)
Interventions	Intervention details: usual care, in addition to 4 motivational interviewing sessions (at 28 days, 3,6 and 9 months post stroke) - the first session was face-to-face either in the participant's home or in hospital and then a further 3 by telephone or face-to-face if telephone was not possible. A letter was sent to the participant's GP to remind them of the participant's participation and a reminder of recommendations to monitor BP and lipid Location: secondary care/community Mode of delivery: face-to-face and/or telephone follow-up Personnel responsible for delivery: researcher Timing post-stroke: started at 28 days post stroke Control: after discharge, participants were followed up by their GP or designated stroke centre every 3 to 6 months as part of the usual stroke care
Outcomes	Self-reported medication adherence at 3, 6 and 9 months; systolic BP at 12 months; LDL, HDL and total cholesterol at 12 months
General Information	Funding: funded by the New Zealand Health Research Council (HRC Ref 10/458) Country of origin: New Zealand Publication language: English
Notes	Analysis method: stated intention-to-treat Risk of bias: low

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	A randomisation technique from a previously published protocol was used
Allocation concealment (selection bias)	Low risk	Treatment allocation was determined by randomisation and was concealed
Incomplete outcome data (attrition bias) All outcomes	Low risk	Sensitivity analysis was undertaken. Missing data on the primary outcome was imputed using the value carry forward approach
Selective reporting (reporting bias)	Low risk	The study protocol was published within a previously peer reviewed journal
Other bias	Low risk	The study appears to be free of other sources of bias

Nailed Stroke 2010

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: secondary care Numbers randomised: total: 537 (I: 266; C: 271) % Completing final follow-up: 90% Inclusion criteria: stroke or TIA Exclusion criteria: patients enrolled in concurrent studies, aphasia, cognitive impairment, impaired hearing; severe/terminal disease Type of stroke (%): ischaemic (I: 59.3 C: 60.1), haemorrhagic (I: 3.7 C: 3.3), TIA (I: 36.9 C:36.6) Mean age (SD): I: 71.5 (11.1) C: 70.1 (10.4) Gender (% men): I: 56.8 C: 57.2 Ethnicity: not stated Socio-economic or socio-demographic status: not stated
Interventions	Intervention details (components, length, frequency): telephone-based lifestyle counselling and assessment of pharmacological treatment. If the target values for BP and/or lipids was not met at the baseline the study nurse consulted a study physician for assessment and personalised adjustment of medication. Participants were reviewed 4 weeks after any adjustments Mode of delivery: telephone communication in the community Personnel responsible for delivery: nurse Timing post-stroke: on discharge post event Control: care in accordance with local standard procedures. Any telephone contact did not include lifestyle counselling or medication assessment. Secondary prevention was initiated on discharge and left to the GP to manage
Outcomes	1 and 12 months BP and blood lipid level
General Information	Funding: the study received funding from the Research Development and Education Unit, Region Jämtland Härjedalen (grant numbers:JLL-376981, JLL-377161) Country of origin: Sweden Publication language: English
Notes	Analysis method: stated intention-to-treat Risk of bias: unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer generated randomisation in blocks of 4, stratified for sex and degree of disability. 2 parallel groups were compared - allocation ration of 1:1
Allocation concealment (selection bias)	Low risk	Robust method for allocation described

Nailed Stroke 2010 (*Continued*)

Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Missing data not inputted - however unlikely to be related to the outcome, hence risk is unclear
Selective reporting (reporting bias)	Low risk	Study protocol has been published and was available before the study
Other bias	Unclear risk	Unclear if recurrent events were presented as number of events rather than number of people with one or more event

O'Carroll 2011

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: hospital stroke clinic and stroke unit Numbers randomised: total: 62 (I: 31; C :31) % Completing final follow-up: 87% Inclusion criteria: first stroke or TIA; discharged home; prescribed secondary prevention antihypertensive medication; sub-optimal medication adherence score Exclusion criteria: requirement for help with taking medications; using a Dosette box; cognitive difficulties that precluded participation in the study Type of stroke (%): not reported Mean age (SD): I: 68 (11); C: 71 (11) Gender (% men): 65% Ethnicity: not reported Socio-economic or socio-demographic status (Scottish Index of Multiple Deprivation Quintile): 1 (highest deprivation) - 2%, 2 - 10%, 3 - 19%, 4 - 19%, 5 (lowest deprivation) - 51%
Interventions	Intervention details (components, length, frequency): 2 intervention sessions (approximately 30 minutes each) conducted 2 weeks apart: session 1 helped participants to establish a better medication-taking routine through completing individualised worksheets; session 2 reviewed participants' plans and addressed barriers to implementation; electronic recording of pill-taking for a duration of 3 months (researcher made monthly home visits to refill the electronic pill bottle) Location: participants' homes or a research facility Mode of delivery: home visits Personnel responsible for delivery: researcher Timing post-stroke: < 3 months post-discharge Control: participants attended 2 sessions with a researcher who "engaged the patient in non-medication related conversation in an attempt to provide some control for non-specific effects of attention/social contact"; electronic recording of pill-taking for 3 months
Outcomes	3 months: medication adherence; SBP; DBP

O'Carroll 2011 (*Continued*)

General Information	Funding: this project was funded by a grant from the Scottish Government, Department of Health Country of origin: UK Publication language: English
Notes	Analysis method: stated intention-to-treat Risk of bias: low

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Participants were randomized to either the Intervention or Control group using web-based software set up by the Edinburgh Clinical Trials Unit."
Allocation concealment (selection bias)	Low risk	Web-based randomisation
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition I: 2/31 (2 hospitalised for non-stroke reasons); C: 2/31 (1 hospitalised for non-stroke reasons; 1 relocated) Excluded from the analysis: (did not receive intervention): I: 2/31 (1 declined to use electronic pill bottle; 1 hospitalised for non-stroke reasons); C: 2/31 (2 hospitalised for non-stroke reasons) Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Protocol available and outcomes reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Peng 2014

Methods	RCT Unit of randomisation: hospital
Participants	Place of recruitment: hospital Numbers randomised: total - participants 3821; I: 1795; C :2026, hospitals I: 23; C: 24 Completing final follow-up: 1 hospital withdrew before the study began Inclusion criteria: > 18 years old, proven ischaemic stroke confirmed by CT or MRI, TIA, hospitalisation within 30 days after the index event; clinical stability, independence

	in daily activities Exclusion criteria: CT/MRI evidence of intracerebral haemorrhage, stroke/TIA unrelated to atherosclerosis, severe co-morbid illness/unstable medical condition, significant memory/behavioural disorders requiring daily care, concurrent participation in another clinical trial, pregnancy Type of stroke (%): not reported Mean age (SD): I: 61.48 (11.47); C: 60.36 (11.66) Gender (% men): I: 67 C: 69 Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): the intervention consisted of lifestyle modification with the patients, including smoking cessation, healthy diet, and regular exercise. Patient education included an interactive website based education session emphasising the importance of adhering to the SMART program including information discussing risk-factor control through medication and lifestyle changes Location: outpatient Mode of delivery: outpatient and online Personnel responsible for delivery: clinical researcher Timing post-stroke: within 30 days Control: participants "received only those interventions chosen by their attending neurologist-clinician, without the use of the algorithm or interactive education and access to the educational website"
Outcomes	12 months: medication adherence
General Information	Funding: funded was provided by the National Key Technology Research and Development Program in the 11th 5-year plan of China Country of origin: China Publication language: English and Chinese
Notes	Analysis method: linear regression model Risk of bias: Unclear

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Simple cluster sampling method applied
Allocation concealment (selection bias)	High risk	Concealment was not discussed therefore assumed no blinding occurred
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Does not discuss missing data
Selective reporting (reporting bias)	Low risk	Study protocol has been published in a previous publication

Peng 2014 (*Continued*)

Other bias	Unclear risk	Unclear if recurrent events were presented as number of events rather than number of people with one or more event

Pergola 2014

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: not documented Numbers randomised: total: 3020 (I: 1501; C: 1519) % Completing final follow-up: 98% Inclusion criteria: lacunar stroke syndrome confirmed by MRI, > 30 years old, normotensive and hypertensive patients Exclusion criteria: no surgical amenable ipsilateral carotid artery disease, no major risk cardio-embolic sources Type of stroke (%): small subcortical stroke (100%) Mean age : 63 +/- 11 years Gender (men): 63% Ethnicity: white (51%), Hispanic (30%), black 916%) Socio-economic or socio-demographic status: USA (56%), Latin America (23%), Spain (12%) Canada (9%)
Interventions	Intervention details (components, length, frequency): participants were randomised to 1 or 2 levels of BP control either 'intensive' (< 130 mmHg) or 'usual' (130-149 mmHg). Also participants were randomly assigned to take clopidogrel 75 mg daily or the matching placebo Location: outpatient clinic Mode of delivery: outpatient clinic face to face, free prescriptions were given Personnel responsible for delivery: physicians Timing post-stroke: 6 months or less Control: usual care - including standard (< 140 mmHg) blood pressure control
Outcomes	3 years: time to first stroke relapse; stroke relapse rate; proportion of participants meeting targets for blood pressure, blood fats, blood sugar and BMI
General Information	Funding: this research was funded by the National Institute of Neurological Disorders and Stroke (NINDS # 2 U01 NS38529-04A1) Country of origin: USA Publication language: English
Notes	Analysis method: analysis of variance Risk of bias: unclear

Risk of bias

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

Pergola 2014 (*Continued*)

Random sequence generation (selection bias)	Low risk	Randomised using a 2 x 2 factorial design stratified by clinical centre and baseline hypertensive stats. Data was inputted and a computer generated unique number was given to assign participants
Allocation concealment (selection bias)	Unclear risk	Insufficient information
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not addressed
Selective reporting (reporting bias)	Low risk	Study protocol is available in a previous publication
Other bias	Low risk	The study appears to be free of other sources of bias

Ranta 2015

Methods	RCT Unit of randomisation: primary care practice/clinic
Participants	Place of recruitment: from local directories - participants were selected if GP practices were involved Numbers randomised: total: 56 (I: 29; C: 27) % Completing final follow-up: 100% Inclusion criteria: any TIA or stroke, never been exposed to this tool before, access to an organised TIA pathway consistent with the New Zealand TIA guideline Exclusion criteria: did not present to a participating primary or secondary health care providers during the study period or presented without neurologic/ophthalmologic symptoms Mean age years (SD): I: 69.8 (13.3) C: 72.3 (14.0) Gender (men): I: 67, C: 55 Ethnicity: I: European 156/172; C: European 101/119
Interventions	Intervention details (components, length, frequency): the tool is a Web-based software program accessed via a GP computer desktop icon. Clicking the icon opens a single page of tick boxes asking for relevant aspects of the presenting illness. Depending on diagnosis and risk estimation, the tool recommends a guideline-based management strategy Location: primary care practice/clinic Mode of delivery: face-to-face Personnel responsible for delivery: primary care doctor Timing post-stroke: after initial event Control: usual care
Outcomes	Stroke at 90 days, stroke and TIA at 90 days or vascular event/death

Ranta 2015 (*Continued*)

General Information	Funding: the New Zealand Health Research Council funded this trial Country of origin: New Zealand Publication language: English
Notes	Analysis method: generalised linear models Risk of bias: unclear

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	The clusters were general practices randomised one-to-one to intervention and control groups using a computer-generated simple randomisation schedule
Allocation concealment (selection bias)	Low risk	Central allocation
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Low number of GP practices agreed to join in the study and none were excluded
Selective reporting (reporting bias)	Low risk	Outcomes were recorded electronically by individual GPs/from GP records
Other bias	Low risk	The study appears to be free of other sources of bias

Slark 2013

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: hospital (inpatient) Numbers randomised: total: 96 (I: 47; C: 49) % Completing final follow-up: 98% Inclusion criteria: ischaemic stroke Exclusion criteria: cognitive or memory difficulties that precluded participation in the intervention Type of stroke: ischaemic (100%) Mean age (SD): I: 65 (12); C: 66 (13) Gender: I: 64%; C: 53% Ethnicity: White: I: 62%; C: 67%; "Black Ethnic Minority (BME) groups made up 13% of the total cohort" Socio-economic or socio-demographic status: • university education: I: 40%; C: 18% • married: 57%; C: 55%

Interventions	Intervention details (components, length, frequency): 30-minute risk awareness session: involved tailored information provision on the topics of stroke aetiology, risk factors and secondary prevention medications; participants were informed of their individual risk scores for secondary stroke Location: hospital Mode of delivery: inpatient appointment Personnel responsible for delivery: researcher Timing post-stroke: initiated prior to hospital discharge Control: usual care (no additional risk awareness information)
Outcomes	3 months: recurrent stroke; SBP, DBP, total cholesterol, adherence to secondary prevention medications
General Information	Funding: this research received no specific grant from any funding agency in the public, commercial or not-for-profit sectors Country of origin: UK Publication language: English
Notes	Analysis method: available case analysis Risk of bias: low

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	"Subjects were randomized using computer-generated random codes"
Allocation concealment (selection bias)	Low risk	"The researcher was blind to randomization until after recruitment of each participant to avoid selection bias….this was achieved through sealing each random code in an envelope prior to commencing the trial, which was only selected after the participant had been recruited."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 0/47; C: 2/47 (2 lost to follow-up) Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Examination of study reports suggests that all outcomes were reported in the pre-specified way

Other bias	Low risk	The study appears to be free of other sources of bias

Wan 2016

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: neurology department Numbers randomised: total: 80 (I: 40; C: 40) % Completing final follow-up: 100% Inclusion criteria: ischaemic stroke, > 35 years of age, hospitalised within 1 month of an ischaemic stroke diagnosed by CT/MRI, previously independent with activities of daily living Exclusion criteria: a history of cardio-embolic infarction, Wernicke's aphasia, cognitive impairment, a history of severe liver or kidney disease, and any known malignancy or other neurological diseases Type of stroke (%): ischaemic stroke Mean age (SD): I: 59.01 ± 12.36; C: 60.24 ± 12.57 Gender (% men): I: 75%; C: 67.5% Ethnicity: not reported Socio-economic or socio-demographic status: education level, elementary C: 22.5% I: 22.5; middle school C: 27.5%; I: 20%, high school C: 27.5%; I:27.5%, undergraduate/ graduate school C: 22.5% I:30%. Employed C: 25%; I:32.5%, unemployed C: 27.5%; I: 25%, retired C:47.5%; I:42.5%
Interventions	Intervention details (components, length, frequency): telephone follow-up with stroke nurses: consisted of goal setting advice focused on selected areas with motivational elements. Delivered at 1 week, 1 and 3 months post discharge lasting 15-20 minutes Location: community Mode of delivery: telephone Personnel responsible for delivery: stroke nurse Timing post-stroke: post hospital discharge Control: usual care including freely available educational brochures on understanding stroke and reducing stroke risk, in addition to GP follow-up
Outcomes	Medication adherence at 3 and 6 months
General Information	Funding: this is a doctoral dissertation and was supported by grants from the Department of Health of Guangdong Province, China (No. A2014211) to Li-Hong Wan, PI. This work was also funded by provincial (Guangdong Science and Technology Department, the Guangdong special program for scientific development, No. 2016A020215039) programs, Li-Hong Wan, PI Country of origin: China Publication language: English
Notes	Analysis method: analysis of variance Risk of bias: low

Wan 2016 (*Continued*)

Risk of bias		
Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Parallel group RCT 1:1 group allocation determine by a sealed opaque envelope with a serial number on the outside
Allocation concealment (selection bias)	Low risk	Central allocation
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group
Selective reporting (reporting bias)	Low risk	Examination of study reports suggests that all outcomes were reported in the pre-specified way
Other bias	Low risk	The study appears to be free of other sources of bias

Wang 2005

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: hospital Numbers randomised: total: 198 (I: 146; C: 52) % Completing final follow-up: unknown Inclusion criteria: stroke in internal carotid artery; first stroke Exclusion criteria: none stated Type of stroke (%): not stated Mean age (SD): I: 63.24 ± 7.35; C: 60.94 ± 9.87 Gender (% men): I: 54%; C: 50% Ethnicity: not reported Socio-economic or socio-demographic status: not reported
Interventions	Intervention details (components, length, frequency): follow-up by a neurologist within one week post-discharge and then every at 1, 2 or 3 months; patients and caregivers educated about nursing care, home rehabilitation, neuropsychology and modifiable risk factors Location: community Mode of delivery: visits, lectures, leaflets, multimedia teaching Personnel responsible for delivery: neurologists Timing post-stroke: < 1 week post-discharge Control: usual care
Outcomes	3 years: time to first stroke relapse; stroke relapse rate; proportion of participants meeting targets for blood pressure, blood fats, blood sugar and BMI

Wang 2005 (*Continued*)

General Information	Funding: this study was supported by the grants from the Ministry of Science and Technology of the People's Republic of China (2011BAI08B02, 2012ZX09303, and 2013BAI09B03), Beijing Institute for Brain Disorders (BIBD-PXM2013_014226_07_000084) Country of origin: China Publication language: English
Notes	Analysis method: not stated Risk of bias: low

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Not stated Unexplained imbalances in numbers allocated to intervention and control groups
Allocation concealment (selection bias)	Unclear risk	Not stated
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Not stated
Selective reporting (reporting bias)	Unclear risk	No protocol available
Other bias	Low risk	The study appears to be free from other sources of bias

Welin 2010

Methods	RCT Unit of randomisation: participant
Participants	Place of recruitment: rural hospital Numbers randomised: total: 163 (I: 81; C: 82) % Completing final follow-up: 71% Inclusion criteria: ischaemic or haemorrhagic stroke; first stroke; < 85 years; living at home before the stroke Exclusion criteria: previous stroke; severe dementia; severe stroke (Rankin score > 5); severe cardiovascular disease; life expectancy < 1 year Type of stroke (%): haemorrhagic I:9%, C:16% Mean age (SD): I: 71.2 (9.9); C: 69.6 (11.7) Gender (% women): I: 41%; C: 37% Ethnicity: not reported Socio-economic or socio-demographic status: not reported

Welin 2010 (*Continued*)

Interventions	Intervention: follow-up appointments with a stroke nurse at 1.5, 6 and 12 months post-discharge (included assessment of handicap and depression, measurement of blood pressure, provision of health information and referral to physiotherapist or occupational therapist if necessary); appointments with a stroke physician at 3 and 9 months (included a review of medication and medical problems with referral to other specialists if necessary) Location: hospital stroke clinic Mode of delivery: outpatient appointment Personnel responsible for delivery: stroke nurse and stroke physician Timing post-stroke: 1.5 to 12 months post-discharge Control: usual care involved follow-up with GP; GPs were sent discharge summaries; "the quality of follow-up care by general practitioners varies in Sweden from non follow-up at all to regular visits every third or fourth month" Usual care before discharge (I and C): initiation of secondary prevention medications and referral to continuous physiotherapy or occupation therapy, if necessary
Outcomes	SBP (12 months); DBP (12 months); recurrent stroke (3.5 years)
General Information	Funding: this study was supported by grants from the Research Fund at Skaraborg Hospital, the Skaraborg Institute for Research and Development, and the Swedish Stroke Association Country of origin: Sweden Publication language: English
Notes	Analysis method: not stated Risk of bias: low

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Shuffling sealed envelopes
Allocation concealment (selection bias)	Low risk	Shuffling sealed envelopes
Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing data reported by group Attrition: I: 18/81 (5 died, 13 did not attend follow-up visit); C: 30/82 (9 died, 21 did not attend follow-up visit) Judgement: reasons for missing data reported and review authors judge that they are unlikely to be related to study outcomes
Selective reporting (reporting bias)	Low risk	Study protocol available and outcomes are reported in the pre-specified way
Other bias	Low risk	The study appears to be free from other sources of bias

AF: atrial fibrillation
AMT: Abbreviated Mental Test
APN: advanced practice nurse
BMI: body mass index
BP: blood pressure
C: control
DBP: diastolic blood pressure
GP: general practitioner
HDL: high density lipoprotein
I: intervention
IQR: interquartile range
LDL: low density lipoprotein
NIHSS: National Institutes of Stroke Scale
RCT: randomised controlled trial
SBP: systolic blood pressure
SD: standard deviation
SE: standard error
TIA: transient ischaemic attack

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

Study	Reason for exclusion
Amariles 2012	Outcomes not reported separately for stroke/TIA participants
Banet 1997	No relevant outcomes
Bokemark 1996	No relevant outcomes
FIMDM˙CVD 2010	Not a stroke service intervention
Gillham 2010	No relevant outcomes
Goessens 2006	Outcomes not reported separately for stroke/TIA participants
Green 2007	No relevant outcomes
Harrington 2007	Not intended to improve modifiable risk factor control
Johnston 2000	Not a stroke service intervention
Joshi 2012	Outcomes not reported separately for stroke/TIA participants
Ma 2009	Outcomes not reported separately for stroke/TIA participants
Middleton 2004	No relevant outcomes
Nir 2006	No relevant outcomes

(*Continued*)

Ornstein 2004	Not a stroke service intervention
Palanco 2011	Outcomes not reported separately for stroke/TIA participants
Rimmer 2000	Contained exercise training program
Ross 2007	Not intended to improve modifiable risk factor control
Sides 2012	Not RCT
Spassova 2016	Outcomes not reported separately for stroke participants
Strandberg 2006	Outcomes not reported separately for stroke/TIA participants
UMIN000001865	Contained exercise training program
Vernooij 2012	Outcomes not reported separately for stroke/TIA participants

TIA: transient ischaemic attack

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

ACTRN12608000166370

Methods	Parallel RCT
Participants	Ischaemic/haemorrhagic stroke or TIA
Interventions	Co-ordinated team approach for risk factor management in primary care setting
Outcomes	12 months and 24 months: Framingham cardiovascular disease risk score; use of secondary prevention medications; BP
Notes	Status: Results awaited (correspondence August 2016)

Feld-Glazman 2012

Methods	Parallel RCT
Participants	Stroke
Interventions	Stroke education program; motivational interviewing to facilitate behaviour change for secondary stroke prevention
Outcomes	12 weeks: risk factor behaviour

Feld-Glazman 2012 (*Continued*)

Notes	Status: completed No study reports available (no correspondence established September 2016)

ISRCTN63816609

Methods	Parallel RCT
Participants	Acute TIA or ischaemic stroke
Interventions	Nurse-led care pathway of roup clinics addressing smoking cessation, healthy eating, physical activity, and the risk factors of stroke
Outcomes	6 months: ambulatory 12-hour systolic blood pressure, change in BMI and abdominal obesity
Notes	Status: completed No study reports available (no correspondence established April 2017)

ISRCTN95662526

Methods	Parallel RCT
Participants	Mild stroke
Interventions	Telephone support addressing secondary prevention and adaption; use of written information and ”StrokEngine“ website
Outcomes	12 months: use of health services and reasons (e.g. recurrent stroke)
Notes	Status: completed (June 2012) No study reports available (no correspondence established September 2016)

NCT00211731

Methods	RCT
Participants	Stroke or TIA
Interventions	Chronic disease self-management course
Outcomes	Adherence to secondary prevention measures
Notes	Status: completed No study reports available (no correspondence established September 2016)

NCT00703274

Methods	RCT
Participants	Ischaemic stroke or TIA
Interventions	Lay persons ('stroke navigators') trained to help participants reduce their risk of secondary stroke
Outcomes	12 months: LDL; SBP; HbA1c; pill count (antiplatelet medication)
Notes	Status: completed; analysing data No study reports available (no correspondence established September 2016)

NCT01071408

Methods	RCT
Participants	Stroke, TIA
Interventions	Outpatient stroke prevention program involving group clinics, patient self-management and telephone care co-ordination
Outcomes	3 months and 7 months: BP; lipids; medication adherence
Notes	Status: completed (31 May 2012); analysing data No study reports available (no correspondence established September 2016)

NCT01122394

Methods	Parallel RCT
Participants	Stroke or TIA
Interventions	Telephone intervention to reduce behavioural risk factors for secondary stroke
Outcomes	6 months: BP; total cholesterol/HDL ratio; antihypertensive/lipid-lowering medication adherence
Notes	Status: results awaited (no correspondence established September 2016)

NCT01807793

Methods	Parallel RCT
Participants	Stroke or TIA
Interventions	Psycho-education (individual and group sessions)
Outcomes	3 months and 6 months: adherence to secondary prevention medications, blood pressure, HbA1c, BMI, cholesterol, triglycerides

NCT01807793 (*Continued*)

Notes	Status: completed - no contact established 2016

NCT02140658

Methods	Parallel assignment
Participants	Ischaemic stroke
Interventions	Multiple health education interventions
Outcomes	Medication adherence at 3, 6 and 12 months
Notes	Status: completed - results awaited

Redfern 2007

Methods	Cluster RCT
Participants	Stroke
Interventions	Individualised evidence-based secondary prevention plans provided to participants/caregivers (”keeping well plans“) and GPs (”secondary prevention plans“) on a maximum of 3 occasions (10 weeks, 5 months and 8 months post-stroke); structured approach to risk factor monitoring
Outcomes	12 months: modifiable risk factors for stroke: blood pressure, total cholesterol, HbA1c, BMI
Notes	Status: completed (2007) and study reports available Outcome data relevant to the review not available (no correspondence established September 2016)

BMI: body mass index
BP: blood pressure
DBP: diastolic blood pressure
GP: general practitioner
LDL: low density lipoprotein
RCT: randomised controlled trial
SBP: systolic blood pressure
TIA: transient ischaemic attack

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

ACTRN12615000888561

Trial name or title	A conversation with patients about medications after a stroke
Methods	RCT
Participants	Stroke/TIA
Interventions	Patient-centred educational exchange
Outcomes	0, 3 and 12 months - self reported medication adherence, BP and cholesterol
Starting date	Start: December 2015 Estimated completion: October 2017
Contact information	Judith Coombes, Pharmacy Department Princess Alexandra Hospital 199 Ipswich Rd Woolloongabba QLD, Australia Contact: judith.coombes@health.qld.gov.au
Notes	Status: recruiting

ChiCTR-TQR-14004950

Trial name or title	Construction of "hospital-community-family" transitional care model for elderly hypertensive patients based on information platform
Methods	Quasi-randomised controlled
Participants	Stroke
Interventions	Nurse follow up
Outcomes	BP and body weight
Starting date	Start: December 2014
Contact information	Yuying Shi, 19 Qi Xiu Road, Nantong, Jiangsu Province China Contact: 675224943@qq.com
Notes	Status: contact not achieved

ChiCTR-TRC-12002127

Trial name or title	Effects of clinical pharmacist interventions on the secondary prevention in the ischaemic stroke patients
Methods	Parallel RCT
Participants	Ischaemic stroke
Interventions	Pharmacist-led individualised pharmaceutical care
Outcomes	Stroke recurrence, myocardial infarction, vascular death, medication compliance, body weight, blood pressure, serum glucose, serum lipids
Starting date	Start: April 2012 Estimated completion: unknown
Contact information	Xu Huimin, 88 Jiefang Road, Hangzhou, China Contact: haibindai@163.com
Notes	Status: ongoing study (correspondence August 2016)

COACH 2014

Trial name or title	Healthy lifestyles after stroke (Stroke Coach)
Methods	Parallel RCT
Participants	Experienced a stroke in the last 12 months, > 50 years
Interventions	Telephone administered lifestyle coaching sessions
Outcomes	0, 6 and 12 months - medication adherence, BP, lipid and glucose profile, BMI
Starting date	Start: July 2014 Estimated completion: January 2017
Contact information	Chihya Hung, University Hospital of Northern BC, Prince George, BC, Canada Contact: Chihya.Hung@ubc.ca
Notes	Status: recruiting

DESERVE 2014

Trial name or title	Discharge Educational Strategies for Reduction of Vascular Events (DESERVE)
Methods	Parallel RCT
Participants	Mild ischaemic cerebral infarction/intracerebral haemorrhage/TIA, > 18 years age; vascular risk factors

DESERVE 2014 (*Continued*)

Interventions	Education on stroke preparedness plus risk factor reduction education, and help accessing follow up care with health workers
Outcomes	6 and 12 months: BP, secondary incident
Starting date	Start: April 2013 Estimated completion: March 2017
Contact information	Bernadette Boden-Albala, NYU Langone Medical Center, New York, NY, USA, 10016 Contact: 212-659-9322
Notes	Status: recruiting

DMP 2014

Trial name or title	The effects of disease management programs for prevention of recurrent ischemic stroke
Methods	Parallel RCT
Participants	Ischaemic stroke/TIA
Interventions	Disease management program include self management education provided by a nurse
Outcomes	2.5 years: Framingham Risk Score; weight; BMI; BP; cholesterol; HbA1c
Starting date	Start: January 2014 Estimated completion: January 2017
Contact information	Michiko Moriyama, Institute of biomedical and health sciences, Hiroshima University, Japan
Notes	Status: active, not recruiting

Feldman 2015

Trial name or title	Center for Stroke Disparities Solution (CSDS) - community transitions intervention
Methods	Parallel RCT
Participants	Stroke or TIA
Interventions	Either usual care, nurse practitioner and health coach or nurse practitioner only. Self-management coaching
Outcomes	3 and 6 months systolic BP, weight loss and medication adherence
Starting date	Start: September 2012 Estimated completion: August 2018

Feldman 2015 (*Continued*)

Contact information	Margaret M McDonald, Visiting Nurse Service of New York, National Institute of Neurological Disorders and Stroke, New York University School of Medicine, NY, USA Contact: Margaret.McDonald@VNSNY.org
Notes	Status: recruiting

ISRCTN07607027

Trial name or title	Promoting Adherence to a Regimen of risk factor modification by Trained Non-medical personnel Evaluated against Regular practice Study PARTNERS
Methods	RCT
Participants	TIA or non-disabling stroke; hypertension
Interventions	Support from a trained volunteer for risk factor reduction
Outcomes	12 months and 24 months: DBP; medication adherence; BMI; cardiovascular risk score; LDL; total cholesterol/HDL ratio; HbA1c
Starting date	Start: April 2009 Estimated completion: 30 September 2017
Contact information	Richard Chan Contact: 339 Windermere Rd, Rm B10-118, University Hospital, N6A 5A5, London, Canada
Notes	Status: ongoing/recruiting (correspondence August 2016)

ISRCTN08913646

Trial name or title	The effect of a Health Empowerment Intervention for Stroke Self-management (HEISS) on the self-management behaviour and health outcomes of stroke rehabilitation patients
Methods	Parallel RCT
Participants	Stroke
Interventions	Stroke self-management intervention (involves group education and nurse-led telephone follow-up)
Outcomes	Stroke recurrence, self-management behaviour
Starting date	Start: May 2012 Estimated completion: May 2014
Contact information	Dr Janet Sit, The Nethersole School of Nursing, Faculty of Medicine, Chinese University of Hong Kong,

ISRCTN08913646 (*Continued*)

Notes	Status: ongoing (correspondence April 2013 - no correspondence established 2016)

ISRCTN97412358

Trial name or title	ECG monitoring to detect atrial fibrillation after stroke
Methods	RCT
Participants	Ischaemic stroke or TIA
Interventions	Continuous ECG monitoring to detect atrial fibrillation after acute stroke or TIA
Outcomes	12 months: recurrent stroke
Starting date	Start: May 2010 Estimated completion: December 2016
Contact information	Professor Kennedy R Lees, Acute Stroke Unit & Cerebrovascular Clinic, Western Infirmary, Glasgow, UK Contact: k.r.lees@clinmed.gla.ac.uk
Notes	Status: ongoing

NCT01517542

Trial name or title	Evaluation of effectiveness of nutritional counselling in patients after stroke
Methods	Parallel RCT
Participants	Stroke
Interventions	Nutritional counselling (participants received written guidance to promote adherence to 'DASH' diet recommendations)
Outcomes	30 days; 3, 6, 9 and 12 months: body weight, blood glucose, blood pressure, lipid profile
Starting date	Strart: February 2010 Estimated completion: February 2012
Contact information	Sheila CO Martins, PI; Vanessa A Piper, SI, Hospital de Clínicas de Porto Alegre, Porto Alegre, RS, Brazil, 90035903 Contact : smartins@portoweb.com; vanalves001@gmail.com
Notes	Status: recruiting participants (correspondence April 2013 - no correspondence established 2016)

NCT01586702

Trial name or title	Intensified Secondary Prevention Intending a Reduction of Recurrent Events in TIA and Minor Stroke Patients (INSPiRE-TMS). A randomized trial comparing a patient centred support program versus conventional care
Methods	Parallel RCT
Participants	TIA or minor stroke
Interventions	"Stepwise intensified patient support program" delivered in outpatient clinics over 2 years (participants are provided with individualised risk factor data and supported in finding physical activities/smoking cessation programs)
Outcomes	3.5 years and 6 years: major vascular events (including stroke, TIA and major coronary events)
Starting date	Start: September 2011 Estimated completion: June 2017
Contact information	Heinrich J Audebert, MD, Department of Neurology, Charité Universitätsmedizin Berlin, Germany, 12200 Contact : heinrich.audebert@charite.de
Notes	Status: recruiting participants

NCT01776034

Trial name or title	Health promotion and wellness program for stroke survivors
Methods	Parallel RCT
Participants	Stroke
Interventions	Health promotion program to reduce body weight (involving lifestyle counselling delivered through group education and telephone follow-up)
Outcomes	3 months and 6 months: body weight, biomarkers (cholesterol, triglycerides, HbA1c)
Starting date	Start: January 2013 Estimated completion: July 2015
Contact information	Corey McDaniel, BA, Cleveland Clinic, Cleveland, OH, USA 44195 Contact : mcdanic3@ccf.org
Notes	Status: recruiting participants

NCT01812421

Trial name or title	A nested case-control study on the secondary prevention of ischemic stroke and TIA by Hypertension Health Education Protocol (HHEP): the Post-Stroke Preventive Trial
Methods	Parallel Assignment
Participants	Ischaemic stroke or TIA
Interventions	Health education tailored for hypertension
Outcomes	Stroke recurrence at 1 year
Starting date	Start: April 2013 Estimated completion: April 2015
Contact information	Dr YeFeng Cai, Brain Center, Guangdong Province Hospital of Traditional Chinese Medicine, Guangzhou, Guangdong, China, 510120 Contact : zizi_33@126.com
Notes	Status: recruiting participants

NCT02132364

Trial name or title	Controlled Education Of Patients after Stroke (CEOPS)
Methods	Parallel assignment
Participants	First stroke, transient or permanent, ischaemic or haemorrhagic
Interventions	Nurse follow-up, including therapeutic follow-up and an educational program directed to the participants and carers
Outcomes	BP at 1 year
Starting date	Start: January 2014 Estimated completion: July 2017
Contact information	Dr Regis Bordet, University Hospital, Lille, Ministry of Health, France Contact : +33 (0)3 20 44 54 49, regis.bordet@univ-lille2.fr
Notes	Status: recruiting participants

NCT02140619

Trial name or title	Multiple health education interventions for medication compliance and clinical prognosis of ischemic stroke patients
Methods	Parallel assignment
Participants	Acute ischaemic stroke
Interventions	Health education manuals and Digital Video Disc (DVD) during hospitalisation and regular text message during 1 year after discharge
Outcomes	3, 6 and 12 month medication adherence
Starting date	Start: May 2014 Estimated completion: September 2015
Contact information	Dr Zixiao Li , Beijing Tian Tan Hospital, Capital Medical University, Beijing, China, 100050 Contact : 00861067013383,yilong528@gmail.com
Notes	Status: recruiting participants

NCT02156778

Trial name or title	Post-stroke disease management - Stroke Card (Stroke Card)
Methods	Parallel assignment
Participants	Ischemic stroke
Interventions	Multifaceted comprehensive post-stroke disease management program to detect and treat complications and optimise secondary prevention
Outcomes	BP target achievement, LDL, physical activity at 1 year
Starting date	Start: January 2014 Estimated completion: March 2017
Contact information	Dr Stefan Kiechl, Department of Neurology, Medical University Innsbruck, Innsbruck, Tyrol, Austria, 6020 Contact : +43-512-504- ext 24244; stefan.kiechl@i-med.ac.at
Notes	Status: recruiting participants

NCT02251834

Trial name or title	Hispanic Secondary Stroke Prevention Initiative (HISSPI)
Methods	Parallel assignment
Participants	History of an ischaemic or intracerebral haemorrhagic stroke within the past 5 years
Interventions	Community health worker to deliver care at home, via telephone or mobile technology or group work to minimise risk factors in post stroke patients
Outcomes	12 months BP, LDL, self-reported adherence to statins and anti-platelets and HbA1C
Starting date	Start: January 2015 Estimated completion: March 2019
Contact information	Dr Olveen Carrasquillo University of Miami, Miami, FL, USA Contact : 305-243-5505
Notes	Status: recruiting participants

NCT02712385

Trial name or title	SPRITE - a feasibility and pilot study
Methods	Parallel assignment
Participants	TIA
Interventions	Novel home-based programme manual
Outcomes	Level of physical activity, BMI, BP at 12 weeks
Starting date	Start: March 2016 Estimated completion: February 2018
Contact information	Dr Neil Heron, Ulster Hospital, Belfast, Antrim, United Kingdom Contact : 028 9097 ext 6064, nheron02@qub.ac.uk
Notes	Status: recruiting participants

NCT02868723

Trial name or title	PROspective Study to OPTimize thE HEALTH of Patients With TIAs (Transient Ischemic Attacks) and Stroke Admitted to the Hamad General Hospital (PROMOTE-HEALTH)
Methods	Parallel assignment
Participants	Ischaemic stroke

NCT02868723 (*Continued*)

Interventions	Nurse and pharmacist follow-up
Outcomes	BP and LDL at 1 year
Starting date	Start: October 2016 Estimated completion: December 2018
Contact information	Dr Yahia Bashier, Hamad Medical Corporation, Qatar Contact : 55246887, yimam@hamad.qa
Notes	Status: not yet recruiting participants

Sarfo 2016

Trial name or title	Phone-based Intervention under Nurse Guidance after Stroke (PINGS)
Methods	Parallel RCT
Participants	Stroke
Interventions	Nurse-directed mobile health technology to promote adherence to antihypertensive medication
Outcomes	9-month BP and medication adherence
Starting date	Start: November 2016 Estimated completion: June 2017
Contact information	Stephen Sarfo, Division of Neurology, Department of Medicine, Kwame Nkrumah University of Science and Technology, Kumasi, Ghana Contact: Stephensarfo78@gmail.com
Notes	Status: not yet recruiting

Spruill 2015

Trial name or title	Practice-based trial of home BP telemonitoring among minority stroke survivors
Methods	Parallel RCT
Participants	Ischaemic or haemorrhagic stroke
Interventions	Home BP telemonitoring protocol with counselling telephone calls with a nurse case manager
Outcomes	12 month BP, 24 month stroke recurrence, 6, 12 and 24 months lipid, blood glucose, weight loss and medication adherence

Spruill 2015 (*Continued*)

Starting date	Start: Decemeber 2013 Estimated completion: December 2018
Contact information	Gbenga Ogedegbe, NYU School of Medicine, New York, NY, USA 10016 Contact: olugbenga.ogedegbe@nyumc.org
Notes	Status: Rrecruiting

THRIVES 2013

Trial name or title	Tailored Hospital-based Risk reduction to Impede Vascular Events after Stroke (THRIVES)
Methods	Parallel RCT
Participants	Stroke
Interventions	Pre-appointment phone text, In-clinic educational video, patient report card, post-clinic phone text
Outcomes	12 month BP and vascular event
Starting date	Start: September 2014 Estimated completion: June 2017
Contact information	Rufus Akinyemi, Sacred Heart Hospital, Medical School of Carolina Country Contact: rufusakinyemi@yahoo.com
Notes	Status: recruiting

Towfighi 2013

Trial name or title	Secondary stroke prevention by Uniting Community and Chronic care model teams Early to End Disparities: the SUCCEED Trial
Methods	Parallel RCT
Participants	Stroke
Interventions	Care manager (nurse practitioner or physician assistant) to implement protocols for secondary prevention; group education sessions on chronic disease self-management; home visits from a community health worker; participants provided with blood pressure monitors
Outcomes	12 months: SBP, dyslipidaemia, HbA1c, BMI, vascular events, medication adherence
Starting date	Start: September 2013 Estimated completion: August 2017

Towfighi 2013 (*Continued*)

Contact information	Barbara G Vickrey, MD, MPH; Amytis Towfighi, MD, Rancho Los Amigos National Rehabilitation Center, Downey, CA, USA, 90242
Notes	Status: enrolling participants by invitation only

BMI: body mass index
BP: blood pressure
CVD: cardiovascular disease
DBP: diastolic blood pressure
ECG: electrocardiogram
GP: general practitioner
LDL: low density lipoprotein
RCT: randomised controlled trial
SBP: systolic blood pressure
TIA: transient ischaemic attack

DATA AND ANALYSES

Comparison 1. Educational or behavioural interventions for patients versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Mean systolic blood pressure	11	1398	Mean Difference (IV, Random, 95% CI)	-2.81 [-7.02, 1.39]
2 Mean diastolic blood pressure	11	1398	Mean Difference (IV, Random, 95% CI)	-0.83 [-2.80, 1.13]
3 Blood pressure target achievement	3	266	Odds Ratio (M-H, Random, 95% CI)	0.74 [0.39, 1.44]
4 Mean total cholesterol	7	721	Mean Difference (IV, Random, 95% CI)	0.10 [-0.28, 0.47]
5 Total cholesterol target achievement	1	56	Odds Ratio (M-H, Random, 95% CI)	1.78 [0.60, 5.30]
6 Mean low density lipoprotein	4	495	Mean Difference (IV, Random, 95% CI)	-0.13 [-0.28, 0.02]
7 Mean high density lipoprotein	3	452	Mean Difference (IV, Random, 95% CI)	-0.03 [-0.11, 0.05]
8 Mean triglycerides	3	182	Mean Difference (IV, Random, 95% CI)	-0.01 [-0.31, 0.30]
9 Mean HbA1c	1	70	Mean Difference (IV, Random, 95% CI)	-0.11 [-0.39, 0.17]
10 HbA1C target achievement	1	67	Odds Ratio (M-H, Random, 95% CI)	1.53 [0.57, 4.08]
11 Mean BMI	2	127	Mean Difference (IV, Random, 95% CI)	0.22 [-0.85, 1.29]
12 Proporation of participants with secondary stroke	4	4333	Odds Ratio (M-H, Random, 95% CI)	0.82 [0.37, 1.84]
13 Number of secondary TIAs	2	4207	Odds Ratio (M-H, Random, 95% CI)	1.09 [0.52, 2.30]
14 Number of myocardial infarctions	3	4277	Odds Ratio (M-H, Random, 95% CI)	0.53 [0.17, 1.65]
15 Number of cardiovascular deaths	1	386	Odds Ratio (M-H, Random, 95% CI)	1.34 [0.30, 6.07]

Comparison 2. Organisational interventions versus usual care

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Mean systolic blood pressure	16	17490	Mean Difference (IV, Random, 95% CI)	-1.58 [-4.66, 1.51]
2 Mean diastolic blood pressure	14	17178	Mean Difference (IV, Random, 95% CI)	-0.91 [-2.75, 0.93]
3 Blood pressure target achievement	13	23631	Odds Ratio (M-H, Random, 95% CI)	0.70 [0.53, 0.92]
4 Mean total cholesterol	7	11955	Mean Difference (IV, Random, 95% CI)	-0.00 [-0.04, 0.03]
5 Total cholesterol target achievement	6	12539	Odds Ratio (M-H, Random, 95% CI)	0.78 [0.53, 1.17]
6 Mean low density lipoprotein	5	1154	Mean Difference (IV, Random, 95% CI)	-0.19 [-0.30, -0.09]
7 Low density lipoprotein target achievement	5	1790	Odds Ratio (M-H, Random, 95% CI)	0.73 [0.47, 1.13]
8 Mean high density lipoprotein	4	522	Mean Difference (IV, Random, 95% CI)	-0.02 [-0.09, 0.04]
9 High density lipoprotein target achievement	1	36	Odds Ratio (M-H, Random, 95% CI)	0.79 [0.20, 3.07]
10 Mean triglycerides	3	485	Mean Difference (IV, Random, 95% CI)	-0.08 [-0.21, 0.04]

11 Triglyceride target achievement	1	36	Odds Ratio (M-H, Random, 95% CI)	4.00 [0.85, 18.84]
12 Mean HbA1C	4	554	Mean Difference (IV, Random, 95% CI)	-0.20 [-0.98, 0.59]
13 HbA1C target achievement	3	553	Odds Ratio (M-H, Random, 95% CI)	0.25 [0.02, 3.33]
14 Mean BMI	5	1089	Mean Difference (IV, Random, 95% CI)	-0.47 [-1.24, 0.30]
15 BMI target achievement	2	234	Odds Ratio (M-H, Random, 95% CI)	0.58 [0.31, 1.08]
16 Mean Framingham cardiovascular risk score	1	36	Mean Difference (IV, Random, 95% CI)	-6.5 [-10.22, -2.78]
17 Proportion of participants with secondary stroke or TIA	4	791	Odds Ratio (M-H, Random, 95% CI)	0.66 [0.23, 1.86]
18 Number of secondary strokes	4	789	Odds Ratio (M-H, Random, 95% CI)	1.00 [0.54, 1.87]
19 Number of secondary TIAs	1	102	Odds Ratio (M-H, Random, 95% CI)	3.80 [1.57, 9.24]
20 Number of secondary TIA or stroke	1	291	Odds Ratio (M-H, Random, 95% CI)	0.26 [0.08, 0.85]
21 Proportion of participants with secondary cardiovascular events	1	324	Odds Ratio (M-H, Random, 95% CI)	1.48 [0.79, 2.77]
22 Number of secondary cardiovascular events	2	381	Odds Ratio (M-H, Random, 95% CI)	0.73 [0.25, 2.15]
23 Number of myocardial infarctions	1	314	Odds Ratio (M-H, Random, 95% CI)	1.0 [0.14, 7.19]
24 Number of vascular deaths	2	605	Odds Ratio (M-H, Random, 95% CI)	0.38 [0.15, 0.97]

Analysis 1.1. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 1 Mean systolic blood pressure.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 1 Mean systolic blood pressure

Study or subgroup	Educational or behavioural interventions for patients N	Mean(SD)	Usual care N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
Adie 2010	29	142 (19.3)	27	142.4 (17.2)		8.0 %	-0.40 [-9.96, 9.16]
Chanruengvanich 2006	31	141.2 (16.8)	31	137.9 (22.7)		7.8 %	3.30 [-6.64, 13.24]
Chiu 2008	78	131.9 (11.4)	76	143.8 (14.5)		12.1 %	-11.90 [-16.03, -7.77]
Kono 2013	35	122.1 (15.9)	35	138.9 (13.8)		9.9 %	-16.80 [-23.77, -9.83]
Lowe 2007	44	145.5 (21.1)	40	139.1 (13.3)		9.6 %	6.40 [-1.07, 13.87]
Maasland 2007	30	144 (23)	27	140 (16)		7.6 %	4.00 [-6.21, 14.21]
MacKenzie 2013	29	163.9 (161.13)	27	140.6 (16.8)		0.5 %	23.30 [-35.69, 82.29]
Mant 2016	182	127.4 (14.8)	197	129.4 (14.8)		12.8 %	-2.00 [-4.98, 0.98]

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Study or subgroup	Educational or behavioural interventions for patients		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
MIST 2014	163	137.75 (21.58)	165	137.05 (17.35)		12.0 %	0.70 [-3.54, 4.94]
O'Carroll 2011	29	131 (17)	29	132 (20)		8.0 %	-1.00 [-10.55, 8.55]
Slark 2013	47	128 (12.1)	47	134 (10.4)		11.8 %	-6.00 [-10.56, -1.44]
Total (95% CI)	**697**		**701**			**100.0 %**	**-2.81 [-7.02, 1.39]**

Heterogeneity: Tau² = 33.73; Chi² = 47.75, df = 10 (P<0.00001); I² =79%

Test for overall effect: Z = 1.31 (P = 0.19)

Test for subgroup differences: Not applicable

Analysis 1.2. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 2 Mean diastolic blood pressure.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 2 Mean diastolic blood pressure

Study or subgroup	Educational or behavioural interventions for patients		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Adie 2010	29	75.7 (10.1)	27	72.1 (12.1)		7.0 %	3.60 [-2.26, 9.46]
Chanruengvanich 2006	31	77.1 (11.3)	31	75.8 (11.5)		7.3 %	1.30 [-4.38, 6.98]
Chiu 2008	78	76 (7.8)	76	80.9 (10)		13.4 %	-4.90 [-7.74, -2.06]
Kono 2013	35	72.9 (9.5)	35	80.7 (10.7)		8.9 %	-7.80 [-12.54, -3.06]
Lowe 2007	44	78.5 (13.3)	40	76.2 (8.1)		9.1 %	2.30 [-2.36, 6.96]
Maasland 2007	30	84 (10)	27	86 (8)		9.1 %	-2.00 [-6.68, 2.68]
MacKenzie 2013	29	106.9 (172)	27	77.8 (8.9)		0.1 %	29.10 [-33.59, 91.79]
Mant 2016	182	79.9 (10)	197	80.4 (9.8)		15.6 %	-0.50 [-2.50, 1.50]

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Study or subgroup	Educational or behavioural interventions for patients N	Mean(SD)	Usual care N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
MIST 2014	163	77.77 (12.58)	165	77.46 (11.66)		14.0 %	0.31 [-2.32, 2.94]
O'Carroll 2011	29	80 (11)	29	79 (13)		6.5 %	1.00 [-5.20, 7.20]
Slark 2013	47	74 (11)	47	73 (12.6)		8.9 %	1.00 [-3.78, 5.78]
Total (95% CI)	**697**		**701**			**100.0 %**	**-0.83 [-2.80, 1.13]**

Heterogeneity: $Tau^2 = 5.40$; $Chi^2 = 23.41$, df = 10 (P = 0.01); $I^2 = 57\%$

Test for overall effect: Z = 0.83 (P = 0.41)

Test for subgroup differences: Not applicable

Analysis 1.3. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 3 Blood pressure target achievement.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 3 Blood pressure target achievement

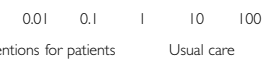
Study or subgroup	Educational or behavioural interventions for patients n/N	Usual care n/N	Odds Ratio(Non-event) M-H,Random,95% CI	Weight	Odds Ratio(Non-event) M-H,Random,95% CI
MacKenzie 2013	17/29	10/27		26.6 %	0.42 [0.14, 1.22]
Adie 2010	11/29	7/27		24.3 %	0.57 [0.18, 1.79]
Chiu 2008	31/78	33/76		49.1 %	1.16 [0.61, 2.21]
Total (95% CI)	**136**	**130**		**100.0 %**	**0.74 [0.39, 1.44]**

Total events: 59 (Educational or behavioural interventions for patients), 50 (Usual care)

Heterogeneity: $Tau^2 = 0.12$; $Chi^2 = 3.06$, df = 2 (P = 0.22); $I^2 = 35\%$

Test for overall effect: Z = 0.88 (P = 0.38)

Test for subgroup differences: Not applicable



Analysis 1.4. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 4 Mean total cholesterol.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 4 Mean total cholesterol

Study or subgroup	Educational or behavioural interventions for patients		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Adie 2010	29	4.4 (1.1)	27	4.1 (0.9)		13.5 %	0.30 [-0.22, 0.82]
Chanruengvanich 2006	31	5.36 (1.17)	31	5.18 (0.88)		13.6 %	0.18 [-0.34, 0.70]
Chiu 2008	53	4.63 (0.87)	49	5.28 (1.16)		15.1 %	-0.65 [-1.05, -0.25]
Kim 2013	17	4 (0.92)	17	2.74 (0.72)		13.0 %	1.26 [0.70, 1.82]
Maasland 2007	30	5.5 (1.1)	27	5.6 (1.5)		11.3 %	-0.10 [-0.79, 0.59]
MIST 2014	157	3.93 (0.91)	159	4.15 (0.97)		17.3 %	-0.22 [-0.43, -0.01]
Slark 2013	47	4.1 (0.75)	47	4 (0.79)		16.2 %	0.10 [-0.21, 0.41]
Total (95% CI)	**364**		**357**			**100.0 %**	**0.10 [-0.28, 0.47]**

Heterogeneity: $Tau^2 = 0.20$; $Chi^2 = 35.97$, df = 6 ($P<0.00001$); $I^2 = 83\%$

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

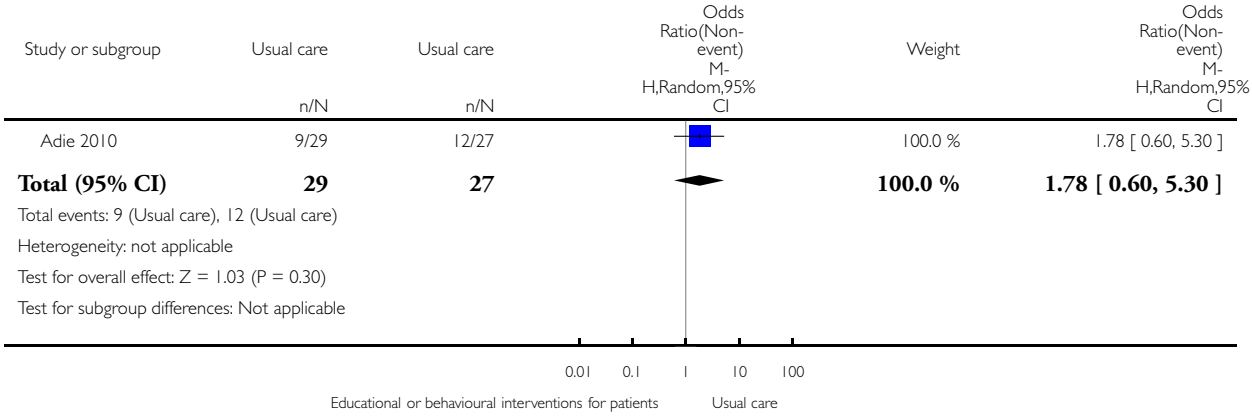
Test for subgroup differences: Not applicable

Analysis 1.5. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 5 Total cholesterol target achievement.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 5 Total cholesterol target achievement



Analysis 1.6. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 6 Mean low density lipoprotein.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

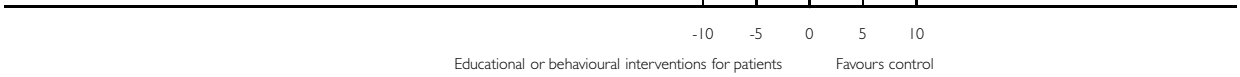
Outcome: 6 Mean low density lipoprotein

Study or subgroup	Educational or behavioural interventions for patients		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Chiu 2008	45	2.81 (0.768)	37	3.2 (0.812)		17.9 %	-0.39 [-0.73, -0.05]
Kono 2013	35	2.67 (0.63)	35	2.65 (0.54)		26.6 %	0.02 [-0.25, 0.29]
Maasland 2007	30	3.6 (1.4)	27	3.8 (1.4)		4.3 %	-0.20 [-0.93, 0.53]
MIST 2014	140	2.14 (0.8)	146	2.25 (0.77)		51.2 %	-0.11 [-0.29, 0.07]
Total (95% CI)	**250**		**245**			**100.0 %**	**-0.13 [-0.28, 0.02]**

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 3.41$, df = 3 (P = 0.33); $I^2 = 12\%$

Test for overall effect: Z = 1.65 (P = 0.098)

Test for subgroup differences: Not applicable



Analysis 1.7. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 7 Mean high density lipoprotein.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 7 Mean high density lipoprotein

Study or subgroup	Usual care N	Mean(SD)	Educational or behavioural interventions for patients N	Mean(SD)	Mean Difference IV,Random,95% CI	Weight	Mean Difference IV,Random,95% CI
Chanruengvanich 2006	31	-1.11 (0.282)	31	-1.11 (0.318)		29.0 %	0.0 [-0.15, 0.15]
Kono 2013	35	-1.62 (0.44)	35	-1.46 (0.4)		16.7 %	-0.16 [-0.36, 0.04]
MIST 2014	159	-1.32 (0.56)	161	-1.31 (0.43)		54.2 %	-0.01 [-0.12, 0.10]
Total (95% CI)	**225**		**227**			**100.0 %**	**-0.03 [-0.11, 0.05]**

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 1.95$, df = 2 (P = 0.38); $I^2 = 0.0\%$

Test for overall effect: Z = 0.78 (P = 0.43)

Test for subgroup differences: Not applicable

Analysis 1.8. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 8 Mean triglycerides.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 8 Mean triglycerides

Study or subgroup	Educational or behavioural interventions for patients		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Chiu 2008	47	1.66 (0.779)	44	1.77 (1.33)		46.4 %	-0.11 [-0.56, 0.34]
Kim 2013	17	1.58 (0.71)	17	1.64 (0.89)		32.3 %	-0.06 [-0.60, 0.48]
Maasland 2007	30	2 (1.6)	27	1.7 (0.9)		21.3 %	0.30 [-0.37, 0.97]
Total (95% CI)	**94**		**88**			**100.0 %**	**-0.01 [-0.31, 0.30]**

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 1.05$, df = 2 (P = 0.59); $I^2 = 0.0\%$

Test for overall effect: Z = 0.04 (P = 0.97)

Test for subgroup differences: Not applicable

Analysis 1.9. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 9 Mean HbA1c.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 9 Mean HbA1c

Study or subgroup	Educational or behavioural interventions for patients		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Kono 2013	35	5.87 (0.46)	35	5.98 (0.71)		100.0 %	-0.11 [-0.39, 0.17]
Total (95% CI)	**35**		**35**			**100.0 %**	**-0.11 [-0.39, 0.17]**

Heterogeneity: not applicable

Test for overall effect: Z = 0.77 (P = 0.44)

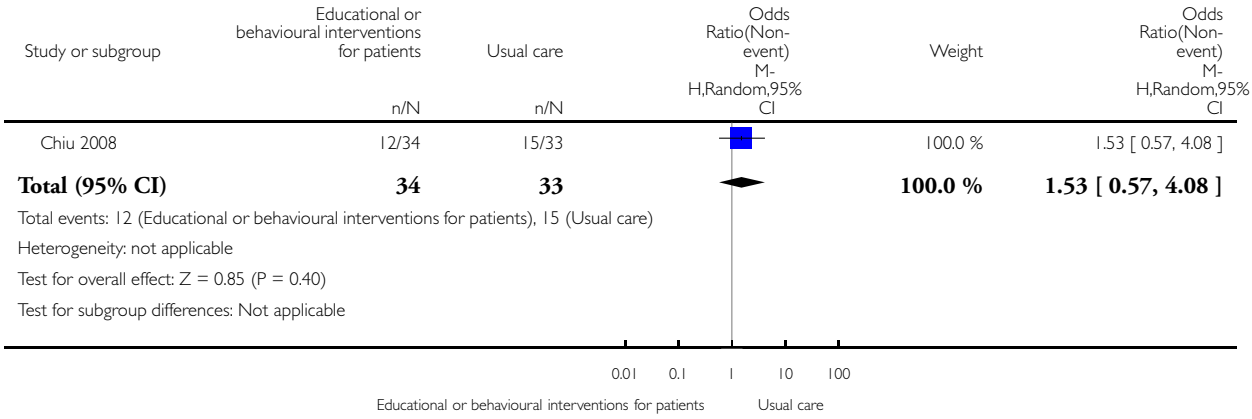
Test for subgroup differences: Not applicable

Analysis 1.10. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 10 HbA1C target achievement.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 10 HbA1C target achievement



Analysis 1.11. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 11 Mean BMI.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

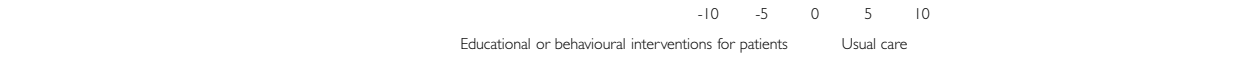
Outcome: 11 Mean BMI

Study or subgroup	Educational or behavioural interventions for patients		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Kono 2013	35	22.6 (2.69)	35	22.7 (2.72)		70.8 %	-0.10 [-1.37, 1.17]
Maasland 2007	30	26.7 (3.8)	27	25.7 (3.8)		29.2 %	1.00 [-0.98, 2.98]
Total (95% CI)	**65**		**62**			**100.0 %**	**0.22 [-0.85, 1.29]**

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.84$, df = 1 (P = 0.36); $I^2 = 0.0\%$

Test for overall effect: Z = 0.41 (P = 0.69)

Test for subgroup differences: Not applicable

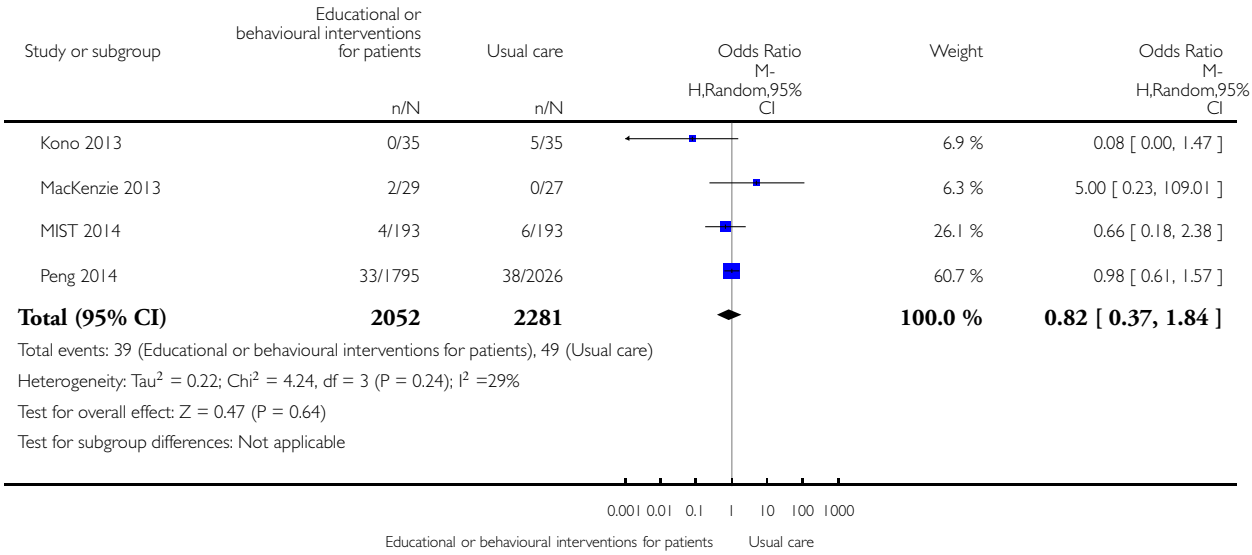


Analysis 1.12. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 12 Proporation of participants with secondary stroke.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 12 Proporation of participants with secondary stroke

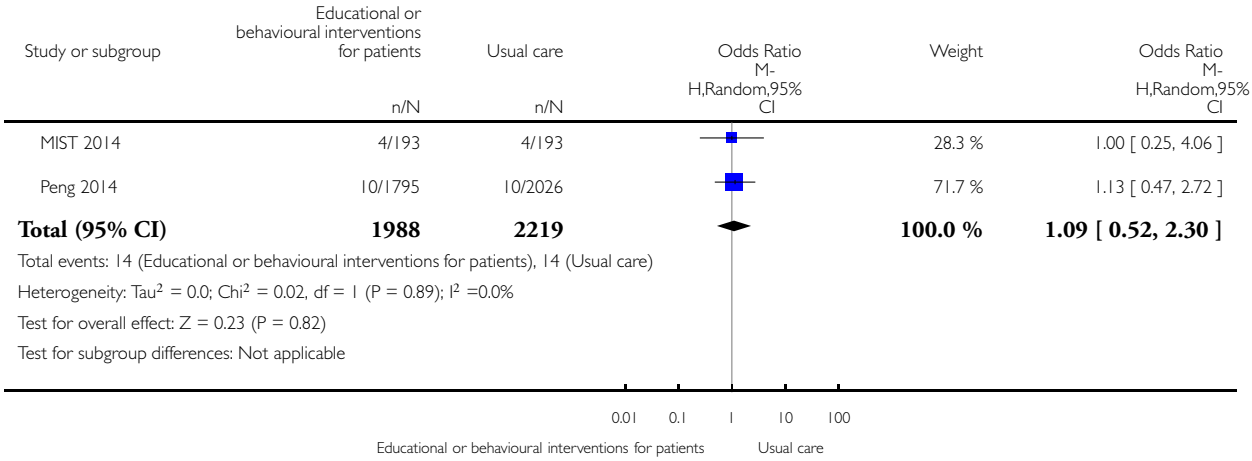


Analysis 1.13. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 13 Number of secondary TIAs.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 13 Number of secondary TIAs

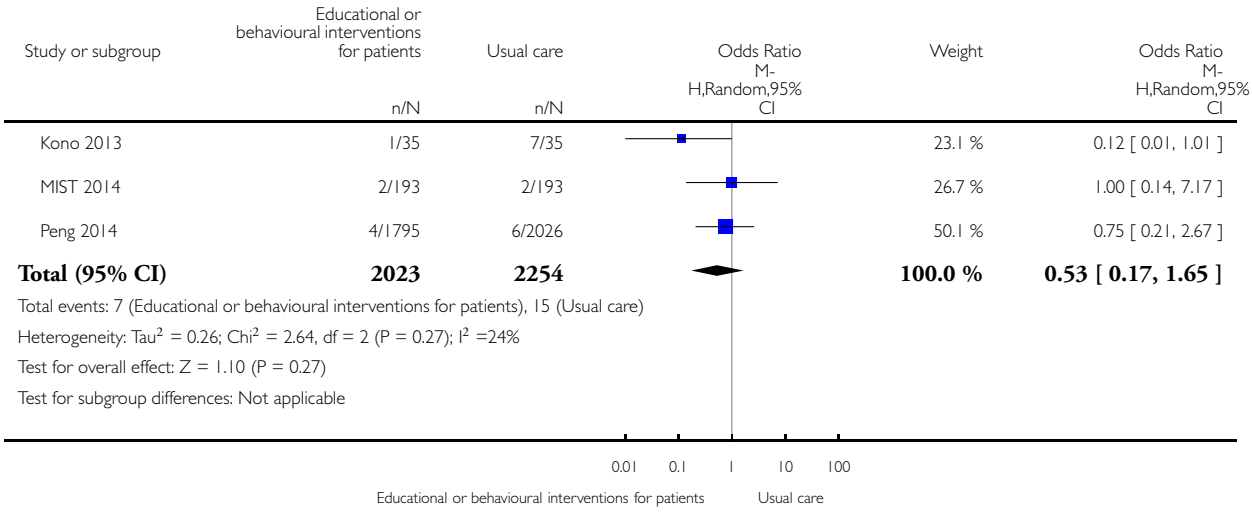


Analysis 1.14. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 14 Number of myocardial infarctions.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 14 Number of myocardial infarctions

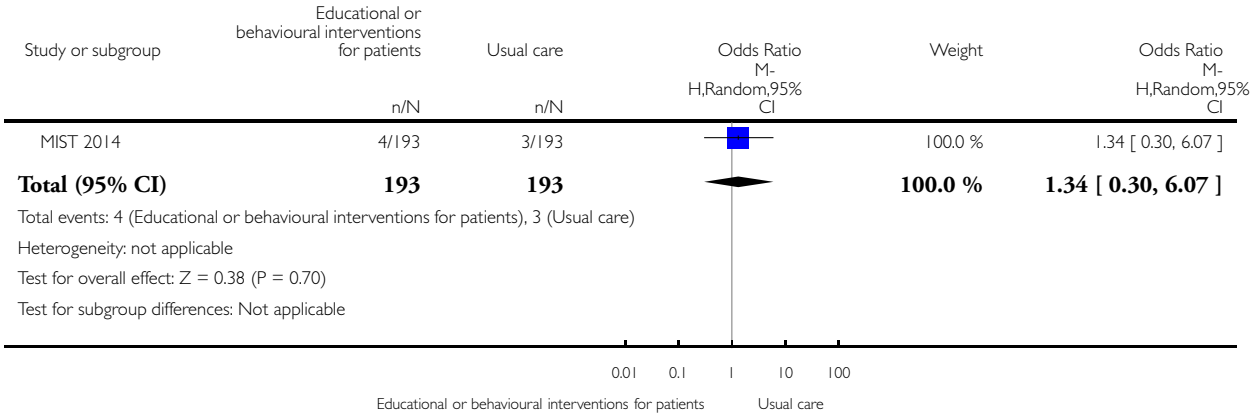


Analysis 1.15. Comparison 1 Educational or behavioural interventions for patients versus usual care, Outcome 15 Number of cardiovascular deaths.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 1 Educational or behavioural interventions for patients versus usual care

Outcome: 15 Number of cardiovascular deaths



Analysis 2.1. Comparison 2 Organisational interventions versus usual care, Outcome 1 Mean systolic blood pressure.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 1 Mean systolic blood pressure

Study or subgroup	Organisational interventions		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Brotons 2011	110	133.9 (15.9)	97	136.6 (15.1)		6.9 %	-2.70 [-6.93, 1.53]
Dregan 2014	5875	131.4 (16.7)	5516	131.7 (16.8)		7.9 %	-0.30 [-0.92, 0.32]
Ellis 2005	94	146.9 (28.4)	98	150.1 (26.8)		5.3 %	-3.20 [-11.02, 4.62]
Evans 2010	4	137.3 (8.5)	4	126.3 (6.2)		4.2 %	11.00 [0.69, 21.31]
Flemming 2013	18	131.8 (19)	18	133.89 (20)		3.4 %	-2.09 [-14.83, 10.65]
Hanley 2015	37	133.9 (13.6)	15	139.8 (15.5)		4.7 %	-5.90 [-14.89, 3.09]
Hornnes 2011	145	139.4 (21.3)	158	142.4 (22.2)		6.6 %	-3.00 [-7.90, 1.90]
Joubert 2009	91	128.5 (13.7)	95	134.5 (19.4)		6.7 %	-6.00 [-10.81, -1.19]
Jönsson 2014	194	138.12 (18.08)	197	141.17 (21.56)		7.0 %	-3.05 [-6.99, 0.89]
Kerry 2013	168	138.5 (20.8)	169	136.7 (20.3)		6.8 %	1.80 [-2.59, 6.19]
Mant 2016	182	143.5 (13.5)	197	142.2 (12.9)		7.5 %	1.30 [-1.36, 3.96]
McAlister 2014	139	127.2 (16.7)	136	124 (13.9)		7.1 %	3.20 [-0.43, 6.83]
McManus 2014	39	138.91 (18.78)	38	131.26 (19.43)		4.9 %	7.65 [-0.89, 16.19]
Nailed Stroke 2010	241	131.9 (15.7)	243	136 (17.5)		7.4 %	-4.10 [-7.06, -1.14]
Pergola 2014	1501	126.7 (16.5)	1519	137.4 (16.2)		7.8 %	-10.70 [-11.87, -9.53]
Welin 2010	78	140.9 (19)	74	144.1 (24)		5.7 %	-3.20 [-10.11, 3.71]
Total (95% CI)	**8916**		**8574**			**100.0 %**	**-1.58 [-4.66, 1.51]**

Heterogeneity: $Tau^2 = 31.21$; $Chi^2 = 275.27$, df = 15 (P<0.00001); I^2 =95%

Test for overall effect: Z = 1.00 (P = 0.32)

Test for subgroup differences: Not applicable

Analysis 2.2. Comparison 2 Organisational interventions versus usual care, Outcome 2 Mean diastolic blood pressure.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 2 Mean diastolic blood pressure

Study or subgroup	Organisational interventions		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Brotons 2011	110	75.9 (10.1)	96	77.1 (10.2)		7.5 %	-1.20 [-3.98, 1.58]
Dregan 2014	5875	74.7 (10.4)	5516	74.5 (10.4)		9.1 %	0.20 [-0.18, 0.58]
Ellis 2005	94	81.3 (17.8)	98	78.8 (22.7)		4.8 %	2.50 [-3.26, 8.26]
Evans 2010	4	78.2 (2.5)	4	75.3 (7.3)		3.6 %	2.90 [-4.66, 10.46]
Hanley 2015	37	75.2 (7.4)	15	76.9 (9.6)		5.1 %	-1.70 [-7.11, 3.71]
Hornnes 2011	145	82 (13.1)	158	86 (12.3)		7.5 %	-4.00 [-6.87, -1.13]
Joubert 2009	91	77.3 (8.3)	95	79.1 (8.9)		7.8 %	-1.80 [-4.27, 0.67]
Jönsson 2014	194	79.63 (10.29)	197	80.45 (11.71)		8.1 %	-0.82 [-3.00, 1.36]
Kerry 2013	168	73.9 (12.3)	169	72.5 (11)		7.8 %	1.40 [-1.09, 3.89]
Mant 2016	182	72 (9)	197	74.4 (8.9)		8.4 %	-2.40 [-4.20, -0.60]
McManus 2014	39	78.56 (8.86)	38	73.5 (10.09)		6.1 %	5.06 [0.81, 9.31]
Nailed Stroke 2010	241	77.3 (10.3)	243	79.6 (10.5)		8.3 %	-2.30 [-4.15, -0.45]
Pergola 2014	1501	69.1 (10.4)	1519	74.8 (10.9)		9.0 %	-5.70 [-6.46, -4.94]
Welin 2010	78	80.5 (8.4)	74	80.3 (12.1)		7.0 %	0.20 [-3.13, 3.53]
Total (95% CI)	**8759**		**8419**			**100.0 %**	**-0.91 [-2.75, 0.93]**

Heterogeneity: $Tau^2 = 9.65$; $Chi^2 = 208.10$, df = 13 (P<0.00001); $I^2 = 94\%$

Test for overall effect: Z = 0.97 (P = 0.33)

Test for subgroup differences: Not applicable

Analysis 2.3. Comparison 2 Organisational interventions versus usual care, Outcome 3 Blood pressure target achievement.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 3 Blood pressure target achievement

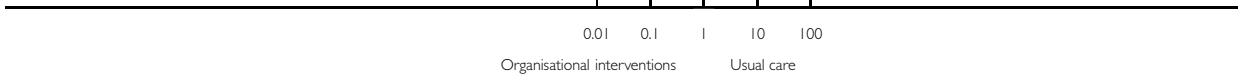
Study or subgroup	Organisational interventions n/N	Usual care n/N	Odds Ratio(Non-event) M-H,Random,95% CI	Weight	Odds Ratio(Non-event) M-H,Random,95% CI
Allen 2009	113/165	108/154		8.2 %	1.08 [0.67, 1.74]
Brotons 2011	33/110	30/97		7.2 %	1.04 [0.58, 1.89]
Dregan 2014	3572/8965	3043/8546		10.7 %	0.83 [0.79, 0.89]
Flemming 2013	14/18	11/18		2.7 %	0.45 [0.10, 1.93]
Hornnes 2011	57/145	59/158		8.3 %	0.92 [0.58, 1.46]
Johnston 2010	29/47	36/58		5.7 %	1.02 [0.46, 2.24]
Joubert 2009	66/88	52/90		6.9 %	0.46 [0.24, 0.86]
Jönsson 2014	102/194	97/197		8.8 %	0.87 [0.59, 1.30]
Kronish 2014	76/299	67/301		9.0 %	0.84 [0.58, 1.22]
McAlister 2014	122/136	115/143		6.5 %	0.47 [0.24, 0.94]
Nailed Stroke 2010	165/241	138/243		9.0 %	0.61 [0.42, 0.88]
Pergola 2014	1100/1501	754/1519		10.4 %	0.36 [0.31, 0.42]
Wang 2005	64/146	15/52		6.5 %	0.52 [0.26, 1.03]
Total (95% CI)	**12055**	**11576**		**100.0 %**	**0.70 [0.53, 0.92]**

Total events: 5513 (Organisational interventions), 4525 (Usual care)

Heterogeneity: $Tau^2 = 0.19$; $Chi^2 = 114.08$, df = 12 (P<0.00001); $I^2 = 89\%$

Test for overall effect: Z = 2.56 (P = 0.011)

Test for subgroup differences: Not applicable



Analysis 2.4. Comparison 2 Organisational interventions versus usual care, Outcome 4 Mean total cholesterol.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 4 Mean total cholesterol

Study or subgroup	Organisational interventions		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Brotons 2011	110	4.88 (0.92)	97	4.84 (0.97)		2.1 %	0.04 [-0.22, 0.30]
Dregan 2014	5516	4.35 (1)	5516	4.35 (1.1)		90.4 %	0.0 [-0.04, 0.04]
Ellis 2005	94	4.84 (0.72)	98	4.83 (0.84)		2.8 %	0.01 [-0.21, 0.23]
Evans 2010	4	4.84 (1.25)	4	4.77 (1.01)		0.1 %	0.07 [-1.50, 1.64]
Joubert 2009	91	5.1 (1)	95	5.2 (1.4)		1.1 %	-0.10 [-0.45, 0.25]
Lowrie 2010	35	4.332 (1.058)	20	4.39 (1.037)		0.4 %	-0.06 [-0.63, 0.52]
McAlister 2014	139	4.1 (0.9)	136	4.2 (0.9)		3.1 %	-0.10 [-0.31, 0.11]
Total (95% CI)	**5989**		**5966**			**100.0 %**	**0.00 [-0.04, 0.03]**

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 1.28$, df = 6 (P = 0.97); $I^2 = 0.0\%$

Test for overall effect: Z = 0.17 (P = 0.86)

Test for subgroup differences: Not applicable

Analysis 2.5. Comparison 2 Organisational interventions versus usual care, Outcome 5 Total cholesterol target achievement.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 5 Total cholesterol target achievement

Study or subgroup	Organisational interventions n/N	Usual care n/N	Odds Ratio(Non-event) M-H,Random,95% CI	Weight	Odds Ratio(Non-event) M-H,Random,95% CI
Allen 2009	107/165	107/154		18.2 %	1.23 [0.77, 1.97]
Dregan 2014	2160/5875	2063/5516		24.0 %	1.03 [0.95, 1.11]
Joubert 2009	57/88	50/90		15.6 %	0.68 [0.37, 1.24]
Jönsson 2014	125/194	127/197		19.2 %	1.00 [0.66, 1.52]
Lowrie 2010	13/39	8/23		8.7 %	1.07 [0.36, 3.16]
Wang 2005	109/146	19/52		14.3 %	0.20 [0.10, 0.38]
Total (95% CI)	**6507**	**6032**		**100.0 %**	**0.78 [0.53, 1.17]**

Total events: 2571 (Organisational interventions), 2374 (Usual care)

Heterogeneity: $Tau^2 = 0.17$; $Chi^2 = 25.20$, df = 5 (P = 0.00013); $I^2 = 80\%$

Test for overall effect: Z = 1.19 (P = 0.23)

Test for subgroup differences: Not applicable

Analysis 2.6. Comparison 2 Organisational interventions versus usual care, Outcome 6 Mean low density lipoprotein.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

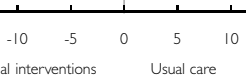
Outcome: 6 Mean low density lipoprotein

Study or subgroup	Organisational interventions		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Brotons 2011	110	2.88 (0.765)	91	2.96 (0.791)		20.2 %	-0.08 [-0.30, 0.14]
Evans 2010	54	2.33 (1.05)	100	2.4 (1.03)		8.5 %	-0.07 [-0.42, 0.28]
Flemming 2013	18	2.22 (1.03)	18	2.61 (0.76)		3.0 %	-0.39 [-0.98, 0.20]
McAlister 2014	143	2.21 (0.73)	136	2.35 (0.81)		27.6 %	-0.14 [-0.32, 0.04]
Nailed Stroke 2010	241	2.3 (0.7)	243	2.6 (0.9)		40.7 %	-0.30 [-0.44, -0.16]
Total (95% CI)	**566**		**588**			**100.0 %**	**-0.19 [-0.30, -0.09]**

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 4.41$, df = 4 (P = 0.35); $I^2 = 9\%$

Test for overall effect: Z = 3.71 (P = 0.00020)

Test for subgroup differences: Not applicable



Analysis 2.7. Comparison 2 Organisational interventions versus usual care, Outcome 7 Low density lipoprotein target achievement.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 7 Low density lipoprotein target achievement

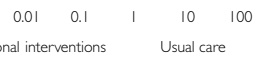
Study or subgroup	Organisational interventions n/N	Usual care n/N	Odds Ratio(Non-event) M-H,Random,95% CI	Weight	Odds Ratio(Non-event) M-H,Random,95% CI
Flemming 2013	10/18	10/18		8.1 %	1.00 [0.27, 3.72]
Jönsson 2014	72/194	75/197		23.2 %	1.04 [0.69, 1.57]
Kronish 2014	54/299	58/301		23.2 %	1.08 [0.72, 1.63]
McAlister 2014	73/143	46/136		21.5 %	0.49 [0.30, 0.79]
Nailed Stroke 2010	161/241	115/243		24.1 %	0.45 [0.31, 0.64]
Total (95% CI)	**895**	**895**		**100.0 %**	**0.73 [0.47, 1.13]**

Total events: 370 (Organisational interventions), 304 (Usual care)

Heterogeneity: $Tau^2 = 0.17$; $Chi^2 = 16.05$, df = 4 (P = 0.003); $I^2 = 75\%$

Test for overall effect: Z = 1.43 (P = 0.15)

Test for subgroup differences: Not applicable



Analysis 2.8. Comparison 2 Organisational interventions versus usual care, Outcome 8 Mean high density lipoprotein.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 8 Mean high density lipoprotein

Study or subgroup	Usual care		Organisational interventions		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Brotons 2011	110	-1.41 (0.445)	93	-1.36 (0.383)		32.6 %	-0.05 [-0.16, 0.06]
Evans 2010	4	-1.33 (0.36)	4	-0.99 (0.25)		2.3 %	-0.34 [-0.77, 0.09]
Flemming 2013	18	-1.22 (0.34)	18	-1.28 (0.57)		4.5 %	0.06 [-0.25, 0.37]
McAlister 2014	139	-1.3 (0.4)	136	-1.3 (0.3)		60.7 %	0.0 [-0.08, 0.08]
Total (95% CI)	**271**		**251**			**100.0 %**	**-0.02 [-0.09, 0.04]**

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 2.88$, df = 3 (P = 0.41); $I^2 = 0.0\%$

Test for overall effect: Z = 0.64 (P = 0.52)

Test for subgroup differences: Not applicable

Analysis 2.9. Comparison 2 Organisational interventions versus usual care, Outcome 9 High density lipoprotein target achievement.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 9 High density lipoprotein target achievement

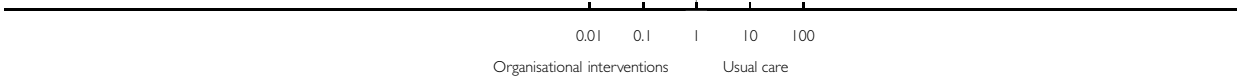
Study or subgroup	Organisational interventions n/N	Usual care n/N	Odds Ratio(Non-event) M-H,Random,95% CI	Weight	Odds Ratio(Non-event) M-H,Random,95% CI
Flemming 2013	12/18	11/18		100.0 %	0.79 [0.20, 3.07]
Total (95% CI)	**18**	**18**		**100.0 %**	**0.79 [0.20, 3.07]**

Total events: 12 (Organisational interventions), 11 (Usual care)

Heterogeneity: not applicable

Test for overall effect: Z = 0.35 (P = 0.73)

Test for subgroup differences: Not applicable



Analysis 2.10. Comparison 2 Organisational interventions versus usual care, Outcome 10 Mean triglycerides.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

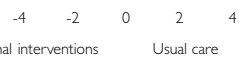
Outcome: 10 Mean triglycerides

Study or subgroup	Organisational interventions		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Brotons 2011	110	1.33 (0.69)	92	1.38 (0.84)		33.4 %	-0.05 [-0.26, 0.16]
Flemming 2013	4	1.66 (0.5)	4	1.75 (0.81)		1.8 %	-0.09 [-1.02, 0.84]
McAlister 2014	139	1.3 (0.6)	136	1.4 (0.7)		64.8 %	-0.10 [-0.25, 0.05]
Total (95% CI)	**253**		**232**			**100.0 %**	**-0.08 [-0.21, 0.04]**

Heterogeneity: $Tau^2 = 0.0$; $Chi^2 = 0.14$, df = 2 (P = 0.93); $I^2 = 0.0\%$

Test for overall effect: Z = 1.31 (P = 0.19)

Test for subgroup differences: Not applicable



Analysis 2.11. Comparison 2 Organisational interventions versus usual care, Outcome 11 Triglyceride target achievement.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 11 Triglyceride target achievement

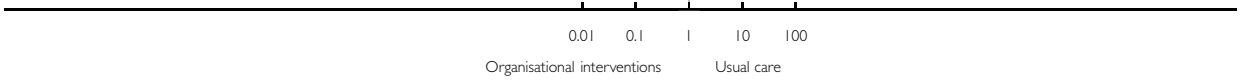
Study or subgroup	Organisational interventions n/N	Usual care n/N	Odds Ratio(Non-event) M-H,Random,95% CI	Weight	Odds Ratio(Non-event) M-H,Random,95% CI
Flemming 2013	10/18	15/18		100.0 %	4.00 [0.85, 18.84]
Total (95% CI)	**18**	**18**		**100.0 %**	**4.00 [0.85, 18.84]**

Total events: 10 (Organisational interventions), 15 (Usual care)

Heterogeneity: not applicable

Test for overall effect: Z = 1.75 (P = 0.080)

Test for subgroup differences: Not applicable



Analysis 2.12. Comparison 2 Organisational interventions versus usual care, Outcome 12 Mean HbA1C.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 12 Mean HbA1C

Study or subgroup	Organisational interventions		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Ellis 2005	94	7.29 (1.61)	98	7.11 (3.91)		21.0 %	0.18 [-0.66, 1.02]
Evans 2010	2	7.2 (0.05)	4	6.35 (0.07)		27.5 %	0.85 [0.75, 0.95]
Flemming 2013	18	5.2 (1)	18	7.2 (0.7)		24.2 %	-2.00 [-2.56, -1.44]
Jönsson 2014	154	4.77 (0.89)	166	4.71 (0.36)		27.4 %	0.06 [-0.09, 0.21]
Total (95% CI)	**268**		**286**			**100.0 %**	**-0.20 [-0.98, 0.59]**

Heterogeneity: $Tau^2 = 0.58$; $Chi^2 = 156.14$, df = 3 ($P<0.00001$); $I^2 = 98\%$

Test for overall effect: Z = 0.49 (P = 0.62)

Test for subgroup differences: Not applicable

Analysis 2.13. Comparison 2 Organisational interventions versus usual care, Outcome 13 HbA1C target achievement.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 13 HbA1C target achievement

Study or subgroup	Organisational interventions n/N	Usual care n/N	Odds Ratio(Non-event) M-H,Random,95% CI	Weight	Odds Ratio(Non-event) M-H,Random,95% CI
Allen 2009	118/165	119/154		38.0 %	1.35 [0.82, 2.25]
Flemming 2013	18/18	16/18		24.7 %	0.18 [0.01, 3.99]
Wang 2005	129/146	16/52		37.3 %	0.06 [0.03, 0.13]
Total (95% CI)	**329**	**224**		**100.0 %**	**0.25 [0.02, 3.33]**

Total events: 265 (Organisational interventions), 151 (Usual care)

Heterogeneity: $Tau^2 = 4.45$; $Chi^2 = 44.60$, df = 2 (P<0.00001); $I^2 = 96\%$

Test for overall effect: Z = 1.04 (P = 0.30)

Test for subgroup differences: Not applicable

Analysis 2.14. Comparison 2 Organisational interventions versus usual care, Outcome 14 Mean BMI.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 14 Mean BMI

Study or subgroup	Organisational interventions		Usual care		Mean Difference	Weight	Mean Difference
	N	Mean(SD)	N	Mean(SD)	IV,Random,95% CI		IV,Random,95% CI
Brotons 2011	109	28.2 (4.25)	92	29.1 (4.47)		20.4 %	-0.90 [-2.11, 0.31]
Flemming 2013	18	28.78 (2)	18	28.8 (2)		18.9 %	-0.02 [-1.33, 1.29]
Joubert 2009	91	27.5 (5.4)	95	28.7 (6.3)		13.9 %	-1.20 [-2.88, 0.48]
Jönsson 2014	194	26.5 (4.93)	197	25.89 (5.12)		24.5 %	0.61 [-0.39, 1.61]
McAlister 2014	139	28.1 (4.6)	136	29.3 (4.8)		22.3 %	-1.20 [-2.31, -0.09]
Total (95% CI)	**551**		**538**			**100.0 %**	**-0.47 [-1.24, 0.30]**

Heterogeneity: $Tau^2 = 0.37$; $Chi^2 = 7.78$, df = 4 (P = 0.10); $I^2 = 49\%$

Test for overall effect: Z = 1.20 (P = 0.23)

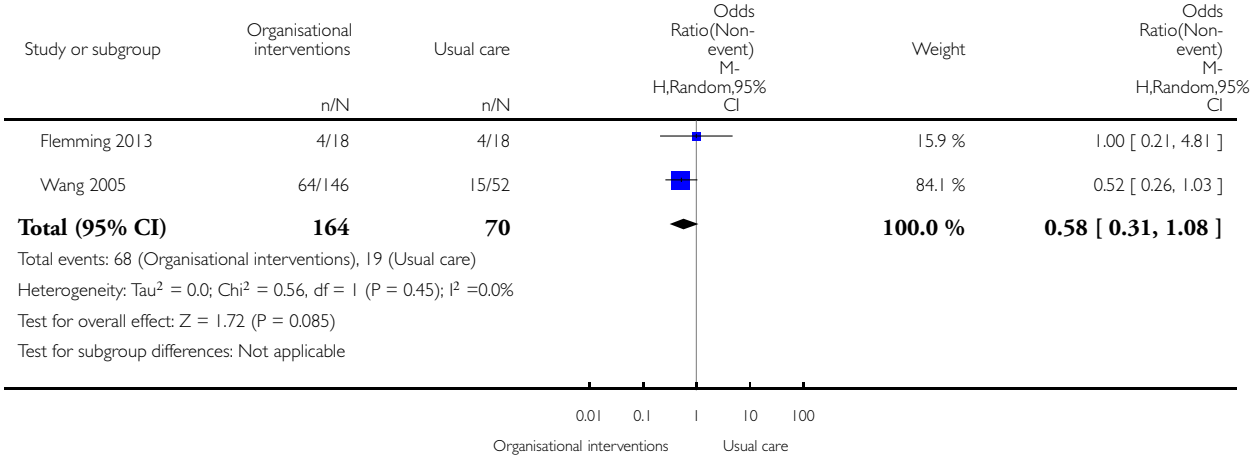
Test for subgroup differences: Not applicable

Analysis 2.15. Comparison 2 Organisational interventions versus usual care, Outcome 15 BMI target achievement.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 15 BMI target achievement

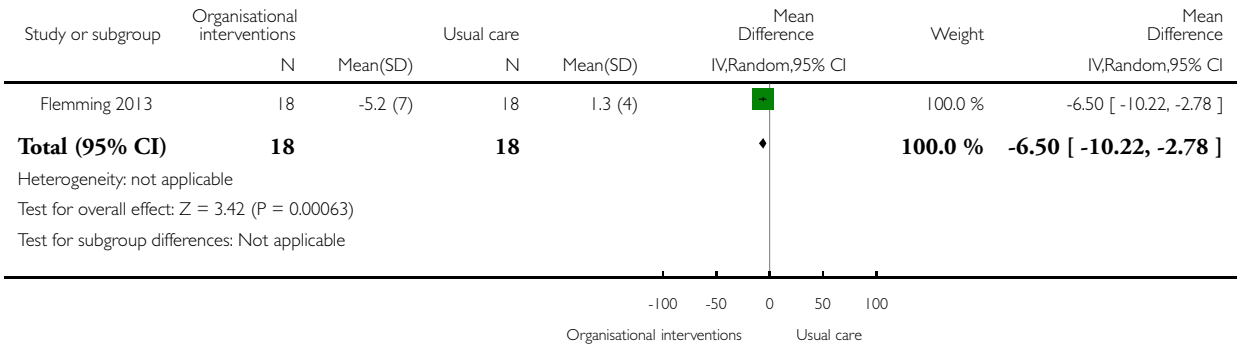


Analysis 2.16. Comparison 2 Organisational interventions versus usual care, Outcome 16 Mean Framingham cardiovascular risk score.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 16 Mean Framingham cardiovascular risk score



Analysis 2.17. Comparison 2 Organisational interventions versus usual care, Outcome 17 Proportion of participants with secondary stroke or TIA.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 17 Proportion of participants with secondary stroke or TIA

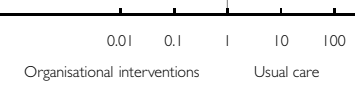
Study or subgroup	Organisational interventions n/N	Usual care n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Allen 2002	1/47	0/46		8.1 %	3.00 [0.12, 75.56]
Kerry 2013	11/168	15/169		30.1 %	0.72 [0.32, 1.62]
Wang 2005	42/146	34/52		31.9 %	0.21 [0.11, 0.42]
Welin 2010	15/81	12/82		29.8 %	1.33 [0.58, 3.04]
Total (95% CI)	**442**	**349**		**100.0 %**	**0.66 [0.23, 1.86]**

Total events: 69 (Organisational interventions), 61 (Usual care)

Heterogeneity: $Tau^2 = 0.76$; $Chi^2 = 13.31$, df = 3 (P = 0.004); $I^2 = 77\%$

Test for overall effect: Z = 0.79 (P = 0.43)

Test for subgroup differences: Not applicable



Analysis 2.18. Comparison 2 Organisational interventions versus usual care, Outcome 18 Number of secondary strokes.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 18 Number of secondary strokes

Study or subgroup	Organisational interventions n/N	Usual care n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Boysen 2009	14/157	11/157		46.5 %	1.30 [0.57, 2.96]
Ellis 2005	2/49	3/53		11.0 %	0.71 [0.11, 4.43]
Markle-Reid 2011	10/43	7/39		29.2 %	1.39 [0.47, 4.08]
Ranta 2015	2/172	5/119		13.3 %	0.27 [0.05, 1.41]
Total (95% CI)	**421**	**368**		**100.0 %**	**1.00 [0.54, 1.87]**

Total events: 28 (Organisational interventions), 26 (Usual care)

Heterogeneity: $Tau^2 = 0.04$; $Chi^2 = 3.29$, df = 3 (P = 0.35); $I^2 = 9\%$

Test for overall effect: Z = 0.01 (P = 0.99)

Test for subgroup differences: Not applicable

Analysis 2.19. Comparison 2 Organisational interventions versus usual care, Outcome 19 Number of secondary TIAs.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 19 Number of secondary TIAs

Study or subgroup	Organisational interventions n/N	Usual care n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Ellis 2005	23/49	10/53		100.0 %	3.80 [1.57, 9.24]
Total (95% CI)	**49**	**53**		**100.0 %**	**3.80 [1.57, 9.24]**
Total events: 23 (Organisational interventions), 10 (Usual care)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.95 (P = 0.0032)					
Test for subgroup differences: Not applicable					

Analysis 2.20. Comparison 2 Organisational interventions versus usual care, Outcome 20 Number of secondary TIA or stroke.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 20 Number of secondary TIA or stroke

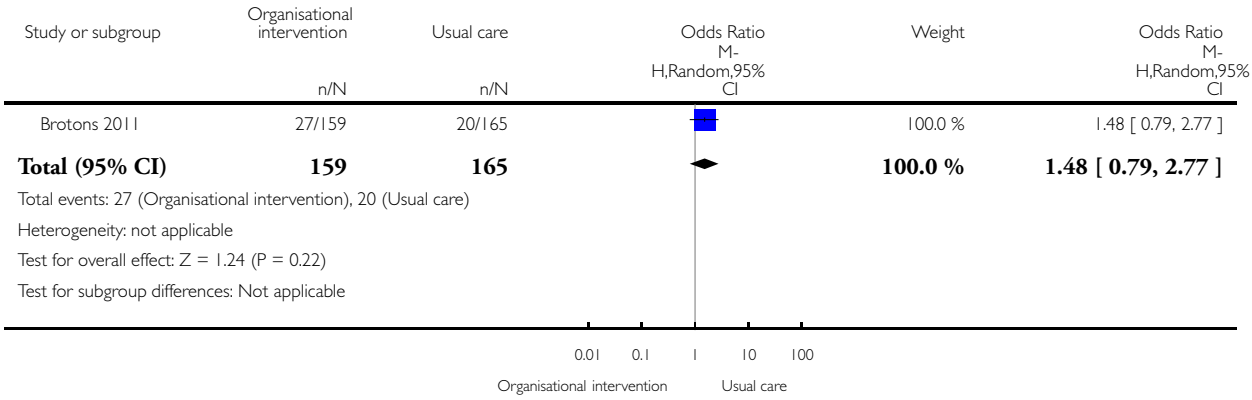
Study or subgroup	Organisational intervention n/N	Usual care n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Ranta 2015	4/172	10/119		100.0 %	0.26 [0.08, 0.85]
Total (95% CI)	**172**	**119**		**100.0 %**	**0.26 [0.08, 0.85]**
Total events: 4 (Organisational intervention), 10 (Usual care)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.23 (P = 0.026)					
Test for subgroup differences: Not applicable					

Analysis 2.21. Comparison 2 Organisational interventions versus usual care, Outcome 21 Proportion of participants with secondary cardiovascular events.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 21 Proportion of participants with secondary cardiovascular events



Analysis 2.22. Comparison 2 Organisational interventions versus usual care, Outcome 22 Number of secondary cardiovascular events.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 22 Number of secondary cardiovascular events

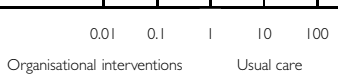
Study or subgroup	Organisational interventions n/N	Usual care n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Ellis 2005	2/49	6/53		33.4 %	0.33 [0.06, 1.74]
McAlister 2014	9/143	8/136		66.6 %	1.07 [0.40, 2.87]
Total (95% CI)	**192**	**189**		**100.0 %**	**0.73 [0.25, 2.15]**

Total events: 11 (Organisational interventions), 14 (Usual care)

Heterogeneity: $Tau^2 = 0.21$; $Chi^2 = 1.43$, df = 1 (P = 0.23); $I^2 = 30\%$

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

Test for subgroup differences: Not applicable



Analysis 2.23. Comparison 2 Organisational interventions versus usual care, Outcome 23 Number of myocardial infarctions.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 23 Number of myocardial infarctions

Study or subgroup	Organisational intervention n/N	Usual care n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Boysen 2009	2/157	2/157		100.0 %	1.00 [0.14, 7.19]
Total (95% CI)	**157**	**157**		**100.0 %**	**1.00 [0.14, 7.19]**
Total events: 2 (Organisational intervention), 2 (Usual care)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.0 (P = 1.0)					
Test for subgroup differences: Not applicable					

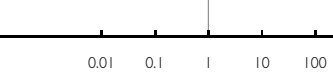
Analysis 2.24. Comparison 2 Organisational interventions versus usual care, Outcome 24 Number of vascular deaths.

Review: Interventions for improving modifiable risk factor control in the secondary prevention of stroke

Comparison: 2 Organisational interventions versus usual care

Outcome: 24 Number of vascular deaths

Study or subgroup	Organisational interventions n/N	Usual care n/N	Odds Ratio M-H,Random,95% CI	Weight	Odds Ratio M-H,Random,95% CI
Boysen 2009	3/157	4/157		33.2 %	0.75 [0.16, 3.39]
Ranta 2015	6/172	14/119		66.8 %	0.27 [0.10, 0.73]
Total (95% CI)	**329**	**276**		**100.0 %**	**0.38 [0.15, 0.97]**
Total events: 9 (Organisational interventions), 18 (Usual care)					
Heterogeneity: Tau^2 = 0.09; Chi^2 = 1.20, df = 1 (P = 0.27); I^2 =17%					
Test for overall effect: Z = 2.03 (P = 0.042)					
Test for subgroup differences: Not applicable					



ADDITIONAL TABLES

Table 1. Intervention categories

Study	Educational/behavioural interventions for patients	Educational/behavioural interventions for service providers	Organisational interventions						Predominant intervention category
			Revision of professional roles	Collaboration between multidisciplinary teams	Integrated care services	Knowledge management systems	Quality management	Financial incentives	
Allen 2002	X	X		X	X				Organisational
Allen 2009	X	X		X	X				Organisational
Boter 2004	X				X				Organisational
Brotons 2011	X	X			X				Organisational
Damush 2015	X				X				Organisational
Dregan 2014		X			X				Organisational
Ellis 2005	X				X				Organisational
Evans 2010	X		X		X				Organisational
Flemming 2013	X	X	X	X	X				Organisational
Hanley 2015	X			X	X				Organisational
Hedegaard 2014	X			X	X				Organisational

Table 1. Intervention categories (*Continued*)

Hornnes 2011	X				X				Organisational
Nailed Stroke 2010	X		X	X	X				Organisational
Johnston 2010		X					X		Organisational
Jönsson 2014	X		X	X	X				Organisational
Joubert 2009	X	X		X	X	X			Organisational
Kerry 2013	X					X			Organisational
Lowrie 2010		X					X		Organisational
Mant 2016					X		X		Organisational
Markle-Reid 2011		X		X	X	X			Organisational
McAlister 2014	X	X	X	X	X				Organisational
McManus 2014	X			X	X				Organisational
Pergola 2014							X		Organisational
Ranta 2015					X	X			Organisational
Wang 2005	X				X				Organisational
Welin 2010	X				X				Organisational
Adie 2010	X								Educational/behavioural

Table 1. Intervention categories (*Continued*)

									inter-vention for patients
MIST 2014	X								Educa-tional/be-havioural inter-vention for patients
Boysen 2009	X								Educa-tional/be-havioural inter-vention for patients
Chan-rueng-vanich 2006	X								Educa-tional/be-havioural inter-vention for patients
Chiu 2008	X								Educa-tional/be-havioural inter-vention for patients
Eames 2013	X								Educa-tional/be-havioural inter-vention for patients
Kim 2013	X								Educa-tional/be-havioural inter-vention for patients
Kono 2013	X								Educa-tional/be-

Table 1. Intervention categories (*Continued*)

									havioural intervention for patients
Kronish 2014	X								Educational/behavioural intervention for patients
Lowe 2007	X								Educational/behavioural intervention for patients
Maasland 2007	X								Educational/behavioural intervention for patients
MacKenzie 2013	X	X							Educational/behavioural intervention for patients
O'Carroll 2011	X								Educational/behavioural intervention for patients
Peng 2014	X								Educational/behavioural intervention for patients

Table 1. Intervention categories (*Continued*)

Slark 2013	X								Educational/behavioural intervention for patients
Wan 2016	X			X					Educational/behavioural intervention for patients

APPENDICES

Appendix 1. CENTRAL search strategy

1. MeSH descriptor: [Cerebrovascular Disorders] explode all trees
2. ((cva or stroke or poststroke or (post next stroke) or (transient next isch*mic next attack) or TIA or ministroke or (mini next stroke)) near/6 (people or patient or outpatient or adult or survivor or victim or individual or client or population or community or subject)):ti,ab,kw (Word variations have been searched)
3. (cerebrovascular* or cerebral vascular):ti,ab,kw (Word variations have been searched)
4. (cerebral or cerebellar or brain* or vertebrobasilar):ti,ab,kw (Word variations have been searched)
5. (infarct* or isch*mi* or thrombo* or apoplexy or emboli*):ti,ab,kw (Word variations have been searched)
6. (4 and 5)
7. (cerebral or intracerebral or intracranial or brain* or cerebellar or subarachnoid):ti,ab,kw (Word variations have been searched)
8. (accident* or h*morrhag*):ti,ab,kw (Word variations have been searched)
9. (7 and 8)
10. (1 or 2 or 3 or 6 or 9)
11. MeSH descriptor: [Child] this term only
12. MeSH descriptor: [Infant] explode all trees
13. MeSH descriptor: [Pediatrics] explode all trees
14. (child* or neonat* or p?ediatric* or infant*):ti,ab,kw (Word variations have been searched)
15. (11 or 12 or 13 or 14)
16. MeSH descriptor: [Patient Care Management] this term only
17. MeSH descriptor: [Comprehensive Health Care] this term only
18. MeSH descriptor: [Nursing Process] this term only
19. MeSH descriptor: [Nursing Assessment] explode all trees
20. MeSH descriptor: [Patient Care Planning] this term only
21. MeSH descriptor: [Case Management] this term only
22. MeSH descriptor: [Delivery of Health Care] this term only
23. MeSH descriptor: [Delivery of Health Care, Integrated] this term only
24. MeSH descriptor: [Managed Care Programs] 1 tree(s) exploded
25. MeSH descriptor: [Disease Management] this term only

26. MeSH descriptor: [Patient Care Team] explode all trees
27. MeSH descriptor: [Primary Health Care] this term only
28. MeSH descriptor: [Reminder Systems] this term only
29. MeSH descriptor: [Guideline Adherence] this term only
30. MeSH descriptor: [Home Care Services] this term only
31. MeSH descriptor: [Home Nursing] this term only
32. MeSH descriptor: [Nursing Services] explode all trees
33. MeSH descriptor: [Professional Role] this term only
34. MeSH descriptor: [Community Health Services] this term only
35. MeSH descriptor: [Medical Records] this term only
36. MeSH descriptor: [Medical Records Systems, Computerized] this term only
37. MeSH descriptor: [Patient Education as Topic] this term only
38. MeSH descriptor: [Patient Compliance] 1 tree(s) exploded
39. MeSH descriptor: [Life Style] this term only
40. MeSH descriptor: [Health Promotion] this term only
41. MeSH descriptor: [Health Services Administration] this term only
42. MeSH descriptor: [Education, Medical, Continuing] this term only
43. MeSH descriptor: [Marketing of Health Services] this term only
44. MeSH descriptor: [Patient Participation] this term only
45. MeSH descriptor: [Quality of Health Care] this term only
46. MeSH descriptor: [Quality Assurance, Health Care] this term only
47. MeSH descriptor: [Exercise] this term only
48. MeSH descriptor: [Physical Fitness] this term only
49. MeSH descriptor: [Smoking Cessation] this term only
50. MeSH descriptor: [Diet] this term only
51. MeSH descriptor: [Diet, Fat-Restricted] this term only
52. MeSH descriptor: [Diet, Carbohydrate-Restricted] this term only
53. MeSH descriptor: [Diet, Reducing] this term only
54. MeSH descriptor: [Caloric Restriction] this term only
55. MeSH descriptor: [Alcohol Drinking] this term only and with qualifier(s): [Prevention & control - PC]
56. MeSH descriptor: [Health Education] this term only
57. MeSH descriptor: [Community Health Planning] this term only
58. MeSH descriptor: [Communication] this term only
59. MeSH descriptor: [Communication Barriers] this term only
60. MeSH descriptor: [Information Dissemination] this term only
61. MeSH descriptor: [Interdisciplinary Communication] this term only
62. MeSH descriptor: [Nurse Clinicians] this term only
63. MeSH descriptor: [Nurse Practitioners] this term only
64. MeSH descriptor: [Risk Reduction Behavior] this term only
65. MeSH descriptor: [Pamphlets] this term only
66. MeSH descriptor: [Health Behavior] this term only
67. MeSH descriptor: [Health Knowledge, Attitudes, Practice] this term only
68. MeSH descriptor: [Secondary Prevention] this term only
69. MeSH descriptor: [Preventive Health Services] this term only
70. (manag* near/3 care):ti,ab,kw (Word variations have been searched)
71. (management near/3 program*):ti,ab,kw (Word variations have been searched)
72. (case near/3 manag*):ti,ab,kw (Word variations have been searched)
73. (patient near/3 management):ti,ab,kw (Word variations have been searched)
74. (home near/3 intervention):ti,ab,kw (Word variations have been searched)
75. (home next visit*):ti,ab,kw (Word variations have been searched)
76. (discharg* near/3 program*):ti,ab,kw (Word variations have been searched)
77. (practice next guideline*):ti,ab,kw (Word variations have been searched)
78. (discharg* near/3 plan*):ti,ab,kw (Word variations have been searched)

79. (comprehensive near/3 care):ti,ab,kw (Word variations have been searched)
80. (treatment near/3 plan*):ti,ab,kw (Word variations have been searched)
81. (nurse near/3 led):ti,ab,kw (Word variations have been searched)
82. (disease next management):ti,ab,kw (Word variations have been searched)
83. (multi next disciplin*):ti,ab,kw (Word variations have been searched)
84. (multidisciplin*):ti,ab,kw (Word variations have been searched)
85. (secondary next prevention next clinic):ti,ab,kw (Word variations have been searched)
86. (reminder):ti,ab,kw (Word variations have been searched)
87. (recall*):ti,ab,kw (Word variations have been searched)
88. (nurse near/3 clinic):ti,ab,kw (Word variations have been searched)
89. (secondary next prevention near/3 intervention):ti,ab,kw (Word variations have been searched)
90. (secondary next prevention near/3 program*):ti,ab,kw (Word variations have been searched)
91. MeSH descriptor: [Appointments and Schedules] this term only
92. (appointment):ti,ab,kw (Word variations have been searched)
93. (outreach next nurs*):ti,ab,kw (Word variations have been searched)
94. (outreach next visit*):ti,ab,kw (Word variations have been searched)
95. (lifestyle near/3 intervention*):ti,ab,kw (Word variations have been searched)
96. (physical next (activity or exercise)):ti,ab,kw (Word variations have been searched)
97. (aerobic):ti,ab,kw (Word variations have been searched)
98. (fitness):ti,ab,kw (Word variations have been searched)
99. (exercise near/3 (train* or intervention or program* or activity or regim*)):ti,ab,kw (Word variations have been searched)
100. (nurs* next intervention*):ti,ab,kw (Word variations have been searched)
101. (education* next program*):ti,ab,kw (Word variations have been searched)
102. ((risk next factor*) near/5 (modif* or reduc* or manage* or monitor* or self-manage*)):ti,ab,kw (Word variations have been searched)
103. {or 1-102}
104. (10 not 15)
105. (103 and 104)

Appendix 2. MEDLINE (Ovid) search strategy

1. exp Cerebrovascular Disorders/
2. ((cva$ or stroke$ or poststroke$ or post-stroke$ or post stroke$ or transient isch?emic attack$ or TIA$ or ministroke$ or ministroke$ or mini stroke$) adj6 (people or patient$ or inpatient$ or outpatient$ or adult$ or survivor$ or victim$ or individual$ or client$ or population$ or community or subject$)).tw.
3. (cerebrovascular$ or cerebral vascular).tw.
4. (cerebral or cerebellar or brain$ or vertebrobasilar).tw.
5. (infarct$ or isch?emi$ or thrombo$ or apoplexy or emboli$).tw.
6. 4 and 5
7. (cerebral or intracerebral or intracranial or brain$ or cerebellar or subarachnoid).tw.
8. (accident$ or h?emorrhag$).tw.
9. 7 and 8
10. 1 or 2 or 3 or 6 or 9
11. exp Adolescent/
12. exp Child/
13. exp Infant/
14. exp Minors/
15. expPediatrics/
16. exp Puberty/
17. exp Schools/
18. (baby* or babies or infant* or infancy or neonat* or newborn* or postmatur* or prematur* or preterm*).tw.
19. (boy* or girl* or teen*).tw.

20. (child* or kid or kids or preschool* or school age* or schoolchild* or toddler*).tw.
21. (elementary school* or high school* or highschool* or kindergar* or nursery school* or primary school* or secondary school*).tw.
22. minors*.tw.
23. (paediatric* or peadiatric* or pediatric*).tw.
24. (prepubescen* or pubescen* or pubert*).tw.
25. (youth or adolescen$).tw.
26. 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25
27. 10 not 26
28. Patient Care Management/
29. Comprehensive Health Care/
30. Nursing Process/
31. exp Nursing Assessment/
32. Patient Care Planning/
33. Case Management/
34. delivery of health care/
35. Delivery of Health Care, Integrated/
36. exp Managed Care Programs/
37. Disease Management/
38. exp Patient Care Team/
39. exp Primary Health Care/
40. Reminder Systems/
41. Guideline Adherence/
42. Home Care Services/
43. Home Nursing/
44. exp Nursing Services/
45. exp Professional Role/
46. Community Health Services/
47. Medical Records/ or Medical Records Systems, Computerized/
48. Patient Education as Topic/
49. exp Patient Compliance/
50. Life Style/
51. Health Promotion/
52. Health Services Administration/
53. Education, Medical, Continuing/
54. Marketing of Health Services/
55. Patient Participation/
56. Quality of Health Care/
57. Quality Assurance, Health Care/
58. Exercise/ or Physical Fitness/
59. Smoking Cessation/
60. Diet/ or Diet, Fat-Restricted/ or Diet, Carbohydrate-Restricted/ or Diet, Reducing/ or Caloric Restriction/
61. Alcohol Drinking/pc [Prevention & Control]
62. Health Education/
63. Community Health Planning/
64. Communication/ or Communication Barriers/ or Information Dissemination/ or Interdisciplinary Communication/
65. Nurse Clinicians/
66. Nurse Practitioners/
67. Risk Reduction Behavior/
68. Pamphlets/
69. Health Behavior/
70. Health Knowledge, Attitudes, Practice/
71. Secondary Prevention/
72. Preventive Health Services/

73. (manag$ adj3 care).tw.
74. (management adj3 program$).tw.
75. (case adj3 manag$).tw.
76. (patient adj3 management).tw.
77. (home adj3 intervention$).tw.
78. (home adj visit$).tw.
79. (discharg$ adj3 program$).tw.
80. (practice adj guideline$).tw.
81. (discharg$ adj3 plan$).tw.
82. (comprehensive adj3 care).tw.
83. (treatment adj3 plan$).tw.
84. (nurse$ adj3 led).tw.
85. (diseaseadj management).tw.
86. multi-disciplin$.tw.
87. multidisciplin$.tw.
88. secondary prevention clinic$.tw.
89. reminder$.tw.
90. recall$.tw.
91. (nurse adj3 clinic$).tw.
92. (secondary prevention adj3 intervention$).tw.
93. (secondary prevention adj3 program$).tw.
94. "Appointments and Schedules"/
95. appointment$.tw.
96. (outreach adjnurs$).tw.
97. (outreach adj visit$).tw.
98. (lifestyle adj3 intervention$).tw.
99. (nurs$ adj intervention$).tw.
100. (education$ adj program$).tw.
101. (physical adj (activit$ or exercise$)).tw.
102. (exercise adj3 (train$ or intervention$ or program$ or activit$ or regim$)).tw.
103. aerobic.tw.
104. fitness.tw.
105. (risk factor$ adj5 (modif$ or reduc$ or manage$ or monitor$ or self-manage$)).tw.
106. 28 or 29 or 30 or 31 or 32 or 33 or 34 or 35 or 36 or 37 or 38 or 39 or 40 or 41 or 42 or 43 or 44 or 45 or 46 or 47 or 48 or 49 or 50 or 51 or 52 or 53 or 54 or 55 or 56 or 57 or 58 or 59 or 60 or 61 or 62 or 63 or 64 or 65 or 66 or 67 or 68 or 69 or 70 or 71 or 72 or 73 or 74 or 75 or 76 or 77 or 78 or 79 or 80 or 81 or 82 or 83 or 84 or 85 or 86 or 87 or 88 or 89 or 90 or 91 or 92 or 93 or 94 or 95 or 96 or 97 or 98 or 99 or 100 or 101 or 102 or 103 or 104 or 105
107. Randomized Controlled Trials as Topic/
108. Random Allocation/
109. Controlled Clinical Trials as Topic/
110. control groups/
111. clinical trials as topic/ or clinical trials, phase i as topic/ or clinical trials, phase ii as topic/ or clinical trials, phase iii as topic/ or clinical trials, phase iv as topic/
112. double-blind method/
113. single-blind method/
114. Placebos/
115. placebo effect/
116. Drug Evaluation/
117. Research Design/
118. randomized controlled trial.pt.
119. controlled clinical trial.pt.
120. (clinical trial or clinical trial phase i or clinical trial phase ii or clinical trial phase iii or clinical trial phase iv).pt.
121. (random$ or RCT or RCTs).tw.

122. (controlled adj5 (trial$ or stud$)).tw.
123. (clinical$ adj5 trial$).tw.
124. ((control or treatment or experiment$ or intervention) adj5 (group$ or subject$ or patient$)).tw.
125. (quasi-random$ or quasi random$ or pseudo-random$ or pseud or random$).tw.
126. ((singl$ or doubl$ or tripl$ or trebl$) adj5 (blind$ or mask$)).tw.
127. placebo$.tw.
128. controls.tw.
129. exp animals/ not humans.sh.
130. 107 or 108 or 109 or 110 or 111 or 112 or 113 or 114 or 115 or 116 or 117 or 118 or 119 or 120 or 121 or 122 or 123 or 124 or 125 or 126 or 127 or 128
131. 130 not 129
132. 27 and 106 and 131

Appendix 3. Embase (Ovid) search strategy

1. exp *cerebrovascular disease/
2. ((cva$ or stroke$ or poststroke$ or post-stroke$ or post stroke$ or transient isch?emic attack$ or TIA$ or ministroke$ or ministroke$ or mini stroke$) adj6 (people or patient$ or inpatient$ or outpatient$ or adult$ or survivor$ or victim$ or individual$ or client$ or population$ or community or subject$)).tw.
3. (cerebrovascular$ or cerebral vascular).tw.
4. (cerebral or cerebellar or brain$ or vertebrobasilar).tw.
5. (infarct$ or isch?emi$ or thrombo$ or apoplexy or emboli$).tw.
6. 4 and 5
7. (cerebral or intracerebral or intracranial or brain$ or cerebellar or subarachnoid).tw.
8. (accident$ or h?emorrhag$).tw.
9. 7 and 8
10. 1 or 2 or 3 or 6 or 9
11. exp adolescence/
12. exp adolescent/
13. exp child/
14. high school/
15. kindergarten/
16. middle school/
17. expnewborn/
18. nursery school/
19. exppediatrics/
20. primary school/
21. exp puberty/
22. school/
23. adoles*.tw.
24. (baby* or babies or infant* or infancy or neonat* or newborn* or postmatur* or prematur* or preterm*).tw.
25. (boy* or girl* or teen*).tw.
26. (child* or kid or kids or preschool* or school age* or schoolchild* or toddler*).tw.
27. (elementary school* or high school* or highschool* or kindergar* or nursery school* or primary school* or secondary school*).tw.
28. minors*.tw.
29. (paediatric* or peadiatric* or pediatric*).tw.
30. (prepubescen* or pubescen* or pubert*).tw.
31. 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30
32. 10 not 31
33. patient care planning/
34. case management/
35. health care delivery/

36. integrated health care system/
37. disease management/
38. reminder system/
39. *medical record/
40. health education/
41. patient education/
42. *patient compliance/
43. lifestyle modification/ or lifestyle/
44. health promotion/
45. medical education/
46. patient participation/
47. *exercise/ or aerobic exercise/ or fitness/ or *physical activity/
48. *smoking cessation/
49. *diet/ or low calory diet/ or low carbohydrate diet/ or low fat diet/ or diet restriction/
50. alcohol consumption/
51. health care planning/
52. interdisciplinary communication/
53. information dissemination/
54. risk reduction/
55. healthbehavior/
56. secondary prevention/
57. preventive medicine/
58. risk management/
59. medical specialist/
60. medical information/
61. (manag$ adj3 care).tw.
62. (management adj3 program$).tw.
63. (case adj3 manag$).tw.
64. (patient adj3 management).tw.
65. (home adj3 intervention$).tw.
66. (home adj visit$).tw.
67. (discharg$ adj3 program$).tw.
68. (practice adj guideline$).tw.
69. (discharg$ adj3 plan$).tw.
70. (comprehensive adj3 care).tw.
71. (treatment adj3 plan$).tw.
72. (nurse$ adj3 led).tw.
73. (diseaseadj management).tw.
74. (multi-disciplin$ or multidisciplin$).tw.
75. reminder$.tw.
76. recall$.tw.
77. (nurse adj3 clinic$).tw.
78. (secondary prevention adj3 intervention$).tw.
79. (secondary prevention adj3 program$).tw.
80. appointment$.tw.
81. (outreach adjnurs$).tw.
82. (outreach adj visit$).tw.
83. (lifestyle adj3 intervention$).tw.
84. (nurs$ adj intervention$).tw.
85. (education$ adj program$).tw.
86. (physical adj (activit$ or exercise$)).tw.
87. (exercise adj3 (train$ or intervention$ or program$ or activit$ or regim$)).tw.
88. aerobic.tw.

89. fitness.tw.
90. or/33-89
91. Randomized Controlled Trial/
92. Randomization/
93. Controlled Study/
94. control group/
95. clinical trial/ or phase 1 clinical trial/ or phase 2 clinical trial/ or phase 3 clinical trial/ or phase 4 clinical trial/ or controlled clinical trial/
96. Crossover Procedure/
97. Double Blind Procedure/
98. Single Blind Procedure/ or triple blind procedure/
99. latin square design/
100. Parallel Design/
101. Placebo/
102. Multicenter Study/
103. experimental design/ or experimental study/ or quasi experimental study/
104. experimental therapy/
105. drug comparison/ or drug dose comparison/
106. drug screening/
107. EVALUATION/ or "EVALUATION AND FOLLOW UP"/ or evaluation research/ or clinical evaluation/
108. METHODOLOGY/
109. "types of study"/
110. research subject/
111. Comparative Study/
112. "systematic review"/
113. Meta Analysis/
114. random$.tw.
115. (controlled adj5 (trial$ or stud$)).tw.
116. (clinical$ adj5 trial$).tw.
117. ((control or treatment or experiment$ or intervention) adj5 (group$ or subject$ or patient$)).tw.
118. (surgical adj5 (group$ or subject$ or patient$)).tw.
119. (quasi-random$ or quasi random$ or pseudo-random$ or pseudo random$).tw.
120. ((multicenter or multicentre or therapeutic) adj5 (trial$ or stud$)).tw.
121. ((control or experiment$ or conservative) adj5 (treatment or therapy or procedure or manage$)).tw.
122. ((singl$ or doubl$ or tripl$ or trebl$) adj5 (blind$ or mask$)).tw.
123. (coin adj5 (flip or flipped or toss$)).tw.
124. latin square.tw.
125. versus.tw.
126. (cross-over or cross over or crossover).tw.
127. placebo$.tw.
128. sham.tw.
129. (assign$ or alternate or allocat$ or counterbalance$ or multiple baseline).tw.
130. controls.tw.
131. (treatment$ adj6 order).tw.
132. (meta-analy$ or metaanaly$ or metaanaly$ or systematic review or systematic overview).tw.
133. 91 or 92 or 93 or 94 or 95 or 96 or 97 or 98 or 99 or 100 or 101 or 102 or 103 or 104 or 105 or 106 or 107 or 108 or 109 or 110 or 111 or 112 or 113 or 114 or 115 or 116 or 117 or 118 or 119 or 120 or 121 or 122 or 123 or 124 or 125 or 126 or 127 or 128 or 129 or 130 or 131 or 132
134. Human/
135. Nonhuman/
136. 134 and 135
137. 135 not 136
138. 133 not 137

Appendix 4. CINAHL (EBSCO) search strategy

1. (MH "Cerebral Ischemia+") OR (MH "Cerebral Hemorrhage") OR (MH "Stroke+") OR (MH "Intracranial Hemorrhage+")
2. (MH "Stroke Patients")
3. TX (cva* OR stroke* OR poststroke* OR post-stroke* OR "transient ischemic attack*" OR "transient ischaemic attack*" OR TIA* OR ministroke* OR mini-stroke*)
4. TX (cerebrovascular* OR "cerebral vascular")
5. TX (cerebral OR cerebellar OR brain* OR vertebrobasilar)
6. TX (infarct* OR ischemi* OR ischaemi* OR thrombo* OR apoplexy OR emboli*)
7. S5 AND S6
8. TX (cerebral OR intracerebral OR intracranial OR brain* OR cerebellar OR subarachnoid)
9. TX (accident* OR hemorrhag* OR haemorrhag*)
10. S8 AND S9
11. S1 OR S2 OR S3 OR S4 OR S7 OR S10
12. (MH "Nursing Interventions")
13. (MH "Nursing Practice")
14. (MH "Advanced Nursing Practice")
15. (MH "Health Care Delivery")
16. (MH "Health Care Delivery, Integrated")
17. (MH "Disease Management")
18. (MH "Case Management")
19. (MH "Multidisciplinary Care Team")
20. (MH "Continuity of Patient Care+")
21. (MH "Patient Education")
22. (MH "Life Style Changes")
23. (MH "Behavior Modification")
24. (MH "Patient Compliance+")
25. (MH "Education, Medical, Continuing")
26. (MH "Education, Nursing, Continuing")
27. TX (manag* n3 care)
28. TX (management n3 program*)
29. TX (case n3 manag*)
30. TX (patient n3 management)
31. TX (home N3 intervention*)
32. TX "home visit*"
33. TX (discharg* n3 program*)
34. TX "practice guideline*"
35. TX (discharg* n3 planning)
36. TX (comprehensive n3 care)
37. TX (treatment n3 plan*)
38. TX (nurse* n3 led)
39. TX "disease management"
40. TX multi-disciplin* OR TX multidisciplin*
41. TX "secondary prevention clinic*"
42. TX reminder* OR TX recall*
43. TX (nurse n3 clinic*)
44. TX "secondary prevention" n3 (intervention* OR program*)
45. TX appointment*
46. TX "outreach nurs*"
47. TX "outreach visit*"
48. TX (lifestyle n3 intervention*)
49. TX "nurs* intervention*"
50. TX "education* program*"

51. TX (”physical activit*“ OR ”physical exercise*“)
52. TX exercise N3 (train* OR intervention* OR program* OR activit* OR regim*)
53. TX fitness OR TX aerobic
54. TX ”risk factor*“ n3 (modif OR reduc* OR manage* OR monitor* OR self-manage*)
55. S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31 OR S32 OR S33 OR S34 OR S35 OR S36 OR S37 OR S38 OR S39 OR S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47 OR S48 OR S49 OR S50 OR S51 OR S52 OR S53 OR S54 550,128
56. (MH ”Random Assignment“)
57. (MH ”Random Sample+“)
58. (MH ”Crossover Design“)
59. (MH ”Clinical Trials+“)
60. (MH ”Comparative Studies“)
61. (MH ”Control (Research)+“)
62. (MH ”Control Group“)
63. (MH ”Factorial Design“)
64. (MH ”Quasi-Experimental Studies+“)
65. (MH ”Nonrandomized Trials“)
66. (MH ”Placebos“)
67. (MH ”Meta Analysis“)
68. (MH ”Clinical Nursing Research“) OR (MH ”Clinical Research+“)
69. (MH ”Community Trials“)
70. (MH ”Experimental Studies“)
71. (MH ”One-Shot Case Study“) OR (MH ”Pretest-Posttest Design+“) OR (MH ”Solomon Four-Group Design“) OR (MH ”Static Group Comparison“) OR (MH ”Study Design“)
72. TI (”clinical trial“ or ”systematic review“).
73. TX Random$
74. TX (((singl$ or doubl$ or tripl$ or trebl$) adj25 (blind$ or mask$))) OR TX ((cross?over or placebo$ or control$ or factorial or sham?)) OR TX (((clin$ or intervention$ or compar$ or experiment$ or preventive or therapeutic) adj10 trial$)) OR TX ((counterbalance$ or multiple baseline$ or ABAB design$)) OR TX ((meta?analys$ or systematic review$)
75. S56 OR S57 OR S58 OR S59 OR S60 OR S61 OR S62 OR S63 OR S64 OR S65 OR S66 OR S67 OR S68 OR S69 OR S70 OR S71 OR S72 OR S73 OR S74
76. S11 AND S55 AND S75

Appendix 5. AMED (Ovid) search strategy

1. CEREBRAL HEMORRHAGE/ or CEREBRAL INFARCTION/ or CEREBRAL ISCHEMIA/ or CEREBROVASCULAR ACCIDENT/ or STROKE/
2. (cva* or stroke* or poststroke* or post-stroke* or transient ischemic attack* or transient ischaemic attack* or TIA* or ministroke* or mini-stroke*).tw.
3. (people or patient* or outpatient * or inpatient* or adult*OR survivor*OR victim* or individual* or client* or population* or community or subject*).tw.
4. 2 and 3
5. (cerebrovascular* or cerebral vascular).tw.
6. (cerebral or cerebellar or brain* or vertebrobasilar).tw.
7. (infarct* or ischemi* or ischaemi* or thrombo* or apoplexy or emboli*).tw.
8. 6 and 7
9. (cerebral or intracerebral or intracranial or brain* or cerebellar or subarachnoid).tw.
10. (accident* or hemorrhag* or haemorrhag*).tw.
11. 9 and 10
12. 1 or 4 or 5 or 8 or 11
13. DELIVERY OF HEALTH CARE/
14. PATIENT CARE MANAGEMENT/

15. PROGRAM EVALUATION/
16. PATIENT EDUCATION/
17. LIFE STYLE/
18. PREVENTION/
19. PATIENT COMPLIANCE/
20. PATIENT CARE TEAM/
21. COMMUNITY HEALTH SERVICES/
22. HEALTH PROMOTION/
23. EXERCISE/
24. DIET/
25. SMOKING CESSATION/
26. HEALTH BEHAVIOR/
27. (manag* adj3 care).tw.
28. (management adj3 program*).tw.
29. (case adj3 manag*).tw.
30. (patient adj3 management).tw.
31. (home adj3 intervention*).tw.
32. "home visit*".tw.
33. (discharg* adj3 program*).tw.
34. "practice guideline*".tw.
35. (discharg* adj3 planning).tw.
36. (comprehensive adj3 care).tw.
37. (treatment adj3 plan*).tw.
38. (nurse* adj3 led).tw.
39. "disease management".tw.
40. multi-disciplin*.tw.
41. multidisciplin*.tw.
42. "secondary prevention clinic".tw.
43. reminder*.tw.
44. recall*.tw.
45. (nurse adj3 clinic*).tw.
46. ("secondary prevention" adj3 intervention*).tw.
47. ("secondary prevention" adj3 program*).tw.
48. appointment*.tw.
49. "outreach nurs*".tw.
50. "outreach visit*".tw.
51. (lifestyle adj3 intervention*).tw.
52. "nurs* intervention*".tw.
53. "education* program*".tw.
54. ("physical activit*" or "physical exercise*").tw.
55. (exercise adj3 train*).tw.
56. (exercise adj3 intervention*).tw.
57. (exercise adj3 program*).tw.
58. (exercise adj3 activit*).tw.
59. (exercise adj3 regim*).tw.
60. aerobic.tw.
61. fitness.tw.
62. ("risk factor*" adj5 modif*).tw.
63. ("risk factor*" adj5 reduc*).tw.
64. ("risk factor*" adj5 manage*).tw.
65. ("risk factor*" adj5 monitor*).tw.
66. ("risk factor*" adj5 self-manage*).tw.
67. or/12-66

68. RANDOMIZED CONTROLLED TRIALS/
69. CLINICAL TRIALS/
70. PLACEBOS/
71. DOUBLE BLIND METHOD/
72. random*.tw.
73. placebo*.tw.
74. 68 or 69 or 70 or 71 or 72 or 73
75. 12 and 67 and 74

Appendix 6. BNI (Ovid) search strategy

1. BNI STROKE/
2. BNI (cva* OR stroke* OR poststroke* OR post-stroke* OR "transient ischemic attack*" OR "transient ischaemic attack*" OR TIA* OR ministroke* OR mini-stroke*).ti,ab
3. BNI (people OR patient* OR outpatient* OR inpatient* OR adult* OR survivor* OR victim* OR individual* OR client* OR population* OR community OR subject*).ti,ab
4. BNI 2 AND 3
5. BNI (cerebrovascular* OR "cerebral vascular").ti,ab
6. BNI (cerebral OR cerebellar OR brain* OR vertebrobasilar).ti,ab
7. BNI (infarct* OR ischemi* OR ischaemi* OR thrombo* OR apoplexy OR emboli*).ti,ab
8. BNI 6 AND 7
9. BNI (cerebral OR intracerebral OR intracranial OR brain* OR cerebellar OR subarachnoid).ti,ab
10. BNI (accident* OR hemorrhag* OR haemorrhag*).ti,ab
11. BNI 9 AND 10
12. BNI 1 OR 4 OR 5 OR 8 OR 11
13. BNI PATIENTS : EDUCATION/
14. BNI NURSING : ROLE/
15. BNI CARE PLANS AND PLANNING/
16. BNI EVIDENCE BASED PRACTICE/
17. BNI MULTIDISCIPLINARY TEAMS/
18. BNI CONTINUITY OF CARE/
19. BNI PATIENTS : COMPLIANCE/
20. BNI (manag* ADJ3 care).ti,ab
21. BNI (management ADJ3 program*).ti,ab
22. BNI (case ADJ3 manag*).ti,ab
23. BNI (patient ADJ3 management).ti,ab
24. BNI (home ADJ3 intervention*).ti,ab
25. BNI "home visit*".ti,ab
26. BNI (discharg* ADJ3 program*).ti,ab
27. BNI "practice guideline*".ti,ab
28. BNI (discharg* ADJ3 planning).ti,ab
29. BNI (comprehensive ADJ3 care).ti,ab
30. BNI (treatment ADJ3 plan*).ti,ab
31. BNI (nurse* ADJ3 led).ti,ab
32. BNI "disease management".ti,ab
33. BNI multi-disciplin*.ti,ab
34. BNI multidisciplin*.ti,ab
35. BNI "secondary prevention clinic*".ti,ab
36. BNI reminder*.ti,ab
37. BNI recall*.ti,ab
38. BNI (nurse ADJ3 clinic*).ti,ab
39. BNI ("secondary prevention" ADJ3 intervention*).ti,ab

40. BNI (”secondary prevention“ ADJ3 program*).ti,ab

41. BNI appointment*.ti,ab
42. BNI ”outreach nurs*“.ti,ab
43. BNI ”outreach visit*“.ti,ab
44. BNI (lifestyle ADJ3 intervention*).ti,ab
45. BNI ”nurs* intervention*“.ti,ab
46. BNI ”education* program*“.ti,ab
47. BNI (”physical activit*“ OR ”physical exercise*“).ti,ab
48. BNI (exercise ADJ3 train*).ti,ab
49. BNI (exercise ADJ3 intervention*).ti,ab
50. BNI (exercise ADJ3 program*).ti,ab
51. BNI (exercise ADJ3 activit*).ti,ab
52. BNI (exercise ADJ3 regim*).ti,ab
53. BNI aerobic.ti,ab
54. BNI fitness.ti,ab
55. BNI (”risk factor*“ ADJ5modif*).ti,ab
56. BNI (”risk factor*“ ADJ5reduc*).ti,ab
57. BNI (”risk factor*“ ADJ5 manage*).ti,ab
58. BNI (”risk factor*“ ADJ5 monitor*).ti,ab
59. BNI (”risk factor*“ ADJ5 self-manage*).ti,ab
60. BNI 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35 OR 36 OR 37 OR 38 OR 39 OR 40 OR 41 OR 42 OR 43 OR 44 OR 45 OR 46 OR 47 OR 48 OR 49 OR 50 OR 51 OR 52 OR 53 OR 54 OR 55 OR 56 OR 57 OR 58 OR 59
61. BNI random*.ti,ab
62. BNI placebo*.ti,ab
63. BNI trial.ti,ab
64. BNI 61 OR 62 OR 63
65. BNI 12 AND 60 AND 64

Appendix 7. Web of Science Conference Proceedings Citation Index - Science search strategy

Stroke* OR TIA OR ”transient isch*mic attack“ OR ”cerebral infarct*“ OR ”brain infarct*“ OR cerebrovascular IN TITLE
AND
(”secondary SAME prevention“) OR (”recurrent stroke“) OR (risk SAME reduc*) IN TOPIC
AND
intervention or program or service* or management IN TOPIC
AND
Proceedings paper IN DOCUMENT TYPE

Appendix 8. Clinical Trials (www.clinicaltrials.gov) - search strategy

1. Stroke*
2. TIA
3. ”transient isch*mic attack“
4. ”cerebral infarct*“
5. ”brain infarct*“
6. cerebrovascular

Appendix 9. ISRCTN Registry (www.isrctn.com) - search strategy

1. Stroke*
2. TIA
3. "transient isch*mic attack"
4. "cerebral infarct*"
5. "brain infarct*"
6. cerebrovascular

Appendix 10. Stroke Trials Registry (www.strokecenter.org/trials/) - search strategy

1. Stroke*
2. TIA
3. "transient isch*mic attack"
4. "cerebral infarct*"
5. "brain infarct*"
6. cerebrovascular
7. disease management/
8. reminder system/
9. patient education/
10. lifestyle modification/ or lifestyle/
11. health promotion/
12. medical education/
13. patient participation/
14. health care planning/
15. secondary prevention/
16. preventive medicine/

Appendix 11. World Health Organization (WHO) International Clinical Trials Registry Platform (www.apps.who.int/trialsearch/) - search strategy

1. Stroke*
2. TIA
3. "transient isch*mic attack"
4. "cerebral infarct*"
5. "brain infarct*"
6. cerebrovascular
7. disease management/
8. reminder system/
9. patient education/
10. lifestyle modification/ or lifestyle/
11. health promotion/
12. medical education/
13. patient participation/
14. health care planning/
15. secondary prevention/
16. preventive medicine/
17. 1 OR 2 OR 3 OR 4 OR 5 OR 6 AND 7
18. 1 OR 2 OR 3 OR 4 OR 5 OR 6 AND 8
19. 1 OR 2 OR 3 OR 4 OR 5 OR 6 AND 9
20. 1 OR 2 OR 3 OR 4 OR 5 OR 6 AND 10
21. 1 OR 2 OR 3 OR 4 OR 5 OR 6 AND 11

22. 1 OR 2 OR 3 OR 4 OR 5 OR 6 AND 12
23. 1 OR 2 OR 3 OR 4 OR 5 OR 6 AND 13
24. 1 OR 2 OR 3 OR 4 OR 5 OR 6 AND 14
25. 1 OR 2 OR 3 OR 4 OR 5 OR 6 AND 15
26 1 OR 2 OR 3 OR 4 OR 5 OR 6 AND 16

WHAT'S NEW

Last assessed as up-to-date: 3 April 2017.

Date	Event	Description
3 April 2017	New citation required but conclusions have not changed	The conclusions of the review remain unchanged.
3 April 2017	New search has been performed	This update included 16 new studies involving 25,819 additional participants, resulting in a total of 42 studies including 33,840 participants analysed in this review. The additional studies provided some evidence for the benefit of organisational interventions achieving target levels for blood pressure. The update provided further evidence that educational and behavioural interventions were not associated with clear differences in any of the review outcomes

CONTRIBUTIONS OF AUTHORS

Dr Bernadeta Bridgwood was principally responsible for data collection, analysis of data, interpretation of data and writing the update review in 2017 and 2018.

Dr Kate Lager contributed to the conception and design of the review. She was principally responsible for data collection, analysis of data, interpretation of data and writing the review.

Dr Amit K Mistri guided protocol development, and contributed to interpretation of the data and revising the review.

Professor Kamlesh Khunti guided protocol development, and contributed to interpretation of the data and revising the review.

Professor Andrew Wilson guided the conception and design of the review. He contributed to data collection, interpretation of data and revising the review.

Miss Priya Modi contributed to the interpretation of data and revising the review.

DECLARATIONS OF INTEREST

Dr Bernadeta Bridgwood acknowledges the support of the National Institute for Health Research Collaboration for the funding support of the Academic Clinical Fellowship in Primary Care.

Dr Kate Lager: none known.

Dr Amit Mistri has received speaker fees for talks on stroke from various companies manufacturing drugs for vascular disease including Boehringer-Ingelheim, Bayer, Bristol-Myers Squibb, Astellas Pharma, Pfizer and Astra Zeneca, and travel grants for conference attendance from Boehringer-Ingelheim. He has received a grant for an investigator-initiated study from Novo Nordisk.

Professor Kamlesh Khunti has acted as a consultant and speaker for Novartis, Novo Nordisk, Sanofi-Aventis, Lilly and Merck Sharp & Dohme. He has received grants in support of investigator and investigator initiated trials from Novartis, Novo Nordisk, Sanofi-Aventis, Lilly, Pfizer, Boehringer Ingelheim and Merck Sharp & Dohme. He has received funds for research, honoraria for speaking at meetings and has served on advisory boards for Lilly, Sanofi-Aventis, Merck Sharp & Dohme and Novo Nordisk. Professor Khunti acknowledges the support of the National Institute for Health Research Collaboration for Leadership in Applied Health Research and Care - East Midlands (NIHR CLAHRC - EM), and the NIHR Leicester - Loughborough Diet, Lifestyle and Physical Activity Biomedical Research Unit.

Professor Andrew Wilson: none known.

Miss Priya Modi: none known

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DIFFERENCES BETWEEN PROTOCOL AND REVIEW

Haunton and Sett were not authors on the protocol but contributed to the first version of the full review. Modi and Bridgwood were not authors on the protocol nor the first version of the review but contributed to this updated version of the review

The title of the protocol was changed from *Stroke services for risk reduction in the secondary prevention of stroke* (Lager 2011) for the 2014 review (Lager 2014) following recommendations made by the Cochrane Stroke Group Editorial Team.

INDEX TERMS

Medical Subject Headings (MeSH)

Behavior Therapy; Health Personnel [education]; Ischemic Attack, Transient [prevention & control]; Patient Education as Topic; Randomized Controlled Trials as Topic; Risk Factors; Secondary Prevention [*methods]; Stroke [*prevention & control]

MeSH check words

Aged; Humans; Middle Aged