Strategies to improve recruitment to randomised controlled trials (Review)

Treweek S, Mitchell E, Pitkethly M, Cook J, Kjeldstrøm M, Johansen M, Taskila TK, Sullivan F, Wilson S, Jackson C, Jones R, Lockhart P

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[Methodology Review]

Strategies to improve recruitment to randomised controlled trials

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ABSTRACT

Background

Recruiting participants to trials can be extremely difficult. Identifying strategies that improve trial recruitment would benefit both trialists and health research.

Objectives

To quantify the effects of strategies to improve recruitment of participants to randomised controlled trials.

Search methods

We searched the Cochrane Methodology Review Group Specialised Register (CMR) 2010, Issue 2, part of *The Cochrane Library* (online) www.thecochranelibrary.com (searched 16 April 2010); MEDLINE, Ovid (1950 to March Week 5 2010) (searched 14 April 2010); EMBASE, Ovid (1980 to 2010 Week 14) (searched 14 April 2010); ERIC, CSA (1966 to 14 April 2010); Science Citation Index Expanded, ISI Web of Science (1975 to 14 April 2010); Social Sciences Citation Index, ISI Web of Science (1975 to 14 April 2010); National Research Register (online) (Issue 3 2007) (searched 3 September 2007); C2-SPECTR (searched 9 April 2008) and PubMed 'Related citations' (searched 4 June 2010)

Selection criteria

Randomised and quasi-randomised controlled trials of methods to increase recruitment to randomised controlled trials. This includes non-healthcare studies and studies recruiting to hypothetical trials. We excluded studies aiming to increase response rates to questionnaires or trial retention, or which evaluated incentives and disincentives for clinicians to recruit patients.

Data collection and analysis

We extracted data on: the method evaluated; country in which the study was carried out; nature of the population; nature of the study setting; nature of the study to be recruited into; randomisation or quasi-randomisation method; and numbers and proportions in each intervention group. We used a risk or odds ratio and their 95% confidence interval (CI) to describe the effect in individual trials. We assessed heterogeneity between trial results.

Main results

We identified 45 eligible trials (18 new to this update) with more than 41,239 participants. There were 40 studies involving interventions aimed directly at trial participants, while five evaluated interventions aimed at people recruiting participants. All studies were in health care.

Some interventions were effective in increasing recruitment: telephone reminders to non-respondents (odds ratio (OR) 1.95, 95% CI 1.04 to 3.66; two trials, 1058 participants), use of opt-out, rather than opt-in, procedures for contacting potential trial participants (RR 1.39, 95% CI 1.06 to 1.84; one study, 152 participants) and open designs where participants know which treatment they are receiving in the trial (RR 1.22, 95% CI 1.09 to 1.36; two studies, 4833 participants). However, some of these strategies have disadvantages, which may limit their widespread use. For example, opt-out procedures are controversial and open designs are by definition unblinded. The effects of many other recruitment strategies are unclear; examples include the use of video to provide trial information to potential participants and modifying the training of recruiters. Many studies looked at recruitment to hypothetical trials and it is unclear how applicable these results are to real trials.

Authors' conclusions

There are promising strategies for increasing recruitment to trials: telephone reminders; requiring potential participants to opt-out of being contacted by the trial team regarding taking part in a trial, rather than them having to opt-in, and open designs. Some strategies (e.g. open trial designs) need to be considered carefully before use because they also have disadvantages. For example, opt-out procedures are controversial and open designs are by definition unblinded.

PLAIN LANGUAGE SUMMARY

Strategies to recruit participants to randomised trials

Many trials do not recruit sufficient participants and this can make it more difficult to use the results of the research in practice. Effective strategies for improving recruitment would be of great benefit to researchers designing and running trials. This review did find some strategies that can increase recruitment to trials. Researchers could telephone non-respondents to remind them about the trial. The research team could use opt-out, rather than opt-in, procedures for contacting potential trial participants, or they could use an open design where participants know which treatment they are receiving in the trial, rather than having some of them receive a placebo or dummy intervention to mask this. However, some of these effective strategies have disadvantages, which may limit their widespread use. The effect of many other recruitment strategies is unclear. Many studies have looked at recruitment to mock trials and it is difficult to know how their findings would apply to real trials. It would be better if more researchers included an evaluation of recruitment strategies in real trials.

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

Telephone reminder versus no telephone reminder

Patient or population: Individuals eligible for a trial
Settings: Any
Intervention: Telephone reminder
Comparison: No telephone reminder

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	No telephone reminder	Telephone reminder				
Number recruited	Low[1]		OR 1.95 (1.04 to 3.66)	778 (2 studies)	⊕⊕⊕◯ moderate[2]	
	30 per 100	46 per 100 (31 to 61)				
	Moderate[1]					
	50 per 100	66 per 100 (51 to 79)				
	High[1]					
	70 per 100	82 per 100 (71 to 90)				

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **OR:** Odds ratio;

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

[1] The low, moderate and high illustrative recruitment levels of 30%, 50% and 70% were selected based on our prior experience with trial recruitment.

[2] There was moderate heterogeneity, $I^2 = 59\%$.

BACKGROUND

Randomised controlled trials are the gold-standard for the evaluation of the effectiveness and safety of healthcare interventions, particularly because they protect against selection bias (Kunz 2007). However, recruiting clinicians and patients to randomised trials can be extremely difficult.

Poor recruitment can lead to an underpowered study, which may report clinically relevant effects to be statistically non-significant. In such cases, it is important to bear in mind that absence of evidence of a difference is not evidence of the absence of a difference (Altman 1995). A non-significant finding increases the risk that an effective intervention will be abandoned before its true value is established, or that there will be a delay in demonstrating this value while more trials or meta-analyses are done. Underpowered trials also raise an ethical problem: trialists have exposed participants to an intervention with uncertain benefit but may still be unable to determine whether the intervention does more good than harm on completion of the trial. Poor recruitment can also lead to the trial being extended, which increases cost.

Although investigations of recruitment differ in their estimates of the proportion of studies that achieve their recruitment targets, it is likely that less than 50% meet their target, or meet their target without extending the length of the trial (Charlson 1984; Foy 2003; Haidich 2001; McDonald 2006). For example, McDonald et al found that only 38 (31%) of the 114 trials achieved their original recruitment target and 65 (53%) were extended (McDonald 2006). The overall start to recruitment was delayed in 47 (41%) trials and early recruitment problems were identified in 77 (63%) trials. Foy et al studied seven primary care trials of dyspepsia management and only one achieved its recruitment target; five recruited less than 50% of their target and three of these closed prematurely because of recruitment problems (Foy 2003).

Trialists use many interventions to improve recruitment (see for example Caldwell 2010, Watson 2006 and Prescott 1999) but it is generally difficult to predict the effect of these interventions. This Cochrane Methodology Review was preceded by an earlier Cochrane review by Mapstone et al (Mapstone 2007), and was published first in 2010 using a revised search strategy focused on interventions to improve recruitment to randomised controlled trials (rather than to research studies in general) and aimed, among other things, to consider the effect of study setting on recruitment (Treweek 2010). We have updated that work in this version of the review.

OBJECTIVES

The primary objective is to quantify the effects of strategies to improve recruitment of participants to randomised controlled trials. A secondary objective is to assess the evidence for the effect of the research setting (e.g. primary care versus secondary care) on recruitment.

METHODS

Criteria for considering studies for this review

Types of studies

Randomised and quasi-randomised controlled trials of interventions to improve recruitment of participants to randomised controlled trials.

Types of data

Randomised and quasi-randomised controlled trials of recruitment strategies set in the context of trials but not limited to health care; since interventions that work in other fields could be applicable to healthcare settings. Strategies both within real settings and in hypothetical trials (studies that ask potential participants whether they would take part in a trial if it was run, but the trial does not actually exist) are eligible. We excluded research into ways to improve questionnaire response and research looking at incentives and disincentives for clinicians to recruit patients to trials as these issues are addressed by complementary Cochrane Methodology Reviews (Edwards 2009; Rendell 2007). Studies of retention strategies were also excluded as a Cochrane Methodology Review on strategies to reduce attrition from trials is being prepared (Brueton 2011).

Types of methods

Any intervention that aimed to improve recruitment of participants to a randomised controlled trial. The interventions being studied could be directed at potential participants (e.g. patients being randomised to a trial), collaborators (e.g. clinicians recruiting patients for a trial), or others (e.g. research ethics committees). Examples of such interventions are letters introducing the trial being signed by eminent people, alternative methods of providing information about the trial to potential participants, additional training for collaborators, monetary incentives for participants, telephone follow-up of expressions of interest and modifications to the design of the trial (e.g. using a preference design).

Types of outcome measures

Primary outcomes

- Proportion of eligible individuals or centres recruited.

Secondary outcomes

- Rate at which participants were recruited.

Search methods for identification of studies

We searched the following electronic databases without language restriction for eligible studies:

- The Cochrane Methodology Review Group Specialised Register (CMR) 2010, Issue 2, part of *The Cochrane Library* (online) www.thecochranelibrary.com (searched 16 April 2010);
- MEDLINE, Ovid (1950 to March Week 5 2010) (searched 14 April 2010);
- EMBASE, Ovid (1980 to 2010 Week 14) (searched 14 April 2010);
- ERIC, CSA (1966 to date of search) (searched 14 April 2010);
- Science Citation Index Expanded, ISI Web of Science (1975 to 14 April 2010);
- Social Sciences Citation Index, ISI Web of Science (1975 to 14 April 2010);
- National Research Register (online) (Issue 3 2007) (searched 3 September 2007);
- C2-SPECTR (searched 9 April 2008); and
- PubMed 'Related citations' (searched 4 June 2010).

The UK Cochrane Centre developed and ran a series of search strategies in MEDLINE in 2000 to identify reports of methodological studies and records for such studies that were identified have been added to CMR. A series of search strategies for methodology studies had also been developed and run in EMBASE in 2004. Therefore, to increase the efficiency of our searches and to retrieve records not yet entered into CMR, our search of MEDLINE was limited to records entered from 2001 and, for EMBASE, we limited the search to records entered from 2005. The UK National Research Register was archived in September 2007 which is why it has not been searched more recently (see UK Clinical Trials Gateway portal.nihr.ac.uk/Pages/NRRArchive.aspx).
We searched PubMed to retrieve 'related articles' for 27 studies included in the earlier version of this review (Avenell 2004; Bentley 2004; Cooper 1997; Coyne 2003; Diguiseppi 2006; Du 2008; Ford 2004; Fowell 2006; Fureman 1997; Gallo 1995; Graham 2007; Hemminki 2004; Ives 2001; Kendrick 2001; Kimmick 2005; Larkey 2002; Liénard 2006; Llewellyn-Thomas 1995a; Llewellyn-Thomas 1995b; Monaghan 2007; Myles 1999; Nystuen 2004; Simel 1991; Simes 1986; Trevena 2006; Welton 1999; Weston 1997).
The full search strategies for all databases are included in Appendix 1.

Data collection and analysis

We have included the protocol for this updated review in Appendix 2 to make it available alongside this review in *The Cochrane Library*.

Selection of studies

Two review authors independently screened the titles and abstracts of all references identified by the search strategy. The full versions of papers not definitely excluded at that stage were obtained for detailed review. Two review authors independently assessed all potentially eligible studies to determine if they met the inclusion criteria. Where differences of opinion occurred, these were discussed and, when necessary, a third review author read the full papers.

Data extraction and management

Two review authors (ST and one of PL, EM or MP) independently carried out data extraction of each included article (using a proforma specifically designed for the purpose). Differences in data extraction were resolved by discussion. We extracted data on the method evaluated; country in which the study was carried out; nature of the population; nature of the study setting; nature of the study to be recruited into; randomisation or quasi-randomisation method; and numbers and proportions of participants in the intervention and comparator groups of the study comparing recruitment strategies.

Assessment of risk of bias in included studies

We assessed the adequacy of allocation concealment (adequate, unclear and inadequate) for each study (Schulz 1995). We also considered other aspects of methodological quality, such as completeness of reporting of results and loss to follow-up. Data on methodological quality are presented in an additional table for all included studies. We assessed completeness of reporting with reference to the ability to judge whether allocation was concealed (i.e. unclear for allocation concealment implies incomplete reporting) but also with regard to clear information on participants, intervention, comparator and outcome measure. We recorded reporting of information on the flow of participants through the trial (e.g. from a CONSORT diagram).
We interpreted results in light of methodological quality but we did not exclude studies because of low quality. The risk of bias is summarised in line with the guidance in the *Cochrane Handbook for Systematic Reviews of Interventions* (version 5.0.1, Handbook 2008), namely: A: Low risk of bias; B: Moderate risk of bias; C: High risk of bias. We considered concealment of allocation (adequate versus inadequate or unclear) as a potential cause of heterogeneity in subgroup analysis, where there were sufficient studies.

Analysis

Trials have been grouped according to the type of intervention (e.g. monetary incentives, alternative forms of consent). Interventions have been grouped where they were similar in form and content. We combined binary data as risk ratios (RR) with the associated 95% confidence intervals (CIs) where sufficient data were available. We only included cluster-randomised trials in the meta-analysis if sufficient data were reported to allow inclusion of analyses that adjusted for clustering in which case we used an odds ratio (OR) as the summary effect in the meta-analysis result. We planned pre-specified subgroups (target group, setting, recruitment to real versus hypothetical trial) if sufficient studies were available.

Assessment of heterogeneity

We sought statistical evidence of heterogeneity of results of trials using the Chi^2 test for heterogeneity and quantified the degree of heterogeneity observed in the results using the I^2 statistic (Higgins 2003). Where substantial heterogeneity was detected, we informally investigated possible explanations and summarised the data using a random-effects analysis if appropriate. We planned to explore the following factors in subgroup analyses, assuming enough studies were identified, as we believed that these were plausible explanations for heterogeneity.

- Type of design used to evaluate recruitment strategies (randomised versus quasi-randomised) and concealment of allocation (adequate versus inadequate or unclear).
- Setting of the study recruiting participants (e.g. primary versus secondary care; healthcare versus non-healthcare settings).
- Design of the study recruiting participants (e.g. open versus blinded studies, trials with placebo arms versus those without).
- Target group (e.g. ethics committees, clinicians, patients).
- Recruitment to hypothetical versus real trials.

Assessment of reporting biases

We investigated reporting (publication) bias for the primary outcomes using a funnel plot where 10 or more studies were available.

RESULTS

Description of studies

See: Characteristics of included studies; Characteristics of excluded studies; Characteristics of studies awaiting classification.
See Characteristics of included studies; Characteristics of excluded studies.
We screened a total of 16,334 titles and abstracts (6701 in this update) and needed the full text of 301 (81 in this update) articles to confirm inclusion, or address uncertainties among review authors as to whether the article should be included, generally due to the lack of an abstract. We were able to obtain the full text of 297 of these articles. The remaining four articles were not obtained for this version of the review because the title or abstract reference was incomplete or incorrect. We translated three articles from the previous version of this review into English for this update, two from Spanish and one from Italian.
Additionally, we retrieved the full text of 10 articles identified by checking the reference lists of reviews picked up by the updated search and of one article (Free 2010) published outside the search period but which looked relevant (it was and is one of the included studies). Of the 308 articles for which full text was obtained, 45 were eligible for inclusion. One previously included study (Gallo 1995) now has a new primary reference as an article originally published in Italian (Perrone 1995) reported more data than Gallo 1995.
There were 40 studies involving interventions aimed directly at trial participants and five evaluated interventions aimed at those recruiting participants. More than 41,239 individuals were involved in the 45 studies; it was not clear how many participants were recruited in two studies, both of which involved interventions aimed at recruiters, rather than those being recruited. The figure of 41,239 includes both individuals who were recruited to randomised controlled trials, as well as those who were approached about recruitment but declined.
We evaluated six categories of intervention, all of which were used in connection with healthcare studies. There were too few studies evaluating the same or similar interventions to allow us to do any of our planned subgroup analyses.

Risk of bias in included studies

See Characteristics of included studies; Figure 1; Figure 2.

Figure 1. 'Risk of bias' graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

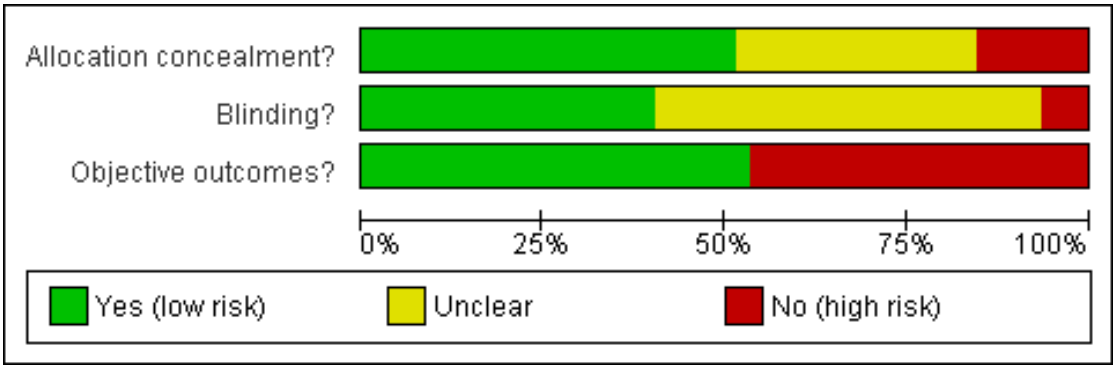
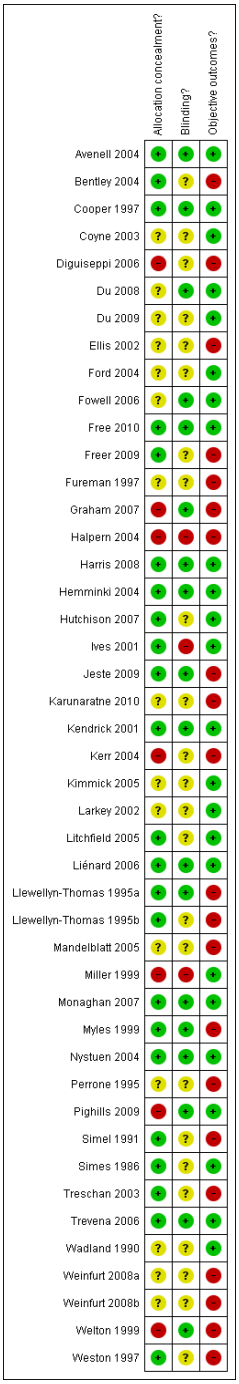


Figure 2. 'Risk of bias' summary: review authors' judgements about each risk of bias item for each included study.



All studies were described by their authors as either randomised (41 studies) or quasi-randomised (four studies). We considered allocation concealment to have been present for 23 studies, not clear for 15 and not met for seven. We considered the overall assessment of the risk of bias as low risk of bias for 12 studies, moderate risk of bias for 13 studies and high risk of bias for 20 studies.

Effect of methods

See: **Summary of findings for the main comparison** Telephone reminder versus no telephone reminder; **Summary of findings 2** Open RCT versus blinded RCT; **Summary of findings 3** Consent to experimental care versus usual consent; **Summary of findings 4** Consent to standard care versus usual consent; **Summary of findings 5** Educational audiovisual information versus standard information; **Summary of findings 6** Study-related questionnaire + trial invitation versus trial invitation; **Summary of findings 7** Clinical trial booklet + standard information versus standard information

We placed the recruitment interventions into six broad categories. One (Modification to the consent form or processes) included seven variations on consent procedures while another (Modification to the approach made to potential participants) included 28 variations on the way potential trial participants were approached about the trial (see Table 1). Although these two categories each contain several studies, we considered the majority of interventions to be sufficiently different to make pooling them inappropriate.

The lines between categories were not always clear. We placed studies according to the emphasis given by the original authors of the study. For example, although Fowell 2006 involved a change to consent procedures, we placed it under 'Design change' because the authors' emphasis was on the use of cluster-randomisation to increase recruitment. Our six categories are as follows.

- Design changes
  - Open RCT versus blinded RCT
  - Placebo versus other comparator
  - Patient preference design versus conventional RCT design

- Modification to the consent form or process
  - Opt-out consent versus opt-in consent
  - Consent to experimental care versus usual consent
  - Consent to standard care versus usual consent
  - Refusers choose treatment versus usual consent
  - Physician-modified consent versus usual consent
  - Participant-modified consent versus usual consent
  - Researcher reading our consent versus participant reading consent
- Modification to the approach made to potential participants
  - Educational audiovisual information versus standard information
  - Educational audiovisual information with written information versus written information
  - Educational audiovisual information + help versus standard information + general audiovisual information + help
  - Telephone reminder versus no telephone reminder
  - Telephone reminder + questionnaire versus no reminder or questionnaire
  - Telephone screening versus face-to-face screening
  - SMS messages containing quotes from existing participants versus no messages
  - Enhanced recruitment package + recruitment at churches versus standard recruitment package
  - Enhanced recruitment package versus standard recruitment package
  - Enhanced recruitment package + baseline data over telephone versus standard recruitment package
  - Electronic completion of screening questionnaire versus standard paper completion
  - Oral completion of screening questionnaire versus standard paper completion
  - Study-related questionnaire + trial invitation versus trial invitation
  - Clinical trial booklet + standard information versus standard information
  - Negative framing of side effects versus neutral framing
  - Positive framing of side effects versus neutral framing
  - Less detailed presentation of risk and other information versus more detailed presentation
  - Information leaflet with explanation versus information leaflet without explanation
  - Brief counselling + print materials versus print materials
  - Emphasising pain in information versus standard information
  - Emphasising risk in information versus standard information
  - Newspaper article + study information versus study information only
  - More favourable newspaper article + study information versus less favourable article + study information
  - Interactive computer presentation of trial information versus standard paper presentation
  - Interactive computer presentation of trial information versus audio-taped presentation
  - Writing treatment effect is 'twice as fast' in trial information versus writing 'half as fast'
  - Total information disclosure versus standard disclosure

- One new versus both standard (description of intervention)
- Screening by senior investigator versus screening by research assistant

- Financial incentives for participants
- Financial incentives for participants
- Modification to the training given to recruiters
- Greater contact between trial co-ordinator and trial sites

We produced 'Summary of findings' tables for all interventions where more than one study was available, giving seven in total (Summary of findings for the main comparison; Summary of findings 2; Summary of findings 3; Summary of findings 4; Summary of findings 5; Summary of findings 6; Summary of findings 7).

Design changes

Six studies (5665 participants; one study also recruited 28 general practices) considered the effect of trial design changes on recruitment; five involved real trials, one a hypothetical trial. Two studies (Avenell 2004 (fracture prevention trial); Hemminki 2004 (postmenopausal hormone therapy trial)) compared an open design (participants know what treatment they are receiving) to a blinded, placebo-controlled design. An open design improved recruitment (RR 1.22, 95% CI 1.09 to 1.39) (Analysis 1.1; Summary of findings 2).

Welton 1999 investigated the effect of a placebo group on willingness of women to take part in a hypothetical hormone replacement trial and found that the number of women who would definitely or probably take part may be less with a placebo as comparator (RR 0.76, 95% CI 0.59 to 0.99) (Analysis 2.1). It was not clear whether participants were told what the placebo would be (e.g. a tablet that did not contain an active ingredient) and the applicability of this result to real trials is unclear.

Three studies looked at other trial design changes. Cooper 1997 compared recruitment in a partially randomised patient preference design (participants with a strong preference for one treatment or another receive it, while the remainder are randomised) with a conventional randomised design for a trial of management strategies for heavy menstrual bleeding. Of the 135 women allocated to the preference arm, 40 had a strong preference for a particular treatment, 90 were willing to be randomised and five refused. Those allocated to the preference design were more likely to agree to take part in the study as a whole (RR 1.37, 95% CI 1.22 to 1.53) but this made little or no difference to recruitment to the randomised trial (Analysis 3.1). Fowell 2006 compared cluster-randomisation in a palliative care trial to individual consent after randomisation if the participant was randomised to the experimental treatment (sometimes called a Zelen design) in a cross-over trial. The study had only two sites (clusters) with few participants: 6 out of 24 potential participants were recruited in the cluster arm, compared to 0 out of 29 in the Zelen arm. Litchfield 2005 compared internet-based, electronic data collection with paper-based data collection in a cluster-randomised trial of two delivery systems for insulin. Improving general efficiency, not recruitment, was the aim of the study but recruitment data were presented. The 14 practices allocated to electronic data collection recruited 45/52 patients screened, while the 14 using paper recruited 28/28 patients. The difference was significant (P = 0.04).

Modification to the consent form or process

Five studies (4824 participants) evaluated the effect of changes to the consent form or consent process; three involved real trials, two hypothetical trials. The effect of participants having to contact the trial team to take part in a trial (opt-in) compared to having to contact the trial team if they did not wish to be approached about the trial (opt-out) was studied by Trevena 2006 in a trial of decision aids for screening of colorectal cancer by faecal occult blood testing. Opt-out improved recruitment (RR 1.39, 95% CI 1.06 to 1.84) (Analysis 4.1).

Two studies involving recruitment to hypothetical trials (Perrone 1995 (trial of a hypothetical new drug); Myles 1999 (anaesthesia trial)) evaluated various combinations of prerandomisation and consent (e.g. prerandomised consent to receive the experimental treatment). Two interventions were common between the two studies: a) seeking consent to receive the experimental treatment and b) seeking consent to receiving the standard treatment. Seeking consent to receive experimental treatment probably leads to little or no difference in recruitment (Analysis 5.1; Summary of findings 3). Seeking consent to receive the standard treatment probably decreased recruitment (RR 0.66, 95% CI 0.60 to 0.71) but there was considerable heterogeneity (I^2 = 93%) (Analysis 6.1; Summary of findings 4). Under a random-effects model there may not be an increase in recruitment (RR 0.76, 95% CI 0.49 to 1.17). There were three other comparisons in these two studies that were not common to both:

- usual consent compared to a consent process that allowed those refusing to be randomised to choose whether they wanted the experimental or standard treatment (Perrone 1995);
- usual consent compared to consenting to a 7 in 10 chance of getting the experimental treatment because the clinician believes experimental treatment is more effective (Myles 1999); and
- usual consent compared to consenting to the participant selecting the chance (6, 7 or 8 in 10) of receiving the experimental treatment (Myles 1999).

All three interventions probably led to little or no difference in recruitment (Analysis 7.1; Analysis 8.1; Analysis 9.1).

In a smoking cessation trial, Wadland 1990 investigated the effect of a researcher reading out the consent form compared to the potential participant reading it; this may not lead to any difference in recruitment (Analysis 10.1). Coyne 2003 ran a cluster trial involv-

ing 44 oncology centres to compare a consent form designed to be easy to read with the organisation's standard consent form. Although the authors did not present centre-level recruitment data, or provide an intracluster correlation coefficient, they did consider intracluster correlation in their analysis and found that recruitment did not differ significantly between the two trial groups (P = 0.32).

Modification to the approach made to potential participants

Twenty-eight studies involving trial participants (28,618 participants) and one involving the centres that recruit participants (126 centres) evaluated the effect of modifying trial information, or the way it was delivered. Fourteen of the studies involved real trials, 14 hypothetical trials. NB. One study (Free 2010) also evaluated a financial incentive and appears in that category as well (See *Financial incentives for participants*).

Six studies investigated the use of educational videos. Three (Du 2009, Du 2008 and Hutchison 2007) investigated the effect of video presentation of information about trials and randomisation on recruitment to a range of therapeutic and non-therapeutic cancer trials but the intervention probably led to little or no difference in recruitment (Analysis 11.1; Summary of findings 5); there was moderate heterogeneity (I^2 = 50%). Weston 1997 compared the effect on willingness to participate of a 10-minute video plus written information versus written information only in a trial evaluating management policies for pregnant women with prelabour rupture of membranes. The video probably improved willingness to participate (RR 1.75, 95% CI 1.11 to 2.74) (Analysis 12.1). Jeste 2009 presented key trial information to participants using a DVD while a research assistant was available to answer any questions to support recruitment of healthy volunteers and individuals with schizophrenia to a hypothetical trial. This probably led to little or no difference in recruitment compared to just having the research assistant to answer questions (Analysis 13.1). Fureman 1997 used a 26-minute video as supplement to a pamphlet to try and improve willingness to take part in a hypothetical preventive HIV vaccine trial. The number of individuals willing to take part was not presented in the published paper but willingness as measured on a composite 0 to 4 score was higher in the video group (1.69) than in the pamphlet-only group (1.50) up to two months after seeing the video, although this difference was not statistically significant.

Telephones were used in four studies; three using voice (Harris 2008; Diguiseppi 2006; Nystuen 2004) and one using text messages (Free 2010). Nystuen 2004 and Harris 2008 evaluated the effect of telephone reminders on recruitment to a trial investigating an intervention to support sick-listed individuals get back to work (Nystuen 2004) and a physical activity trial in older people (Harris 2008). Telephone reminders improved recruitment (odds ratio 1.95, 95% CI 1.04 to 3.66) although there was moderate heterogeneity (I^2 = 59%) (Analysis 14.1; Summary of findings for the main comparison) in terms of the magnitude of the effect. Harris 2008 also combined telephone reminders with a study-related questionnaire sent together with the invitation letter, which led to little or no difference in recruitment (Analysis 15.1). Diguiseppi 2006 compared the effect on willingness to participate in a hypothetical future lifestyle change trial of telephone screening for hazardous drinking versus face-to-face administration in the clinic. Telephone screening may have improved willingness to take part compared to face-to-face administration (RR 1.26, 95% CI 1.06 to 1.50) (Analysis 16.1). Free 2010 sent a series of four text messages with quotes from existing participants to potential participants in a smoking cessation trial and this improved recruitment (RR 35.09, 95% CI 2.12 to 581.48) (Analysis 17.1) although the small numbers recruited overall led to a very wide confidence interval.

Ford 2004 developed three enhanced recruitment interventions to recruit African Americans to a cancer trial. The enhancements included using African Americans to conduct screening interviews, collecting baseline information by telephone rather than mailed questionnaire and face-to-face recruitment sessions at African American churches. These were compared to the standard recruitment procedure. The most intense intervention, which included the church sessions, probably led to an improvement in recruitment (RR 1.37, 95% CI 1.05 to 1.78) (Analysis 18.1). The two other interventions probably led to little or no difference in recruitment (Analysis 19.1; Analysis 20.1). Graham 2007 compared the effect on willingness to take part in a hypothetical lifestyle change trial of electronic, oral and paper-and-pencil completion of a screening questionnaire. These interventions may not have led to any difference in recruitment (Analysis 21.1; Analysis 22.1). Harris 2008 and Kendrick 2001 both mailed study-relevant (physical activity and injury prevention, respectively) questionnaires to potential participants together with invitation letters but this led to little or no difference in recruitment (Analysis 23.1; Summary of findings 6). We identified three other interventions that involved booklets:

- two compared standard information compared to a clinical trial information booklet plus standard trial information, one for a hypothetical breast cancer trial (Ellis 2002), the other a real trial for HIV patients (Ives 2001);
- neutrally-framed information on side effects in a colon cancer trial compared to negatively-framed information (Llewellyn-Thomas 1995a); and
- neutrally-framed information on side effects in a colon cancer trial compared to positively-framed information (Llewellyn-Thomas 1995a).

All three interventions probably led to little or no difference in recruitment (Analysis 24.1 (Summary of findings 7); Analysis 25.1; Analysis 26.1). There was probably little or no difference in recruitment from using a less detailed information leaflet rather than a more detailed leaflet in a hypothetical intensive care trial (Freer 2009) (Analysis 27.1). This result was not improved by providing

an verbal explanation with the leaflet (Analysis 28.1). Mandelblatt 2005 added a brief verbal education session to standard printed participant information leaflets and this may improve recruitment slightly compared to print materials alone (Analysis 29.1). Emphasising how painful, or risky, trial procedures were in participant information for a hypothetical surgery trial probably decreases recruitment slightly in both cases (Treschan 2003; RR 0.55, 95% CI 0.36 to 0.85; RR 0.41, 95% CI 0.24 to 0.68) (Analysis 30.1; Analysis 31.1). It is unclear how applicable this result is to real trials.

Pighills 2009 investigated the effect of providing a newspaper article about the trial together with the standard participant information but this probably led to little or no difference in recruitment (Analysis 32.1). Replacing the newspaper article with one that was more favourable to the trial did not change this result (Analysis 33.1). Weinfurt 2008a investigated the effect of investigators' financial disclosure on recruitment to a hypothetical heart disease trial by presenting participants with one of three scenarios where the investigator's financial interests in the study drug were varied. Willingness to participate was less if the investigator had equity in the drug company than for per capita payments to the investigator's research organisation (P = 0.01), or if there was no disclosure (P = 0.03). A second study, Weinfurt 2008b, had five scenarios presenting various financial interests and found that the various disclosures did not substantially affect participants' willingness to take part in the hypothetical asthma or diabetes trial.

Karunaratne 2010 compared an interactive computer presentation of information about a hypothetical trial on managing heart attack complications with standard paper-based information and found that this may not lead to any difference in recruitment (Analysis 34.1). Llewellyn-Thomas 1995b found that an interactive computer presentation of trial information probably slightly improved recruitment to a hypothetical cancer trial compared to an audiotape presentation (Analysis 35.1).

Simel 1991 used two different consent forms for a hypothetical trial of a new medication, one saying the new treatment may work 'twice as fast', the other saying the new treatment may work 'half as fast', as standard care. Both consent forms were read aloud to potential participants. The first consent form probably improved recruitment (RR 1.62, 95% CI 1.10 to 2.37) although it is not clear how applicable this result is to real trials (Analysis 36.1).

Simes 1986 compared provision of total disclosure of a range of information relevant to a cancer trial versus more limited default disclosure with additional provision being at the discretion of the clinician. The intervention led to little or no difference in recruitment (Analysis 37.1). Kerr 2004 considered the impact of describing treatments as new or standard in patient information leaflets for a hypothetical arthritis trial. Describing a treatment as new may slightly decrease recruitment (Analysis 38.1).

Miller 1999 evaluated the cost-effectiveness of screening for clinical trials by senior investigators compared to research assistants but did present effect on recruitment as a secondary outcome. These authors found that screening by senior investigators may not lead to any difference in recruitment (Analysis 39.1).

Kimmick 2005 ran a cluster trial involving 126 oncology centres to compare the effect of an educational intervention aimed at improving recruitment of older participants at cancer centres that were part of a network of cancer centres. Although the authors did not present centre-level recruitment data, or provide an intracluster correlation coefficient, they did consider intracluster correlation in their analysis. An educational package comprising standard information plus a symposium, additional educational materials, monthly mailings and emails for one year, lists of trial protocols to attach to patient charts and a seminar did not significantly increase recruitment compared to standard information alone (31% of participants aged over 65 in both intervention and control groups in year 2, P = 0.83).

Financial incentives for participants

Three studies involving 888 participants evaluated the effect of financial incentives on trial recruitment; one involved a real trial, two hypothetical trials. Free 2010 sent a GBP £5 note together with a letter containing study and consent information in a smoking cessation trial, which improved recruitment (RR 12.95, 95% CI 1.71 to 98.21) (Analysis 40.1).

Bentley 2004 investigated the effect of three levels of risk presentation (high, medium and low) and three levels of financial incentive (USD $1800, $800 and $350), giving nine interventions in total, on willingness to take part in a hypothetical trial. The number of individuals willing to participate is not given in the published report for the study but financial incentives increased willingness to participate for all three risk levels (P = 0.015). For a fixed risk, willingness to participate increased with the size of the financial incentive for each of the three risk levels. Halpern 2004 did something similar by varying risk (either adverse events or rate of randomisation to placebo) and incentives (USD $2000, $1000 and $100) for a hypothetical trial of an antihypertensive drug. Willingness to participate increased as payment rose (P < 0.001).

Modification to the training given to recruiters

One study with 96 recruiters (Larkey 2002) evaluated the effect of using trained Hispanic women already taking part in a trial as lay advocates to refer women to trials within the Women's Health Initiative. The training comprised six hours of training in informal sessions and concentrated on the communication of benefits to Latinas of being in the trial. The authors did not report an analysis that corrected for the clustering or provide an intracluster correlation coefficient. Data at the recruiter aggregate level were reported on whether a recruiter did or did not recruit anyone to the trial. Eight of the 28 trained Hispanic recruiters recruited one or more women to the trial whereas none of the 26 untrained Hispanic

women recruited anyone the trial. Two of the 42 untrained Anglo control group recruited two women.

Greater contact between trial co-ordinator and trial sites

Two studies investigated the effect of greater contact between trial co-ordinators and trial sites in multicentre cluster trials. Liénard 2006 (135 trial sites) evaluated onsite initiation visits to review the trial protocol, inclusion and exclusion criteria, safety, randomisation and other trial aspects in a multicentre breast cancer trial. They did not provide sufficient data to allow for an analysis which adjusted for clustering. The authors did not present the proportion of eligible participants recruited, only the number recruited: visited sites recruited 302 participants while those not receiving visits recruited 271. The difference was reported to be not statistically significant (no P value was given). Monaghan 2007 (167 trial sites) evaluated the effect of additional communication strategies (e.g. individually-tailored feedback on recruitment) with trial sites. The authors did not present the proportion of eligible participants recruited. Site level analyses of the time to meet half of the site's recruitment target and the median number recruited were reported. The median total number of participants in the additional communication group was 37.5, compared to 37.0 in the standard communication group. This difference was not statistically significant (P = 0.68). Intervention centres achieved half their recruitment targets in 4.4 months, compared to 5.8 months for control centres. This difference was not statistically significant (P = 0.08).

ADDITIONAL SUMMARY OF FINDINGS *[Explanation]*

Open RCT versus blinded RCT

Patient or population: Individuals eligible for a trial
Settings: Any
Intervention: Open RCT
Comparison: Blinded RCT

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Blinded RCT	Open RCT				
Number recruited	Low[1]		RR 1.22 (1.09 to 1.36)	4833 (2 studies)	⊕⊕⊕◯ moderate[2]	
	30 per 100	37 per 100 (33 to 41)				
	Moderate[1]					
	50 per 100	61 per 100 (55 to 68)				
	High[1]					
	70 per 100	85 per 100 (76 to 95)				

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **RR:** Risk ratio;

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

[1] The low, moderate and high illustrative recruitment levels of 30%, 50% and 70% were selected based on our prior experience with trial recruitment.

[2] There was moderate heterogeneity, $I^2 = 64\%$.

Consent to experimental care versus usual consent

Patient or population: Individuals eligible for trial
Settings: Any
Intervention: Consent to experimental care
Comparison: Usual consent

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Usual consent	Consent to experimental care				
Willingness to participate	Low[1]		RR 1.01 (0.98 to 1.05)	2456 (2 studies)	⊕⊕◯◯ low[2]	
	30 per 100	30 per 100 (29 to 31)				
	Moderate[1]					
	50 per 100	50 per 100 (49 to 52)				
	High[1]					
	70 per 100	71 per 100 (69 to 73)				

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **RR:** Risk ratio;

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

[1] The low, moderate and high illustrative recruitment levels of 30%, 50% and 70% were selected based on our prior experience with trial recruitment.

[2] Risk of bias: Myles 1999 = B, Perrone 1995 = C. Categorised as moderate to high risk of bias overall.

Consent to standard care versus usual consent

Patient or population: Individuals eligible for trial
Settings: Any
Intervention: Consent to standard care
Comparison: Usual consent

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Usual consent	Consent to standard care				
Willingness to participate	Low[1]		RR 0.76 (0.49 to 1.17)	1759 (2 studies)	⊕◯◯◯ very low[2,3]	
	30 per 100	23 per 100 (15 to 35)				
	Moderate[1]					
	50 per 100	38 per 100 (25 to 58)				
	High[1]					
	70 per 100	53 per 100 (34 to 82)				

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **RR:** Risk ratio;

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

Very low quality: We are very uncertain about the estimate.

[1] The low, moderate and high illustrative recruitment levels of 30%, 50% and 70% were selected based on our prior experience with trial recruitment.

[2] Risk of bias: Myles 1999 = B, Perrone 1995 = C. Categorised as moderate to high risk of bias overall.

[3] There was substantial heterogeneity, I^2 = 93%. Perrone 1995 found in favour of the control, while Myles 1995 found little or no difference between intervention and control.

Educational audiovisual information versus standard information

Patient or population: Individuals eligible for trial
Settings: Any
Intervention: Educational audiovisual information
Comparison: Standard information

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Standard information	Educational audiovisual information				
Number recruited	Low[1]		RR 1.20 (0.75 to 1.91)	495 (3 studies)	⊕◯◯◯ very low[2,3,4]	
	30 per 100	36 per 100 (22 to 57)				
	Moderate[1]					
	50 per 100	60 per 100 (38 to 95)				
	High[1]					
	70 per 100	84 per 100 (52 to 100)				

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **RR:** Risk ratio;

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

[1] The low, moderate and high illustrative recruitment levels of 30%, 50% and 70% were selected based on our prior experience with trial recruitment.

[2] Du 2008 = moderate risk of bias (B), Du 2009 = high risk of bias, Hutchison 2007 = low risk of bias. Categorised as moderate risk of bias overall.

[3] All three studies suggest little or no difference in recruitment due to the intervention but the Hutchison 2007 point estimate was in favour of control, while that of both Du studies was in favour of the intervention.

[4] The confidence limits for all three studies were wide, especially the two Du studies, and all three included the possibility of benefit or harm.

Study-related questionnaire + trial invitation versus trial invitation

Patient or population: Individuals eligible for a trial
Settings: Any
Intervention: Study-related questionnaire + trial invitation
Comparison: Trial invitation

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Trial invitation	Study-related questionnaire + trial invitation				
Number recruited	Low[1]		OR 1.17 (0.74 to 1.87)	2673 (2 studies)	⊕⊕⊕◯ moderate[2]	
	30 per 100	33 per 100 (24 to 44)				
	Moderate[1]					
	50 per 100	54 per 100 (43 to 65)				
	High[1]					
	70 per 100	73 per 100 (63 to 81)				

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **OR:** Odds ratio;

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

[1] The low, moderate and high illustrative recruitment levels of 30%, 50% and 70% were selected based on our prior experience with trial recruitment.

[2] Harris 2008 found that the intervention had little or no effect on recruitment, while Kendrick 2001 found that the intervention improved recruitment.

Clinical trial booklet + standard information versus standard information

Patient or population: Individuals eligible for trial
Settings: Any
Intervention: Clinical trial booklet + standard information
Comparison: Standard information

Outcomes	Illustrative comparative risks* (95% CI)		Relative effect (95% CI)	No of participants (studies)	Quality of the evidence (GRADE)	Comments
	Assumed risk	Corresponding risk				
	Standard information	Clinical trial booklet + standard information				
Willingness to participate/number recruited	Low[1]		RR 1.11 (0.71 to 1.72)	91 (2 studies)	⊕◯◯◯ very low[2,3,4]	
	30 per 100	33 per 100 (21 to 52)				
	Moderate[1]					
	50 per 100	56 per 100 (35 to 86)				
	High[1]					
	70 per 100	78 per 100 (50 to 100)				

*The basis for the **assumed risk** (e.g. the median control group risk across studies) is provided in footnotes. The **corresponding risk** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).
CI: Confidence interval; **RR:** Risk ratio;

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

[1] The low, moderate and high illustrative recruitment levels of 30%, 50% and 70% were selected based on our prior experience with trial recruitment.
[2] Risk of bias: Ives 2001 = C, Ellis 2002 = C. Categorised as high risk of bias overall.
[3] There was some heterogeneity, $I^2 = 46\%$ but this was not judged sufficient to categorise as serious inconsistency.
[4] Ellis 2002 involved a hypothetical trial so the outcome was willingness to participate, not actual participation.

DISCUSSION

This review identified 45 studies, 18 new to this update, that evaluated the effect of six categories of strategies to improve recruitment to randomised controlled trials. The interventions used in these studies varied significantly, which made it difficult to pool data. Even those studies based on the same basic strategy (e.g. changing the consent process) were generally sufficiently different to make pooling inappropriate (Engels 2000). For example, although there were five studies and seven interventions looking at changes to consent procedures, only two interventions were similar enough to be pooled. Videos were used in six studies but generally delivered different information, or were used in combination with other interventions that differed between studies. Only three could be combined in the same analysis. We had planned to investigate the impact of recruiting to a hypothetical trial versus a real trial but were unable to due to the lack of studies. For only one comparison was there at least one of each kind of trial and we were therefore unable to assess this factor. Only one of the cluster trials (Harris 2008) provided sufficient data to allow an appropriate analysis to be incorporated in the review. Additionally there were a number of studies which potentially had data clustered by the study the participant was invited to join (e.g. Hutchison 2007 and Kerr 2004) even though the participants were individually randomised and estimates from these studies may be overly precise.

While new studies were added to the review, the overall picture with regard to interventions to improve recruitment to trials remains similar to the previous version of the review. Most studies did not provide clear evidence of benefit. Many studies were small, likely to be underpowered and with confidence intervals including the possibility of substantial benefit. This is particularly true of interventions that modified the approach made to potential participants by, for example, presenting trial information to them in different ways. Moreover, 19 studies involved hypothetical trials and it is not clear how applicable their results are to real trials. Our suggestion to trialists is to build evaluations of recruitment interventions into their real trials rather than use hypothetical trials. Additionally, we had hoped to be able to do a number of subgroup analyses but the variations in the interventions themselves would have made these comparisons meaningless.

Some interventions do appear to be effective, although the evidence base for some is still rather small. Telephone reminders to non-responders (Harris 2008; Nystuen 2004), opt-out procedures requiring potential participants to contact the trial team if they did not want to be contacted about a trial (Trevena 2006), including GBP £5 together with the trial invitation (Free 2010) and making the trial open rather than blinded (Avenell 2004; Hemminki 2004) all improved recruitment in high-quality studies involving real trials. There are, however, caveats. For telephone reminders, the pooled analysis has moderate heterogeneity (I^2 = 59%) though it would seem that it is the magnitude of effect and not the benefit of telephone reminders that is in doubt. Although the GBP £5 financial incentive used in Free 2010 improved recruitment, the total number of participants recruited was very small, leading to substantial uncertainty about the magnitude of the benefit. Two other studies involving financial incentives (Bentley 2004; Halpern 2004) found that increasing payment led to increased recruitment but this was to hypothetical trials using sums of money that may not be feasible in real trials. Both telephone reminders and financial incentives are promising but would benefit from additional, rigorous evaluation. Ethical concerns have been raised about their use (i.e. that they amount to a form of coercion) though both have been used and are accepted by many. Opt-out has been proposed by others (e.g. Hewison 2006) as a way of improving recruitment to health research but it remains controversial because ethics committees generally require that research participants give their active, opt-in approval to research participation, including being contacted about the research by researchers. However, it is worth noting that Trevena 2006 studied opting-out of being contacted about a trial and not opting-out of consenting to actually take part in the trial. This is perhaps less controversial and ethics committees may be more willing to accept this as part of a recruitment strategy. While it may be easier to recruit to an open trial, there is clearly a greater risk of bias with such trials over blinded trials.

The effect of other strategies to improve recruitment to trials remains less clear. Partial preference designs may improve recruitment to a study as a whole but not to the randomised part (Cooper 1997). Other than the opt-out strategy mentioned above, a whole range of strategies involving changes to consent procedures failed to produce promising recruitment strategies. Modifications to the way or quantity of information presented to potential participants about trials in general, or about one trial in particular, did not provide clear evidence in favour of this approach to improving recruitment. Providing potential participants with quotes from existing participants via SMS (Free 2010) looks promising but requires further evaluation. Three studies looked at strategies aimed not at potential participants but at those recruiting them (Larkey 2002; Liénard 2006; Monaghan 2007) and none presented clear evidence in favour of the strategies used.

Potential bias was a problem in many of the included studies. Although allocation concealment was considered high quality for 23 of the 45 studies (it was unclear for 15 and poor for seven), the overall assessment of the risk of bias was considered as low for only 12 studies. Twenty studies were considered to be at high risk of bias. This was often linked to hypothetical trials. It was not possible to predict the direction of effect that any bias may have had on study outcomes. We were unable to make statistical judgements about the likelihood of publication and related biases with our relatively small number of included studies per comparison and the wide variation in the recruitment strategies being evaluated.

Four potentially eligible studies identified by our search were not included in this review because the reference returned by the search

was incomplete or incorrect. We will aim to obtain sufficient information to include or exclude these studies when we update this review. We would welcome feedback about studies that have been missed or newly published studies.

AUTHORS' CONCLUSIONS

Implication for systematic reviews and evaluations of healthcare

Some interventions to increase recruitment do appear to be effective: telephone reminders to non-respondents; use of opt-out, rather than opt-in procedures for contacting potential trial participants; and open designs. The use of open trial designs needs to be considered carefully since the lack of blinding may lead to bias. Financial incentives look promising but would benefit from more evaluation. Evidence is inconclusive for several interventions, including the use of video to provide information to potential participants and some types of change to consent procedures. There is evidence to suggest that preference designs, the use of a placebo as a comparator, and greater contact between trial co-ordinators and recruiting sites may not increase recruitment.

Implication for methodological research

Trialists should include evaluations of their recruitment strategies in their trials and funders should support this because the number of interventions that have been rigorously evaluated in the context of a real trial is low. The use of hypothetical trials to study recruitment strategies has its place but it would be better if methodologists could collaborate with trialists to study recruitment in real trials. Two interventions, financial interventions and SMS messages to potential participants, are clearly worth further evaluation. There is a clear gap in knowledge with regard to effective strategies aimed at recruiters and research into how to increase recruitment by sites participating in trials would be beneficial.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

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

Avenell 2004

Methods	Randomised controlled trial
Data	Setting: secondary care, UK. Participants were patients aged 70 or over attending a fracture clinic or orthopaedic ward. 538 participants
Comparisons	Investigated the effect of different trial designs Open trial design comparing vitamin D, versus calcium, versus vitamin D and calcium, versus no tablets. Compared to conventional trial comparing vitamin D, versus calcium, versus vitamin D and calcium, versus placebo
Outcomes	Proportion recruited to trial.
Notes	Overall risk of bias - A: Low risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Yes	Blinding only partial but looking at the effect of open study design was the purpose of the study
Objective outcomes?	Yes	Proportion recruited to trial

Bentley 2004

Methods	Randomised controlled trial
Data	Setting: university, USA. Participants were pharmacy students. 270 participants
Comparisons	Investigated the effect of financial incentives and trial risk Nine-arm trial looking at the effect of financial incentives and bonus based on the level of risk (high, medium or low) associated with the intervention drug Interventions A-C: information on high-risk trial for a drug not yet tested on humans, paying one of USD $1800, $800 or $350 Interventions D-F: information on medium-risk study for a generic drug already on the market, paying one of USD $1800, $800 or $350 Intervention G-I: information on low-risk study measuring salivary levels of stress hormones, paying one of USD $1800, $800 or $350
Outcomes	Willingness to take part in hypothetical studies

Bentley 2004 (*Continued*)

Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Unclear	Participants potentially able to discuss, though people handing out envelopes (course instructors) blinded
Objective outcomes?	No	Hypothetical trial

Cooper 1997

Methods	Randomised controlled trial
Data	Setting: secondary care, UK. First time attendees at a gynaecological clinic. 273 participants
Comparisons	Investigated the effect of different trial designs Partially randomised patient preference design allocating to medical management or transcervical resection of the endometrium or preferred option. Comparator was a conventional trial design allocating to medical management or transcervical resection of the endometrium
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - A: Low risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Yes	Participants were blinded but not investigators
Objective outcomes?	Yes	Proportion recruited to trial

Coyne 2003

Methods	Randomised controlled trial
Data	Setting: secondary care, USA. Patients eligible for participation in a cancer treatment trial. 226 participants

Coyne 2003 (*Continued*)

Comparisons	Investigated the effect of different consent methods Easy to read consent statements (altered text style, layout, font size, vocabulary; reading level 7th to 8th grade) were compared to standard consent statements
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Nurse clearly knew that the participant had intervention or control consent statement; not clear how much participant was told about the intervention. Not clear if telephone interviewers knew the allocation
Objective outcomes?	Yes	Proportion recruited to trial

Diguiseppi 2006

Methods	Quasi-randomised controlled trial
Data	Setting: health maintenance organisation, USA. Participants were patients aged 18 or over attending the HMO with an acute injury. 469 participants
Comparisons	Investigated the effect of different methods of pre-screening participants Telephone administered questionnaire on hazardous drinking and willingness to participate in lifestyle intervention. This was compared to face-to-face administered questionnaire on hazardous drinking and willingness to participate in lifestyle intervention
Outcomes	Proportion recruited to hypothetical trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	By week
Blinding?	Unclear	Potential participants were probably blind but researchers and practice staff were not blind
Objective outcomes?	No	Hypothetical trial

Du 2008

Methods	Randomised controlled trial
Data	Setting: secondary care, USA. Patients aged 21 to 80 attending multidisciplinary lung clinic at a cancer centre. 126 participants
Comparisons	Investigated the effect of different methods of providing information about the trial 18-minute educational video giving an overview of clinical trials and the importance of cancer clinical research to society. This was compared to standard care (i.e. normal first visit to oncologist)
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - B: Moderate risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	No details given
Blinding?	Yes	Oncologist was blinded but the participant was not (not clear if they were told that intervention was a video versus standard care)
Objective outcomes?	Yes	Proportion recruited to trial

Du 2009

Methods	Randomised controlled trial
Data	Setting: secondary care, USA. Women scheduled for treatment evaluation by medical oncology specialist at KCI breast clinic. Aged 21 to 80, new female patient at clinic, with diagnosis of histologically confirmed invasive breast cancer, and self-determined as white or African America. Plus (a) the ability to read and understand English at least at the 6th grade level, (b) the capability to make their own treatment decisions, (c) not having previously participated in a cancer clinical trial, and (d) performance status (PS) B 2 (Southwest Oncology Group (SWOG) scale). 196 participants
Comparisons	Intervention: 18-minute video. The video presents an overview of Phase I, II and III clinical trials and the importance of cancer clinical research to society. The video addresses common concerns regarding clinical trials and cancer treatment from the patient's perspective such as side effects, expected risks and benefits, eligibility criteria, the enrolment process, and treatment costs. Comparator: usual practice - return to waiting room but not clear what 'standard care' actually is
Outcomes	Enrolment in therapeutic trials
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Du 2009 (*Continued*)

Item	Authors' judgement	Description
Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Not clear if staff were blinded and for participants it depended on what they had been told about study. Participants completed questionnaire's themselves so may not have been influenced by staff if staff were unblinded
Objective outcomes?	Yes	Enrolment in therapeutic trials

Ellis 2002

Methods	Randomised controlled trial
Data	Setting: secondary care, Australia. Women undergoing definitive surgical operation for early stage breast cancer. 60 participants
Comparisons	Intervention: Booklet explaining trials, how treatment is selected in RCT, discussion of treatment options, examples of trials, where to get more info, advantages and disadvantages of participating + usual information from clinician, discussion of treatment which may include discussion of RCT, no standardisation of what is discussed Comparator: Usual information from clinician, discussion of treatment which may include discussion of RCT, no standardisation of what is discussed
Outcomes	Willingness to take part in hypothetical trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	Text says 'randomised centrally' but not clear what this means
Blinding?	Unclear	Not clear what participants were told. Not clear if clinicians providing general advice knew allocation
Objective outcomes?	No	Hypothetical trial

Ford 2004

Methods	Randomised controlled trial
Data	Setting: community, USA. African American men aged 55 to 74 eligible for a prostate, lung and colorectal cancer screening trial. 12,400 participants
Comparisons	Investigated the effect of different trial information and consent methods Intervention A: Enhanced recruitment letter, telephone call by African American interviewer, baseline information by mail, reminder calls/mailings for baseline information/consent Intervention B: Enhanced recruitment letter, telephone call by African American interviewer, baseline information over telephone, reminder calls/mailings for consent form Intervention C: Enhanced recruitment letter, telephone call by African American interviewer, church session, baseline information at church session Compared to standard recruitment letter, telephone assessment by African American or Caucasian interviewer, baseline information by mail, reminder calls/mailings for baseline information/consent
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - B: Moderate risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Potential participants were blinded but the researchers probably were not blinded
Objective outcomes?	Yes	Proportion recruited to trial

Fowell 2006

Methods	Randomised controlled trial
Data	Setting: secondary care, UK. Cancer inpatients receiving palliative care and starting on a syringe driver. 53 participants
Comparisons	Investigated the effect of different trial designs Cluster randomisation compared to Zelen's design (in which only those randomised to the intervention group were asked for consent)
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description

Fowell 2006 (*Continued*)

Allocation concealment?	Unclear	No details given
Blinding?	Yes	Blinding only partial but looking at the effect of open study design was the purpose of the study
Objective outcomes?	Yes	Proportion recruited to trial

Free 2010

Methods	Randomised controlled trial
Data	Setting: Community, UK. Participants were daily smokers, 16 or over, wanting to stop smoking in next month. 1302 participants
Comparisons	Investigated whether including GBP £5 with invitation increased recruitment and does sending SMS messages to potential participants increase recruitment? Intervention A: GBP £5 with participant info sheet and consent form Intervention B: series of 4 text messages with quotes from existing participants Comparator: normal trial procedures - letter with participant information sheet and consent form
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - A: Low risk of bias

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	Adequate
Blinding?	Yes	Those assessing outcomes were blinded
Objective outcomes?	Yes	Proportion recruited to trial

Freer 2009

Methods	Randomised controlled trial
Data	Setting: secondary care, UK. Participants were parents of immature infant(s) were admitted to a large tertiary NICU but which did not require intensive care (i.e. not requiring mechanical ventilation or continuous observation). 41 participants
Comparisons	Intervention A: US trial leaflet with explanation Intervention B: US trial leaflet alone

	Intervention C: UK trial leaflet with explanation Intervention D: UK trial leaflet alone
Outcomes	Willingness to take part in a hypothetical study
Notes	Overall risk of bias - B: Moderate risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Unclear	Depends what researchers providing standard statements knew and what participants were told about the study
Objective outcomes?	No	Hypothetical trial

Fureman 1997

Methods	Randomised controlled trial
Data	Setting: university, USA. Participants in the Risk Assessment Project (injection drug users). 188 participants
Comparisons	Investigated the effect of different trial information methods Enhanced video on an HIV vaccine trial plus 1-hour pamphlet presentation (5 minutes pre-test, 26 minutes of video, 10 minutes to review pamphlet, research assistant initiated question and answer session, post-test questionnaire, survey at 1 month. This was compared to standard half-hour pamphlet-only presentation (5 minutes pre-test, 10 minutes to review trial information pamphlet, research assistant initiated question and answer session, post-test questionnaire, survey at 1 month
Outcomes	Willingness to take part in hypothetical trial (expressed as a score on a willingness scale)
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Not clear how much participants were told before the study, not clear what the research assistant running sessions knew about randomisation; probably knew that video was the intervention. Assistant could in principle influence post-test questionnaire responses of participants because these

Fureman 1997 (*Continued*)

		were done during the session
Objective outcomes?	No	Hypothetical trial

Graham 2007

Methods	Quasi-randomised controlled trial
Data	Setting: health maintenance organisation, USA. Participants were patients aged 18 or over attending the HMO with an acute injury. 370 participants
Comparisons	Investigated the effect of different methods of pre-screening participants Intervention A: Electronic questionnaire on hazardous drinking and willingness to participate in lifestyle intervention Intervention B: Oral questionnaire read aloud to patients in the clinic, potential answers printed on cards and patients asked to point Compared to standard self complete paper questionnaire
Outcomes	Willingness to take part in a hypothetical trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	No	By week
Blinding?	Yes	Potential participants probably blind but not researchers or practice staff
Objective outcomes?	No	Hypothetical trial

Halpern 2004

Methods	Randomised controlled trial
Data	Setting: secondary care, USA. Participants who had mild to moderate hypertension and who met standard entry criteria (unclear what these are) for phase 2 and 3 trials at the clinic), attending clinic on selected interview days. Exclusion criteria were unable/unwilling to give oral informed consent and any exclusion criteria for the current Phase 3 trials at the clinic (it was unclear what these were). 126 participants
Comparisons	Intervention A: The variables altered were (1) information regarding the percentage of previous patients who experienced adverse effects from the study drug (10%, 20% and 30%) and (2) the payment participants would receive (USD $100, $1000, and $2000)

Halpern 2004 (*Continued*)

	Intervention B: the variables altered were (1) the percentage of patients who would be assigned to placebo (10%, 30% and 50%) and (2) the payment level
Outcomes	Willingness to participate in a hypothetical trial (patients were told the trial was real but then told trial was not but after decision, so still not a real decision)
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	Participants were selected on alternate days of the week
Blinding?	No	Participants blind but not investigator who could, in principle, influence their responses because data collection was via interview
Objective outcomes?	No	Hypothetical trial

Harris 2008

Methods	Cluster-randomised controlled trial
Data	Setting: community, UK. Participants were aged ≥ 65 years, able to walk outside the home and registered with a 6-partner general practice (primary health care centre). Those living in care homes, those with dementia, terminal illness, poorly controlled cardiac failure or unstable angina and those housebound due to disability were excluded by computer record search and by general practitioner and district nurse examination of patient lists. Patients undergoing active follow-up in another research study at the practice (investigating the effect of fish oils on cognitive function) were also excluded. 560 participants
Comparisons	Intervention A: Personalised letter + info sheet Intervention B: Personalised letter + info sheet + 12-page questionnaire asking about physical health, mood, ability to perform daily activities etc. Intervention C: Personalised letter + info sheet +telephone reminders (up to 4) Intervention D: Personalised letter + info sheet + 12-page questionnaire asking about physical health, mood, ability to perform daily activities etc + telephone reminders (up to 4)
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - A: Low risk of bias. Clustering was accounted for in analysis

Risk of bias

Item	Authors' judgement	Description

Harris 2008 (*Continued*)

Allocation concealment?	Yes	Adequate
Blinding?	Yes	Participants were blinded. Research nurse was not.
Objective outcomes?	Yes	Proportion recruited to trial

Hemminki 2004

Methods	Randomised controlled trial
Data	Setting: 'local clinics', Estonia. Postmenopausal women aged 50 to 64. 4295 participants
Comparisons	Investigated the effect of different design methods Non-blinded allocation comparing active HRT treatment versus no treatment. This was compared to traditional blinded allocation comparing active HRT treatment versus placebo
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - A: Low risk of bias

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	Adequate
Blinding?	Yes	Blinding only partial but looking at the effect of open study design was the purpose of the study
Objective outcomes?	Yes	Proportion recruited to trial

Hutchison 2007

Methods	Randomised controlled trial
Data	Setting: secondary care, UK. Patients with colorectal, breast, lung cancer and clinically eligible to enter one of centre's trials; access to a video recorder, CD-ROM or DVD player; can understand English. 173 participants
Comparisons	Intervention: Video covering general trial info, randomisation, pictures of patients receiving care + voiceover discussing uncertainty + standard practice (clinician discussing treatment options and possibility of taking part in a trial) + standard practice Comparator: Standard practice (clinician discussing treatment options and possibility of taking part in a trial)
Outcomes	Proportion recruited to trial

Notes	Overall risk of bias - A: Low risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Unclear	Not clear if patients know about video versus normal info when consenting. Staff may also be unblinded although materials are sent to them at home and all participants receive standard care so probably small chance of introducing bias
Objective outcomes?	Yes	Proportion recruited to trial

Ives 2001

Methods	Randomised controlled trial
Data	Setting: secondary care, UK. Patients attending an HIV hospital clinic. 50 participants
Comparisons	Investigated the effect of different trial information methods Standard trial information plus booklet entitled, "Clinical Trials in HIV and AIDS: Information for people who are thinking about joining a trial". This was compared to standard trial information (information sheet specific to proposed trial, plus discussion with trial doctor and research nurse)
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	No	Patients and investigators not blinded
Objective outcomes?	Yes	Proportion recruited to trial

Jeste 2009

Methods	Randomised controlled trial
Data	Setting: secondary care, USA. Participants were > 40 years, with schizophrenia, fluency in English and an absence of a Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV), 34 diagnosis of current substance use disorder, dementia or other known conditions likely to influence decisional capacity independent of the effects of schizophrenia and/or by verbal report from the patients' treating clinicians. 128 participants
Comparisons	Intervention: DVD presenting key information from consent form plus a narrator explaining consent relevant info, video and slides as well. A Research Assistant also was there to answer questions. Comparator: Printed consent information plus a 10-minute control DVD giving general info about research. A Research Assistant also was there to answer questions
Outcomes	Willingness to participate in a hypothetical trial
Notes	Overall risk of bias - B: Moderate risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Yes	Researchers were blind but not clear how much participants knew about aim of study. They probably were blind
Objective outcomes?	No	Hypothetical trial

Karunaratne 2010

Methods	Randomised controlled trial
Data	Setting: secondary care, Australia. Participants were English speaking, computer-literate patients with diabetes aged 18 to 70, able to travel to hospital. 60 participants
Comparisons	Intervention: Computer-based presentation of information on leaflet but with interactive explanatory features, e.g. text linked to keywords, video clips Comparator: Paper-based information
Outcomes	Willingness to take part in a hypothetical trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description

Karunaratne 2010 (*Continued*)

Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Unclear if participants knew nature of the intervention when consenting. Not clear if staff doing one-to-one interviews were blinded
Objective outcomes?	No	Hypothetical trial

Kendrick 2001

Methods	Randomised controlled trial
Data	Setting: primary care, UK. Families with children aged under 5 years, living in deprived areas. 2393 participants
Comparisons	Investigated the effect of different trial information methods Mailed invitation to participate in an injury prevention trial, including a home safety questionnaire. This was compared to mailed invitation to participate excluding the home safety questionnaire
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - A: Low risk of bias

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	Adequate
Blinding?	Yes	Participants blinded, but researchers know (probably). However, because mailed questionnaire no way researchers could influence result
Objective outcomes?	Yes	Proportion recruited to trial

Kerr 2004

Methods	Randomised controlled trial
Data	Setting: Further Education colleges, UK. Participants were 18+ and enrolled on further education and leisure courses. 130 participants
Comparisons	Investigated the effect of describing trial treatments as new or standard for two disease areas, arthritis and back pain Intervention A: arthritis: treatment A described as standard, treatment B described as standard Intervention B: arthritis: treatment A described as new, treatment B described as standard Intervention C: arthritis: treatment A described as new, treatment B described as new Intervention D: back pain: treatment A described as standard, treatment B described as standard Intervention E: back pain: treatment A described as new, treatment B described as standard

Kerr 2004 (*Continued*)

	Intervention F: back pain: treatment A described as new, treatment B described as new
Outcomes	Willingness to participate in a hypothetical trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	Although starting point was selected randomly, from then on there is no concealment because the scenarios were ordered consecutively from a starting point
Blinding?	Unclear	Students were probably blind but not clear about staff
Objective outcomes?	No	Hypothetical trial

Kimmick 2005

Methods	Cluster-randomised controlled trial
Data	Setting: secondary care and academic institutions, USA. Practitioners and researchers from Cancer and Leukaemia Group B (CALGB) institutions. 126 centres
Comparisons	Investigated the effect of different trial information methods Educational intervention of standard information plus an educational symposium, geriatric oncology educational materials, monthly mailings and e-mails for 1 year, lists of available protocols for use on patient charts, case discussion seminar. This was compared to standard information of periodic notification of all existing CALGB trials by the CALGB Central Office, and CALGB web site access
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - C: High risk of bias. Clustering was accounted for in the analysis

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Not clear what details were given to the participants about the study before it started
Objective outcomes?	Yes	Proportion recruited to trial

Larkey 2002

Methods	Cluster-randomised controlled trial
Data	Setting: various existing trial sites, USA. Participants in the Women's Health Initiative trial. 96 participants
Comparisons	Investigated the effect of different methods of training lay advocates for trials Intervention A: Hispanic lay advocates; attended 6 hour-long training sessions, 5 quarterly meetings and received brochures with interest cards to distribute to other women Intervention B: Hispanic women controls, received quarterly telephone calls and brochures with interest cards to distribute to other women Compared to Anglo women controls, received quarterly telephone calls and brochures with interest cards to distribute to other women
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - B: Moderate risk of bias. Clustering was not accounted for in the analysis

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Not clear if the participants were blinded
Objective outcomes?	Yes	Proportion recruited to trial

Litchfield 2005

Methods	Cluster-randomised controlled trial
Data	Setting: primary care, UK. Participants were general practices participating in a trial of 2 delivery systems for insulin, NovoPen and Innovo. 28 practices were involved, which recruited 73 participants
Comparisons	Intervention: electronic data capture Comparator: paper data capture
Outcomes	Number of participants recruited to the trial. Improving recruitment was not the main aim (improving efficiency was the main aim) of the study though this information is provided
Notes	Overall risk of bias - B: Moderate risk of bias. Clustering was not accounted for in analysis

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	Adequate

Litchfield 2005 (*Continued*)

Blinding?	Unclear	Investigators knew that both paper and electronic data collection were to be used so study was not blinded. Unlikely that patient decisions to join study would be affected by this. Not clear how much influence knowledge of data collection method might have had on practices
Objective outcomes?	Yes	Number of participants recruited to the trial. Improving recruitment was not the main aim (improving efficiency was the main aim) of the study though this information is provided

Liénard 2006

Methods	Cluster-randomised controlled trial
Data	Setting: secondary care, France. Centres recruiting to a randomised controlled trial for breast cancer. 573 participants
Comparisons	Investigated the effect of organising visits by the trial co-ordination team to centres participating in a multicentre trial Site visits including an initiation visit to review trial protocol, inclusion/exclusion criteria, safety, randomisation etc. plus ongoing review visits. This was compared to no site visits (unless requested)
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - A: Low risk of bias. Clustering was not accounted for in the analysis

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	Adequate
Blinding?	Yes	Centres blind. Somewhat unclear if monitors were blind but probably were not
Objective outcomes?	Yes	Proportion recruited to trial

Llewellyn-Thomas 1995a

Methods	Randomised controlled trial
Data	Setting: secondary care, Canada. Colorectal cancer patients attending cancer hospital as outpatients. 90 participants
Comparisons	Investigated the effect of different trial information methods Intervention A: Booklet with negatively-framed intervention about treatment side effects and survival

Llewellyn-Thomas 1995a (*Continued*)

	Intervention B: Booklet with positively-framed intervention about treatment side effects and survival Compared to booklet with neutrally-framed intervention about treatment side effects and survival
Outcomes	Proportion recruited to hypothetical trial
Notes	Overall risk of bias - B: Moderate risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Yes	Interviewer was blinded, but unclear about participants
Objective outcomes?	No	Hypothetical trial

Llewellyn-Thomas 1995b

Methods	Randomised controlled trial
Data	Setting: secondary care, Canada. Patients attending the outpatient department of a cancer hospital. 100 participants
Comparisons	Investigated the effect of different trial information methods Searchable computerised information on a hypothetical trial, including purpose, description of treatment group and randomisation, possible benefits, side effects and patients' rights. This was compared to tape-recorded information on a hypothetical trial, including purpose, description of treatment arm and randomisation, possible benefits, side effects and patients' rights
Outcomes	Proportion recruited to hypothetical trial
Notes	Overall risk of bias - B: Moderate risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Unclear	Unclear if the interviewer or the participants were blinded. It depends on what the participants were told. Interviewer did not seem to do more than help with equipment, so perhaps limited room for bias
Objective outcomes?	No	Hypothetical trial

Mandelblatt 2005

Methods	Randomised controlled trial
Data	Setting: community cancer clinics, USA. Participants were eligible for cancer prevention trial (high risk of breast cancer but low risk of side effects). 450 participants
Comparisons	Intervention: 5 10-minute educational session about STAR cancer prevention trial following short interview about prior knowledge, risk perceptions and background. Education emphasised benefits of participation, lack of financial burden and need for minority participation in trials. Also given a brochure. Comparator: Brochure plus short background interview
Outcomes	Intention/likelihood of taking part in STAR cancer prevention trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Not clear how much info participants given about intervention during consent process
Objective outcomes?	No	Intention to participate, not actual participation

Miller 1999

Methods	Quasi-randomised controlled trial
Data	Setting: USA, secondary care, 347 participants. Participants were eligible for 1 of the 2 trials being run through the unit: 18 to 75 years old and DSM-IV dysthymic disorder, double depression (major depression superimposed on antecedent dysthymia), or chronic major depression. Exclusion criteria were 1) history of psychosis, mania or hypomania, 2) comorbid substance abuse, 3) severe medical illness, 4) failed 3 adequate trials of antidepressants from 2 different classes of antidepressants in the past 3 years and 5) failed study medication or study psychotherapy
Comparisons	Investigated whether screening my research assistants was more cost-effective than by senior investigators Intervention: screening by senior investigator Comparator: screening by research assistant
Outcomes	Proportion recruited to trials
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description

Miller 1999 (*Continued*)

Allocation concealment?	No	Alternating screening calls were given to senior investigator
Blinding?	No	Investigator and research assistants knew allocation
Objective outcomes?	Yes	Proportion recruited to trials

Monaghan 2007

Methods	Cluster-randomised controlled trial
Data	Setting: existing, multicentre, international trial. Clinical sites in 19 countries recruiting to a diabetes and vascular disease treatment trial. 167 centres
Comparisons	Investigated the effect of different levels of communication between the trial co-ordination team and participating sites Additional communication - usual plus frequent emails, regular personalised mail-outs of league tables/ graphs of performance against other sites, certificates of achievement for recruitment/other study items (one per month). This was compared to usual communication (provided via the regional centre) plus occasional direct communications from the co-ordinating centre in the form of generic newsletters, emails and faxes
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - A: Low risk of bias. Clustering was not accounted for in analysis

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	Adequate
Blinding?	Yes	Centres were blinded, but the central office was not blind
Objective outcomes?	Yes	Proportion recruited to trial

Myles 1999

Methods	Randomised controlled trial
Data	Setting: secondary care, Australia. Inpatients aged 18 or over, scheduled for elective surgery. 769 participants
Comparisons	Investigated the effect of different consent methods Intervention A: Pre-randomised to experimental drug and asked to provide consent; if no consent, standard treatment given Intervention B: Pre-randomised to standard drug and asked to provide consent; if no consent, experimental

Myles 1999 (*Continued*)

	treatment given Intervention C: Told that the physician thinks experimental drug superior, if consent given, has 70% chance of receiving this; if no consent, standard treatment given Intervention D: Allowed to increase or decrease their chance of receiving the experimental drug if consent given, and if no preference, 50% chance of receiving it; if no consent, standard treatment given Compared to standard randomisation method (equal chance of experimental or standard drug)
Outcomes	Proportion recruited to hypothetical trial
Notes	Overall risk of bias - B: Moderate risk of bias

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	Adequate
Blinding?	Yes	Patient is blinded (they are not told the exact details of the study in the patient information). Researchers (probably) knew the allocation
Objective outcomes?	No	Hypothetical trial

Nystuen 2004

Methods	Randomised controlled trial
Data	Setting: community, Norway. Sick-listed employees attending a participating social security office. 498 participants
Comparisons	Investigated the effect of different telephone reminders Written invitation to participate in a community-based trial followed by a telephone reminder if no response within 2 weeks; guide used for discussion. This was compared to written invitation to participate in a community-based trial followed by no reminder if no response within 2 weeks
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - A: Low risk of bias

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	Adequate

Blinding?	Yes	Participants were blinded but not the research team, although the team do not contact the control group
Objective outcomes?	Yes	Proportion recruited to trial

Perrone 1995

Methods	Randomised controlled trial
Data	Setting: community, Italy. Members of the general public aged under 80 years, attending a scientific exhibition. 3573 participants
Comparisons	Intervention A: 1-sided informed consent (subjects refusing were given standard treatment) Intervention B: 2-sided informed consent (subjects refusing could choose between experimental and standard treatment) Intervention C: randomised to experimental (subjects refusing were given standard treatment) Intervention D: randomised to standard (subjects refusing were given experimental treatment)
Outcomes	Willingness to participate in a hypothetical trial
Notes	This is same trial as Gallo 1995 but Perrone 1995 includes participants under 20 Overall risk of bias - C: High risk of bias

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Not clear what participants were told. Researchers unblinded and since researcher asked participants for his/her views at end of test, there is the potential for bias
Objective outcomes?	No	Hypothetical trial

Pighills 2009

Methods	Randomised controlled trial
Data	Setting: community, UK. Participants were over 70 and on a participating GP's list. 4488 participants
Comparisons	Intervention A: Newspaper article about the trial Intervention B: More favourable newspaper article about the trial

	Intervention C: The original newspaper article Comparator: No article (i.e. usual recruitment materials)
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - B: Moderate risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	Control and intervention were stacked alternately in packs given to GP practice
Blinding?	Yes	Recipients and practice staff blinded
Objective outcomes?	Yes	Proportion recruited to trial

Simel 1991

Methods	Randomised controlled trial
Data	Setting: secondary care, USA. Patients attending an ambulatory care clinic. 100 participants
Comparisons	Investigated the effect of different consent methods Consent form including a statement that the new treatment may work twice as fast as usual treatment. This was compared to a consent form including a statement that the new treatment may work half as fast as usual treatment
Outcomes	Number consenting (inferred from data rather than being an outcome presented by authors)
Notes	Overall risk of bias - B: Moderate risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Unclear	Participants probably were blind but the investigators were not. Investigators got an independent reviewer to look at a portion of interviews and he/she thought they were fair. They also used a script so less room for investigator initiative
Objective outcomes?	No	Number consenting not presented as an outcome but inferred from data

Simes 1986

Methods	Randomised controlled trial
Data	Setting: secondary care, Australia. Patients attending an oncology unit. 57 participants
Comparisons	Investigated the effect of different consent methods Individual approach to consent - patients given information about aims, expected results, potential toxicities of treatment; details of treatment left to discretion of consultant; patients given opportunity to ask questions, verbal consent obtained. This was compared to total disclosure approach - patients were fully informed about all trial aspects by consultant: patients given opportunity to ask questions, also given a consent form outlining the information; this was kept overnight and written consent was obtained the following day
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - A: Low risk of bias

Risk of bias

Item	**Authors' judgement**	**Description**
Allocation concealment?	Yes	Adequate
Blinding?	Unclear	Participants were probably blinded. Clinicians were probably not blinded. It is not clear if it is the same clinicians provided information in to both groups
Objective outcomes?	Yes	Proportion recruited to trial

Treschan 2003

Methods	Randomised controlled trial
Data	Setting: secondary care, Austria. Participants were patients undergoing minor surgery with general anaesthetic, 19 to 80 years old. Exclusion criteria were pain, cancer, unable to give unformed consent, could not speak German. 150 participants
Comparisons	Investigated the effect of mentioning risk or discomfort on recruitment Intervention A: Said no risk but emphasised the painful nature of tests etc Intervention B: Said no pain but emphasised risk Comparator: Said extra oxygen is harmless and the wound evaluations are painless. This study thus poses essentially no risk and will not produce any significant pain
Outcomes	Willingness to participate in a hypothetical trial - patients were not told the trial was hypothetical until after decision to take part but still not a real decision
Notes	Overall risk of bias - B: Moderate risk of bias

Risk of bias

Treschan 2003 (*Continued*)

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Unclear	Participants were blinded (just given general statement that study was about pain and risk) but not clear if interviewers were. They were however told not to give personal comments to influence the decision-making process
Objective outcomes?	No	Hypothetical trial

Trevena 2006

Methods	Randomised controlled trial
Data	Setting: primary care, Australia. Patients aged 50 to 74 eligible for a colorectal cancer screening trial. 152 participants
Comparisons	Investigated the effect of different trial information methods Opt-in recruitment; letter from doctor advising that the practice is taking part in screening trial; would only be contacted if contact details returned. This was compared to opt-out recruitment; letter from doctor advising that the practice is taking part in screening trial; would be contacted unless the practice was advised to withhold contact details The distribution of participants between intervention and comparison groups is uneven: 60 versus 92, respectively. This was due to a change in legislation in Australia, which meant that the trialists could no longer continue with the opt-out procedure and had to change to opt-in to keep their ethical approval
Outcomes	Proportion recruited to trial
Notes	Overall risk of bias - A: Low risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Yes	Participants not told about different recruitment methods. Not clear if clinicians were blinded but they were not involved in recruitment, which was done by letter and then contact with research team
Objective outcomes?	Yes	Proportion recruited to trial

Wadland 1990

Methods	Randomised controlled trial
Data	Setting: primary care, USA. Participants were smokers, > 18 years old. 104 participants
Comparisons	Intervention: Consent form read out by researcher Comparator: Consent form read by patient
Outcomes	Proportion recruited to trial
Notes	Only Site 2 in the study ran a randomised evaluation so only its data are included Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Not clear if the participants were told about how consent might be varied
Objective outcomes?	Yes	Proportion recruited to trial

Weinfurt 2008a

Methods	Randomised controlled trial
Data	Setting: community, USA. 18 or over and diagnosed with coronary artery disease. 3623 participants
Comparisons	Intervention A: Drug company pays investigator running costs plus general statement saying ethics committee did not think this would affect patient safety Intervention B: Drug company pays investigator money for things outside the study plus general statement saying ethics committee did not think this would affect patient safety Intervention C: Investigator owns part of drug company plus general statement saying ethics committee did not think this would affect patient safety. Intervention D: Institution owns part of drug company plus general statement saying ethics committee did not think this would affect patient safety Comparator: Generic financial disclosure: general statement about investigator possibly gaining financially plus general statement saying ethics committee did not think this would affect patient safety
Outcomes	Willingness to take part in hypothetical trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Weinfurt 2008a (*Continued*)

Item	Authors' judgement	Description
Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Not clear what participants were told about the purpose of the study although there were 5 disclosure statements so everyone got a statement (i.e. hard to tell which group they were in). Participants completed a questionnaire (probably) so research team unable to influence
Objective outcomes?	No	Hypothetical trial

Weinfurt 2008b

Methods	Randomised controlled trial
Data	Setting: community but recruited through outpatient dept, USA. Participants were 18 or over and diagnosed with coronary artery disease. 470 participants
Comparisons	Intervention A: Financial disclosure saying that the drug company pays hospital Intervention B: Financial disclosure saying that the drug company pays the investigator Comparator: No financial disclosure
Outcomes	Willingness to take part in hypothetical trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Unclear	No details given
Blinding?	Unclear	Not clear what participants were told about disclosure study; not clear if interviewers knew allocation
Objective outcomes?	No	Hypothetical trial

Welton 1999

Methods	Quasi-randomised controlled trial
Data	Setting: primary care, UK. Women aged 45 to 64 who had not had a hysterectomy. 436 participants

Welton 1999 (*Continued*)

Comparisons	Investigated the effect of different trial information methods Verbal information about a trial of HRT, comparing oestrogen only versus combined oestrogen and progestogen. This was compared to verbal information about a trial of HRT, comparing oestrogen only, versus combined oestrogen and progestogen, versus placebo
Outcomes	Willingness to take part in hypothetical trial
Notes	Overall risk of bias - C: High risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	No	By week
Blinding?	Yes	Participants were blinded but the nurses were not
Objective outcomes?	No	Hypothetical trial

Weston 1997

Methods	Randomised controlled trial
Data	Setting: secondary care, Canada. Women attending for antenatal visits. 90 participants
Comparisons	Investigated the effect of different trial information methods Written study information followed by viewing of Term Prelabour Rupture of the Membranes (Term PROM) video. This was compared to written study information only
Outcomes	Proportion recruited to hypothetical trial
Notes	Overall risk of bias - B: Moderate risk of bias

Risk of bias

Item	Authors' judgement	Description
Allocation concealment?	Yes	Adequate
Blinding?	Unclear	Depends if the women were told they might watch a video - they probably were told. Women completed a questionnaire so they were probably not influenced by the study nurse
Objective outcomes?	No	Hypothetical trial

HRT: hormone replacement therapy

NICU: neonatal intensive care unit
RCT: randomised controlled trial

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

Study	Reason for exclusion
Aaronson 1996	Not studying a recruitment intervention
Alexander 2008	Not recruiting to a trial
Andrew 1993	Used Zelen design but its use was not part of a randomised evaluation of the design to increase recruitment
Berman 2005	Not randomised
Brealey 2007	Not randomised
Burns 2008	Not studying a recruitment intervention
Caldwell 2002	An earlier version of work later published in a systematic review (Caldwell PHY et al. Strategies for increasing recruitment to randomised controlled trials: systematic review. PLoS Med 7(11): e1000368), the references of which were checked for this Cochrane Review
Calimlim 1977	Not studying a recruitment intervention
Celentano 1995	Recruiting to a survey
Chin Feman 2008	Not randomised
Dal-Ré 1991	Not recruiting to a randomised controlled trial (simulated trial was a non-randomised Phase 1 study)
Davis 1998	Not randomised
Donovan 2009	Not randomised
Feman 2008	Not randomised
Gallo 1995	This study presents a subset of the data given in Perrone 1995, which is included in this review
Gillon 2009	Not studying a recruitment intervention
Ginexi 2003	Not randomised
Gitanjali 2003	Allocation not randomised
Gomez 1998	Letter
Halpern 2002	Allocation not randomised

(*Continued*)

Jay 2007	Not studying a recruitment intervention
Ji 2008	Allocation not randomised
Junghans 2005	Not recruiting to a trial but to an observational study of patients with angina
Karlawish 2008	Allocation not randomised
Kelechi 2010	Allocation not randomised
Kernan 2009	Hospitals not randomised to intervention
Kiernan 2000	Studying response to an advertisement not actual recruitment
Korde 2009	Allocation not randomised
Kruse 2000	Looking at impact on knowledge, not recruitment
Lancet 2001	Editorial
Lang 1991	Not studying a recruitment intervention
Larkey 2009	Allocation not randomised
Leader 1978	Allocation not randomised
Lichter 1991	Editorial
Lloyd-Williams 2002	Not studying a recruitment intervention
Macias 2005	Not studying a recruitment intervention
Marco 2008	Not recruiting to a trial
Masood 2006	Not recruiting to a trial
May 2007	Not studying a recruitment intervention
Menoyo 2006	Not studying a recruitment intervention
Monane 1991	Not studying a recruitment intervention
Olver 2009	Not recruiting to a trial
Paskett 2002	Allocation not randomised
Perri 2006	Allocation not randomised

(*Continued*)

Quinaux 2003	An earlier version of Liénard 2006, which is included in this review
Rogers 1998	Studying recall, understanding and satisfaction rather than effect on recruitment
Saul 2002	News item
Scholes 2007	Not recruiting to a trial
Schrott 1982	Not studying a recruitment intervention
Ubel 1997	Allocation not randomised
Unger 2006	Not studying a recruitment intervention
Wragg 2000	Allocation not randomised
Yates 2009	Not randomised

The majority of the studies that we considered in detail but excluded arose from articles that we ordered because the database reference gave no abstract and it was not possible to exclude on the basis of the title. The majority of articles falling into this category were excluded as soon as the full text was checked, with the most common reason being that the study did not evaluate a recruitment intervention.

The two exceptions are Aaronson 1996 and Kiernan 2000, which we excluded at the data extraction stage for the reasons given in the table.

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

Brocklehurst 2007

Methods	
Data	
Comparisons	
Outcomes	
Notes	Full text to be obtained

Cramer 1993

Methods	
Data	
Comparisons	
Outcomes	
Notes	Full text to be obtained

Free 2011

Methods	Recruitment method evaluation embedded in Txt2Stop trial
Data	
Comparisons	Text message reminder suggesting places on trial were scarce versus just text message reminder
Outcomes	Number recruited
Notes	Published after search was run but looks like it will be included in next update

Glen 1980

Methods	
Data	
Comparisons	
Outcomes	
Notes	Full text to be obtained

Greenlee 2003

Methods	
Data	
Comparisons	
Outcomes	
Notes	Full text to be obtained

DATA AND ANALYSES

Comparison 1. Open RCT vs Blinded RCT

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	2	4833	Risk Ratio (M-H, Random, 95% CI)	1.22 [1.09, 1.36]

Comparison 2. Placebo vs other comparator

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	436	Risk Ratio (M-H, Fixed, 95% CI)	0.76 [0.59, 0.99]

Comparison 3. Patient preference design vs conventional RCT

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	273	Risk Ratio (M-H, Fixed, 95% CI)	0.95 [0.81, 1.11]

Comparison 4. Opt-out consent vs opt-in consent

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	152	Risk Ratio (M-H, Fixed, 95% CI)	1.39 [1.06, 1.84]

Comparison 5. Consent to experimental care vs usual consent

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	2	2456	Risk Ratio (M-H, Fixed, 95% CI)	1.01 [0.98, 1.05]

Comparison 6. Consent to standard care vs usual consent

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	2	1759	Risk Ratio (M-H, Random, 95% CI)	0.76 [0.49, 1.17]

Comparison 7. Refusers choose treatment vs usual consent

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	1592	Risk Ratio (M-H, Fixed, 95% CI)	0.94 [0.89, 0.98]

Comparison 8. Physician-modified consent vs usual consent

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	301	Risk Ratio (M-H, Fixed, 95% CI)	1.09 [0.90, 1.32]

Comparison 9. Participant-modified consent vs usual consent

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	301	Risk Ratio (M-H, Fixed, 95% CI)	1.02 [0.83, 1.24]

Comparison 10. Researcher reading out consent vs participant reading consent

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	104	Risk Ratio (M-H, Fixed, 95% CI)	1.12 [0.76, 1.65]

Comparison 11. Educational audiovisual information vs standard information

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	3	495	Risk Ratio (M-H, Random, 95% CI)	1.20 [0.75, 1.91]

Comparison 12. Educational audiovisual information + written information vs written information

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	90	Risk Ratio (M-H, Fixed, 95% CI)	1.75 [1.11, 2.74]

Comparison 13. Educational audiovisual information + help vs standard information + general audiovisual information + help

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	128	Risk Ratio (M-H, Fixed, 95% CI)	0.99 [0.78, 1.27]

Comparison 14. Telephone reminder vs no telephone reminder

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	2		Odds Ratio (Random, 95% CI)	1.95 [1.04, 3.66]

Comparison 15. Telephone reminder + questionnaire vs no reminder or questionnaire

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	280	Risk Ratio (M-H, Fixed, 95% CI)	1.17 [0.90, 1.51]

Comparison 16. Telephone screening vs face-to-face screening

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	469	Risk Ratio (M-H, Fixed, 95% CI)	1.26 [1.06, 1.50]

Comparison 17. SMS messages containing quotes from existing participants vs no messages

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	811	Risk Ratio (M-H, Fixed, 95% CI)	35.09 [2.12, 581.48]

Comparison 18. Enhanced recruitment package + recruitment at churches vs standard recruitment package

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	6246	Risk Ratio (M-H, Fixed, 95% CI)	1.37 [1.05, 1.78]

Comparison 19. Enhanced recruitment package vs standard recruitment package

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	6376	Risk Ratio (M-H, Fixed, 95% CI)	0.88 [0.65, 1.18]

Comparison 20. Enhanced recruitment package + baseline data over telephone vs standard recruitment package

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	6372	Risk Ratio (M-H, Fixed, 95% CI)	0.98 [0.74, 1.31]

Comparison 21. Electronic completion of screening questionnaire vs standard paper completion

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	292	Risk Ratio (M-H, Fixed, 95% CI)	0.85 [0.67, 1.07]

Comparison 22. Oral completion of screening questionnaire vs standard paper completion

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	219	Risk Ratio (M-H, Fixed, 95% CI)	1.00 [0.77, 1.29]

Comparison 23. Study-related questionnaire + trial invitation vs trial invitation

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	2		Odds Ratio (Random, 95% CI)	1.17 [0.74, 1.87]

Comparison 24. Clinical trial booklet + standard information vs standard information

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	2	91	Risk Ratio (M-H, Random, 95% CI)	1.11 [0.71, 1.72]

Comparison 25. Negative framing of side effects vs neutral framing

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	60	Risk Ratio (M-H, Fixed, 95% CI)	0.87 [0.63, 1.20]

Comparison 26. Positive framing of side effects vs neutral framing

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	60	Risk Ratio (M-H, Fixed, 95% CI)	0.78 [0.55, 1.11]

Comparison 27. Less detailed presentation of risk and other information vs more detailed presentation

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	19	Risk Ratio (M-H, Fixed, 95% CI)	1.2 [0.36, 3.97]

Comparison 28. Information leaflet with explanation vs information leaflet without explanation

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	37	Risk Ratio (M-H, Fixed, 95% CI)	1.51 [0.73, 3.10]

Comparison 29. Brief counselling + print materials vs print alone

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	450	Risk Ratio (M-H, Fixed, 95% CI)	1.14 [1.01, 1.28]

Comparison 30. Emphasising pain in information vs standard information

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	98	Risk Ratio (M-H, Fixed, 95% CI)	0.55 [0.36, 0.85]

Comparison 31. Emphasising risk in information vs standard information

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	97	Risk Ratio (M-H, Fixed, 95% CI)	0.41 [0.24, 0.68]

Comparison 32. Newspaper article + study information vs study information only

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	4488	Risk Ratio (M-H, Fixed, 95% CI)	1.03 [0.75, 1.42]

Comparison 33. More favourable newspaper article + study information vs Less favourable newspaper article + study information

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	2745	Risk Ratio (M-H, Fixed, 95% CI)	1.05 [0.73, 1.52]

Comparison 34. Interactive computer presentation of trial information vs standard paper presentations

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	60	Risk Ratio (M-H, Fixed, 95% CI)	1.35 [0.93, 1.96]

Comparison 35. Interactive computer presentation of trial information vs audio-taped presentation

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	100	Risk Ratio (M-H, Fixed, 95% CI)	1.48 [1.00, 2.18]

Comparison 36. Writing treatment effect is 'twice as fast' in trial information vs writing 'half as fast'

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	100	Risk Ratio (M-H, Fixed, 95% CI)	1.62 [1.10, 2.37]

Comparison 37. Total information disclosure vs standard disclosure

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	57	Risk Ratio (M-H, Fixed, 95% CI)	1.13 [0.93, 1.38]

Comparison 38. One new vs both standard (intervention description)

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	124	Risk Ratio (M-H, Fixed, 95% CI)	0.81 [0.66, 0.99]

Comparison 39. Screening by senior investigator vs screening by research assistant

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	347	Risk Ratio (M-H, Fixed, 95% CI)	1.45 [0.87, 2.44]

Comparison 40. Financial incentive vs no incentive

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Participant recruited	1	491	Risk Ratio (M-H, Fixed, 95% CI)	12.95 [1.71, 98.21]

Analysis 1.1. Comparison 1 Open RCT vs Blinded RCT, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 1 Open RCT vs Blinded RCT

Outcome: 1 Participant recruited

Study or subgroup	Open n/N	Blinded n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Hemminki 2004	134/180	233/358		41.8 %	1.14 [1.02, 1.28]
Avenell 2004	1027/2159	796/2136		58.2 %	1.28 [1.19, 1.37]
Total (95% CI)	**2339**	**2494**		**100.0 %**	**1.22 [1.09, 1.36]**

Total events: 1161 (Open), 1029 (Blinded)

Heterogeneity: $Tau^2 = 0.00$; $Chi^2 = 2.74$, df = 1 (P = 0.10); $I^2 = 64\%$

Test for overall effect: Z = 3.54 (P = 0.00041)

Test for subgroup differences: Not applicable

Analysis 2.1. Comparison 2 Placebo vs other comparator, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 2 Placebo vs other comparator

Outcome: 1 Participant recruited

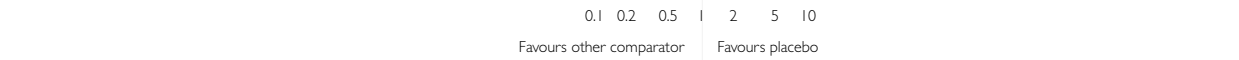
Study or subgroup	Placebo n/N	Other comparator n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Welton 1999	65/218	85/218		100.0 %	0.76 [0.59, 0.99]
Total (95% CI)	**218**	**218**		**100.0 %**	**0.76 [0.59, 0.99]**

Total events: 65 (Placebo), 85 (Other comparator)

Heterogeneity: not applicable

Test for overall effect: Z = 2.00 (P = 0.045)

Test for subgroup differences: Not applicable



Analysis 3.1. Comparison 3 Patient preference design vs conventional RCT, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 3 Patient preference design vs conventional RCT

Outcome: 1 Participant recruited

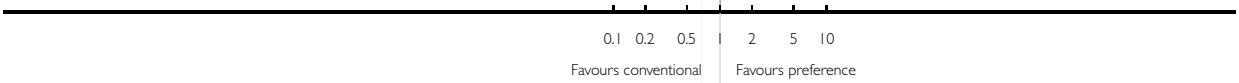
Study or subgroup	Patient preference design n/N	Conventional design n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Cooper 1997	90/135	97/138		100.0 %	0.95 [0.81, 1.11]
Total (95% CI)	**135**	**138**		**100.0 %**	**0.95 [0.81, 1.11]**

Total events: 90 (Patient preference design), 97 (Conventional design)

Heterogeneity: not applicable

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

Test for subgroup differences: Not applicable

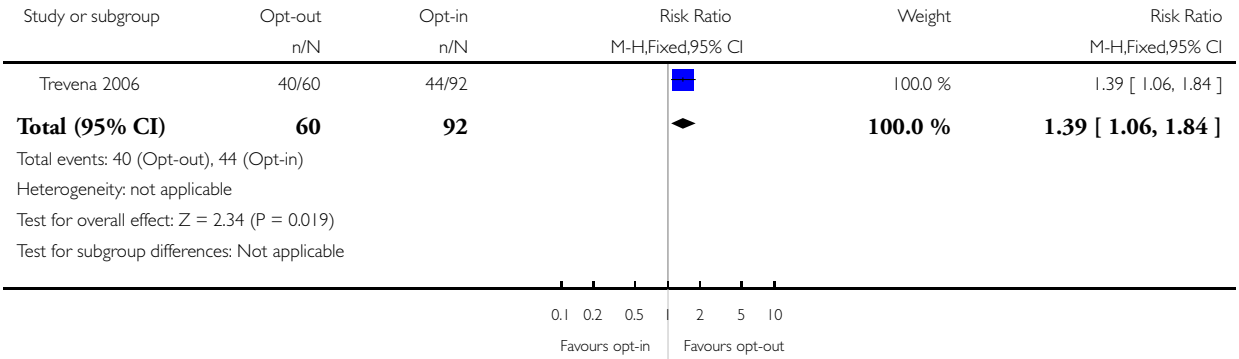


Analysis 4.1. Comparison 4 Opt-out consent vs opt-in consent, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 4 Opt-out consent vs opt-in consent

Outcome: 1 Participant recruited

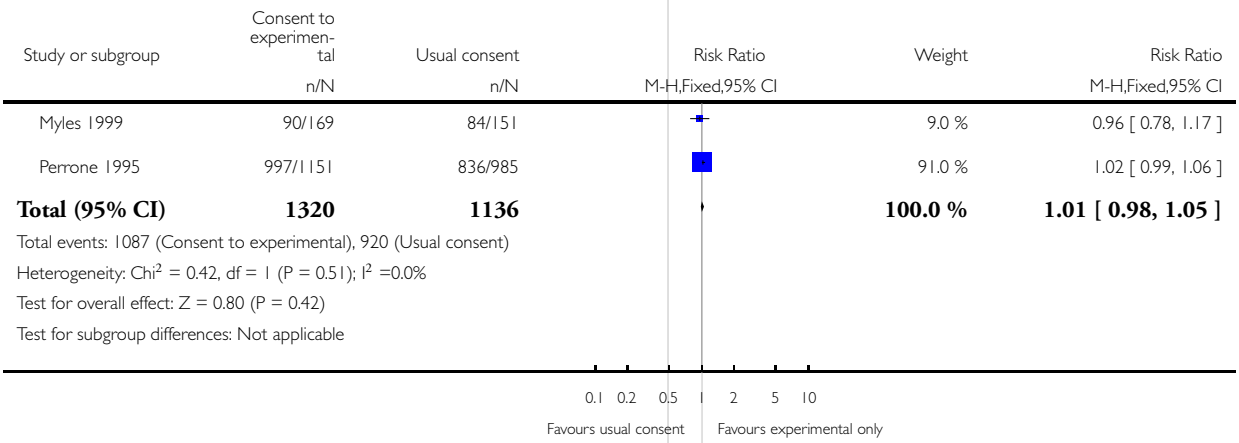


Analysis 5.1. Comparison 5 Consent to experimental care vs usual consent, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 5 Consent to experimental care vs usual consent

Outcome: 1 Participant recruited

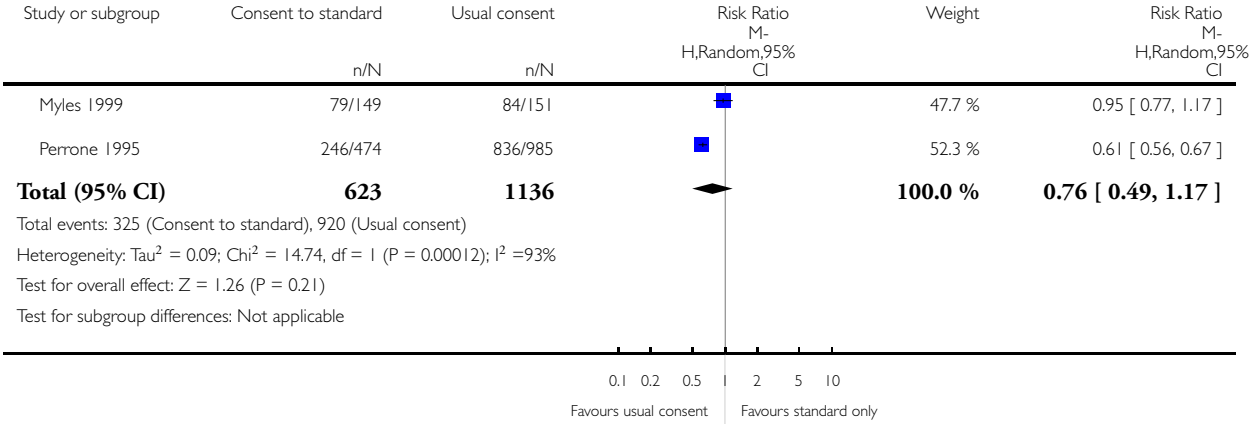


Analysis 6.1. Comparison 6 Consent to standard care vs usual consent, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 6 Consent to standard care vs usual consent

Outcome: 1 Participant recruited



Analysis 7.1. Comparison 7 Refusers choose treatment vs usual consent, Outcome 1 Participant recruited.

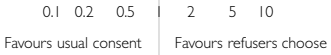
Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 7 Refusers choose treatment vs usual consent

Outcome: 1 Participant recruited

Study or subgroup	Refusers choose n/N	Usual consent n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Perrone 1995	482/607	836/985		100.0 %	0.94 [0.89, 0.98]
Total (95% CI)	**607**	**985**		**100.0 %**	**0.94 [0.89, 0.98]**

Total events: 482 (Refusers choose), 836 (Usual consent)
Heterogeneity: not applicable
Test for overall effect: Z = 2.70 (P = 0.0069)
Test for subgroup differences: Not applicable



Analysis 8.1. Comparison 8 Physician-modified consent vs usual consent, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 8 Physician-modified consent vs usual consent

Outcome: 1 Participant recruited

Study or subgroup	Physician modified n/N	Usual consent n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Myles 1999	91/150	84/151		100.0 %	1.09 [0.90, 1.32]
Total (95% CI)	**150**	**151**		**100.0 %**	**1.09 [0.90, 1.32]**

Total events: 91 (Physician modified), 84 (Usual consent)
Heterogeneity: not applicable
Test for overall effect: Z = 0.88 (P = 0.38)
Test for subgroup differences: Not applicable

Analysis 9.1. Comparison 9 Participant-modified consent vs usual consent, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 9 Participant-modified consent vs usual consent

Outcome: 1 Participant recruited

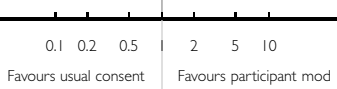
Study or subgroup	Participant modified n/N	Usual consent n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Myles 1999	85/150	84/151		100.0 %	1.02 [0.83, 1.24]
Total (95% CI)	**150**	**151**		**100.0 %**	**1.02 [0.83, 1.24]**

Total events: 85 (Participant modified), 84 (Usual consent)

Heterogeneity: not applicable

Test for overall effect: Z = 0.18 (P = 0.86)

Test for subgroup differences: Not applicable



Analysis 10.1. Comparison 10 Researcher reading out consent vs participant reading consent, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 10 Researcher reading out consent vs participant reading consent

Outcome: 1 Participant recruited

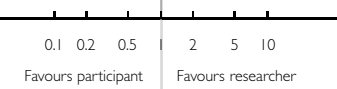
Study or subgroup	Researcher reads n/N	Participant reads n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Wadland 1990	27/51	25/53		100.0 %	1.12 [0.76, 1.65]
Total (95% CI)	**51**	**53**		**100.0 %**	**1.12 [0.76, 1.65]**

Total events: 27 (Researcher reads), 25 (Participant reads)

Heterogeneity: not applicable

Test for overall effect: Z = 0.59 (P = 0.56)

Test for subgroup differences: Not applicable



Analysis 11.1. Comparison 11 Educational audiovisual information vs standard information, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 11 Educational audiovisual information vs standard information

Outcome: 1 Participant recruited

Study or subgroup	AV information n/N	Usual information n/N	Risk Ratio M-H,Random,95% CI	Weight	Risk Ratio M-H,Random,95% CI
Du 2008	16/63	10/63		25.7 %	1.60 [0.79, 3.25]
Du 2009	10/98	6/98		16.9 %	1.67 [0.63, 4.41]
Hutchison 2007	62/86	66/87		57.3 %	0.95 [0.80, 1.13]
Total (95% CI)	**247**	**248**		**100.0 %**	**1.20 [0.75, 1.91]**

Total events: 88 (AV information), 82 (Usual information)

Heterogeneity: $Tau^2 = 0.09$; $Chi^2 = 4.00$, df = 2 (P = 0.14); $I^2 = 50\%$

Test for overall effect: Z = 0.75 (P = 0.46)

Test for subgroup differences: Not applicable

Analysis 12.1. Comparison 12 Educational audiovisual information + written information vs written information, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 12 Educational audiovisual information + written information vs written information

Outcome: 1 Participant recruited

Study or subgroup	AV+written n/N	Written n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Weston 1997	26/42	17/48		100.0 %	1.75 [1.11, 2.74]
Total (95% CI)	**42**	**48**		**100.0 %**	**1.75 [1.11, 2.74]**

Total events: 26 (AV+written), 17 (Written)

Heterogeneity: not applicable

Test for overall effect: Z = 2.43 (P = 0.015)

Test for subgroup differences: Not applicable

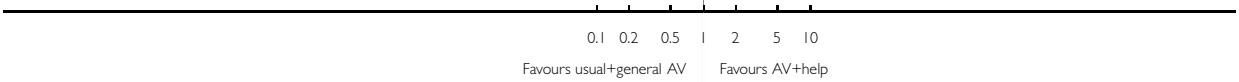
Analysis 13.1. Comparison 13 Educational audiovisual information + help vs standard information + general audiovisual information + help, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 13 Educational audiovisual information + help vs standard information + general audiovisual information + help

Outcome: 1 Participant recruited

Study or subgroup	AV+help n/N	Usual+general AV n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Jeste 2009	41/62	44/66		100.0 %	0.99 [0.78, 1.27]
Total (95% CI)	**62**	**66**		**100.0 %**	**0.99 [0.78, 1.27]**
Total events: 41 (AV+help), 44 (Usual+general AV)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.06 (P = 0.95)					
Test for subgroup differences: Not applicable					

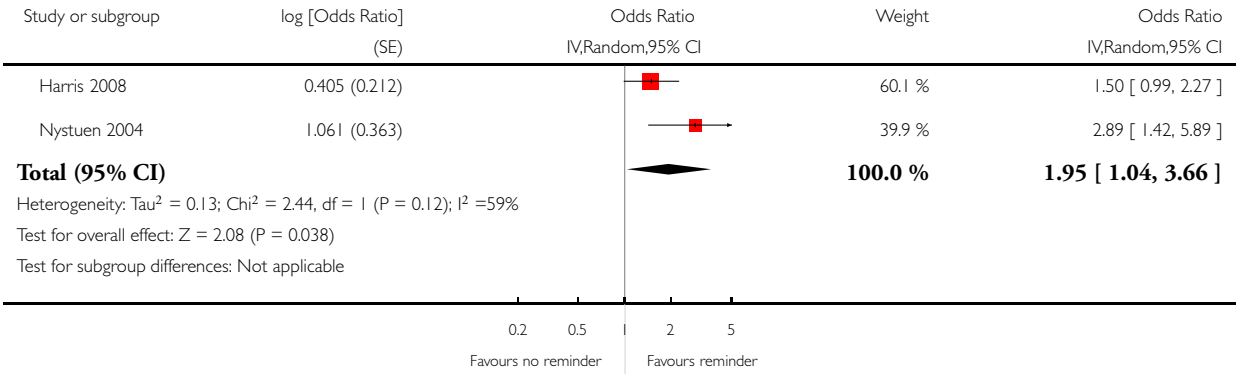


Analysis 14.1. Comparison 14 Telephone reminder vs no telephone reminder, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 14 Telephone reminder vs no telephone reminder

Outcome: 1 Participant recruited

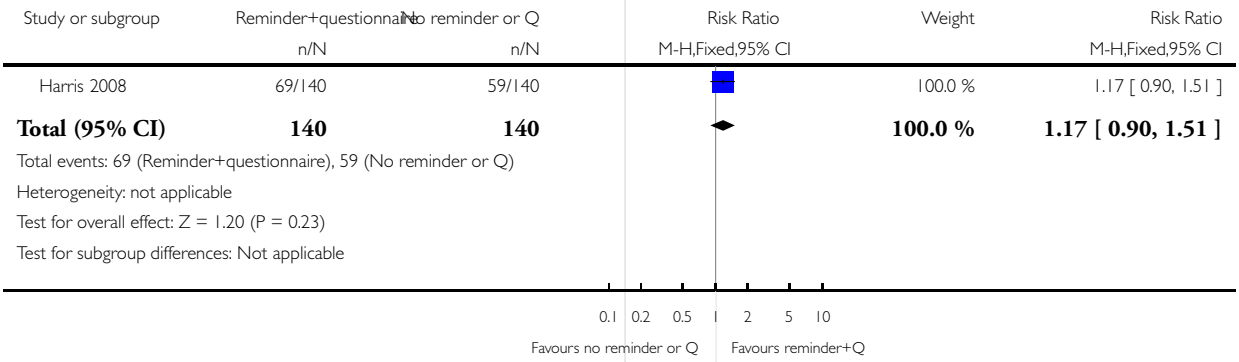


Analysis 15.1. Comparison 15 Telephone reminder + questionnaire vs no reminder or questionnaire, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 15 Telephone reminder + questionnaire vs no reminder or questionnaire

Outcome: 1 Participant recruited



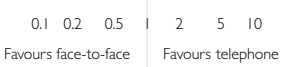
Analysis 16.1. Comparison 16 Telephone screening vs face-to-face screening, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 16 Telephone screening vs face-to-face screening

Outcome: 1 Participant recruited

Study or subgroup	Telephone screening n/N	Face-to-face screening n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Diguiseppi 2006	64/99	190/370		100.0 %	1.26 [1.06, 1.50]
Total (95% CI)	**99**	**370**		**100.0 %**	**1.26 [1.06, 1.50]**
Total events: 64 (Telephone screening), 190 (Face-to-face screening)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.56 (P = 0.010)					
Test for subgroup differences: Not applicable					



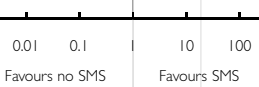
Analysis 17.1. Comparison 17 SMS messages containing quotes from existing participants vs no messages, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 17 SMS messages containing quotes from existing participants vs no messages

Outcome: 1 Participant recruited

Study or subgroup	SMS n/N	No SMS n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Free 2010	17/405	0/406		100.0 %	35.09 [2.12, 581.48]
Total (95% CI)	**405**	**406**		**100.0 %**	**35.09 [2.12, 581.48]**
Total events: 17 (SMS), 0 (No SMS)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.48 (P = 0.013)					
Test for subgroup differences: Not applicable					



Analysis 18.1. Comparison 18 Enhanced recruitment package + recruitment at churches vs standard recruitment package, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 18 Enhanced recruitment package + recruitment at churches vs standard recruitment package

Outcome: 1 Participant recruited

Study or subgroup	Enhanced+churches n/N	Standard n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Ford 2004	116/2949	95/3297		100.0 %	1.37 [1.05, 1.78]
Total (95% CI)	**2949**	**3297**		**100.0 %**	**1.37 [1.05, 1.78]**
Total events: 116 (Enhanced+churches), 95 (Standard)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.29 (P = 0.022)					
Test for subgroup differences: Not applicable					

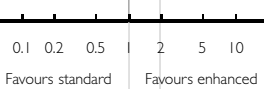
Analysis 19.1. Comparison 19 Enhanced recruitment package vs standard recruitment package, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 19 Enhanced recruitment package vs standard recruitment package

Outcome: 1 Participant recruited

Study or subgroup	Enhanced n/N	Standard n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Ford 2004	78/3079	95/3297		100.0 %	0.88 [0.65, 1.18]
Total (95% CI)	**3079**	**3297**		**100.0 %**	**0.88 [0.65, 1.18]**
Total events: 78 (Enhanced), 95 (Standard)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.85 (P = 0.39)					
Test for subgroup differences: Not applicable					



Analysis 20.1. Comparison 20 Enhanced recruitment package + baseline data over telephone vs standard recruitment package, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 20 Enhanced recruitment package + baseline data over telephone vs standard recruitment package

Outcome: 1 Participant recruited

Study or subgroup	Enhanced+phone n/N	Standard n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Ford 2004	87/3075	95/3297		100.0 %	0.98 [0.74, 1.31]
Total (95% CI)	**3075**	**3297**		**100.0 %**	**0.98 [0.74, 1.31]**
Total events: 87 (Enhanced+phone), 95 (Standard)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.12 (P = 0.90)					
Test for subgroup differences: Not applicable					

Analysis 21.1. Comparison 21 Electronic completion of screening questionnaire vs standard paper completion, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 21 Electronic completion of screening questionnaire vs standard paper completion

Outcome: 1 Participant recruited

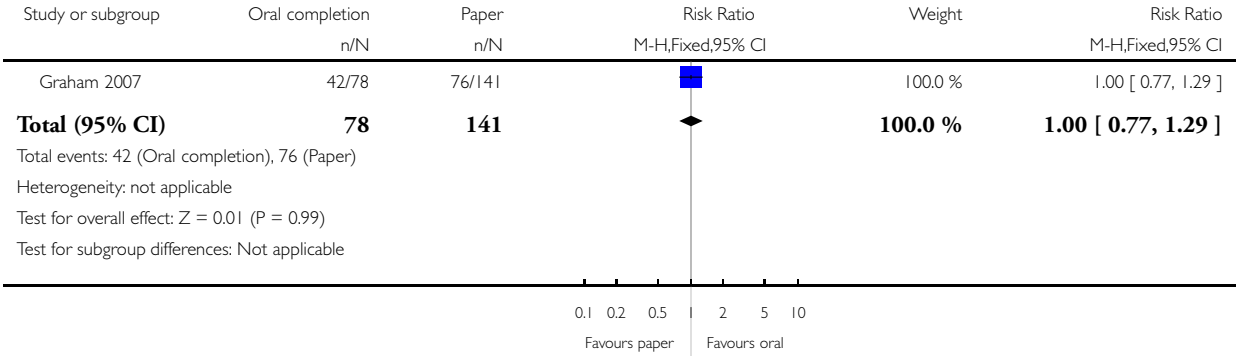
Study or subgroup	Electronic completion n/N	Paper n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Graham 2007	69/151	76/141		100.0 %	0.85 [0.67, 1.07]
Total (95% CI)	**151**	**141**		**100.0 %**	**0.85 [0.67, 1.07]**
Total events: 69 (Electronic completion), 76 (Paper)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.40 (P = 0.16)					
Test for subgroup differences: Not applicable					

Analysis 22.1. Comparison 22 Oral completion of screening questionnaire vs standard paper completion, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 22 Oral completion of screening questionnaire vs standard paper completion

Outcome: 1 Participant recruited

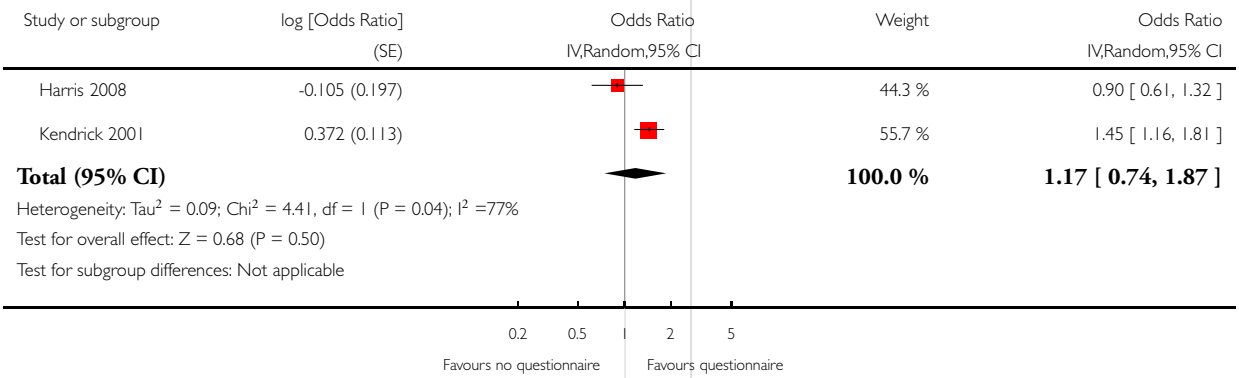


Analysis 23.1. Comparison 23 Study-related questionnaire + trial invitation vs trial invitation, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 23 Study-related questionnaire + trial invitation vs trial invitation

Outcome: 1 Participant recruited

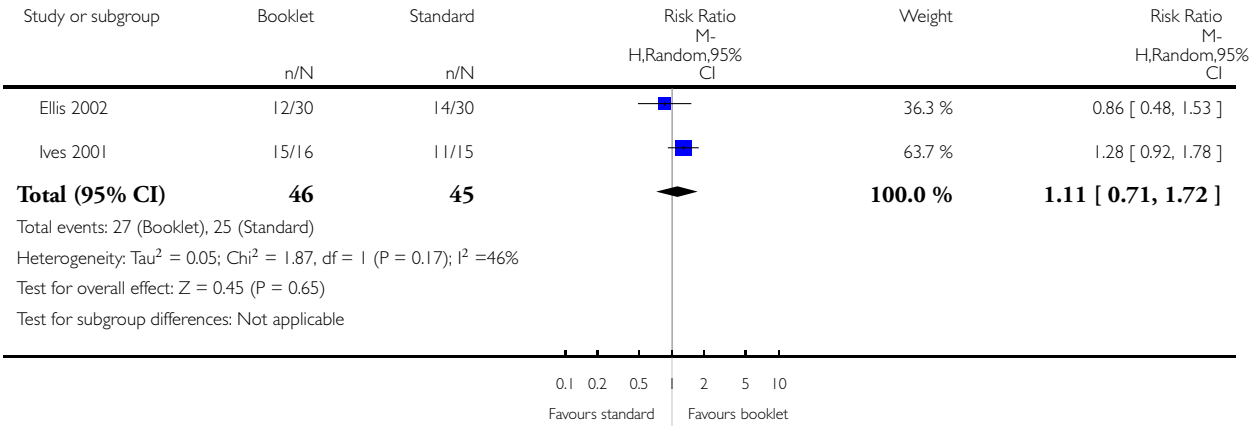


Analysis 24.1. Comparison 24 Clinical trial booklet + standard information vs standard information, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 24 Clinical trial booklet + standard information vs standard information

Outcome: 1 Participant recruited

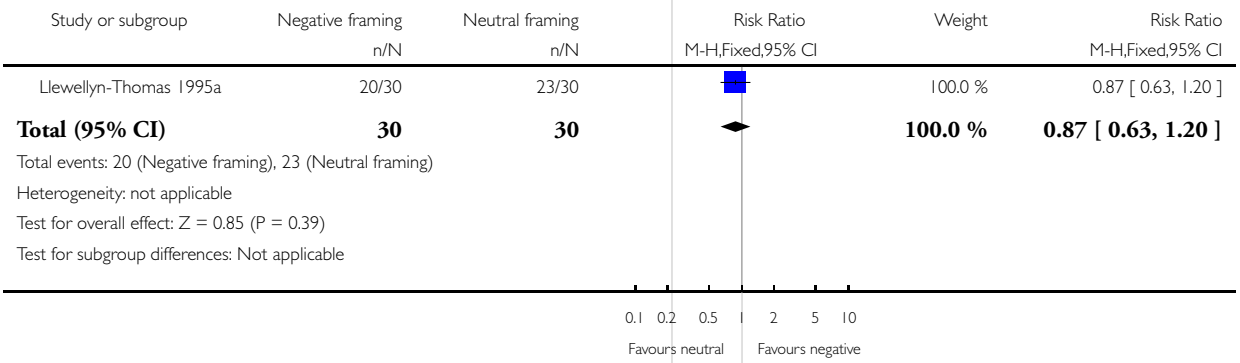


Analysis 25.1. Comparison 25 Negative framing of side effects vs neutral framing, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 25 Negative framing of side effects vs neutral framing

Outcome: 1 Participant recruited



Analysis 26.1. Comparison 26 Positive framing of side effects vs neutral framing, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 26 Positive framing of side effects vs neutral framing

Outcome: 1 Participant recruited

Study or subgroup	Positive framing n/N	Neutral framing n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Llewellyn-Thomas 1995a	18/30	23/30		100.0 %	0.78 [0.55, 1.11]
Total (95% CI)	**30**	**30**		**100.0 %**	**0.78 [0.55, 1.11]**

Total events: 18 (Positive framing), 23 (Neutral framing)

Heterogeneity: not applicable

Test for overall effect: Z = 1.36 (P = 0.17)

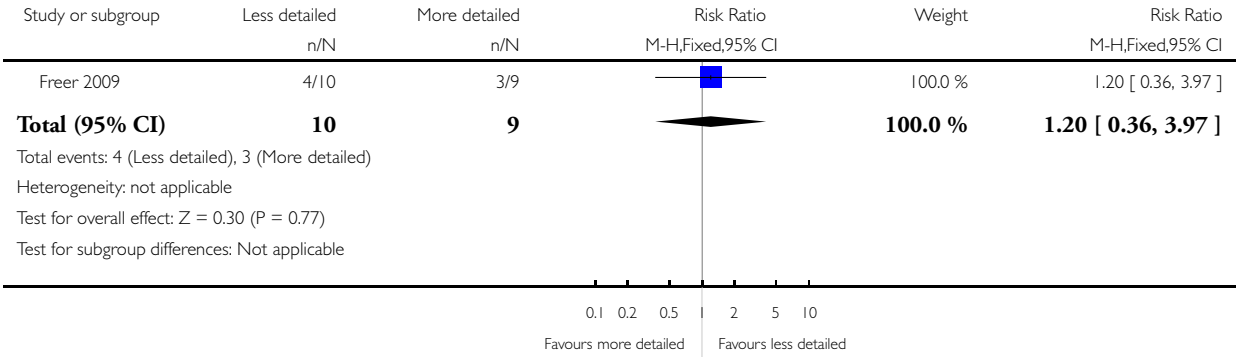
Test for subgroup differences: Not applicable

Analysis 27.1. Comparison 27 Less detailed presentation of risk and other information vs more detailed presentation, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 27 Less detailed presentation of risk and other information vs more detailed presentation

Outcome: 1 Participant recruited

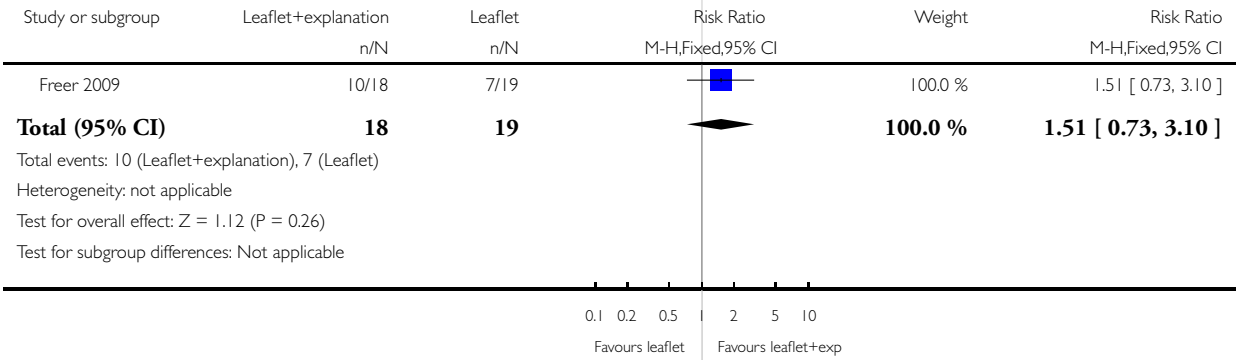


Analysis 28.1. Comparison 28 Information leaflet with explanation vs information leaflet without explanation, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 28 Information leaflet with explanation vs information leaflet without explanation

Outcome: 1 Participant recruited



Analysis 29.1. Comparison 29 Brief counselling + print materials vs print alone, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 29 Brief counselling + print materials vs print alone

Outcome: 1 Participant recruited

Study or subgroup	Councelling+print n/N	Print n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Mandelblatt 2005	178/232	147/218		100.0 %	1.14 [1.01, 1.28]
Total (95% CI)	**232**	**218**		**100.0 %**	**1.14 [1.01, 1.28]**
Total events: 178 (Councelling+print), 147 (Print)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.18 (P = 0.030)					
Test for subgroup differences: Not applicable					

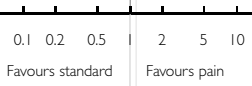
Analysis 30.1. Comparison 30 Emphasising pain in information vs standard information, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 30 Emphasising pain in information vs standard information

Outcome: 1 Participant recruited

Study or subgroup	Emphasise pain n/N	Standard n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Treschan 2003	18/51	30/47		100.0 %	0.55 [0.36, 0.85]
Total (95% CI)	**51**	**47**		**100.0 %**	**0.55 [0.36, 0.85]**
Total events: 18 (Emphasise pain), 30 (Standard)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.70 (P = 0.0068)					
Test for subgroup differences: Not applicable					



Analysis 31.1. Comparison 31 Emphasising risk in information vs standard information, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 31 Emphasising risk in information vs standard information

Outcome: 1 Participant recruited

Study or subgroup	Emphasise risk n/N	Standard n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Treschan 2003	13/50	30/47		100.0 %	0.41 [0.24, 0.68]
Total (95% CI)	**50**	**47**		**100.0 %**	**0.41 [0.24, 0.68]**

Total events: 13 (Emphasise risk), 30 (Standard)
Heterogeneity: not applicable
Test for overall effect: Z = 3.42 (P = 0.00063)
Test for subgroup differences: Not applicable

Analysis 32.1. Comparison 32 Newspaper article + study information vs study information only, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 32 Newspaper article + study information vs study information only

Outcome: 1 Participant recruited

Study or subgroup	Newspaper+information n/N	Study information n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Pighills 2009	73/2243	71/2245		100.0 %	1.03 [0.75, 1.42]
Total (95% CI)	**2243**	**2245**		**100.0 %**	**1.03 [0.75, 1.42]**

Total events: 73 (Newspaper+information), 71 (Study information)
Heterogeneity: not applicable
Test for overall effect: Z = 0.17 (P = 0.86)
Test for subgroup differences: Not applicable

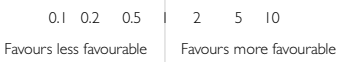
Analysis 33.1. Comparison 33 More favourable newspaper article + study information vs Less favourable newspaper article + study information, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 33 More favourable newspaper article + study information vs Less favourable newspaper article + study information

Outcome: 1 Participant recruited

Study or subgroup	Favourable newspaper n/N	Less favourable n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Pighills 2009	57/1374	54/1371		100.0 %	1.05 [0.73, 1.52]
Total (95% CI)	**1374**	**1371**		**100.0 %**	**1.05 [0.73, 1.52]**
Total events: 57 (Favourable newspaper), 54 (Less favourable)					
Heterogeneity: not applicable					
Test for overall effect: Z = 0.28 (P = 0.78)					
Test for subgroup differences: Not applicable					



Analysis 34.1. Comparison 34 Interactive computer presentation of trial information vs standard paper presentations, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 34 Interactive computer presentation of trial information vs standard paper presentations

Outcome: 1 Participant recruited

Study or subgroup	Computer presentation n/N	Paper n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Karunaratne 2010	23/30	17/30		100.0 %	1.35 [0.93, 1.96]
Total (95% CI)	**30**	**30**		**100.0 %**	**1.35 [0.93, 1.96]**
Total events: 23 (Computer presentation), 17 (Paper)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.60 (P = 0.11)					
Test for subgroup differences: Not applicable					

Analysis 35.1. Comparison 35 Interactive computer presentation of trial information vs audio-taped presentation, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 35 Interactive computer presentation of trial information vs audio-taped presentation

Outcome: 1 Participant recruited

Study or subgroup	Computer presentation n/N	Audio presentation n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Llewellyn-Thomas 1995b	31/50	21/50		100.0 %	1.48 [1.00, 2.18]
Total (95% CI)	**50**	**50**		**100.0 %**	**1.48 [1.00, 2.18]**
Total events: 31 (Computer presentation), 21 (Audio presentation)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.95 (P = 0.051)					
Test for subgroup differences: Not applicable					

Analysis 36.1. Comparison 36 Writing treatment effect is 'twice as fast' in trial information vs writing 'half as fast', Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 36 Writing treatment effect is 'twice as fast' in trial information vs writing 'half as fast'

Outcome: 1 Participant recruited

Study or subgroup	Twice as fast n/N	Half as fast n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Simel 1991	35/52	20/48		100.0 %	1.62 [1.10, 2.37]
Total (95% CI)	**52**	**48**		**100.0 %**	**1.62 [1.10, 2.37]**
Total events: 35 (Twice as fast), 20 (Half as fast)					
Heterogeneity: not applicable					
Test for overall effect: Z = 2.44 (P = 0.015)					
Test for subgroup differences: Not applicable					

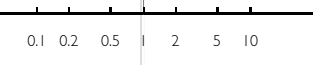
Analysis 37.1. Comparison 37 Total information disclosure vs standard disclosure, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 37 Total information disclosure vs standard disclosure

Outcome: 1 Participant recruited

Study or subgroup	Total disclosure n/N	Standard n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Simes 1986	27/29	23/28		100.0 %	1.13 [0.93, 1.38]
Total (95% CI)	**29**	**28**		**100.0 %**	**1.13 [0.93, 1.38]**
Total events: 27 (Total disclosure), 23 (Standard)					
Heterogeneity: not applicable					
Test for overall effect: Z = 1.23 (P = 0.22)					
Test for subgroup differences: Not applicable					



Analysis 38.1. Comparison 38 One new vs both standard (intervention description), Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 38 One new vs both standard (intervention description)

Outcome: 1 Participant recruited

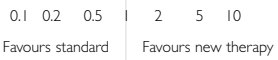
Study or subgroup	Intervention new therapy n/N	Intervention standard n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Kerr 2004	43/64	50/60		100.0 %	0.81 [0.66, 0.99]
Total (95% CI)	**64**	**60**		**100.0 %**	**0.81 [0.66, 0.99]**

Total events: 43 (Intervention new therapy), 50 (Intervention standard)

Heterogeneity: not applicable

Test for overall effect: Z = 2.06 (P = 0.040)

Test for subgroup differences: Not applicable



Analysis 39.1. Comparison 39 Screening by senior investigator vs screening by research assistant, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 39 Screening by senior investigator vs screening by research assistant

Outcome: 1 Participant recruited

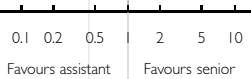
Study or subgroup	Senior investigator n/N	Research assistant n/N	Risk Ratio M-H,Fixed,95% CI	Weight	Risk Ratio M-H,Fixed,95% CI
Miller 1999	28/162	22/185		100.0 %	1.45 [0.87, 2.44]
Total (95% CI)	**162**	**185**		**100.0 %**	**1.45 [0.87, 2.44]**

Total events: 28 (Senior investigator), 22 (Research assistant)

Heterogeneity: not applicable

Test for overall effect: Z = 1.42 (P = 0.16)

Test for subgroup differences: Not applicable

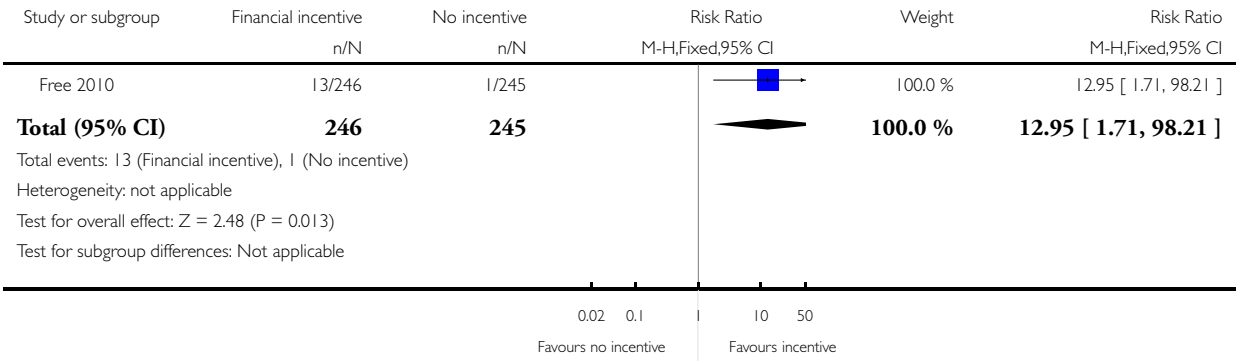


Analysis 40.1. Comparison 40 Financial incentive vs no incentive, Outcome 1 Participant recruited.

Review: Strategies to improve recruitment to randomised controlled trials

Comparison: 40 Financial incentive vs no incentive

Outcome: 1 Participant recruited



ADDITIONAL TABLES

Table 1. Intervention categories

Intervention category	Studies
Design (e.g. use of an active comparator instead of placebo, or electronic data collection rather than paper)	Avenell 2004, Cooper 1997, Fowell 2006, Hemminki 2004, Litchfield 2005, Welton 1999*
Modification to the consent form or process (e.g. consenting to be randomised to the experimental treatment versus standard consent)	Coyne 2003, Myles 1999*, Perrone 1995*, Trevena 2006, Wadland 1990
Modification to the approach made to potential participants (e.g. different patient information leaflets, or video information versus written information)	Diguiseppi 2006*, Du 2008, Du 2009, Ellis 2002*, Ford 2004, Free 2010†, Freer 2009*, Fureman 1997*, Graham 2007*, Harris 2008, Hutchison 2007, Ives 2001, Jeste 2009*, Karunaratne 2010*, Kendrick 2001, Kerr 2004*, Kimmick 2005, Llewellyn-Thomas 1995a*, Llewellyn-Thomas 1995b*, Mandelblatt 2005, Miller 1999, Nystuen 2004, Pighills 2009, Simel 1991*, Simes 1986, Treschan 2003*, Weinfurt 2008a*, Weinfurt 2008b*, Weston 1997
Financial incentives for participants	Bentley 2004*, Free 2010†, Halpern 2004*
Modification to the training given to recruiters (e.g. extra educational sessions)	Larkey 2002

Table 1. Intervention categories (*Continued*)

Greater contact between trial co-ordinator and trial sites	Liénard 2006, Monaghan 2007

Studies marked with * were recruiting to hypothetical trials. †Free 2010 evaluated interventions in two categories.

APPENDICES

Appendix 1. Search strategies

CMR The Cochrane Library Online

#1 "accrual and sample size":kw or "attitudes to trials":kw or Òinformed consentÓ:kw
#2 (participat* or recruit* or enrol* or select*) near/8 (trial* or research or study):ti or (participat* or recruit* or enrol* or select*) near/8 (trial* or research or study):ab
#3 (#1 OR #2)

MEDLINE Ovid

1. Patient Selection/
2. ((participat$ or recruit$ or enrol$) adj4 trial?).tw.
3. 1 or 2
4. Informed Consent/
5. informed consent.tw.
6. 4 or 5
7. exp Clinical Trial as Topic/
8. Research Subjects/
9. (trial? or study or studies or research).tw.
10. 7 or 8 or 9
11. 3 or (6 and 10)
12. Research Support, NIH, Extramural.pt.
13. Research Support, NIH, Intramural.pt.
14. Research Support, Non US Gov't.pt.
15. Research Support, US Gov't, Non PHS.pt.
16. Research Support, US Gov't, PHS.pt.
17. recruitment.ab. /freq=2
18. participation.ab. /freq=2
19. research.tw.
20. or/12-19
21. randomized controlled trial.pt.
22. controlled clinical trial.pt.
23. random$.ab.
24. 21 or 22 or 23
25. humans.sh.
26. 24 and 25

27. comment.pt.
28. editorial.pt.
29. 26 not (27 or 28)
30. 11 and 20 and 29
31. 2001$.ed.
32. 2002$.ed.
33. 2003$.ed.
34. 2004$.ed.
35. 2005$.ed.
36. 2006$.ed.
37. 2007$.ed.
38. 2008$.ed,ep,yr.
39. 2009$.ed,ep,yr.
40. 2010$.ed,ep,yr.
41. or/31-40
42. 30 and 41

EMBASE Ovid

1. ((participat$ or recruit$ or enrol$ or enter$ or entry) and (trial? or study)).ti.
2. (select$ adj3 (participants or patients or controls)).tw.
3. recruit$.ab. /freq=2
4. participat$.ab. /freq=2
5. research.tw.
6. 2 and (3 or 4 or 5)
7. (informed consent or consent process$ or consent procedure?).tw.
8. exp Clinical Trial/
9. (trial? or study or studies or research).tw.
10. 7 and (8 or 9)
11. 1 or 6 or 10
12. Randomized Controlled Trial/
13. random$.tw.
14. Major Clinical Study/
15. 12 or 13 or 14
16. Nonhuman/
17. editorial.pt.
18. 15 not (16 or 17)
19. 11 and 18
20. (2005$ or 2006$ or 2007$ or 2008$).em.
21. (2008$ or 2009$ or 2010).em,yr.
22. 20 or 21
23. 19 and 22

Science Citation Index Expanded and Social Sciences Citation Index, ISI

TS=(recruitment same “clinical trial”) or TS=(recruitment same “clinical trials”) or TS=(recruitment same “controlled trial”) or TS=(recruitment same “controlled trials”)

ERIC, CSA

(recruit* or participat*) and ((clinical trial*) or (controlled
trial) or randomi*): Anywhere

National Research Register (NRR) Online

#1 CLINICAL TRIALS explode all trees (MeSH)
#2 recruit*
#3 #1 and #2

C2-SPECTR

Recruitment
searched In All indexed fields OR in All non-indexed fields.

PubMed

Related articles to the 27 studies included in review version published in Issue 2 2010.

Appendix 2. Protocol

Cover sheet

Title

Strategies to improve recruitment to randomised controlled trials

Reviewers

Treweek S, Sullivan F, Pitkethly M, Jackson C, Wilson S, Kjeldstrøm M, Johansen M, Jones R, Cook J.

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Contribution of reviewers

All authors contributed to the writing of the protocol.

Internal sources of support

Scottish Higher Education Funding Council, Scotland
Rigshospitalet, Denmark

External sources of support

None

Background

Randomised controlled trials are the gold-standard for the evaluation of the effectiveness and safety of healthcare interventions, particularly because they protect against selection bias (Kunz 2002). However, recruiting clinicians and patients to randomised trials can be extremely difficult.

Poor recruitment can lead to an underpowered study, which may report clinically relevant effects to be statistically non-significant. In such cases it is important to bear in mind that 'absence of evidence is not evidence of absence' (Altman 1995). A non-significant finding increases the risk that an effective intervention will be abandoned before its true value is established, or that there will be a delay in demonstrating this value while more trials or meta-analyses are done. Underpowered trials also raise an ethical problem: trialists have exposed participants to an intervention with uncertain benefit but may still be unable to determine whether an intervention does more good than harm on completion of the trial. Poor recruitment can also lead to the trial being extended, which increases cost.

Although investigations of recruitment differ in their estimates of the proportion of studies that achieve their recruitment targets, it is likely that less than 50% meet their target, or meet their target without extending the length of the trial (Charlson 1984; Haidich 2001; Foy 2003; McDonald 2006). McDonald 2006, for example, found that of 114 trials, only 38 (31%) achieved their original recruitment target and 65 (53%) were extended. The overall start to recruitment was delayed in 47 (41%) trials and early recruitment problems were identified in 77 (63%) trials. Foy 2003 studied seven primary care trials of dyspepsia management and only one achieved its recruitment target; five recruited less than 50% of their target and three of these closed prematurely because of recruitment problems.

Trialists use many interventions to improve recruitment (see for example Prescott 1999 and Watson 2006) but it is generally difficult to predict the effect of these interventions. This Cochrane Methodology Review extends an earlier review by Mapstone et al (Mapstone), which was last updated in February 2002, by adding an investigation of study setting on recruitment and by including more recently published studies.

Objectives

The primary objective is to quantify the effects of strategies to improve recruitment of participants to randomised controlled trials. A secondary objective is to assess the evidence for the effect of the research setting (e.g. primary care versus secondary care) on recruitment.

Criteria for considering studies for this review

Types of studies

Randomised and quasi-randomised controlled trials of interventions to improve recruitment to randomised controlled trials.

Types of participants

The randomised and quasi-randomised controlled trials of recruitment strategies should be set in the context of trials and are not limited to healthcare; interventions that work in other fields could be applicable to healthcare settings. Research into ways to improve questionnaire response and research looking at incentives and disincentives for clinicians to recruit patients to trials will be excluded, as these issues are addressed by complementary Cochrane Methodology reviews (Edwards 2007; Rendell 2007). Strategies both within real settings and in mock trials (studies that ask potential participants whether they would take part in a trial if it was run but the study does not actually run the trial) will be eligible. Studies of retention strategies will be excluded.

Types of interventions

Any intervention aimed at improving recruitment of participants nested within studies undertaken for other purposes. The interventions being studied could be directed at research ethics committees (e.g. educational interventions that support the case for not requiring mandatory signed, witnessed consent for recruitment to a trial), collaborators (e.g. clinicians recruiting patients for a trial) or study participants (e.g. patients being randomised to a trial). Examples of such interventions are letters introducing the trial being signed by eminent people or using university, public bodies or private letterheads, collaborators' meetings and feedback, monetary incentives, telephone follow up of expressions of interest, simplified consent procedures, pre-prepared research ethics committee documentation for collaborators, raffles for participants, recruitment co-ordinators in centres, use of media advertising, active versus passive case finding methods and simplified protocols.

Types of outcome measures

Primary

Proportion of eligible individuals or centres contacted by the study authors who were actually recruited.
Proportion of patients with full follow-up.

Secondary

Rate at which participants were recruited.
Number and characteristics of people (participants, researchers, etc) who agree to take part.
Difficulties identified (including feelings of coercion or guilt).
Benefits identified (including feelings of altruism or being better cared for).

Search methods for identification of studies

To identify studies we will search bibliographic databases, look through reference lists of relevant systematic reviews and reference lists of all included studies. We will contact authors of included studies and search the ISI Web of Science for records that have cited studies included in the review. We will not apply any language or time restrictions.

We will search the following databases:

Cochrane Methodology Register (CMR)
Cochrane Central Register of Controlled Trials (CENTRAL)
MEDLINE, OVID 1950 to present
EMBASE, OVID 1980 to present
CINAHL, OVID 1982 to present
ERIC, CSA 1966 to present
PsycINFO, Ovid 1806 to present
C2-SPECTR
The National Research Register
ISI Web of Science Science Citation Index Expanded 1975 to present
ISI Web of Science Social Sciences Citation Index 1975 to present
Open-SIGLE (European grey literature) L'INstitut de l'Information Scientifique et Technique (INIST-CNRS)

The following MEDLINE search strategy, developed for SilverPlatter, will be adjusted according to the above listed databases.

A. (subject* near3 recruit) or (subject* near3 recruitment) or (subject* near3 participate) or (subject* near3 participation) or (subject* near3 enro?l) or (subject* near3 enrol?ment) or (subject* near3 enlist)
B. (patient* near3 recruit) or (patient* near3 recruitment) or (patient* near3 participate) or (patient* near3 participation) or (patient* near3 enro?l) or (patient* near3 enrol?ment) or (patient* near3 enlist)

C. (clinician* near3 recruit) or (clinician* near3 recruitment) or (clinician* near3 participate) or (clinician* near3 participation) or (clinician* near3 enro?l) or (clinician* near3 enrol?ment) or (clinician* near3 enlist)
D. (doctor near3 recruit) or (doctor near3 recruitment) or (doctor near3 participate) or (doctor near3 participation) or (doctor near3 enro?l) or (doctor near3 enrol?ment) or (doctor near3 enlist)
E. (doctors near3 recruit) or (doctors near3 recruitment) or (doctors near3 participate) or (doctors near3 participation) or (doctors near3 enro?l) or (doctors near3 enrol?ment) or (doctors near3 enlist)
F. (physician* near3 recruit) or (physician* near3 recruitment) or (physician* near3 participate) or (physician* near3 participation) or (physician* near3 enro?l) or (physician* near3 enrol?ment) or (physician* near3 enlist)
G. (experimenter* near3 recruit) or (experimenter* near3 recruitment) or (experimenter* near3 participate) or (experimenter* near3 participation) or (experimenter* near3 enro?l) or (experimenter* near3 enrol?ment) or (experimenter* near3 enlist)
H. (researcher* near3 recruit) or (researcher* near3 recruitment) or (researcher* near3 participate) or (researcher* near3 participation) or (researcher* near3 enro?l) or (researcher* near3 enrol?ment) or (researcher* near3 enlist)
I. (investigator* near3 recruit) or (investigator* near3 recruitment) or (investigator* near3 participate) or (investigator* near3 participation) or (investigator* near3 enro?l) or (investigator* near3 enrol?ment) or (investigator* near3 enlist)
J. (hospital* near3 recruit) or (hospital* near3 recruitment) or (hospital* near3 participate) or (hospital* near3 participation) or (hospital* near3 enro?l) or (hospital* near3 enrol?ment) or (hospital* near3 enlist)
K. (center* near3 recruit) or (center* near3 recruitment) or (center* near3 participate) or (center* near3 participation) or (center* near3 enro?l) or (center* near3 enrol?ment) or (center* near3 enlist)
L. (centre* near3 recruit) or (centre* near3 recruitment) or (centre* near3 participate) or (centre* near3 participation) or (centre* near3 enro?l) or (centre* near3 enrol?ment) or (centre* near3 enlist)
M. (participant* near3 recruit) or (participant* near3 recruitment) or (participant* near3 participate) or (participant* near3 participation) or (participant* near3 enro?l) or (participant* near3 enrol?ment) or (participant* near3 enlist)
N. PATIENT SELECTION in MeSH
O. A or B or C or D or E or F or G or H or I or J or K or L or M or N
P. Cochrane optimally sensitive search strategy for identifying randomised clinical trials (Dickersin et al 1994)
Q. O and P

Methods of the review

Identifying trials

Two authors will independently screen the titles and abstracts of all records retrieved from the searches of the electronic bibliographic databases. Any disagreements will be resolved through discussion and, if necessary, the involvement of a third author. The full text will be obtained for studies that appear to meet the inclusion criteria. All potentially eligible studies will be independently assessed by two authors to determine if they meet the inclusion criteria. Any disagreements will be resolved through discussion or the involvement of a third author.

Assessment of methodological quality

The adequacy of allocation concealment (adequate, unclear and inadequate) will be assessed for each study (Schulz 1995). Other aspects of methodological quality, such as completeness of reporting of results and loss to follow-up will also be considered. Completeness of reporting will be assessed with reference to the ability to judge whether allocation was concealed (i.e. unclear for allocation concealment implies incomplete reporting) but also with regard to clear information on participants, intervention, comparator and outcome measure. Reporting of information on the flow of participants through the trial (e.g. from a CONSORT diagram) will be recorded.
Data on methodological quality will be presented in an additional table for all included studies. Results will be interpreted in light of methodological quality but we will not exclude studies because of low quality. Concealment of allocation (adequate versus inadequate or unclear) will be considered as a potential cause of heterogeneity in subgroup analysis if there are sufficient studies (see 'Data analysis').

Data extraction

A data extraction form will be developed to collect the information required for the outcome measures given under 'Types of outcome measures'. Data will be extracted independently from each article by two authors. Differences in data extraction will be resolved

by discussion or the involvement of a third author. We will contact the authors of reports of potentially relevant studies to obtain information or data needed for the review that could not be found in the published reports. Data will be extracted on the method evaluated; country in which the study was done; nature of population; nature of the study setting; nature of the study to be recruited into, randomisation or quasi-randomisation method; numbers and proportions in each arm.

Data analysis

Trials will be analysed according to the type of intervention (e.g. monetary incentives, letters). Interventions will be grouped when they are similar in form and content. Continuous data will be combined using odds ratios or relative risks and 95% confidence intervals generated. Continuous data will be combined and 95% confidence intervals will be calculated using weighted mean differences or standardised mean differences if different scales have been used. A subgroup analysis will assess the recruitment interventions by target groups (e.g. ethics committees, clinicians, patients) where sufficient studies are available. Statistical evidence of heterogeneity of results of trials will be sought using the Chi^2 test for heterogeneity and quantify the degree of heterogeneity observed in the results using the I^2 statistic (Higgins 2003). Where substantial heterogeneity was detected possible explanations will be investigated informally, and the data summarised using a random-effects analysis if appropriate. The following explanations will be explored in subgroup analyses where there are sufficient studies because we believe that these are plausible, potential explanations for heterogeneity:
Type of design used to evaluate recruitment strategies (randomised versus quasi-randomised) and concealment of allocation (adequate versus inadequate or unclear).
Setting of the study recruiting participants (e.g. primary versus secondary care; healthcare versus non-healthcare settings).
Design of the study recruiting participants (e.g., randomised versus non-randomised studies, trials with placebo arms versus those without).
Reporting (publication) bias will be investigated for the primary outcomes using a funnel plot where 10 or more studies are available.

Potential conflict of interest

None known.

Additional references

Altman 1995
Altman DG, Bland JM. Absence of evidence is not evidence of absence. BMJ 1995; 311: 485.

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Schulz 1995
Schulz KF, Chalmers I, Hayes RJ, Altman DG. Dimensions of methodological quality associated with estimates of treatment effects in controlled trials. JAMA 1995;273(5):408-12

Contributions to the protocol

Contributing authors (October 2007): Treweek S, Sullivan F, Pitkethly M, Jackson C, Wilson S, Kjeldstrøm M, Johansen M, Jones R, Cook J.
Comments on drafts (October 2007): Treweek S, Sullivan F, Pitkethly M, Jackson C, Wilson S, Kjeldstrøm M, Johansen M, Jones R, Cook J.

Glossary of selected terms

Control
In clinical trials comparing two or more interventions, a control is a person in the comparison group that receives a placebo, no intervention, usual care or another form of care.

Primary care
Care provided in the community by generalists (e.g. general practitioners, or family doctors) who often act as the first point of contact between a patient and the rest of the health service.

Secondary care
Care provided in hospitals by specialists. Patients often (but not always) need to contact a clinician in primary care before getting a referral to secondary care.

Randomised controlled trial (RCT) (Synonym: randomised clinical trial)
An experiment in which investigators randomly allocate eligible people into intervention groups to receive or not to receive one or more interventions that are being compared. The results are assessed by comparing outcomes in the treatment and control groups.

Statistical power
The probability that the null hypothesis will be rejected if it is indeed false. In studies of the effectiveness of healthcare interventions, power is a measure of the certainty of avoiding a false negative conclusion that an intervention is not effective when in truth it is effective. The power of a trial is determined by how large it is (the number of participants), the number of events (e.g. strokes) or the

degree of variation in a continuous outcome (such as weight), how small an effect one believes is important (i.e. the smallest difference in outcomes between the intervention and the control groups that is considered to be important), and how certain one wants to be of avoiding a false positive conclusion (i.e. the cut-off that is used for statistical significance).

Statistical significance
An estimate of the probability of an association (effect) as large or larger than what is observed in a trial occurring by chance, usually expressed as a P value. For example, a P value of 0.049 for a risk difference of 10% means that there is less than a one in 20 (0.05) chance of an association that is as large or larger having occurred by chance and it could be said that the results are 'statistically significant' at P = 0.05). The cut-off for statistical significance is usually taken at 0.05, but sometimes at 0.01 or 0.10.These cut-offs are arbitrary and have no specific importance. Although it is often done, it is inappropriate to interpret the results of a trial differently according to whether the P value is, say, 0.055 or 0.045 (which are quite similar values, not diametrically opposed ones).

FEEDBACK

Michaels, 2 March 2010

Summary

I suggest that the next iteration of this report take into account, assuming it does exist in the literature, researcher relationships with the community. I am not only referring to Community Based Participatory Research (CBPR) in relation to clinical research (see www.communitiespartners.org), but also to researcher relationships with referring physicians and community based organizations. These relationships are critical to the success of clinical research, especially in the community setting.
The review also needs to take into account disease states in terms of recruitment. The patient with controllable diabetes vs the patient needing cancer treatment have very different information needs when it comes to clinical trial participation.
Submitter agrees with default conflict of interest statement:
I certify that I have no affiliations with or involvement in any organization or entity with a financial interest in the subject matter of my feedback.
(Feedback submitted by Margo Micheals March 2010)

Reply

Many thanks for this suggestion, which we would like to build into our review. In terms of managing this, we think the best way to incorporate this comment would be to create a new category of intervention where researchers have specifically evaluated the impact on recruitment of building close collaborative relationships with potential participants, be they patients, healthy volunteers, or health professionals. Here we would be looking to studies that compared such an intervention against what might be called traditional recruitment strategies. We will also add disease as a potential subgroup analysis. We agree that it is highly plausible that disease (especially chronic versus acute) plays a role in recruitment.
As you mention, we may not find primary studies that allow us to act on these suggestions straight away. We did not identify studies that evaluated the kind of interventions mentioned above in our initial search though this may change as the review is updated.
Thanks again for your interest in our review.

Contributors

Reply received from the review team, April 2010.

WHAT'S NEW

Last assessed as up-to-date: 31 May 2010.

Date	Event	Description
10 June 2011	New search has been performed	Review updated: search extended to April 2010, 18 additional included studies. While new studies were added to the review, the overall picture with regard to interventions to improve recruitment to trials remains similar to the previous version of the review

HISTORY

Protocol first published: Issue 3, 2002

Review first published: Issue 1, 2004

Date	Event	Description
16 April 2010	Feedback has been incorporated	Feedback from Margo Michaels added with reply from authors.
10 November 2009	New citation required but conclusions have not changed	The title of this review has changed, as have the authors.
10 November 2009	New search has been performed	New search conducted September 2007. Twelve new studies identified
27 December 2007	Amended	Converted to new review format.
20 February 2007	New citation required and conclusions have changed	Substantive amendment.

CONTRIBUTIONS OF AUTHORS

Shaun Treweek, Jonathan Cook, Catherine Jackson, Marit Johansen, Ritu Jones, Monica Kjeldstrøm, Marie Pitkethly, Frank Sullivan and Sue Wilson contributed to study design, record screening, reviewing full-text articles and drafting of the report. Shaun Treweek, Pauline Lockhart, Elizabeth Mitchell and Marie Pitkethly extracted the data. Jonathan Cook and Shaun Treweek analysed the data. Marit Johansen developed and ran the electronic searches. Pauline Lockhart, Elizabeth Mitchell and Taina Taskila contributed to record screening, reviewing full-text articles and drafting of the report. Marie Pitkethly checked the reference lists of review articles identified by the search.

DECLARATIONS OF INTEREST

All authors declare no conflict of interest.

SOURCES OF SUPPORT

Internal sources

- Scottish Funding Council, UK.
- Rigshospitalet, Denmark.

External sources

- Department of Health, Cochrane Review Incentive Scheme 2008, UK.
- Department of Health, Cochrane Review Incentive Scheme 2011, UK.
- Medical Research Council, UK.

Jonathan Cook holds a Medical Research Council UK personal fellowship (G0601938).

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We have not considered one of the primary outcomes and three of the secondary outcomes listed in our protocol:

Primary outcome:

- Proportion of patients with full follow-up.

Secondary outcomes:

- Number and characteristics of the different types of people (participants, researchers, etc) who agree to take part.
- Difficulties identified (including feelings of coercion or guilt).
- Benefits identified (including feelings of altruism or being better cared for).

Once an individual has been recruited the effect on follow-up (if any) of an intervention is a retention issue and there is now a Cochrane protocol on retention strategies in trials (Brueton 2011). We have therefore decided to remove this primary outcome from our review. With regard to the secondary outcomes listed above, very few of our included studies reported these outcomes, while a large number of the studies we rejected did. We now believe that these outcomes would be better reported as primary outcomes in a different review.

INDEX TERMS

Medical Subject Headings (MeSH)

*Patient Selection; *Randomized Controlled Trials as Topic; Patient Education as Topic; Sample Size

MeSH check words

Humans