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[Intervention Review]

Tailored interventions to address determinants of practice

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ABSTRACT

Background

Tailored intervention strategies are frequently recommended among approaches to the implementation of improvement in health professional performance. Attempts to change the behaviour of health professionals may be impeded by a variety of different barriers, obstacles, or factors (which we collectively refer to as determinants of practice). Change may be more likely if implementation strategies are specifically chosen to address these determinants.

Objectives

To determine whether tailored intervention strategies are effective in improving professional practice and healthcare outcomes. We compared interventions tailored to address the identified determinants of practice with either no intervention or interventions not tailored to the determinants.

Search methods

We conducted searches of *The Cochrane Library*, MEDLINE, EMBASE, PubMed, CINAHL, and the British Nursing Index to May 2014. We conducted a final search in December 2014 (in MEDLINE only) for more recently published trials. We conducted searches of the *meta*Register of Controlled Trials (*m*RCT) in March 2013. We also handsearched two journals.

Selection criteria

Cluster-randomised controlled trials (RCTs) of interventions tailored to address prospectively identified determinants of practice, which reported objectively measured professional practice or healthcare outcomes, and where at least one group received an intervention designed to address prospectively identified determinants of practice.

Data collection and analysis

Two review authors independently assessed quality and extracted data. We undertook qualitative and quantitative analyses, the quantitative analysis including two elements: we carried out 1) meta-regression analyses to compare interventions tailored to address identified determinants with either no interventions or an intervention(s) not tailored to the determinants, and 2) heterogeneity analyses to investigate sources of differences in the effectiveness of interventions. These included the effects of: risk of bias, use of a theory when developing the intervention, whether adjustment was made for local factors, and number of domains addressed with the determinants identified.

Main results

We added nine studies to this review to bring the total number of included studies to 32 comparing an intervention tailored to address identified determinants of practice to no intervention or an intervention(s) not tailored to the determinants. The outcome was implementation of recommended practice, e.g. clinical practice guideline recommendations. Fifteen studies provided enough data to be included in the quantitative analysis. The pooled odds ratio was 1.56 (95% confidence interval (CI) 1.27 to 1.93, P value < 0.001). The 17 studies not included in the meta-analysis had findings showing variable effectiveness consistent with the findings of the meta-regression.

Authors' conclusions

Despite the increase in the number of new studies identified, our overall finding is similar to that of the previous review. Tailored implementation can be effective, but the effect is variable and tends to be small to moderate. The number of studies remains small and more research is needed, including trials comparing tailored interventions to no or other interventions, but also studies to develop and investigate the components of tailoring (identification of the most important determinants, selecting interventions to address the determinants). Currently available studies have used different methods to identify determinants of practice and different approaches to selecting interventions to address the determinants. It is not yet clear how best to tailor interventions and therefore not clear what the effect of an optimally tailored intervention would be.

PLAIN LANGUAGE SUMMARY

Tailored interventions to address identified determinants of practice

Tailored interventions to change professional practice are interventions planned following an investigation into the factors that explain current professional practice and any reasons for resisting new practice. These factors are referred to using various terms, including barriers, enablers, obstacles, and facilitators; in this review we use the term determinants of practice to include all such factors. The determinants may vary in different healthcare settings, groups of healthcare professionals, or clinical tasks. It is widely assumed that efforts to change professional practice have a lower likelihood of success unless these determinants are identified and taken into account.

In a previous review, we included 26 studies and we concluded that tailoring can change professional practice. However, more studies of tailoring have been published and therefore we have incorporated the new studies into an update of the review.

We have included 32 studies in the new review. The findings continue to indicate that tailored interventions can change professional practice, although they are not always effective and, when they are, the effect is small to moderate. There is insufficient evidence on the most effective approaches to tailoring, including how determinants should be identified, how decisions should be made on which determinants are most important to address, and how interventions should be selected to account for the important determinants. In addition, there is no evidence about the cost-effectiveness of tailored interventions compared to other interventions to change professional practice. Therefore, future research studies should seek to develop and evaluate more systematic approaches to tailoring.

SUMMARY OF FINDINGS

Summary of findings for the main comparison.

Interventions tailored to address identified determinants of practice compared with no intervention for implementing appropriate clinical practice

Patient or population: healthcare professionals

Settings: mostly primary care in the USA and Europe

Intervention: tailored interventions to implement practice guidelines

Comparison: no intervention or dissemination of guidelines alone

Outcomes	Absolute effect		Relative effect (95% CI)	No of participants (studies)	Certainty of the evidence (GRADE)	Comments
	Without tailored intervention	With tailored intervention				
	Difference (95% CI)					
Implementation of recommended practice, e.g. clinical practice guideline recommendations	Moderate adherence* 60 per 100 patients	70 per 100 patients	**OR** 1.56 (95% CI 1.27 to 1.93, P value < 0.001)	15 studies with at least 7990 health professionals (numbers unclear in 5 studies)	⊕⊕⊕⊖ **moderate**†	17 other studies could not be included in the meta-regression. The effect of tailored interventions in these studies varied from no effect to moderate effect between studies and between outcomes within studies, a finding consistent with the meta-regression
	Difference: 10 more patients receiving recommended practice per 100 patient encounters (Margin of error: 6 to 14 more patients)					
	Low adherence* 20 per 100 patients	28 per 100 patients				
	Difference: 8 more patients receiving recommended practice per 100 patient encounters (Margin of error: 4 to 13 more patients)					

Healthcare outcomes	-	-	-	No studies	-	The studies did not include sufficient evidence to enable an assessment of effect on healthcare outcomes to be made
Costs	-	-	-	No studies	-	The studies did not include sufficient evidence to enable an assessment of effect on healthcare outcomes to be made
Adverse effects	-	-	-	No studies	-	The studies did not include sufficient evidence to enable an assessment of effect on healthcare outcomes to be made

Margin of error = Confidence Interval (95% CI) OR: Odds Ratio
GRADE: GRADE Working Group grades of evidence (see below and last page)

*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).

† The OR and confidence intervals shown are taken from a meta-regression. The results of 14 studies not included in the meta-regression indicated that, on average, tailored interventions improve professional practice. However, the effects were mixed.

CI: confidence interval; **OR:** odds ratio

GRADE Working Group grades of evidence

High = This research provides a very good indication of the likely effect. The likelihood that the effect will be substantially different† is low.

Moderate = This research provides a good indication of the likely effect. The likelihood that the effect will be substantially different† is moderate.

Low = This research provides some indication of the likely effect. However, the likelihood that it will be substantially different† is high.

Very low = This research does not provide a reliable indication of the likely effect. The likelihood that the effect will be substantially different† is very high.

†Substantially different = a large enough difference that it might affect a decision

[1]The assumed risks without a tailored intervention were selected to help interpret the overall odds ratios in situations in which there is a high risk of undesirable professional practice without intervening (20% desired practice) and a medium risk (60% desired practice).

BACKGROUND

Description of the condition

The extent to which recommendations for clinical practice based on good quality research evidence are implemented varies. Gaps between what is recommended and what health professionals do and patients receive are common, and there can be delays before the findings of research are widely adopted (Grol 2005; Oxman 1995). Although the subject of many research studies in recent years, including trials of interventions to implement recommended practice, the problem persists and more work is needed in order to understand the reasons for gaps in clinical practice and to identify interventions to address them (Eccles 2009; Wensing 2012).

Description of the intervention

This review updates a Cochrane review of the effects of tailored interventions that was originally completed in 2005 (Shaw 2005) and subsequently updated in 2010 (Baker 2010). We define tailored interventions as 'strategies to improve professional practice that are planned, taking account of prospectively identified determinants of practice'. Determinants of practice are factors that could influence the effectiveness of an intervention to improve professional practice, and have been previously referred to using alternative terms, including barriers, obstacles, enablers, and facilitators. They have been classified by the Cochrane Effective Practice and Organisation of Care (EPOC) Group into nine categories (information management, clinical uncertainty, sense of competence, perceptions of liability, patient expectations, standards of practice, financial disincentives, administrative constraints, and other) (EPOC 2002). This categorisation has not been used extensively and more research into the determinants of practice has been completed since the classification was proposed. Following a detailed review of studies of determinants, including recent studies, a new checklist of determinants has been devised (Flottorp 2013).

How the intervention might work

Whether considered in the context of models for quality and safety improvement or guideline implementation initiatives (Ashford 1999; Grol 2005; Lomas 1994; Robertson 1996), systematic reviews of improvement interventions (Chaillet 2006; Grimshaw 2004) or guideline adoption (Cabana 1999), determinants are believed to influence the success of improvement strategies. If the determinants of practice are identified using methods that could include brainstorming, interviews or focus groups of health professionals, or questionnaires (Flottorp 2013; Krause 2014a), and strategies are then implemented that have been chosen to address the determinants using methods such as group interviews of implementation practitioners or health professionals (Huntink 2014; Wensing 2014), it would appear reasonable to expect performance to improve. Despite the attractiveness of this argument, however, the effects of attempts to translate research evidence into practice and improve performance remain inconsistent (Grimshaw 2004; Grimshaw 2012; McGlynn 2003).

Why it is important to do this review

We have not identified any reviews evaluating the effects of tailored implementation strategies on professional performance other than the earlier versions of this review, which concluded that tailored interventions were more likely to improve professional practice than no intervention or dissemination of guidelines or educational materials alone.

Although there are a number of reviews in specific clinical fields (Chaillet 2006; Kroenke 2000), which have discussed the possibility that tailored strategies might be more effective than strategies selected without taking account of determinants, these reviews did not address the effect or costs of tailored interventions specifically. Bosch and colleagues undertook a qualitative analysis of 20 quality improvement studies reporting investigation of determinants (Bosch 2007). Individual and group interviews of professionals were the most commonly used method of identifying determinants, but in many studies the reasons for believing a particular strategy would address a particular determinant were not explained. Again, the effectiveness of tailored strategies was not evaluated.

Since the publication of the last revision of this review (Baker 2010), several new studies of tailored intervention strategies have been published. Consequently, there may be additional evidence on the effectiveness of tailoring or on how it can be undertaken most effectively. Since tailoring is regarded as an important step in improvement interventions, we undertook an update of the review.

OBJECTIVES

We have addressed the same question considered in the previous versions of the review: are tailored strategies effective in improving professional practice and healthcare outcomes?

To answer this question, we compared interventions tailored to address identified determinants with either no interventions or an intervention(s) not tailored to the determinants. In addition, in this update, but not in the previous version of the review, we separately compared:

1. implementation interventions tailored to address identified determinants of practice compared to no intervention;
2. implementation interventions tailored to address identified determinants of practice compared to non-tailored implementation interventions.

We anticipated that sufficient numbers of studies would have been published to allow these separate comparisons, and that comparison of tailoring with non-tailored interventions would tend to indicate less effect than in comparison with no intervention.

METHODS

Criteria for considering studies for this review

Types of studies

Cluster-randomised controlled trials (cluster-RCTs) with at least two control and two intervention sites.

Types of participants

Healthcare professionals responsible for patient care. We excluded studies that involved only students.

Types of interventions

We defined tailored strategies as strategies to improve professional practice that are planned, taking account of prospectively

identified determinants of practice. Determinants may be identified by various methods, including observation, brainstorming, focus group discussions, interviews or surveys of the involved healthcare professionals, and/or through an analysis of the organisation or system in which care is provided. We excluded studies that use gap analysis only (i.e. audits identifying a gap between actual and desired performance), and studies of educational interventions based on an identified lack of knowledge and designed to improve knowledge only. The identification of determinants must have been undertaken before the design and delivery of the intervention. If the timing of the identification of determinants was not clear, we contacted the study authors for clarification.

Studies had to involve a comparison group that did not receive a tailored intervention, or a comparison between an intervention that was targeted at determinants, compared with an intervention not targeted at identified determinants.

Types of outcome measures

For inclusion, study outcomes had to be either objectively measured adherence of health professionals to recommended practice, in a healthcare setting, or patient outcome, or adverse effects (patient outcomes, quality of care, and adverse effects, as defined in the EPOC guidance on outcomes to be reported in EPOC reviews) (EPOC 2013). When costs were reported in studies that included either measures of professional practice, patient outcomes, or adverse effects, we planned to include these, but we excluded studies of costs alone. We did not include measures of knowledge or performance in a test situation as an outcome measure and we excluded studies that included only this outcome.

Search methods for identification of studies

M. Fiander and J. Camosso-Stefinovic developed and ran the search strategies. We searched the Cochrane Database of Systematic Reviews and the Database of Abstracts of Reviews of Effects (DARE) for related systematic reviews, and the databases listed below for primary studies. The most recent search was conducted in December 2014.

We searched the following databases:

- *The Cochrane Library* (2014, Issue 2) (Central Register of Controlled Trials, Cochrane Methodology Register, Health Technology Assessment Database, NHS Economic Evaluations Database);
- MEDLINE (R) 1946 onwards, and In-Process and Other Non-Indexed Citations, OvidSP;
- EMBASE, 1947 onwards, OvidSP;
- EPOC Group Specialised Register, Reference Manager;
- CINAHL (Cumulative Index to Nursing and Allied Health Literature), 1980 onwards, EbscoHost;
- British Nursing Index (BNI), 1994 onwards, ProQuest;
- Health Management Information Consortium (HMIC), 1983 to 2009, Department of Health's Library and Information Services, King's Fund Information and Library Services. We were unable to search this database in 2014.

We searched *The Cochrane Library*, MEDLINE, EMBASE, and PubMed to May 2014. We searched CINAHL and BNI only to March 2013 due to time constraints. The Cochrane EPOC Group Specialised Register has not been updated since 2012 and therefore has not been searched since that date. We were unable to search HMIC because we no longer had access.

We applied neither language nor date restrictions. We used two methodological search filters to limit retrieval to appropriate study designs: the Cochrane Highly Sensitive Search Strategy (sensitivity- and precision-maximising version, 2008 revision) to identify randomised trials (cf. *Cochrane Handbook for Systematic Reviews of Interventions* 6.4d) (Lefebvre 2011), and a partial EPOC methodological search filter (cf. lines 37-40 in the MEDLINE strategy). We repeated the MEDLINE search in December 2014, to identify any recently reported studies. Detailed search strategies used for searches from 2009 to 2014 are provided in Appendix 1 to Appendix 8. Search strategies used prior to 2009 are provided in Appendix 9.

Searching other resources

We searched the following trial registers:

- *meta*Register of Controlled Trials (*m*RCT) up to March 2013 (http://www.controlled-trials.com/mrct/), which includes: ISRCTN; Action Medical Research; NIH ClinicalTrials.gov; Wellcome Trust; and UK Trials Register (Appendix 8).

We also:

- handsearched two key journals (*Implementation Science* (vol. 1 2006 through 2014 vol. 9, August 2014) and *Journal of Evaluation in Clinical Practice* (October 2009 to end August 2014, vol. 20, Issue 4));
- reviewed reference lists of all included studies, relevant systematic reviews, and primary studies;
- contacted authors of relevant studies or reviews to clarify information presented in published articles where necessary or to request further details and unpublished results or data;
- contacted researchers with expertise relevant to the review topic.

Data collection and analysis

Selection of studies

We loaded the reference details and abstracts of articles identified in the searches into the Early Review Organizing Software (IECS 2009). Two review authors independently assessed studies for inclusion. We resolved disagreements by discussion, involving a third review author if necessary. We obtained all selected articles in full text.

Data extraction and management

Two review authors independently extracted the data from included studies by using a revised version of the data extraction form used in the previous version of the review (Baker 2010). Information collected on the types of patients in studies included whether some or all were disadvantaged or low-income.

We summarised the determinants of practice identified and if the included papers provided sufficient information, we classified determinants into the seven domains of the Tailored Implementation in Chronic Disease (TICD) checklist: guideline factors, individual health professional factors, patient factors, professional interactions, incentives and resources, capacity for organisational change, and social, political, and legal factors

(Flottorp 2013). We also summarised the methods that were used to identify them and qualitatively assessed the processes used to identify and prioritise them and tailor interventions to account for them. Two review authors independently classified the intensity of the methods used to identify determinants using the following three categories: low – a questionnaire survey of health professionals or informal discussion with, for example, a guideline group; moderate – interviews and/or focus groups with samples of health professionals specifically seeking information about determinants, or a survey supplemented by performance data; high – interviews and/or focus groups of health professionals supplemented by additional methods, for example observation.

We recorded the timings of interventions (whether at the start of the programme and whether delivered once or repeated at intervals). We also recorded the rationales for the choice of interventions. This included the behaviour change mechanism if reported in studies including, for example, role modelling. We also recorded the use of theory to inform interventions, for example, the Theoretical Domains Framework (Cane 2012), or Normalisation Process Theory (May 2007).

Two independent review authors classified the extent to which the tailored intervention was adjusted to account for local factors using the following two categories: not adjusted – the intervention was designed in response to the general determinants affecting all or most professionals, and not adjusted to the particular determinants at individual or team level; some adjustment – one or more of the components of the intervention were adjusted at the level of the team or individual to account for local factors.

Assessment of risk of bias in included studies

Two review authors assessed the risk of bias of the included studies using the approach set out in Chapter 8 of the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011). The tool includes the following categories of bias: random sequence generation, allocation concealment, baseline outcomes, baseline characteristics, blinding of participants and personnel, blinding of outcome assessment, incomplete outcome data, contamination, selective reporting, and other sources of bias. We assessed risk of bias as either high risk, low risk, or unclear risk (either lack of information or uncertainty over the potential for bias). The risk of bias of each of the included studies is presented in the Results section.

Measures of treatment effect

We assessed all the included studies for inclusion in a meta-regression analysis, with the aim of providing an overall assessment of the effectiveness of tailored interventions in comparison with either no intervention or non-tailored interventions.

When several outcomes were reported in a trial we only extracted results for the variable(s) explicitly described as the primary outcome(s). When the primary outcome was not specified we took the variable described in the sample size calculation as the primary outcome. When the primary outcome was still unclear or when the manuscript described several primary outcomes, we selected the median effect size value across multiple outcomes. If the median fell between two outcomes, we chose the more conservative (smaller effect size) of the two.

We extracted data for the outcome of interest at both baseline and follow-up, to allow adjustment for baseline differences between the two treatment groups to be made in the analysis.

Unit of analysis issues

As all the trials were cluster-randomised, studies needed to report results for each cluster or, failing that, provide an estimate of the intra-class correlation coefficient (ICC) to enable the clustering effect to be accounted for in the overall effect size estimate from each study (Ukoumunne 2002). Five studies included in the analysis reported either an estimate of the ICC or reported data for each cluster, allowing the ICC to be estimated. Where no ICC could be derived from the study, we utilised published ICCs (Campbell 2005). Campbell et al extracted 220 ICCs from 21 data sets and reported the results separately for both primary and secondary care settings. For each of the studies included in our meta-analysis where no ICC was available, we utilised the median ICC reported by Campbell et al for the relevant setting. We then used the design effect to adjust the estimated effect sizes for clustering, whereby the variances of the odds ratios were increased by multiplying them by the design effect (Rao 1992).

Dealing with missing data

The trials included in the analysis were randomised at the cluster level, for example, at the level of the clinic or general practice. None of the studies described problems of drop-outs at this level during the trial period. The majority of trials included in this review collected data before and after interventions on different patients, therefore drop-out at the patient level was not an issue for these trials. Where data were collected on the same group of patients throughout the trial (three studies), no problem with drop-outs was reported.

Assessment of heterogeneity

We also investigated heterogeneity within the effectiveness of tailored interventions to identify factors that need consideration when designing and implementing a tailored intervention. In the previous review, we addressed the level of tailoring (whether to the determinants at the level of individual health professionals, or determinants at the level of the healthcare team, or at the level of the organisation), but this did not predict the effectiveness of tailored interventions. In the previous review, we also addressed the rigour of the determinants analyses undertaken in the included studies, anticipating that a more rigorous analysis would lead to a better tailored intervention and therefore greater effect on clinical practice. However, it was difficult to judge the rigour of the analysis of determinants since little is yet known of the most useful approaches (Huntink 2014; Wensing 2014), and this variable failed to predict effectiveness. In the previous review, we also investigated the effect of the presence of administrative constraints (EPOC 2002), since these might limit the ability of health professionals to change their behaviour, but this variable was also not predictive of effectiveness. Therefore, we omitted these variables in this update.

In this update we assessed:

- the risk of bias in the included studies, in case studies with a higher risk of bias were more likely to show tailored interventions were effective;

- whether tailoring was informed by theories of behaviour or behaviour change, since theories may be expected to aid the selection and design of tailored interventions;
- whether adjustment was made for local factors. Interventions delivered to different settings, such as different clinical teams or hospitals, may be adjusted to account for factors such as existing policies, the staff available, or other local issues, and this adjustment may be anticipated to improve the effect of tailored interventions; and
- the number of domains represented by the determinants identified (Flottorp 2013). If a wider range of determinant domains are found to influence practice, it may be more difficult to implement change in professional behaviour.

A summary of the decisions on inclusion of variables in the investigation of heterogeneity is included in Appendix 10. Although there are many factors that may potentially affect implementation interventions (including, for example, the duration of the intervention and whether it is delivered by influential agents, the complexity of the targeted behaviour, and the extent to which the determinants may be amenable to intervention), the appendix indicates those that we considered for inclusion.

We assessed heterogeneity for all meta-regression models using the I^2 residual statistic (Higgins 2003), which represents the proportion of residual between-study variation due to heterogeneity, as opposed to sampling variability. To investigate possible causes of heterogeneity in the effectiveness of tailored interventions between studies we assessed attributes that might have an impact on findings of intervention effectiveness. These were: risk of bias, use of a theory when developing the intervention, whether adjustment was made for local factors, and number of domains addressed with the determinants identified. Classifications for each study by attribute are reported in the table of Characteristics of included studies. We investigated heterogeneity by fitting the meta-regression analysis separately for each category of the study attribute of interest and comparing odds ratios, and additionally by fitting the study attributes as continuous variables into the meta-regression models (Habord 2008).

Assessment of reporting biases

We applied no language restrictions in the searches or inclusion of studies. We conducted a sensitive search of major biomedical databases and trial registries (see Search methods for identification of studies). As the *m*RCT includes randomised trial records held on the National Institutes of Health (NIH) ClinicalTrials.gov website (available at: http://clinicaltrials.gov/), we did not search the latter registry. Furthermore, as the studies included in the review spanned a number of years and were not all recent publications, time-lag bias is unlikely to be a major problem. In our analyses, we used meta-regression in order to be able to account for differences between control and intervention groups at study baselines. There is no equivalent of forest or funnel plots for meta-regression analyses and reliance on only follow-up results to produce such plots would have provided misleading information. We did, however, produce meta-regression plots to present the fitted models, the circles representing the estimate from each study.

Data synthesis

For the 15 studies included in the meta-regression, we combined the estimated odds ratios for each study (adjusted for clustering) using meta-regression techniques, whereby the baseline odds ratios were included as a covariate to adjust for any baseline differences between the intervention and control groups (Sutton 2000). The codes in Stata 2013 are included in Appendix 11. In addition, separate models were fitted depending on whether the control group received no intervention (seven studies) or a non-tailored intervention (eight studies). Of the eight studies that received a non-tailored intervention, seven received relevant guidelines or educational material only. One study delivered a group lecture and distributed the standard protocol to the control group (Beeckman 2013). Due to a more rigorous non-tailored intervention being delivered in this study, we also repeated the meta-regression analysis with this study removed.

Sensitivity analysis

In the meta-regression analyses, we carried out sensitivity analyses assuming a larger clustering effect than had been accounted for in the standard analyses, by using higher ICC estimates (i.e. the reported upper quartile range values) taken from Campbell (Campbell 2005).

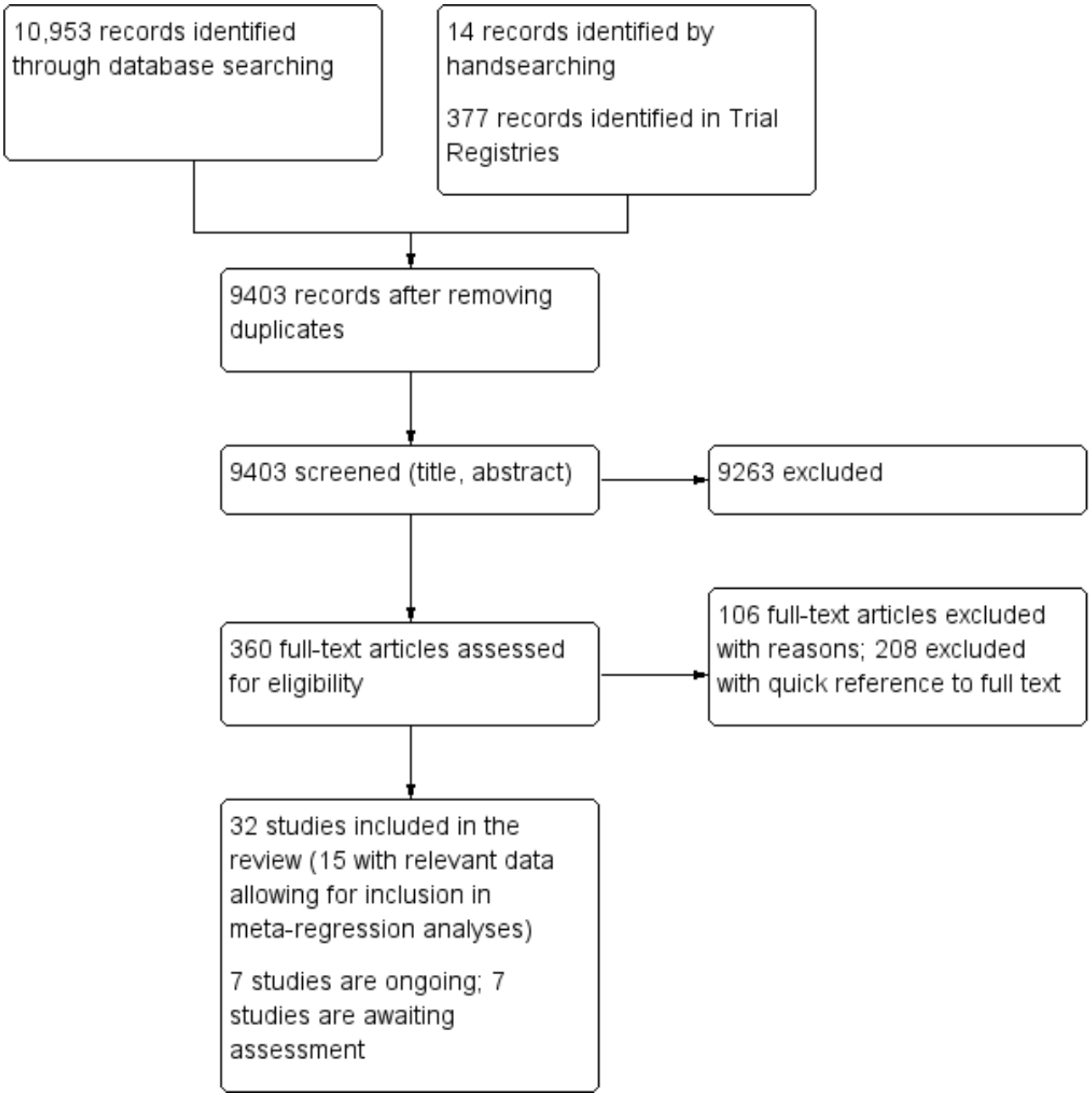
RESULTS

Description of studies

Results of the search

We screened 9403 unique citations (Figure 1) and reviewed the full text of 360. Of these, we included 32. Seven are ongoing studies (Ongoing studies) and seven are awaiting assessment (Studies awaiting classification). We excluded 106 with reasons provided in the Characteristics of excluded studies table and we excluded 208 with quick reference to the full text.

Figure 1. PRISMA diagram



Included studies

Twenty-three of the studies had been included in the previous version of the review, but we excluded three studies from that review because the interventions were not assessed on this occasion as meeting the criteria for tailoring (Davies 2002; Sehgal 2002; Verhoeven 2005). All included studies were cluster-randomised trials (Characteristics of included studies). We included 15 of 32 studies in the meta-regression analysis (Table 1; Table 2). The remaining 17 studies were not eligible for meta-regression because they either did not assess a suitable binary outcome, or they reported no data at baseline.

Healthcare setting and characteristics of healthcare professionals

Twelve trials were undertaken in the USA, five in the Netherlands, four in the United Kingdom, two each in Belgium, Norway, South Africa and Indonesia, and one each in Portugal, Canada, and Ireland. Seventeen studies were based in primary care settings, seven in hospital settings, three in nursing homes, and one each in child health clinics, community pharmacies, the regional health system, and a Medicaid programme. The health professionals included in the studies were: primary care practitioners (family physicians, general practitioners) in 14 studies, mixed professional groups in eight studies, nursing in four, pharmacy in two, and unclear, geriatric teams, gynaecology teams, and physicians in one study each. The studies did not give particular attention to

disadvantaged groups, although two studies were undertaken in a low/middle-income country (Indonesia).

Targeted behaviours

Twelve studies targeted use of drugs including, for example, the prescribing of antibiotics in the community, medication advised for acute diarrhoea, and drugs used to treat hypertension. Eleven studies targeted the management of disease, including diagnosis, assessment, and treatment. Six studies targeted preventive care, including secondary prevention in coronary heart disease. Two studies targeted influenza vaccination and one study the reporting of adverse drug reactions.

Prospective identification of determinants of practice

We categorised the investigation of determinants as low intensity in 10, moderate in 18, and high in four. The studies using high intensity methods employed a mix of methods. For example, Scott 2013 used both focus groups and interviews, Flottorp 2002 used a literature search, discussion with the guideline development group, brainstorming, focus group interviews with patients and health professionals, discussion groups, and informal interviews, and Murphy 2009 used focus groups with practitioners and patients as well as piloting. Another used an in-depth practice assessment (Goodwin 2001). In 13 studies, more than one method was used to identify determinants. Interviews with health professionals and occasionally patients were used in 11 studies, focus group interviews in 10 studies, questionnaire surveys in six, review of the literature in four, review of performance data in two, a meeting or workshop in two, and other methods in four (including observation and consultation with an expert group).

Determinants of practice

Four studies did not include information on the determinants identified (Avorn 1992; Hux 1999; Karuza 1995). Individual health professional factors (knowledge, motivation, perceptions of likely benefits, and risks) were the more commonly reported determinants, being noted in 25 studies. Patient factors (patient expectations and preferences) were reported in eight studies, incentives and resources in eight (including lack of staff and time, and financial disincentives to adopt new practices), guideline factors were noted in four studies (lack of clarity or lack of recommendations), organisational capacity (recording information, tools, workload, systems) in nine studies, professional interactions in three studies, and social, political, and legal factors in two studies.

Influence of prospective identification of determinants on intervention design

In 12 studies the rationale used to associate determinants with interventions thought likely to address them was either not clear or not stated (Coenen 2004; Engers 2005; Fairall 2012; Hux 1999; Langham 2002; Leviton 1999; Matchar 2002; Santoso 1996; Soumerai 1998; van Bruggen 2008; van Gaal 2010; Zwarenstein 2007). Behaviour change theories were explicitly referred to in seven studies (Baker 2001; Evans 1997; Foy 2004; Karuza 1995; Lakshminarayan 2010; Murphy 2009; Scott 2013). In five others the principles of academic detailing or persuasive strategies, or a framework of professional attitudes, were referred to (Avorn 1983; Avorn 1992; Figueiras 2006; Ross-Degnan 1996; Simon 2005). In eight studies, implementation models, existing evidence on intervention effectiveness, intervention mapping, or a statement on the logic of tailoring were given as the rationale for selection of interventions (Beeckman 2013; Callahan 1994; Cheater 2006; Flottorp 2002; Fretheim 2006; Goodwin 2001; Looijmans 2010; Schouten 2007).

Characteristics of the intervention

The interventions applied in the included studies were generally multifaceted. Educational materials, in the form of guidelines, copies of articles, summary documents or abstracts, were the most common intervention, being used in 16 studies. In 15 studies, educational outreach was used, either on a one-to-one basis or with groups. Educational group sessions were used in 14 studies and involved different formats, varying from lecture formats to facilitated interactive group discussions. Audit with feedback was also a common intervention, being used in eight studies. Decision support and other tools to aid health professionals in consultations with patients were used in eight studies, and role changes, including the selection of local opinion leaders or co-ordinators, were included in the interventions in eight studies. In six studies, reminders were used, either in consultations or in mailings or meetings, and practical assistance or organisational changes were included in four studies. In 20 studies, there was some adjustment to local factors, at the level of individual or team level; in five studies there was no adjustment; and in seven it was unclear whether there had been any adjustment.

Excluded studies

We excluded 106 studies for not meeting our eligibility criteria. For details see: Characteristics of excluded studies.

Risk of bias in included studies

For each study, the risk of bias is indicated in Table 1 (see Figure 2 and Figure 3). We assessed the overall risk of bias as high in four studies (Evans 1997; Hux 1999; Matchar 2002; Santoso 1996), unclear in 21 (Avorn 1983; Avorn 1992; Baker 2001; Beeckman 2013; Coenen 2004; Engers 2005; Foy 2004; Goodwin 2001; Karuza 1995; Lakshminarayan 2010; Langham 2002; Leviton 1999; Looijmans 2010; Murphy 2009; Ross-Degnan 1996; Schouten 2007; Simon 2005; Soumerai 1998; van Bruggen 2008; van Gaal 2010; Zwarenstein 2007), and low in six (Cheater 2006; Fairall 2012; Figueiras 2006; Flottorp 2002; Fretheim 2006; Scott 2013).

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

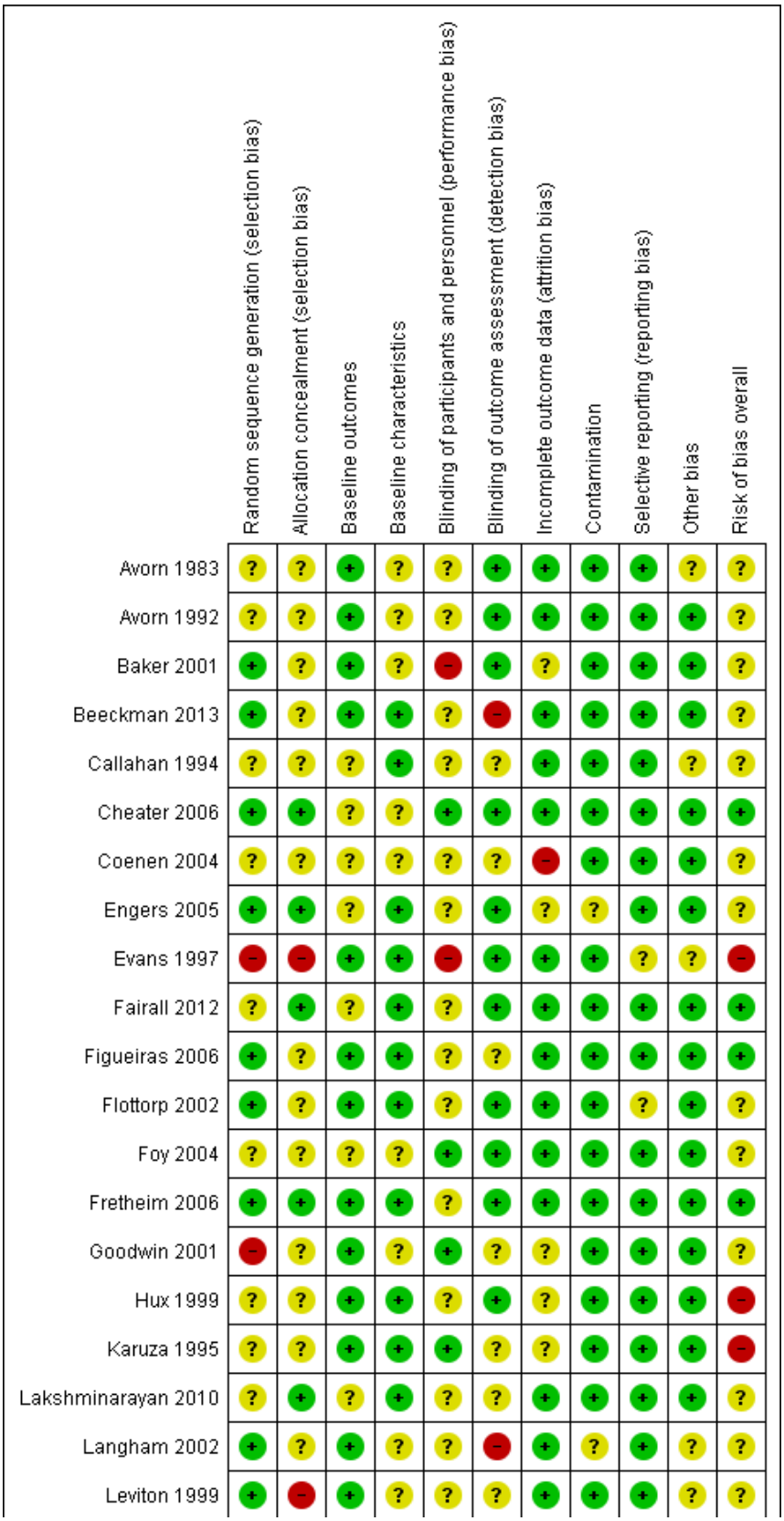


Figure 2. (Continued)

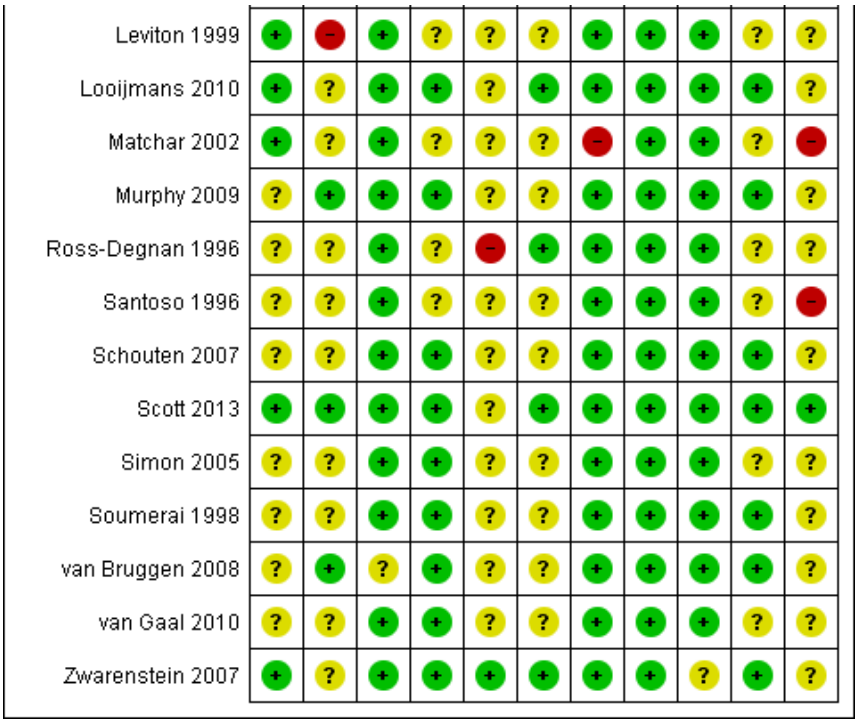
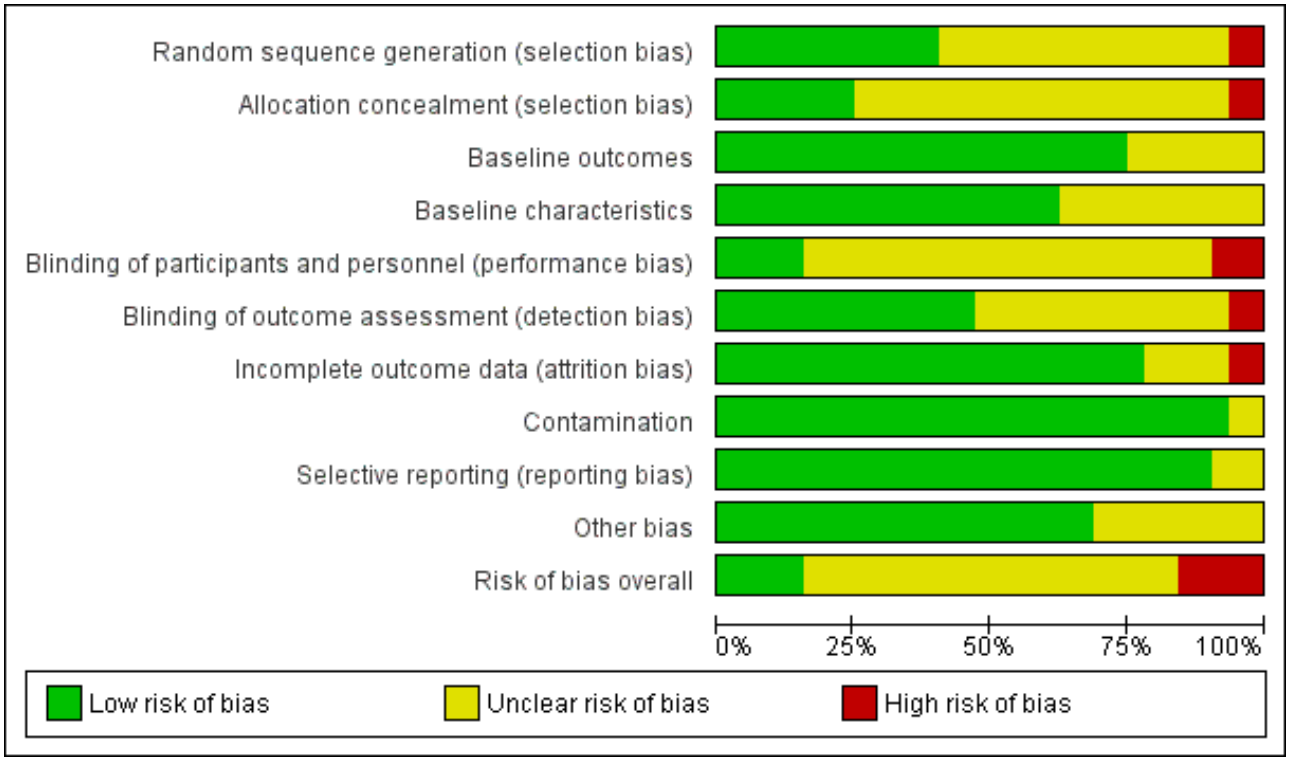


Figure 3. 'Risk of bias' graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.



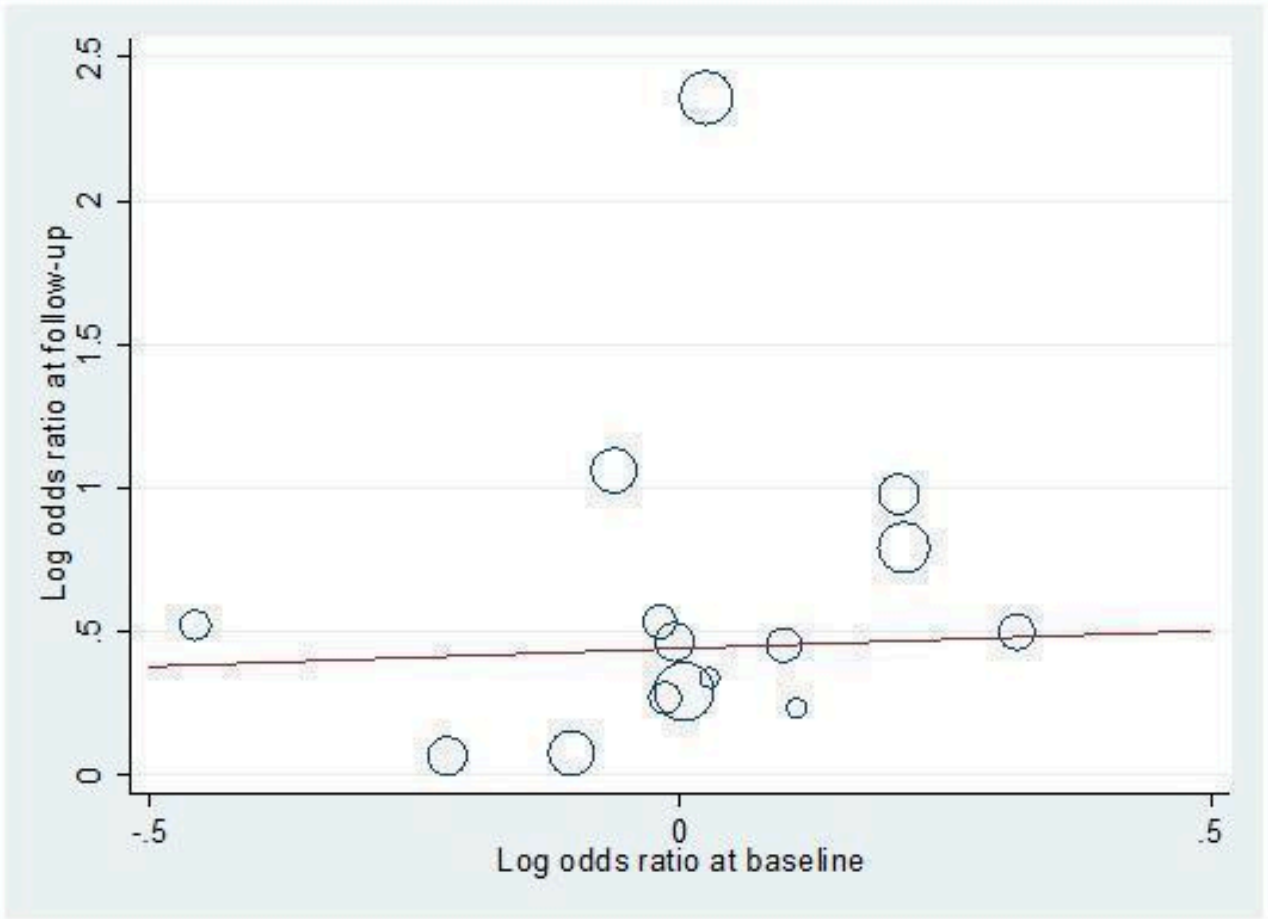
Effects of interventions

See: **Summary of findings for the main comparison**

The findings are summarised in the GRADE table (Summary of findings for the main comparison), the summary of findings worksheets being included in Appendix 12 and Appendix 13.

In Table 2, for the 15 studies included in the meta-regression analyses, we report the data utilised in the models. The effect sizes reported have been adjusted for the clustering effect induced by the study designs. The odds ratios at follow-up, adjusted for clustering, ranged from 1.08 to 10.59. When combined using meta-regression techniques and adjusting for baseline odds ratios, the pooled odds ratio was 1.56 (95% confidence interval (CI) 1.27 to 1.93, P value < 0.001). In Figure 4, the log odds ratios at follow-up are plotted against the log odds ratios at baseline, with each circle representing one study in the analysis, and the straight line indicating the pooled estimated follow-up log odds ratio for each value of the baseline log odds ratio. Circle size is relative to the standard error of the log odds ratio. The 17 studies not included had findings showing variable effectiveness consistent with the findings of the meta-regression.

Figure 4. Meta-regression plot for the 15 studies in the analysis



In addition to the main comparison in this review, we also undertook comparisons with no intervention or non-tailored interventions separately. Seventeen studies compared tailored interventions to no intervention (Avorn 1983; Avorn 1992; Callahan 1994; Fairall 2012; Figueiras 2006; Flottorp 2002; Goodwin 2001; Hux 1999; Looijmans 2010; Matchar 2002; Murphy 2009; Ross-Degnan 1996; Santoso 1996; Scott 2013; Schouten 2007; van Gaal 2010; Zwarenstein 2007) (see Table 1). Of these, seven were suitable for inclusion in a meta-regression, and the pooled odds ratio for the seven studies that received no control intervention was 1.36 (95% CI 0.92 to 1.99, P value = 0.099) (Avorn 1992; Callahan 1994; Flottorp 2002; Looijmans 2010; Murphy 2009; Scott 2013; Schouten 2007).

Fifteen studies compared tailored interventions to a non-tailored intervention (Baker 2001; Beeckman 2013; Cheater 2006; Coenen 2004; Engers 2005; Evans 1997; Foy 2004; Fretheim 2006; Karuza 1995; Lakshminarayan 2010; Langham 2002; Leviton 1999; Simon 2005; Soumerai 1998; van Bruggen 2008) (see Table 1). Eight of these were included in a meta-regression; the pooled odds ratio was 1.79 (95% CI 1.06 to 3.01, P value = 0.033) (Baker 2001; Beeckman 2013; Cheater 2006; Coenen 2004; Evans 1997; Fretheim 2006; Leviton 1999; Simon 2005). In all but one of these trials, the non-tailored intervention consisted of the dissemination of written educational materials or guidelines. Beeckman 2013 issued a standard protocol and group lecture to the control group. Removing this study from the meta-regression gave a pooled odds ratio of 1.48 (95% CI 1.24 to 1.75, P value = 0.002) (plots for these two comparisons are shown in Figure 5 and Figure 6).

Figure 5. Meta-regression plot for the eight studies that had a non-tailored control

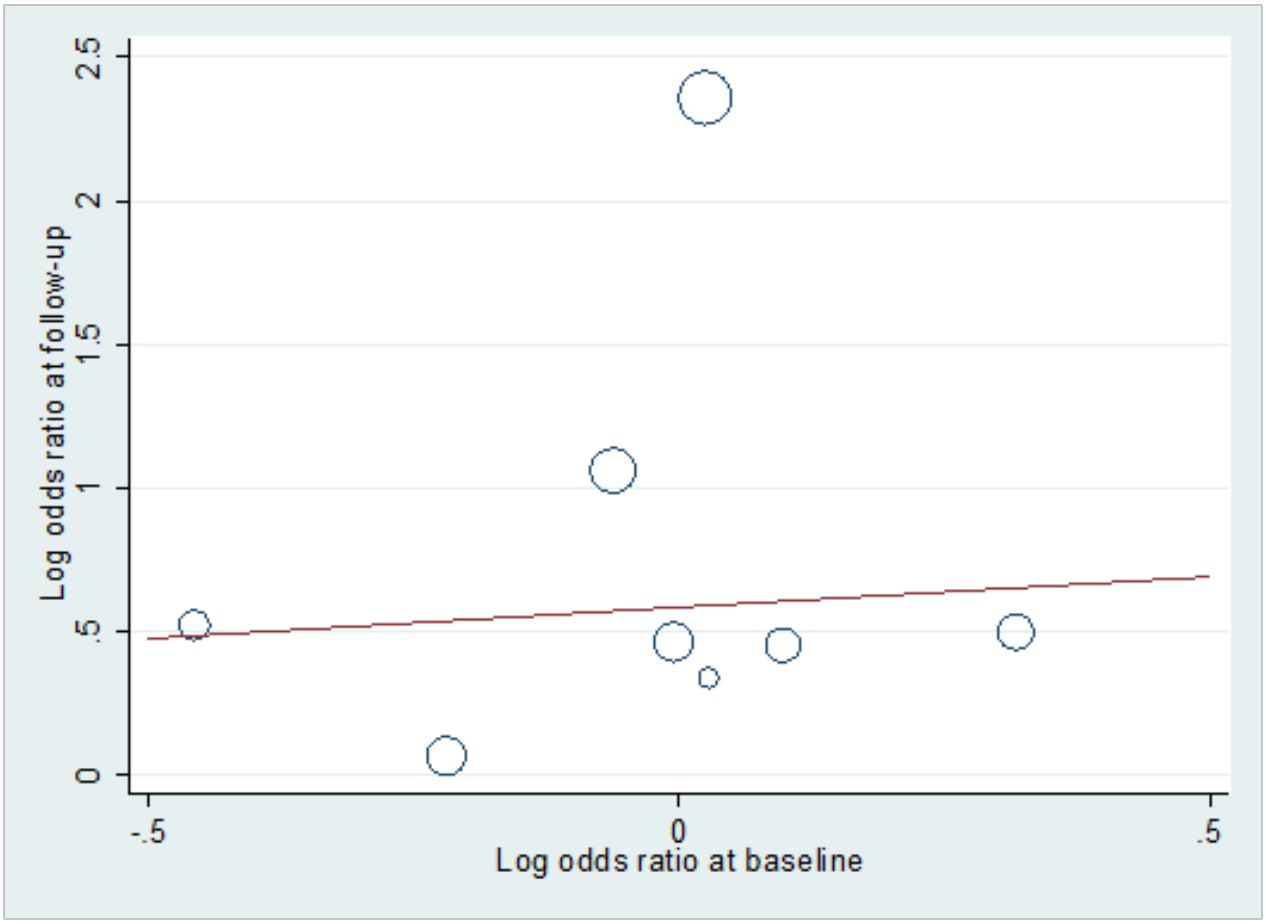
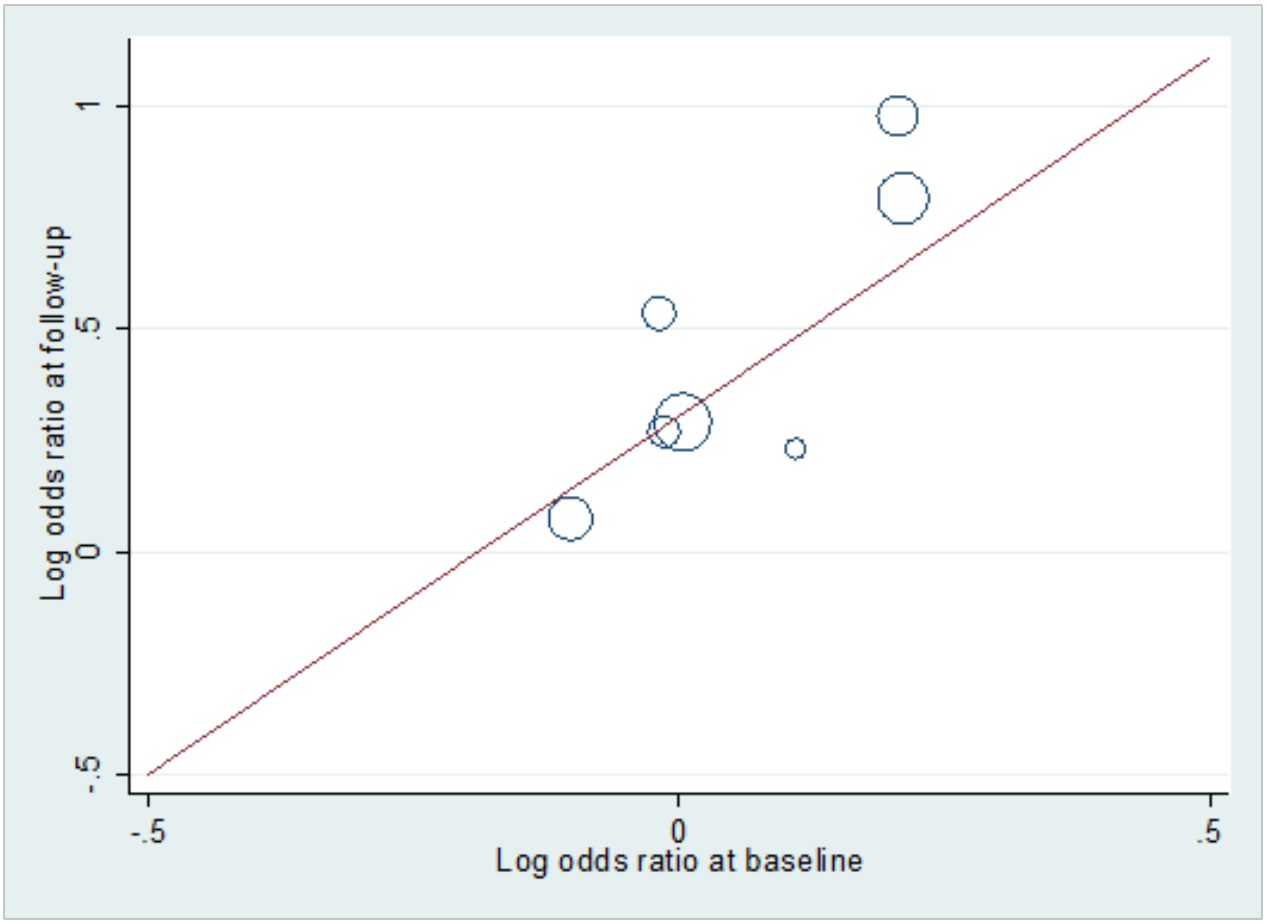


Figure 6. Meta-regression plot for the seven studies with a control of no intervention



We carried out analyses to investigate possible sources of heterogeneity between trial results. Study attributes assessed were risk of bias, explicit utilisation of a theory when developing the intervention, adjustment to local factors, and number of domains addressed by the determinants identified. Separate models were fitted dependent on the intervention delivered to the control group (none or non-tailored), but none were found to be associated with the reported effectiveness of the tailored interventions. We carried out sensitivity analyses assuming a larger clustering effect than had been accounted for in the standard analyses, by using higher intra-class correlation coefficient (ICC) estimates taken from Campbell (Campbell 2005). For the main analysis with all 15 studies, the pooled odds ratio was 1.54 (95% CI 1.27 to 1.86, P value < 0.001). For the eight studies where the control group was a non-tailored intervention, the OR was 1.63 (95% CI 1.11 to 2.40, P value = 0.020), and for the eight studies where the control group received no intervention the OR was 1.30 (95% CI 0.78 to 2.15, P value = 0.243).

Since the studies were of interventions designed to implement appropriate clinical practice, adverse effects may have been unlikely, although it is possible that the implementation interventions could have unintended effects. Clear reports of such effects were not included in the studies.

DISCUSSION

Summary of main results

In this update of our review of randomised trials of tailored implementation interventions, we identified an additional nine studies, seven of which had been published since the previous version of the review (Baker 2010). With 23 studies included from the previous version of the review, the finding of nine further studies suggests that the number of research studies into the effectiveness and mechanisms of tailored implementation is increasing. Despite the increase in the number of studies, however, our overall finding is similar to that of the previous review. Tailored implementation can be effective, but the effect is variable and tends to be small to moderate.

In the subsidiary comparisons, the effect of tailoring appeared to be less in comparison with no intervention than with non-tailored interventions. This unexpected finding may be due to imprecision, chance, the small number of studies, and other unexplained factors. The best estimate of the effectiveness of tailored interventions is most likely to be that of the overall analysis that included all 15 studies.

Overall completeness and applicability of evidence

The completeness and applicability of the evidence are limited by the current level of development of the methods of tailoring. In the included studies, tailoring was undertaken in different ways and agreement on which methods should be used appeared to be absent.

The methods used to identify determinants and to select interventions to address them, including the rationale underpinning the approach to intervention selection, varied between studies. Determinants may be investigated by various methods and, if several methods are used together, a large number of determinants may be identified (Krause 2014a). Determinants may be classified in different ways (Légaré 2009). We used a recently developed classification, which employs descriptive categories derived from a review of studies of determinants (Flottorp 2013). Once determinants have been identified and those to be addressed have been chosen, strategies to address them have to be selected, but this process may be undertaken in different ways (Wensing 2014). This process was not, however, described in detail in the included studies and they did not suggest that a generally accepted method had emerged. The adoption of a standard approach to reporting interventions, such as TIDieR, might help to overcome this problem (Hoffmann 2014).

The studies in our review also did not investigate whether identified determinants had been overcome by the chosen interventions other than through assessment of changes in professional behaviour or health outcomes. In future, researchers should consider investigating whether determinants have indeed been addressed, by undertaking process evaluations or investigations of programme theory (Rogers 2008) alongside trials, perhaps incorporating some of the methods initially used to identify the determinants, with investigation taking place in both the intervention and control arms of trials. Studies to compare different ways of selecting interventions are also required, for example studies that compare the use of different theories, or the use of an explicit theory with no explicit theory.

Furthermore, it is not clear which element of the tailored strategy approach explained effectiveness. The studies employed various interventions to improve professional practice and it is possible that use of such interventions (for example, audit with feedback, educational outreach) would have improved professional practice whether or not tailoring had been undertaken. Eight of the trials in the meta-regression included a control group that received a non-tailored intervention, but in all but one study the control intervention was limited to the dissemination of educational materials or guidelines. Therefore, our review shows that tailored strategies can be effective, but is unable to determine whether this approach is more effective than selecting other interventions. Evidence on the applicability of the method to low-income countries and with disadvantaged groups is also limited.

It should be pointed out that the studies included in this review do not enable any assessment of the costs of tailored strategies. Since the identification of determinants and tailoring of strategies involve additional steps beyond the application of a particular strategy, such as education alone, the economic costs of tailoring may be higher than several other interventions. Conversely, they may be lower through enabling the more expensive elements of interventions to be reserved for situations when they are likely to be effective. Consequently, evidence of the cost-effectiveness of tailoring in comparison with other implementation methods is required from well-designed evaluation studies. There are, therefore, several important questions to be addressed in future research into the effectiveness of tailored strategies.

Certainty of the evidence

It was possible to include 32 trials in this update, whereas 26 were included in the previous version (Baker 2010). We excluded three studies from this update that had been included in the previous version of the review because we assessed them as no longer meeting our criteria for tailoring. Fifteen studies could be included in the meta-regression analysis in this update. Therefore, the amount of evidence has improved. Nevertheless, applying the Grades of Recommendation, Assessment, Development and Evaluation (GRADE) system (GRADE Working Group 2004), the certainty of evidence is still moderate (Summary of findings for the main comparison). The reasons for this remain the variable risk of bias of the included studies and the inconsistent results.

A number of questions remain about the design of tailored strategies and their impact on identified determinants, as described above. It is possible to have reasonable confidence that tailored implementation strategies are more likely to lead to improved performance than the dissemination of guidelines alone, but further well-planned studies are required to determine how the tailored strategies approach should be designed to maximise effectiveness, and how the approach compares to other more intensive implementation strategies.

Agreements and disagreements with other studies and reviews

The only reviews that have directly investigated the effects of tailored interventions are the previous versions of this review (Baker 2010; Shaw 2005). In their review of 32 studies (randomised controlled trials, controlled trials, controlled before and after studies and interrupted time series) of implementation of clinical guidelines in obstetric care, Chaillet 2006 reported that the proportion of strategies that were effective was higher among studies that included a prospective identification of determinants compared with standardised interventions. Bosch 2007 undertook qualitative analysis of 20 purposefully selected quality improvement studies that reported investigations of determinants of practice. They found that attention to determinants did not always mean that the chosen intervention was based on determinants identified, although determinants were often used to adjust interventions, and concluded that the design of quality improvement interventions was in its infancy, the translation of identified determinants into implementation interventions still being a black box. Our findings concur with these reviews in showing that tailored strategies can be effective, but that the methods of tailoring are not yet well developed and are not described in detail in published studies.

Potential biases in the review process

The review was limited to randomised controlled trials (RCTs) and whilst the randomised trial design is considered to be less susceptible to bias in comparison with other study designs, it is possible that good quality interrupted time series or controlled before-after studies could provide further insight into the effectiveness of tailored implementation strategies.

A potential limitation of electronic handsearching is that this approach, in contrast to handsearching print journals, risks overlooking otherwise unpublished studies reported in (non-indexed) conference abstracts and journal supplements (Hopewell 2002). However, this is more likely to be a source of bias for reviews in which interrupted time series and controlled before-after studies are included, since in comparison with these types of studies, randomised trials are more likely to be identified through electronic database searches. Using a complex search, including a sensitive RCT filter, in the key electronic databases should have identified the majority of relevant, published trials.

Of the 32 trials reviewed, only 15 could be included in the meta-regression analysis. In the meta-regression analysis, the outcomes included were either those reported as the primary outcome or, when this was not possible, we selected the most clinically relevant measure and therefore the introduction of bias is unlikely. We pooled a relatively wide variety of outcomes in the meta-regression analysis, although in all studies the study outcomes related to processes of care, and the studies all addressed the same question about the effectiveness of tailored interventions. The small number of studies, however, limited the power to detect study attributes that could explain the variation in intervention effectiveness.

AUTHORS' CONCLUSIONS

Implications for practice

Interventions tailored to address identified barriers are probably more likely to improve professional practice than no intervention or the dissemination of guidelines alone. It is uncertain whether tailored implementation is more effective than other interventions that are not tailored, such as educational outreach visits (O'Brien 2007), or audit and feedback (Ivers 2012). Also, it is not possible to determine from the studies reviewed which methods of identifying determinants and tailoring interventions to account for them should be selected. Furthermore, the cost-effectiveness of tailored implementation in comparison with other implementation interventions is uncertain. Therefore, professionals and healthcare organisations should consider the required resources when choosing their approach.

Implications for research

Although further randomised trials of tailored interventions in comparison with no intervention or non-tailored interventions may be desirable, future research should aim to establish which methods of tailoring, under what circumstances, are most likely to be appropriate. Questions that need to be addressed include:

1. Which methods for identifying the determinants of practice are most likely to identify those determinants that are most important and are most amenable to being addressed through interventions commonly available for use in implementation? Although various methods are available for identifying determinants, more evidence is needed to indicate which methods are most suitable for different settings or clinical topics. Studies to compare methods are therefore required, focused not only on the numbers of determinants identified but also on the relevance of the determinants to the design of implementation interventions. In addition, studies are needed to evaluate and compare approaches for reaching explicit decisions on the importance of individual determinants and the extent to which they are amenable to change. Such approaches include consensus among experts or practitioners, and practical pilot testing.
2. Which methods are most appropriate for selecting interventions to address specific determinants of practice? Various methods may be used, from a simple implicit belief or hunch to a fully developed theory of human behaviour change drawing on fields such as psychological, social, or political science. Studies are needed to describe and compare the potential advantages of the different methods, to be followed by studies that compare those which are more likely to lead to successful tailoring of implementation interventions. Following the identification of promising methods of selecting and designing tailored interventions, randomised trials should be undertaken to confirm which are more likely to lead to professional behaviour change.

Trials that compare the effect on change in professional practice of different ways of identifying determinants or of different ways of selecting interventions may be premature until research to develop these components of tailoring has been completed. However, when trials are undertaken, process evaluations or investigation of programme theory should be incorporated and the interventions should be reported in detail (Hoffmann 2014).

Future reviews of trials of tailored interventions, including further updates of this review, should continue to investigate the reasons for the heterogeneity of the results. Factors to consider should include the methods of identifying the important determinants and the approaches used to select interventions to account for them.

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* Indicates the major publication for the study

CHARACTERISTICS OF STUDIES

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

Avorn 1983

Methods	Design: cluster-RCT
Participants	Country: USA Setting: Medicaid programmes Specialty: unclear N of health professionals: 435 N of patients: unclear
Interventions	Interventions: 1. printed materials only 2. printed materials plus academic detailing 3. no intervention
Outcomes	Targeted behaviour: prescribing of propoxyphene, vasodilators, and cephalexin
Notes	Methods used to identify determinants: interviews of health professionals; prescribing data were used to target high prescribers (moderate intensity) Classification of determinants: guideline factors; individual health professional factors; patient factors Timing of intervention: 2 visits in 6-month period Adjusted for local factors: no Rationale: Quote: "established principles of behavioural science, market research, and communications theory"

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Method of sequence generation not described. Quote: "Control and experimental interventions then allocated randomly within each block."
Allocation concealment (selection bias)	Unclear risk	Quote: "Control and experimental interventions were then allocated randomly within each block..."
Baseline outcomes	Low risk	Significance not reported, but data given and said to be comparable
Baseline characteristics	Unclear risk	Targeted physicians comparable in terms of specialty and board certification. No data reported
Blinding of participants and personnel (performance bias)	Unclear risk	Blinding of participants is not described formally. Quote: "Physicians in the program were approached as participants in an innovative demonstra-

Avorn 1983 *(Continued)*

All outcomes		tion program, rather than as 'mis-prescribers'. As a result, it is unlikely that Hawthorne-type effects accounted for the prescribing changes observed."
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Medicaid prescribing records were used as the source of data
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Of the 435, 9 moved away, 6 died, 5 retired. Dropout rates for each cause were found to be equally divided among the three study groups."
Contamination	Low risk	Appropriate clusters used
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Unclear risk	No correction for statistical clustering in analysis. The risk of contamination was low. Baseline performance was similar in the study groups, although detailed characteristics of the physicians in the study groups are not reported
Risk of bias overall	Unclear risk	5 criteria unclear risk

Avorn 1992

Methods	Design: cluster-RCT
Participants	Country: USA Setting: 12 nursing homes Specialty: geriatric care N of health professionals: unclear N of patients: 823 residents of nursing homes
Interventions	1. Academic detailing, for physicians, nurses, and nursing assistants. 2. no intervention
Outcomes	Targeted behaviour: prescribing of psychoactive drugs
Notes	Methods used to identify determinants: interviews of health professionals (moderate intensity) Classification of determinants: unclear Timing of intervention: 3 interactive visits for physicians, 4 training sessions for nurses and nursing assistants Adjusted for local factors: unclear Rationale: intervention based on the principles of academic detailing

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	The 12 homes were grouped into pairs. Quote: "One in institution in each pair was then randomly assigned to receive the experimental program."

Avorn 1992 *(Continued)*

Allocation concealment (selection bias)	Unclear risk	The method of allocation is not described
Baseline outcomes	Low risk	Data reported, comparable medication use at baseline
Baseline characteristics	Unclear risk	Information on the clinicians in homes, and their patients, is not reported
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Unable to assess
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "The same blinded research assistant returned to each facility to administer the clinical-assessment battery again to each resident who had been assigned previously."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Over 80% of residents followed up in second data collection
Contamination	Low risk	Nursing homes geographically distant
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Similar characteristics in intervention and control groups; contamination unlikely
Risk of bias overall	Unclear risk	5 criteria unclear risk

Baker 2001

Methods	Design: cluster-RCT
Participants	Country: UK Setting: primary care Specialty: general practice N of health professionals: 64 general practitioners N of patients: 780 patients newly diagnosed with depression
Interventions	1. Guideline plus feedback, outreach visit, group session, quotations from other GPs, depending on individual barriers identified. 2. guideline only
Outcomes	Targeted behaviour: management of adult patients with depression
Notes	Methods used to identify determinants: interviews of health professionals (moderate intensity) Classification of determinants: individual health professional factors (preparedness to change, social influence, psychological illness) Timing of intervention: once Adjusted for local factors: yes

Baker 2001 *(Continued)*

	Rationale: psychological theories of behaviour change

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "The practices of those GPs who agreed to take part were randomised using a table of random numbers to control and intervention groups."
Allocation concealment (selection bias)	Unclear risk	Information not reported
Baseline outcomes	Low risk	Baseline outcomes comparable other than for 1 outcome, but adjusted for
Baseline characteristics	Unclear risk	Fewer male patients in the intervention group
Blinding of participants and personnel (performance bias) All outcomes	High risk	GPs were not blind to the study group
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "Data collection was undertaken by two trained data collectors blind to practitioners' study group."
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "64 randomised (three of the original volunteers did not enrol any patients and were excluded, one moved away, one withdrew."
Contamination	Low risk	No practice included intervention and control general practitioners
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Contamination unlikely; similar study group characteristics
Risk of bias overall	Unclear risk	3 unclear risk, 1 high risk criteria

Beeckman 2013

Methods	Design: cluster-RCT
Participants	Country: Belgium Setting: nursing home wards Specialty: nursing, physiotherapists, occupational therapists N of health professionals: 118 N of patients: 464 residents of nursing homes
Interventions	1. 6-step multi-faceted tailored implementation, including education, feedback, decision support, introduction of key nurse role. 2. standard protocol plus group lecture
Outcomes	Targeted behaviour: pressure ulcer prevention

Beeckman 2013 *(Continued)*

Notes	Methods used to identify determinants: diagnostic interview with (1) the key nurse and (2) a selection of professionals involved in pressure ulcer prevention on the nursing ward (moderate intensity) Classification of determinants: individual health professional factors (lack of appropriate education; lack of knowledge); capacity for organisational change (time limitations; ease of use/accessibility of the current pressure ulcer protocol; lack of clarity about each one's responsibilities) Timing of intervention: the implementation phase lasted 16 weeks Adjusted for local factors: yes Rationale: an implementation model was used

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Simple randomization (using SPSS) was used to assign the wards to the experimental and the control groups"
Allocation concealment (selection bias)	Unclear risk	Information not reported
Baseline outcomes	Low risk	Baseline outcomes comparable
Baseline characteristics	Low risk	Baseline characteristics were similar
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Quote: "Blinding of either residents or professionals was not possible due to the character of the intervention."
Blinding of outcome assessment (detection bias) All outcomes	High risk	The outcome data were collected by the researcher. Quote: "Because of specific nature of this study, the researcher could not be blinded to unit assignment or control or experimental conditions."
Incomplete outcome data (attrition bias) All outcomes	Low risk	No patients reported as lost to follow-up
Contamination	Low risk	Wards were randomised
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Contamination unlikely; baseline characteristics similar in both study groups
Risk of bias overall	Unclear risk	2 unclear risk, 1 high risk criteria

Callahan 1994

Methods	Design: cluster-RCT
Participants	Country: USA Setting: academic primary care group practice

Callahan 1994 *(Continued)*

	Specialty: primary care N of health professionals: 103 family physicians N of patients: 175 patients aged 60 and older with depression
Interventions	1. Additional appointments for patients, plus supplementation of medical record with an intervention letter to the physician, educational flyer and post-visit questionnaire. 2. No intervention
Outcomes	Targeted behaviour: diagnosis and management of depression; changes in depression rating scale
Notes	Methods used to identify determinants: questionnaire for professionals plus review of records (low intensity) Classification of determinants: individual health professional factors (knowledge); time constraints Timing of intervention: 3 patient visits over 3 months Adjusted for local factors: no Rationale: services to assist primary care physicians (practice-enabling factors) were expected to improve practice

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Unable to assess
Allocation concealment (selection bias)	Unclear risk	Quote: "29 practice sessions were randomized to control or intervention status."
Baseline outcomes	Unclear risk	No baseline outcomes
Baseline characteristics	Low risk	No differences in baseline characteristics
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	No information given
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	No information given
Incomplete outcome data (attrition bias) All outcomes	Low risk	16% of control and 21% intervention patients withdrew before the 6-month assessment
Contamination	Low risk	All physicians and patients in a given session were in the same experimental group
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Unclear risk	Similar patients in study groups (see Table 3). No baseline data on physician performance. The study was conducted in a single health centre and contamination may have been possible

Callahan 1994 *(Continued)*

Risk of bias overall	Unclear risk	5 criteria unclear risk

Cheater 2006

Methods	Design: cluster-RCT
Participants	Country: UK Setting: primary and community care Speciality: community nursing N of health professionals: 176 community nurses N of patients: 1078 with a diagnosis of urinary incontinence
Interventions	Description of groups: 1. audit and feedback versus 2. educational outreach versus 3. audit and feedback with educational outreach versus 4. educational materials only
Outcomes	Targeted behaviour: adherence to evidence-linked review criteria; patient outcomes assessed using a patient questionnaire
Notes	Methods used to identify determinants: questionnaire to health professionals (low intensity) Classification of determinants: professional interactions (referrals), incentives and resources (time) Timing of intervention: once only Adjusted for local factors: limited adjustment according to baseline performance Rationale: implementation methods were selected because they had been evaluated in studies of changing doctors' or team behaviour

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Computer-based randomisation
Allocation concealment (selection bias)	Low risk	Cluster trial; concealed randomisation was conducted by the project administrator and 1 researcher
Baseline outcomes	Unclear risk	Baseline performance similar for all but 1 study group
Baseline characteristics	Unclear risk	Professionals characteristics comparable. A greater proportion of patients in 1 study group had intractable urinary incontinence
Blinding of participants and personnel (performance bias) All outcomes	Low risk	All study groups received an intervention (control group received printed educational materials)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Researchers and data collectors were blind to allocation

Cheater 2006 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	Low risk	Missing values are stated for all review criteria and all groups
Contamination	Low risk	Randomisation of practices
Selective reporting (reporting bias)	Low risk	All described outcomes reported
Other bias	Low risk	Groups comparable (page 548); no evidence of contamination
Risk of bias overall	Low risk	2 criteria unclear risk

Coenen 2004

Methods	Design: cluster-RCT
Participants	Country: Belgium Setting: primary care Specialty: general practice N of health professionals: 85 N of patients: 1800 adult patients consulting with acute cough
Interventions	1. A guideline, educational outreach visit and a postal reminder. 2. Educational materials only
Outcomes	Targeted behaviour: antibiotic prescribing
Notes	Methods used to identify determinants: focus groups with GPs, and a questionnaire to 316 GPs (moderate intensity) Classification of determinants: individual health professional factors (diagnostic uncertainty); patient factors (patient expectations) Timing of intervention: delivered once Adjusted for local factors: yes Rationale: none stated

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Details not reported
Allocation concealment (selection bias)	Unclear risk	Quote: "Overall, 85 GPs agreed to participate and a stratified randomization using minimization for sex, university of graduation and age was performed (Table 1)."
Baseline outcomes	Unclear risk	No baseline outcomes reported

Coenen 2004 *(Continued)*

Baseline characteristics	Unclear risk	Patients in the intervention group were less likely to produce sputum or be referred
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Quote: "They (the GPs) collected the data themselves on pre-printed forms."
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	No details reported
Incomplete outcome data (attrition bias) All outcomes	High risk	Post-test data from 27 of 42 (64%) GPs in intervention and 32 of 43 (74%) GPs in control group. Data from about 73% to 78% of eligible patients, diaries from 62% to 71% of patients)
Contamination	Low risk	Randomised by GP, but GPs in the same practice were in the same group
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Similar GP characteristics in the study groups; risk of contamination low
Risk of bias overall	Unclear risk	6 unclear risk, 1 high risk

Engers 2005

Methods	Design: cluster-RCT
Participants	Country: The Netherlands Setting: primary care Specialty: general practitioners N of health professionals: 67 N of patients: 531 patients with low back pain
Interventions	1. Included: a 2-hour workshop; a patient education card; guideline for educational therapists; 2 scientific articles on GP management of non-specific low back pain; a tool to facilitate greater agreement with physical, exercise and manual therapists on the management of non-specific low back pain. 2. Guideline only
Outcomes	Targeted behaviour: management of low back pain (referral prescribing, patient education)
Notes	Methods used to identify determinants: questionnaire to health professionals (low intensity) Classification of determinants: patient factors (patient preferences) Timing of intervention: initial training session, with a mailing 4 weeks later Adjusted for local factors: no Rationale: no theory or model
Risk of bias	

Engers 2005 *(Continued)*

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	A computer-generated list of random numbers was used
Allocation concealment (selection bias)	Low risk	Quote: "Blind treatment allocation was conducted by an independent researcher with no information on the GPs, using a computer-generated random list of numbers."
Baseline outcomes	Unclear risk	No baseline outcomes data reported
Baseline characteristics	Low risk	Characteristics of GPs and patients comparable
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Blinding of GPs was not possible
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Prescribing and referral data. There were also self report data from GPs on information provided to patients, which would have a high risk of bias
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "Of the 67 GPs included in the study, a total of 41 returned one or more post consultation forms (response rate of 61%)"
Contamination	Unclear risk	GPs were randomised, but it is not reported if 2 GPs could be included from the same practice
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Baseline characteristics in the 2 study groups were similar and contamination was unlikely
Risk of bias overall	Unclear risk	4 criteria unclear risk

Evans 1997

Methods	Design: cluster-RCT
Participants	Country: USA Setting: 22 child health clinics Specialty: child health (doctors, nurses, assistants, laboratory technicians, clerical assistants) N of health professionals: 150 N of patients: 61,652
Interventions	1. Training in five 3-hour sessions held over a 5-month period delivered by the investigators to professional and support staff in intervention group clinics. 2. Guideline only
Outcomes	Targeted behaviour: identification and management of children with asthma
Notes	Methods used to identify determinants: focus groups of professionals (moderate intensity)

Evans 1997 *(Continued)*

	Classification of determinants: individual professional factors (understanding of asthma); professional interactions (referral to other agencies); capacity for organisational change (leadership committed to the programme) Timing of intervention: monthly Adjusted for local factors: unclear Rationale: theory-based approaches to organisational change and learner-centred teaching

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Quote: "we randomly allocated one panel to intervention status by asking a volunteer to toss a coin during a meeting of BCH supervisors and administrators"
Allocation concealment (selection bias)	High risk	The allocation was made in a meeting
Baseline outcomes	Low risk	Baseline outcomes similar
Baseline characteristics	Low risk	No differences between characteristics of clinics or patients
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants were aware of assignment to study groups
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Data were extracted from the clinic computer database
Incomplete outcome data (attrition bias) All outcomes	Low risk	No clinics reported to have dropped out
Contamination	Low risk	Randomisation by clinic
Selective reporting (reporting bias)	Unclear risk	Appropriate outcomes reported
Other bias	Unclear risk	The clinics in the study groups had similar characteristics; there may have been some risk of contamination. Quote: "...all regional supervisors managed clinics in both the intervention and control groups..."
Risk of bias overall	High risk	3 high risk criteria, 2 unclear risk

Fairall 2012

Methods	Design: cluster-RCT
Participants	Country: South Africa Setting: primary care

Fairall 2012 *(Continued)*

	Specialty: nursing N of health professionals: unclear N of patients: 15,483
Interventions	1. A co-ordinator, permission for nurse prescribing, training, guidelines, management support, clinic toolkit. 2. Routine care (no intervention)
Outcomes	Targeted behaviour: prescribing of antiretroviral therapy in HIV
Notes	Methods used to identify determinants: initial meetings with senior managers and clinicians; workshops were then held with managers to further develop the intervention; meetings with clinic staff (moderate intensity) Classification of determinants: individual health professional factors – (concern of ability of nurses to assume new clinical responsibilities); incentives and resources (lack of physicians, high caseload of ART nurses growing numbers of ART patients); capacity for organisational change (workload, drug transport and storage problems, transport problems for patients, and lack of communication infrastructure such as telephones and fax machines); social, political, and legal factors (ambivalence about nurses' ability to take on responsibility for ART prescribing) Timing of intervention: delivered over 18 months Adjusted for local factors: yes Rationale: not stated

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Quote: "Within each stratum, clinics were randomly assigned to intervention or control according to sequences of random numbers in a random number table (even numbers for control and odd numbers for intervention), with separate sequences for each stratum."
Allocation concealment (selection bias)	Low risk	Quote: "The trial statistician (CL) undertook the randomisation before the trial started."
Baseline outcomes	Unclear risk	No baseline data
Baseline characteristics	Low risk	There were some differences in baseline characteristics, adjusted for in analyses
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Blinding was not possible; the lack of blinding is unlikely to be an important threat to validity for the main outcomes
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "The interim analysis was blind, but data analysts were not masked after the database was locked for final analysis."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Outcome data collected on high proportion of patients
Contamination	Low risk	Clinics randomised within strata

Fairall 2012 *(Continued)*

Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Baseline patient characteristics similar; low likelihood of contamination
Risk of bias overall	Low risk	3 criteria unclear risk

Figueiras 2006

Methods	Design: cluster-RCT
Participants	Country: Portugal Setting: the national health system in north Portugal Specialty: staff of 104 patient centres and 25 hospitals N of health professionals: 6950 physicians N of patients: Unclear
Interventions	1. A continuing medical education multifaceted intervention, comprising an outreach visit, reminder card, and report form. 2. No intervention
Outcomes	Targeted behaviour: reporting of adverse drug reactions
Notes	Methods used to identify determinants: a prior case-control study of the same population of physicians (moderate intensity) Classification of determinants: individual health professional factors (knowledge); incentives and resources (lack of time) Timing of intervention: once (1-hour educational visit) Adjusted for local factors: unclear Rationale: a framework of professional attitudes was used

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Quote: "Using a computer-generated procedure, 4 clusters were assigned to the intervention and 11 to the control group."
Allocation concealment (selection bias)	Unclear risk	Information not reported
Baseline outcomes	Low risk	No differences between groups
Baseline characteristics	Low risk	Control group older, more likely to work in general medicine and outpatient centres, but adjusted for in analyses
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Participants could not be blinded to the intervention

Figueiras 2006 *(Continued)*

Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Quote: "The Pharmacosurveillance Unit expert responsible for codifying adverse reactions (J.P.) was blinded to the physician study group assignment. Confidentiality was maintained, with data only being available for study purposes under a code number assigned to each physician that precluded any further identification."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Adverse drug reaction reporting is a passive process in which every report that is generated is received by the Northern Pharmacosurveillance Unit, which then furnished it to the researchers. Because of this, there was 100% assessment of ADR outcomes in the study population, and effectively no loss to follow-up. The only potential source of error would be if physicians in the study left clinical practice or died, and this information is not available. If this occurred it would not have affected the accuracy of the number of ADR reports but could distort the per-physician rates."
Contamination	Low risk	Randomised by hospital-based clusters
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Similar baseline characteristics in the study groups; contamination unlikely. Quote: "To prevent cross contamination between the intervention and control groups, 15 spatial clusters were used as units of assignment"
Risk of bias overall	Low risk	3 criteria unclear risk

Flottorp 2002

Methods	Design: cluster-RCT
Participants	Country: Norway Setting: 142 general practices Specialty: primary care N of health professionals: unclear N of patients: 16,939 consultations for sore throat and 9887 consultations for urinary tract infection
Interventions	1. Patient educational material, computer decision support, reminders, fee for telephone consultations, interactive courses for GPs and practice assistants. 2. No intervention
Outcomes	Targeted behaviour: use of antibiotics, laboratory tests, and telephone consultations
Notes	Methods used to identify determinants: review of literature, brainstorming, focus groups, pilot study, small group discussions, interviews (high intensity) Classification of determinants: individual health professional factors (fear of overlooking serious disease, lack of knowledge); not enough time, loss of income through telephone consultations (incentives and resources); changing routines (capacity for organisational change); patient expectations (patient factors) Timing of intervention: over 8 months Adjusted for local factors: unclear

Flottorp 2002 *(Continued)*

	Rationale: Quote: "Identifying barriers to change and tailoring interventions to address these is a logical approach to selecting appropriate interventions."

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Overall, 142 practices were randomised by computer"
Allocation concealment (selection bias)	Unclear risk	No information about allocation concealment given
Baseline outcomes	Low risk	Some small differences in prescribing rates at baseline, adjusted for in the analysis
Baseline characteristics	Low risk	No differences reported (data reported)
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Quote: "Because of the nature of the interventions, participating practices knew the group to which they were assigned."
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Data were extracted from electronic medical records with standard software
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Thirteen practices in the urinary tract infection arm and nine practices in the sore throat arm dropped out after randomisation."
Contamination	Low risk	Randomisation at the level of the general practice
Selective reporting (reporting bias)	Unclear risk	Appropriate outcomes reported
Other bias	Low risk	Baseline performance similar in the study groups; low risk of contamination
Risk of bias overall	Unclear risk	Allocation concealment

Foy 2004

Methods	Design: cluster-RCT
Participants	Country: Scotland (UK) Setting: hospital gynaecology units Specialty: gynaecology N of health professionals: unclear N of patients: 1474 patients receiving abortion care
Interventions	1. Audit report distributed to clinical staff, plus commentaries on the evidence and lead gynaecologists' views. Presentation at educational meetings; local barriers to change discussed; patient information booklet promoted, local action plans formulated. 2. Guideline only

Foy 2004 *(Continued)*

Outcomes	Targeted behaviour: adherence to guideline recommendations on assessment and use of medications
Notes	Methods used to identify determinants: questionnaire and interviews of health professionals (moderate intensity) Classification of determinants: individual health professional factors (errors of omission); capacity for organisational change (lack of control over organisational factors) Timing of intervention: several components delivered at different times Adjusted for local factors: yes Rationale: the theory of planned behaviour was used in identifying determinants

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Information not included
Allocation concealment (selection bias)	Unclear risk	Information not included
Baseline outcomes	Unclear risk	Baseline data not reported
Baseline characteristics	Unclear risk	Characteristics of patients and gynaecology units were similar
Blinding of participants and personnel (performance bias) All outcomes	Low risk	The participating gynaecology units were aware of their study group
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Record review and a patient survey used in data collection
Incomplete outcome data (attrition bias) All outcomes	Low risk	No loss of participating units reported
Contamination	Low risk	Randomisation at unit level. All 26 gynaecology units in Scotland participated
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Characteristics of the units in each study group were similar; action was taken against contamination. Quote: "the risk of contamination among units was recognised ... Measures were taken to avoid contamination (e.g. avoidance of any educational meetings between units)."
Risk of bias overall	Unclear risk	4 criteria unclear risk, including randomisation and allocation concealment

Fretheim 2006

Methods	Design: cluster-RCT

Fretheim 2006 *(Continued)*

Participants	Country: Norway Setting: primary care Specialty: general practitioners N of health professionals: 244 in 69 practices N of patients: 37,958
Interventions	1. Educational outreach, audit and feedback, computerised reminders linked to the medical record. 2. Guideline only
Outcomes	Targeted behaviour: prescribing for primary prevention of cardiovascular disease
Notes	Methods used to identify determinants: structured reflection, questionnaire to physicians, pilot testing (moderate intensity) Classification of determinants: individual health professional factors (knowledge); capacity for organisational change (no risk assessment tool at hand) Timing of intervention: aspects active throughout intervention period Adjusted for local factors: yes Rationale: tailoring was thought logical, although evidence of effectiveness was limited

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "A colleague not directly involved in our research project generated the allocation list using software from www.randomization.com. We gave her identification numbers representing each recruited practice, and she informed us whether the practice was allocated to the intervention or control group."
Allocation concealment (selection bias)	Low risk	See above
Baseline outcomes	Low risk	Similar outcomes at baseline
Baseline characteristics	Low risk	Similar patient and practice characteristics in study groups
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	The participating GPs could not be blinded to the intervention
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Data extracted electronically from practice computer systems
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "For seven of the 146 participating practices we were unable to collect medical record data for various reasons (Figure 1). 1 of the remaining 139 practices was not included in the analyses involving estimation of cardiovascular risk (three secondary outcomes) because of an error during data collection."

Fretheim 2006 *(Continued)*

Contamination	Low risk	Block randomisation in different geographical areas
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Contamination unlikely; no other important sources of bias
Risk of bias overall	Low risk	1 criterion unclear risk

Goodwin 2001

Methods	Design: cluster-RCT
Participants	Country: USA Setting: primary care Specialty: family physicians N of health professionals: 154 N of patients: 10,172
Interventions	1. Practice-wide meeting at the end of the assessment; tools to help enhance preventive service delivery (forms, stickers, posters, educational materials); feedback every 6 months on preventive service delivery rates, continued for the next 2 years; follow-up visits and discussions. 2. No intervention
Outcomes	Targeted behaviour: preventive service delivery
Notes	Methods used to identify determinants: 1-day practice assessment by nurse facilitator to identify opportunities for tailoring (high intensity) Classification of determinants: capacity for organisational change (existing office structures, practice size); incentives and resources (personnel available), individual health professional factors (current practice, practice values) Timing of intervention: over 12 months, an average of 4 follow-up visits (ranging from 0 to 9) were made to each practice Adjusted for local factors: yes Rationale: Quote: "need for greater individualization of intervention strategies based on understanding of local barriers"

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	High risk	Details not reported. Quote: "practices were randomised in blocks of 4 as they enrolled in the study"
Allocation concealment (selection bias)	Unclear risk	Not reported
Baseline outcomes	Low risk	At baseline, the summary score was lower in the intervention group, but there was adjustment in the analyses

Goodwin 2001 *(Continued)*

Baseline characteristics	Unclear risk	Baseline patient characteristics were similar in both study groups. No data given on the physicians
Blinding of participants and personnel (performance bias) All outcomes	Low risk	The nature of the intervention did not allow blinding
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	It is not stated whether study nurses were blinded. Quote: "trained research nurses (separate from the nurse facilitators) visited each practice to collect detailed data"
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Missing data are not discussed
Contamination	Low risk	Randomised at the level of the family practice
Selective reporting (reporting bias)	Low risk	All described outcomes are reported
Other bias	Low risk	Baseline patient characteristics similar
Risk of bias overall	Unclear risk	1 high risk, 4 unclear risk criteria

Hux 1999

Methods	Design: cluster-RCT
Participants	Country: Canada Setting: primary care practices in Ontario Specialty: primary care N of health professionals: 800 N of patients: unclear; Ontario residents over the age of 65
Interventions	1. Mailed packages of prescribing feedback and guideline-based educational materials, accompanied by educational bulletins. 2. No intervention
Outcomes	Targeted behaviour: prescribing of antibiotics
Notes	Methods used to identify determinants: focus groups of professionals (moderate intensity) Classification of determinants: unclear Timing of intervention: every 2 months for 6 months Adjusted for local factors: no Rationale: none stated

Risk of bias

Bias	Authors' judgement	Support for judgement

Hux 1999 *(Continued)*

Random sequence generation (selection bias)	Unclear risk	Quote: "Of the 833 remaining eligible physicians, 400 were randomly assigned to the intervention arm and 400 to the control arm."
Allocation concealment (selection bias)	Unclear risk	No details provided
Baseline outcomes	Low risk	Baseline outcomes similar
Baseline characteristics	Low risk	Characteristics of participating physicians similar at baseline
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Blinding of participants not possible
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Prescribing data were prepared independently. Quote: "The profiles were prepared from claims data for prescriptions under the Ontario Dug Benefit program."
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	A small proportion of physicians randomised took part. Quote: intervention group – "Five packages were returned as undeliverable; responses were received from 203 of the 395 physicians who received packages, of whom 135 wished to participate, giving an overall consent rate of 34%." Control group – "Ten packages were returned as undeliverable; responses were received from 194 of the 390 physicians who received packages, of whom 116 (30% of those who received invitations) wished to participate."
Contamination	Low risk	Physicians with the same address as another participant were not selected
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	The study groups had similar characteristics; contamination unlikely
Risk of bias overall	High risk	4 unclear risk criteria, including randomisation sequence, and allocation concealment

Karuza 1995

Methods	Design: cluster-RCT
Participants	Country: USA Setting: group practices Specialty: primary care N of health professionals: 51 primary care physicians N of patients: 29 to 30 patients aged 65 and over per physician
Interventions	1. Small group discussion, 1 hour duration with 2 phases including discussion on the relevance of the guidelines and review of barriers. Plan developed to address the barriers; technical assistance in implementing the strategy generated at each site e.g. providing posters for patients. 2. Discussion on an unrelated preventive healthcare topic

Karuza 1995 *(Continued)*

Outcomes	Targeted behaviour: influenza vaccination
Notes	Methods used to identify determinants: facilitated group discussion (low intensity) Classification of determinants: unclear Timing of intervention: delivered once Adjusted for local factors: yes Rationale: group dynamics theories (social dynamics, group decision processes)

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Details not reported
Allocation concealment (selection bias)	Unclear risk	Details not clear. Quote: "Because the physicians practiced in group settings, the practice groups were assigned to the two study arms randomly before the physicians were approached and enrolled in the study."
Baseline outcomes	Low risk	Similar baseline outcomes
Baseline characteristics	Low risk	No patient differences between study groups
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Quote: "physicians in the control arm were involved in a placebo intervention"
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Data were collected from patient charts and it is not clear whether the data collectors were blinded
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	It is not clear why the mean number of charts reviewed is lower than the 45 planned for; some charts were not available at post intervention data collection
Contamination	Low risk	Practice groups randomised
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Low risk of contamination; baseline characteristics and performance similar. Quote: "No systematic differences in the patients' demographic profile or health status were noted between study arms."
Risk of bias overall	High risk	4 unclear risk criteria, including randomisation sequence and allocation concealment

Lakshminarayan 2010

Methods	Design: cluster-RCT
Participants	Country: USA

Lakshminarayan 2010 *(Continued)*

	Setting: hospitals Specialty: stroke care N of health professionals: unclear N of patients: 2305 patients with acute ischaemic stroke
Interventions	1. Clinical opinion leaders, customised feedback, practical support for hospital administrators. 2. Audit and written feedback
Outcomes	Targeted behaviour: quality indicators for acute, inpatient, and discharge care
Notes	Methods used to identify determinants: questionnaire survey of professionals (low intensity) Classification of determinants: organisational capacity for change (lack of standardised order sets) Timing of intervention: continuous throughout the intervention period Adjusted for local factors: yes Rationale: the theoretical framework of adult learning and behaviour change

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	A randomised block design was used, but the method for generating the randomisation sequence was not described
Allocation concealment (selection bias)	Low risk	Quote: "Allocation was blinded except for one hospital where the medical director of the study practiced."
Baseline outcomes	Unclear risk	The baseline outcomes were similar, except for onset to drug treatment within 180 minutes; not clear if this was adjusted for
Baseline characteristics	Low risk	Patient characteristics were similar
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	The participating hospitals would be aware of their study group
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	It is not clear whether the data abstractors were blind to study group allocation. Quote: "Data were abstracted from patient medical records by trained nurses using a laptop program and manual."
Incomplete outcome data (attrition bias) All outcomes	Low risk	No loss to follow-up after randomisation
Contamination	Low risk	Hospitals randomised
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Low likelihood of contamination; baseline characteristics of patients similar
Risk of bias overall	Unclear risk	4 unclear risk criteria

Langham 2002

Methods	Design: cluster-RCT
Participants	Country: UK Setting: general practices in a socially deprived city area Specialty: general practice N of health professionals: unclear (17 general practices) N of patients: 1261 patients with cardiovascular disease
Interventions	1. Training in information systems versus 2. training of practices in evidence-based medicine versus 3. both versus 4. training on an unrelated topic
Outcomes	Targeted behaviour: recording, treatment, and control of risk factors
Notes	Methods used to identify determinants: each practice team was visited by a member of the study team, and all teams were brought together to identify barriers (low intensity) Classification of determinants: individual health professional factors (lack of training); capacity for organisational change (improving the ability to record information) Timing of intervention: 18 to 30 weeks Adjusted for local factors: yes Rationale: unclear

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Minimisation and random numbers table were used"
Allocation concealment (selection bias)	Unclear risk	Quote: "Practices were randomly allocated to one of the four intervention groups..."
Baseline outcomes	Low risk	Baseline outcomes similar
Baseline characteristics	Unclear risk	Baseline patient characteristics comparable other than age, BP, and smoking prevalence in 1 group, but not clear whether adjusted for
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Blinding was not possible due to the nature of the intervention
Blinding of outcome assessment (detection bias) All outcomes	High risk	Participating practices collected the data themselves
Incomplete outcome data (attrition bias) All outcomes	Low risk	Follow-up of 85% of patients achieved

Langham 2002 *(Continued)*

Contamination	Unclear risk	Practices were randomised
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Unclear risk	Baseline patients' characteristics broadly similar; practices were in a single locality and contamination may have been possible
Risk of bias overall	Unclear risk	1 high risk, 5 unclear risk criteria

Leviton 1999

Methods	Design: cluster-RCT
Participants	Country: USA Setting: tertiary care hospitals with neonatal intensive care facilities Specialty: maternal-fetal medicine specialists, perinatologists, obstetricians, and their teams N of health professionals: unclear N of patients: 6661
Interventions	1. An influential physician or nurse identified, grand rounds, chart reminder system, group discussions, feedback. 2. Written educational materials
Outcomes	Targeted behaviour: use of corticosteroids in preterm birth
Notes	Methods used to identify determinants: interviews and focus groups with maternal-fetal medicine specialists, neonatologists and obstetricians (moderate intensity) Classification of determinants: individual health professional factors (overestimation of risks, concerns encouraging delay) Timing of intervention: continuing throughout the intervention period Adjusted for local factors: yes Rationale: not stated

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Low risk	Quote: "We assigned hospitals by random number table either to the active dissemination (n=13) or usual dissemination control (n=14) group."
Allocation concealment (selection bias)	High risk	Allocation was not undertaken independently
Baseline outcomes	Low risk	Baseline outcomes were similar
Baseline characteristics	Unclear risk	There were no differences in hospital characteristics, but there was a difference in abnormal fetal conditions in patients (adjusted for)

Leviton 1999 *(Continued)*

Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Quote: "The study was not blinded because physicians in the active dissemination condition were aware of the study, and the leadership of all hospitals (including the chairpersons of obstetrics and gynaecology departments) were aware of the condition of assignment."
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Data collection done by medical abstractors but it is not clear if they were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	Only 1 hospital withdrew after randomisation
Contamination	Low risk	The hospital was the unit of randomisation
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Unclear risk	Quote: "A difference between intervention and control cases in the frequency of abnormal fetal conditions or fetal distress was significant at the patient level...". Contamination is unlikely
Risk of bias overall	Unclear risk	1 high risk and 5 unclear risk criteria

Looijmans 2010

Methods	Design: cluster-RCT
Participants	Country: The Netherlands Setting: nursing homes Specialty: nurses and other staff N of health professionals: 6635 N of patients: unclear
Interventions	1. An outreach visit (plus a script about the programme, required materials, announcements, personal invitation letter, leaflets, posters, reference to the website); a plenary, 1-hour meeting; the appointment of local programme co-ordinator. 2. No intervention
Outcomes	Targeted behaviour: influenza vaccination uptake among healthcare workers
Notes	Methods used to identify determinants: questionnaire to health professionals (low intensity) Classification of determinants: guideline factors; individual health professional factors (knowledge); professional interactions; social, political and legal factors Timing of intervention: in 3 stages Adjusted for local factors: unclear Rationale: the intervention mapping method
Risk of bias	

Looijmans 2010 *(Continued)*

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "...and were randomly allocated to an intervention and a control group by a computer"
Allocation concealment (selection bias)	Unclear risk	Information not provided
Baseline outcomes	Low risk	Baseline outcomes similar
Baseline characteristics	Low risk	Baseline characteristics comparable
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	The participants could not be blinded to the intervention
Blinding of outcome assessment (detection bias) All outcomes	Low risk	The vaccinating professional recorded the vaccination on a website
Incomplete outcome data (attrition bias) All outcomes	Low risk	2 intervention nursing homes withdrew during the study, and 1 control home was excluded as no influenza vaccination was offered during the study period
Contamination	Low risk	Randomisation at nursing home level
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Comparable baseline characteristics in the study groups; contamination unlikely
Risk of bias overall	Unclear risk	2 unclear risk criteria (1 allocation concealment)

Matchar 2002

Methods	Design: cluster-RCT
Participants	Country: USA Setting: managed care organisations Specialty: physicians N of health professionals: unclear N of patients: 680
Interventions	1. Anticoagulation service run by trained managers (3-day workshop), following recommendations of a panel of national experts. There was compensation for financial disincentives to physicians. The logistic organisation (e.g. for taking blood samples) was tailored to the local setting. 2. No intervention
Outcomes	Targeted behaviour: anticoagulation in patients with atrial fibrillation
Notes	Methods used to identify determinants: a survey of 800 physicians, interviews (moderate intensity)

Matchar 2002 *(Continued)*

	Classification of determinants: individual health professional factors (fear of warfarin-related bleeding, desire to avoid fragmentation of care); organisational capacity for change (lack of a reminder mechanism) Timing of intervention: throughout the intervention period Adjusted for local factors: yes Rationale: not stated

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	A computer random number function was used
Allocation concealment (selection bias)	Unclear risk	Process not reported
Baseline outcomes	Low risk	No differences at baseline
Baseline characteristics	Unclear risk	There were no differences in patient characteristics between study groups. No data on clinicians
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Participants were not blinded
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Whether or not the data abstractors were blinded is not reported
Incomplete outcome data (attrition bias) All outcomes	High risk	30% attrition is reported
Contamination	Low risk	Groups of geographically related practices were randomised
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Unclear risk	Contamination may have been possible, since geographically related practices were randomised to intervention and control groups. Patient characteristics were similar in both groups
Risk of bias overall	High risk	5 unclear risk criteria, including allocation concealment

Murphy 2009

Methods	Design: cluster-RCT
Participants	Country: Ireland and Northern Ireland Setting: primary care

Murphy 2009 *(Continued)*

	Specialty: general practice N of health professionals: 48 general practice teams N of patients: 903 with established heart disease
Interventions	1. A tailored action plan for each practice. Academic detailing for GPs, a session on behaviour change, consultation with the patient to identify areas for improvement, plus booklet and regular consultations. 2. No intervention
Outcomes	Targeted behaviour: secondary prevention of heart disease
Notes	Methods used to identify determinants: focus groups of practitioners and patients; piloting of the intervention (high intensity) Classification of determinants: individual health professional factors (knowledge in health behaviour change); patient factors (motivation and lack of support) Timing of intervention: continuous through intervention period Adjusted for local factors: yes Rationale: social cognitive theory, and other theories of behaviour change, were drawn on

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Details limited. Quote: "Practices were stratified according to numbers of whole time equivalent general practitioners in each practice (<2 and >2) and randomised using a process of minimisation within each centre."
Allocation concealment (selection bias)	Low risk	Randomisation was undertaken, quote: "by an individual independent of the research team."
Baseline outcomes	Low risk	Baseline outcomes comparable
Baseline characteristics	Low risk	Intervention and control groups comparable
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Practices could not be blinded to the intervention
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Data were collected from patient records by a research nurse
Incomplete outcome data (attrition bias) All outcomes	Low risk	
Contamination	Low risk	Randomisation at general practice level
Selective reporting (reporting bias)	Low risk	Quote: "Forty two patients discontinued the intervention and 23 patients in the control group defaulted"
Other bias	Low risk	Baseline characteristics similar; low likelihood of contamination

Murphy 2009 *(Continued)*

Risk of bias overall	Unclear risk	3 unclear risk criteria

Ross-Degnan 1996

Methods	Design: cluster-RCT
Participants	Country: Indonesia Setting: community pharmacies Specialty: pharmacy N of health professionals: 87 community pharmacies N of patients: 87 simulated patient mothers of a child under 5 years old
Interventions	1. Printed educational materials aimed at customers, information for pharmacy staff. 2. No intervention
Outcomes	Targeted behaviour: use of oral rehydration solution, antidiarrhoeals, and antibiotics
Notes	Methods used to identify determinants: focus groups with pharmacy owners, pharmacists, and counter attendants (moderate intensity) Classification of determinants: individual health professional factors; patient factors; incentives and resources Timing of intervention: delivered once to pharmacists and counter assistants Adjusted for local factors: yes Rationale: the intervention is described as a persuasive strategy

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	No details of the randomisation sequence were given. Quote: "Pharmacies were first stratified by geographic location and their baseline practices, and then randomly assigned to intervention (n=43) and control (n=44) groups from within these strata."
Allocation concealment (selection bias)	Unclear risk	Unable to assess
Baseline outcomes	Low risk	Baseline outcomes similar
Baseline characteristics	Unclear risk	Baseline characteristics not reported
Blinding of participants and personnel (performance bias) All outcomes	High risk	Quote: "It is possible that some pharmacy staff were aware of the role of the surrogate patients and changed their behaviour accordingly."
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "These surrogate patients were blind to the purpose of the study, and to the study or control status of the pharmacies"

Ross-Degnan 1996 *(Continued)*

Incomplete outcome data (attrition bias) All outcomes	Low risk	Data were collected from all pharmacies in the study
Contamination	Low risk	Pharmacies stratified by geographical location prior to randomisation
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Unclear risk	There are no baseline performance data; the risk of contamination is unclear
Risk of bias overall	Unclear risk	4 unclear risk, 1 high risk criteria

Santoso 1996

Methods	Design: cluster-RCT
Participants	Country: Indonesia Setting: health centres in 6 districts Specialty: primary care N of health professionals: unclear N of patients: 5400 prescriptions were included in the analysis
Interventions	1. Face to face interactive discussions in health centres versus 2. seminars in lecture format. 3. No intervention
Outcomes	Target behaviour: prescribing in acute diarrhoea
Notes	Methods used to identify determinants: focus groups with health professionals and consumers (moderate intensity) Classification of determinants: individual health professional factors (knowledge about the effects of different medications); patient factors (patient expectations) Timing of intervention: single episode Adjusted for local factors: no Rationale: no theoretical framework

Risk of bias

Bias	**Authors' judgement**	**Support for judgement**
Random sequence generation (selection bias)	Unclear risk	Details not provided. Quote: "The districts were randomly divided into three groups."
Allocation concealment (selection bias)	Unclear risk	Details not provided
Baseline outcomes	Low risk	Baseline outcomes similar
Baseline characteristics	Unclear risk	Baseline characteristics not reported

Santoso 1996 *(Continued)*

Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	It would not have been possible to blind staff of the study health centres to the intervention group
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	It is not clear who collected the data and whether they were blinded. Quote: "Ten cases were randomly selected from all acute diarrhoea cases seen in each month from a health centre."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Quote: "Altogether, there were 5400 prescriptions included for analysis, collected from 90 health centers 3 months before and 3 months after the intervention."
Contamination	Low risk	Randomisation at the level of the district
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Unclear risk	Contamination is unlikely; baseline characteristics of the health centres are not reported
Risk of bias overall	High risk	6 unclear risk criteria

Schouten 2007

Methods	Design: cluster-RCT
Participants	Country: The Netherlands Setting: 6 hospitals Specialty: teams managed community-acquired pneumonia N of health professionals: unclear N of patients: 1906 patients admitted with community-acquired pneumonia
Interventions	1. Local organising committee, lecture, feedback, care pathways, followed by adjustment to needs and wishes of each hospital. 2. No intervention
Outcomes	Targeted behaviour: adherence to guidelines on use of antibiotics in lower respiratory infection
Notes	Methods used to identify determinants: interviews with health professionals (moderate intensity) Classification of determinants: individual health professional factors (knowledge, lack of outcome expectancy); guideline factors (lack of recommendations); professional interactions (communication with laboratories) Timing of intervention: sequentially during intervention phase Adjusted for local factors: yes Rationale: tailoring to address barriers

Risk of bias

Bias	Authors' judgement	Support for judgement

Schouten 2007 *(Continued)*

Random sequence generation (selection bias)	Unclear risk	Coin toss was used to assign hospitals to intervention or control groups
Allocation concealment (selection bias)	Unclear risk	Quote: "R.P.A., who was blinded to the composition of the groups, flipped a coin to determine which hospitals would be in the intervention and control groups."
Baseline outcomes	Low risk	There were baseline differences in some outcomes, but adjusted for
Baseline characteristics	Low risk	Characteristics of hospitals and professionals similar at baseline, although there was an uneven distribution of patients with heart failure, but there was adjustment
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Hospitals could not be blinded to their intervention group
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	It is not clear whether the data collectors were blind to study groups
Incomplete outcome data (attrition bias) All outcomes	Low risk	All hospitals completed the study
Contamination	Low risk	Randomisation at the hospital level
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Contamination unlikely; baseline characteristics similar
Risk of bias overall	Unclear risk	4 criteria unclear risk

Scott 2013

Methods	Design: cluster-RCT
Participants	Country: USA Setting: community hospitals Specialty: hospital staff involved in stroke care, including emergency departments N of health professionals: unclear N of patients: 40,823 patients with stroke
Interventions	1. 9-component process, including on-site educational intervention, audit and feedback, academic detailing, decision support and web-based instruments. 2. No intervention
Outcomes	Targeted behaviour: alteplase use in stroke patients in emergency departments
Notes	Methods used to identify determinants: focus groups with health professionals, interviews of health professionals (high intensity)

Scott 2013 *(Continued)*

	Classification of determinants: individual health professional factors (familiarity with the guidelines, physician motivation); capacity for organisational change (communication with radiology teams, poor availability of neurologists)
	Timing of intervention: in stages over a 12-month period
	Adjusted for local factors: yes
	Rationale: behaviour change theory is referred to

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Assignment to intervention or control group was determined with a computer-generated randomisation sequence (SAS version 9.1) with a 50:50 chance."
Allocation concealment (selection bias)	Low risk	Allocation was undertaken by a data management centre independent of the researchers
Baseline outcomes	Low risk	Baseline outcomes similar
Baseline characteristics	Low risk	Characteristics similar
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Quote: "Masking of the study and hospital personnel to site assignment was not possible because of the nature of the intervention"
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Quote: "External medical reviewers who were masked to group assignment assessed outcomes and appropriate use of alteplase."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Intention-to-treat analysis; all included hospitals completed the study
Contamination	Low risk	Hospitals randomised
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Low risk of contamination
Risk of bias overall	Low risk	1 criterion unclear risk.

Simon 2005

Methods	Design: cluster-RCT
Participants	Country: USA
	Setting: a large health maintenance organisation
	Specialty: primary care
	N of health professionals: 367 prescribing clinicians

Simon 2005 *(Continued)*

	N of patients: 3692 patients with newly treated hypertension
Interventions	1. Individual academic detailing versus 2. group academic detailing versus mailed information. 3. Printed educational materials only
Outcomes	Targeted behaviour: prescribing of antihypertensive medication in accordance with guidelines
Notes	Methods used to identify determinants: focus group (moderate intensity) Classification of determinants: individual health professional factors (physician perceptions of drug effects); patient factors (patient reluctance to switch medications) Timing of intervention: once Adjusted for local factors: not clear Rationale: the principles of academic detailing

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	No details given
Allocation concealment (selection bias)	Unclear risk	No details given
Baseline outcomes	Low risk	Baseline outcomes similar
Baseline characteristics	Low risk	More physicians in the control group were male. Otherwise, patient and physician characteristics were similar between groups (adjusted for)
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Quote: "Blinding with respect to the experimental condition was not feasible."
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	The method of collecting prescribing data is not clear, but was probably from an electronic medical record
Incomplete outcome data (attrition bias) All outcomes	Low risk	Each time period had a different cohort of patients
Contamination	Low risk	Practices were randomised
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Unclear risk	The study took place in a single health maintenance organisation and contamination may be a risk. Baseline adherence was higher than national figures
Risk of bias overall	Unclear risk	4 unclear risk criteria

Soumerai 1998

Methods	Design: cluster-RCT
Participants	Country: USA Setting: 37 community hospitals in Minnesota Specialty: doctors, nurses caring for patients with acute myocardial infarction N of health professionals: unclear N of patients: 5347
Interventions	1. Identification of opinion leaders through staff survey; meeting of opinion leaders, identification of barriers; feedback on hospitals comparative performance. Tools and resources for use by opinion leaders – slides, administrative support, educational brochure, local interventions by the opinion leaders over the next 7 months – adaption to local staff, educational and informal interactions, revising protocols. 2. Feedback
Outcomes	Targeted behaviour: use of drugs in management of acute myocardial infarction
Notes	Methods used to identify determinants: 1-day meeting of opinion leaders, including discussion of evidence and review of feedback (low intensity) Classification of determinants: individual health professional factors Timing of intervention: continuing intervention over 7 months Adjusted for local factors: yes Rationale: not stated

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Method of sequence generation not described
Allocation concealment (selection bias)	Unclear risk	Method not described
Baseline outcomes	Low risk	Baseline outcomes similar
Baseline characteristics	Low risk	Patient characteristics were similar
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Health professionals could not be blinded to the intervention
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	It is not clear if the data collectors were blinded
Incomplete outcome data (attrition bias) All outcomes	Low risk	No hospitals were reported as withdrawing

Soumerai 1998 *(Continued)*

Contamination	Low risk	Hospitals were randomised, large cities being randomised as clusters to avoid contamination
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Baseline patient characteristics were similar. Contamination unlikely
Risk of bias overall	Unclear risk	4 criteria unclear risk

van Bruggen 2008

Methods	Design: cluster-RCT
Participants	Country: The Netherlands Setting: 30 general practices Specialty: general practice N of health professionals: unclear N of patients: 1640 with diabetes
Interventions	1. Nurses visited practices 2x/month for 3 hours and trained all practice staff in the use of the guidelines. Performance feedback and benchmarks 6 months after start of the intervention. Abstracts of the guidelines were issued. 2. Asked to continue care in line with national guidelines
Outcomes	Targeted behaviour: control of clinical measures (glycated Hb, cholesterol, BMI, blood pressure)
Notes	Methods used to identify determinants: nurse specialists interviewed practice staff (low intensity) Classification of determinants: individual health professional factors (lack of knowledge, lack of motivation, reluctance to prescribe multiple drug regimens); incentives and resources (lack of time, lack of financial incentive) Timing of intervention: practice visits twice per month Adjusted for local factors: yes Rationale: not stated

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	A random number table was used
Allocation concealment (selection bias)	Low risk	Allocation was undertaken by an independent researcher
Baseline outcomes	Unclear risk	No baseline data
Baseline characteristics	Low risk	Patient characteristics comparable except for education and macrovascular complications (adjusted for)

van Bruggen 2008 *(Continued)*

Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Blinding of practices not possible due to the nature of the intervention
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	There is no information on blinding of data collection
Incomplete outcome data (attrition bias) All outcomes	Low risk	No practices withdrew
Contamination	Low risk	General practices were randomised
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Low risk	Baseline characteristics similar; low likelihood of contamination
Risk of bias overall	Unclear risk	4 criteria unclear risk

van Gaal 2010

Methods	Design: cluster-RCT
Participants	Country: the Netherlands Setting: nursing homes and hospitals Specialty: nursing N of health professionals: 10 wards in nursing homes, 10 wards in hospitals N of patients: 3521
Interventions	1. Education: group lesson on the wards for all nurses, a CD-ROM with education material and a knowledge test, case discussions on every ward. 2. No intervention
Outcomes	Targeted behaviour: prevention of adverse events (incidence of pressure ulcers, urinary tract infections, and falls)
Notes	Methods used to identify determinants: group discussions among professionals (moderate intensity) Classification of determinants: unclear Timing of intervention: continuous throughout 14-month intervention period Adjusted for local factors: yes Rationale: not stated

Risk of bias

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

van Gaal 2010 *(Continued)*

Random sequence generation (selection bias)	Unclear risk	Quote: "The randomisation of the wards was stratified for centre and type of ward … and took place prior to baseline data collection"
Allocation concealment (selection bias)	Unclear risk	Details not reported
Baseline outcomes	Low risk	Baseline outcomes similar
Baseline characteristics	Low risk	Baseline characteristics similar
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Nurses could not be blinded to study group
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	It is not clear if data collectors were blind to study group. Quote: "To measure AEs and preventive care the research assistants read the patient files and observed the patients during a weekly visit."
Incomplete outcome data (attrition bias) All outcomes	Low risk	Adequate follow-up achieved
Contamination	Low risk	Randomised at hospital and nursing home level
Selective reporting (reporting bias)	Low risk	Appropriate outcomes reported
Other bias	Unclear risk	Quote: "As we studied different wards in the same centre, contamination across wards could have occurred. However, we are convinced that contamination is not an issue in our study."
Risk of bias overall	Unclear risk	5 unclear risk criteria

Zwarenstein 2007

Methods	Design: cluster-RCT
Participants	Country: South Africa Setting: primary care Specialty: general practice N of health professionals: 43 general practices N of patients: 318 children with asthma
Interventions	1. Delivery of 8 key messages by a pharmacist in academic detailing visits. 2. No intervention
Outcomes	Targeted behaviour: asthma symptom score
Notes	Methods used to identify determinants: qualitative and survey research in a similar nearby community (low intensity)

Zwarenstein 2007 *(Continued)*

Classification of determinants: individual health professional factors (knowledge); capacity for organisational change (lack of continuity, insufficient consultation time); incentives and resources (cost of chronic medication)

Timing of intervention: once

Adjusted for local factors: unclear

Rationale: not stated

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Practices within the study area were numbered and randomised to two groups using a computer-generated list of random numbers."
Allocation concealment (selection bias)	Unclear risk	Method of allocation not described
Baseline outcomes	Low risk	Baseline outcomes similar
Baseline characteristics	Low risk	Baseline characteristics comparable
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Data were based on a questionnaire completed by patients
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Symptom questionnaire completed by patients
Incomplete outcome data (attrition bias) All outcomes	Low risk	Over 84% of patients in each study group provided data
Contamination	Low risk	Randomised at general practice level
Selective reporting (reporting bias)	Unclear risk	No information on adherence to recommended practice
Other bias	Low risk	Generally similar practitioners and patients in study and control groups; randomised by practice, reducing the risk of contamination
Risk of bias overall	Unclear risk	2 criteria unclear risk

ART: antiretroviral therapy
BMI: body mass index
BP: blood pressure
GP: general practitioner
RCT: randomised controlled trial

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

Study	Reason for exclusion
Allison 2005	Intervention not explicitly tailored to barriers
Althabe 2008	No systematic, prospective analysis of determinants
Altiner 2007	No systematic, prospective analysis of determinants or tailoring
Avery 2012	No systematic, prospective analysis of determinants
Azocar 2003	No systematic, prospective analysis of determinants
Baer 2001	No systematic, prospective analysis of determinants; no clinical outcome measures
Barkun 2009	No systematic, prospective analysis of determinants
Barkun 2013	No systematic, prospective analysis of determinants
Benner 2007	No systematic, prospective analysis of determinants or tailoring
Benrimoj 2003	No systematic, prospective analysis of determinants
Bosworth 2007	Targeted patient behaviour, not professionals' behaviour
Bravo 2005	Not a RCT - pre/post-test design
Brinkman 2009	No systematic, prospective analysis of determinants or tailoring
Buckmaster 2006	Not a RCT
Byrne 2006	Not a RCT
Cabrera 2001	Not a RCT
Casebeer 2003	No systematic, prospective analysis of determinants; only outcome measured: knowledge
Cohen-Mansfield 2012	Trial intervention aimed at patients, not healthcare professionals
Cranney 1999	No objective performance outcomes
Cranney 2001	Not a RCT
Cupples 2008	Not a RCT - cross-sectional study
Davies 2002	Previously included, but excluded from this update. On reassessment, the barrier analysis did not meet the inclusion criteria
de Velasco 2004	Not a RCT
Downs 2006	No systematic, prospective analysis of determinants
Drew 2011	Not implementation of EBP, although tailoring and RCT
Dykes 2009	Not a RCT
Eccles 2007	Tailoring, not ahead of, but during, implementation

Study	Reason for exclusion
Edwards 2002	Not a RCT
Edwards 2007	Not a RCT
Engelman 2007	Not a RCT - process evaluation
Feder 2011	No systematic, prospective analysis of determinants. Author contacted
Figueiras 2001	No systematic, prospective analysis of determinants
Fretheim 2004	Not a RCT
Garcia 2004	Not a RCT
Gask 2005	Not a RCT
Gjelstad 2006	No systematic, prospective analysis of determinants
Gonano 2003	No systematic, prospective analysis of determinants or tailoring
Green 2002	Not a RCT
Gregory 1999	Lack of objectively measured outcomes; no statistical tests reported
Griffiths 2007	No systematic, prospective analysis of determinants or tailoring
Gülmezoglu 2007	No systematic, prospective analysis of determinants
Hammar 2009	No systematic, prospective analysis of determinants. Author contacted
Hanbury 2009	Not a RCT
Hardeman 2005	Not a RCT
Hendryx 1998	Intervention targeted at patients, not health professionals
Hennessy 2006	No systematic, prospective analysis of determinants
Herdeiro 2005	Not a RCT
Herdeiro 2008	No systematic, prospective analysis of determinants
Holzemer 2007	Intervention targeted at patients, not health professionals
Inouye 2000	Not a RCT
Jansen 2007	No systematic, prospective analysis of determinants or tailoring
Jones 2004	Not a RCT
Kinmonth 1996	Not a RCT
Lafata 2007	No systematic, prospective analysis of determinants or tailoring
LaPointe 2006	No systematic, prospective analysis of determinants

Study	Reason for exclusion
Laprise 2009	No systematic, prospective analysis of determinants or tailoring
Laurant 2007	No systematic, prospective analysis of determinants
Leong 2006	Not a RCT
Leveille 1998	Intervention targeted at patients, not health professionals
Levine 2005	RCT with pre- and post-intervention survey. Outcome measured: physician satisfaction
Lobo 2004	No systematic, prospective analysis of determinants - though some within-intervention consideration of barriers
Lowrie 2010	No systematic, prospective analysis of determinants. Author contacted
Lundborg 1999	No systematic, prospective analysis of determinants
Markey 2001	Only outcomes measured: knowledge and attitudes
Middleton 2011	A complex, multi-component intervention with some local adjustment to barriers, but assessed as not meeting our inclusion criteria of a prospective identification of barriers. Author contacted
Montgomery 2008	Not a trial of a tailored implementation intervention. Author contacted
Murphy 2005	Not a RCT
Nansel 2007	RCT. Some tailoring, but outcomes not measured objectively (parent self report)
Naughton 2007	No systematic, prospective analysis of determinants or tailoring
New 2003	No systematic, prospective analysis of determinants
Otero-Sabogal 2006	Intervention targeted at patients, not health professionals
Peters-Klimm 2008	No systematic, prospective analysis of determinants or tailoring
Ploeg 2007	Not a RCT
Romero 2005	Focused on content of guidelines, rather than barriers to implementation
Saini 2006	Not a RCT
Sehgal 1998	Not a RCT
Sehgal 2002	Not a tailored intervention
Seltzer 1997	Not a RCT
Shirazi 2008	Educational intervention tailored, but lack of objectively measured outcomes
Shirazi 2011	No tailoring
Silverman 2004	Not a RCT
Simunovic 2011	No tailoring

Study	Reason for exclusion
Socolar 1998	Feedback tailored to identified deficiencies, not to barriers
Solomon 2001	No systematic, prospective analysis of determinants
Solomon 2007	No systematic, prospective identification of barriers. Some tailoring of education for patients, but not reported at professional level
Spunt 1996	Not a RCT
Straand 2006	No systematic, prospective analysis of determinants
Stéphan 2006	No systematic, prospective analysis of determinants
Taylor 1996	Interventions carefully planned, but not tailored to barriers
Taylor 2000	Not a RCT
Turnbull 2006	No systematic, prospective analysis of determinants
Unrod 2007	Targeted at patients rather than professional performance
Vallerand 2004	Only outcomes measured: knowledge and attitudes
van de Ven 2013	No systematic, prospective analysis of determinants
van Driel 2007	No systematic, prospective analysis of determinants
van Eijk 2001	No systematic, prospective identification of barriers
Verhoeven 2005	Did not meet our more rigorous inclusion criteria for barrier analysis and was therefore excluded
Ward 2009	Intervention targeted at patients, not health professionals
Welschen 2004	No systematic, prospective analysis of determinants
Weston 2008	No tailoring
Witt 2004	No systematic, prospective analysis of determinants
Wright 2003	Not a RCT
Wright 2006	Not a RCT - before and after design
Zimmerman 2003	Not a RCT
Zimmerman 2006	Not a RCT
Zwarenstein 2011	No tailoring

EBP: evidence-based practice
RCT: randomised controlled trial

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

Bosch 2014

Methods	Cluster-randomised trial
Participants	34 Australian 24-hour emergency departments
Interventions	Intervention and control group. The intervention group will receive an implementation intervention based on an analysis of influencing factors, which include local stakeholder meetings, identification of nursing and medical opinion leaders in each site, a train-the-trainer day, and standardised education and interactive workshops delivered by the opinion leaders. Control group departments will receive a copy of the most recent Australian evidence-based clinical practice guideline on the acute management of patients with mild head injuries
Outcomes	Clinical practice outcomes. Primary: 'appropriate PTA screening' measures - whether prospective assessment of PTA was appropriately undertaken. Secondary: 'PTA screening-tool' measures - whether the administration of the validated tool was completed at least once; 'Memory-clinical' measures - whether staff members have made an assessment of memory using questions in their clinical assessment. Other secondary measures assessing effectiveness of intervention in improving the ED management of mTBI
Notes	Clinical practice outcomes will be measured retrospectively through chart audit by an independent, trained chart auditor

Chavane 2014

Methods	Demonstration project to be developed through a facility-based cluster-randomised controlled trial with a stepped wedge design
Participants	This study will be conducted in 10 antenatal care clinics in the 3 regions of Mozambique
Interventions	The intervention includes 4 components: the provision of kits with all necessary medicines and laboratory supplies for antenatal care clinics (medical and non-medical equipment), a storage system, a tracking system, and training sessions for health care providers
Outcomes	The primary outcome will be delivery of selected healthcare practices to women attending the first antenatal care visit. 3 practices will be chosen from a list of priority practices, after evaluating their current use during the baseline period and before implementation of the intervention. Practices not selected as primary outcomes will be incorporated as secondary outcomes
Notes	—

Dixon 2013

Methods	Concurrent mixed methods design, with data collection to be conducted during 3 project phases
Participants	Outpatient INPC primary care practices operating in urban and rural settings that are part of the INPC, representing multiple health systems and clinics
Interventions	2 technical interventions will be deployed over a staggered schedule at participating clinics: 1) "standard" pre-populated forms and 2) "enhanced" pre-populated forms
Outcomes	Data will be triangulated to find convergence or agreement by cross-validating results to produce a contextualised portrayal of the facilitators and barriers to implementation and use of the intervention

Dixon 2013 *(Continued)*

Notes	Since deployment is staggered, at any point in time non-intervention sites can act as natural controls for intervention sites, without the selection bias generally present in non-randomised experiments. Therefore, the study protocol is theoretically equivalent in its ability to generate causal evidence to a traditional randomised controlled trial

Dizon 2014

Methods	Randomised controlled trial
Participants	54 physical therapists from the Philippines recruited from a range of sources: a database of physical therapists obtained from a preliminary descriptive survey study, the network of the Philippine Physical Therapy Association, and a list of hospitals in the yellow pages
Interventions	Random allocation to evidence-based practice group (intervention) and wait list (control) group
Outcomes	Measurement of changes to physical therapists' evidence-based practice knowledge, skills, attitudes, and behaviour. 3 measurement points: pre, post, and 3 months post intervention for knowledge, skills, and attitudes
Notes	—

He 2014

Methods	Randomised study
Participants	Village doctors from 2 adjacent, similar Community Health Service Stations (CHSS), chosen from 10 of the 15 townships in Chongyi County. CHSSs were matched based on the education and training, age, and service population of the village doctors. One was randomly as allocated to the intervention group, the other to the control group
Interventions	A structured on-site intervention including education, supervision, and technical support was provided to village doctors in the intervention group tailored to their needs. The control group received no visits
Outcomes	Village doctors' use of electronic health records (EHR) in rural community health services in less developed areas
Notes	—

McNulty 2014

Methods	Prospective, cluster-randomised controlled trial with a modified Zelen design
Participants	160 general practices in South West England in 2010
Interventions	Intervention comprised of practice-based education with up to 2 additional contacts to increase the importance of screening to GP staff and their confidence to offer tests through skill development (including videos). Practical resources (targets, posters, invitation cards, computer reminders, newsletters including feedback) aimed to actively influence social cognitions of staff, increasing their testing intention

McNulty 2014 *(Continued)*

Outcomes	Numbers of chlamydia infections detected
Notes	Modified Zelen design overcomes potential bias in difficult to conceal evaluations of educational interventions, by not informing any participants that they are participating in a trial

Voorn 2014

Methods	Cluster-randomised controlled trial including an effect, process, and economic evaluation
Participants	Study to be conducted in a minimum of 20 hospitals in the Netherlands using EPO and/or perioperative blood salvage in THA and TKA. One representative orthopaedic surgeon per hospital will be invited to participate in the study
Interventions	The hospitals in the intervention group will receive a tailored de-implementation strategy that consists of 4 components: interactive education, feedback in educational outreach visits, electronically sent reports on hospital performance (all aimed at orthopedic surgeons and anaesthesiologists), and information letters or emails aimed at other involved professionals within the intervention hospital (transfusion committee, OR-personnel, pharmacists). The hospitals in the control group will receive a control strategy (i.e. passive dissemination of available evidence)
Outcomes	Primary outcome: the percentage of patients undergoing primary elective total hip or knee arthroplasty in which erythropoietin or perioperative blood salvage is applied. Outcomes will be measured at patient level, using retrospective medical record review
Notes	—

ED: emergency department
EPO: erythropoetin
mTBI: mild traumatic brain injury
OR: operating room
PTA: post-traumatic amnesia
INPC: Indiana Network for Patiuent Care
THA: total hip arthroplasty
TKA: total knee arthroplasty

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

Aakhus 2014

Trial name or title	Tailored interventions to implement recommendations for elderly patients with depression in primary care: a study protocol for a pragmatic cluster randomised controlled trial.
Methods	Design: pragmatic cluster-RCT
Participants	General practitioners and other health care providers from 80 municipalities; home dwelling, depressed patients >= 65 years who have consulted their GP during preceding 6 months
Interventions	Multifaceted, collaborative care plan tailored to participants and which addresses local determinants assumed to influence patient care
Outcomes	Primary: proportion of recommendations implemented by GPs; proportion of recommended practices adhered to by GP. Secondary: patient improvement (CGI-I, PGI and HADS scales); patient-reported psycho-social outcomes and medication adherence
Starting date	Trial start date: 2011; intervention start date, autumn 2013

Aakhus 2014 *(Continued)*

Contact information	Eivind Aakhus, Research Centre for Old Age Psychiatry, Innlandet Hospital Trust, N-2312 Ottestad, Norway; Norwegian Knowledge Centre for the Health Services, Box 7004, St Olavs plass, N-0130 Oslo, Norway
Notes	—

Godycki-Cwirko 2014

Trial name or title	Evaluation of a tailored implementation strategy to improve the management of patients with chronic obstructive pulmonary disease in primary care: a study protocol of a cluster randomized trial.
Methods	Design: pragmatic cluster-RCT (2-armed)
Participants	18 general practices with at least 80 identified (at baseline) patients with diagnosed COPD; estimated enrolment 540
Interventions	Multifaceted intervention tailored to participant physicians and which addresses local determinants influencing patient care: medical record annotation alerting physician to patient's condition, COPD; provision of mMRC prognostic scale in electronic or print medical record; provision of physician checklist to guide patient consultation; provision of inhalers to GP clinics for use in patient demonstrations
Outcomes	Physicians' adherence to 4 recommended practices during patient encounter: brief anti-smoking advice, dyspnoea assessment, consultation checklist, and demonstration to patients of correct inhaler use
Starting date	December 2013
Contact information	Maciek Godycki-Cwirko, Centre for Family and Community Medicine, Medical University of Lodz, 20 Kopcinskiego Street, Lodz 90-153, Poland
Notes	—

Huntink 2013

Trial name or title	Effectiveness of a tailored intervention to improve cardiovascular risk management in primary care: study protocol for a randomised controlled trial.
Methods	Design: cluster-RCT (2-armed)
Participants	Practice nurses, in general practice settings, who have been trained for cardiovascular risk management (CVRM)
Interventions	Training in motivational interviewing; e-learning course on CVRM tailored to practice nurses; instruction in e-health and application of Twitterconsult
Outcomes	Nurse adherence to 6 recommended practices related to blood pressure and cholesterol target values, risk profiling, and lifestyle advice
Starting date	July 2013

Huntink 2013 *(Continued)*

Contact information	Elke Huntink, Radboud University Nijmegen Medical Center, Scientific Institute for Quality of Healthcare, Postbus 9101, 6500 HB, Nijmegen, The Netherlands
Notes	—

Jäger 2013

Trial name or title	A tailored implementation intervention to implement recommendations addressing polypharmacy in multimorbid patients: study protocol of a cluster randomized controlled trial.
Methods	Design: cluster-RCT
Participants	General practitioners and healthcare assistants in primary care practices who are organised in quality circles (QC). Two QC with approximately 20 practices each for the control group and intervention group. Patients: 64+ years; +4 drug prescriptions; 3 or more chronic conditions; approximately 1000 patients
Interventions	Tailored workshops with objective of improving medication management to reduce polypharmacy. Interventions based on identified determinants of practice; workshop topics: 1) medication counselling; (2) medication management, including the use of medication lists; (3) pharmacological issues, including PIMs; and (4) organisational study issues, such as documentation, use of tablet PCs and creation of practice-based pathways
Outcomes	Degree of implementation of 3 recommended practices measured at the patient level
Starting date	November 2013
Contact information	Cornelia Jäger, Department of General Practice and Health Services Research, University Hospital Heidelberg, Voßstrasse
Notes	—

Krause 2014b

Trial name or title	Evaluation of a tailored intervention to improve management of overweight and obesity in primary care: study protocol of a cluster randomised controlled trial.
Methods	Design: cluster-RCT
Participants	Primary care teams recruited from the East Midlands of England
Interventions	General practices are randomised into 2 study arms: 1) the study group in which primary care teams are offered a set of interventions, each intervention having been tailored to address one or more previously identified determinants; or 2) the control group in which primary care teams administer usual care
Outcomes	Primary: the proportion of overweight or obese patients to whom the health professional has offered a weight loss intervention within the study period Secondary: patient data collected from each practice: proportion of patients with a BMI or waist circumference measurement recorded within the study period; proportion of patients with a record of lifestyle assessment; referral to external weight loss services; proportion of overweight/obese

Krause 2014b *(Continued)*

	patients who changed weight (lost or gained 1 kg) during the study period; mean weight change over the same period
Starting date	August 2013
Contact information	Jane Krause, Department of Health Sciences, College of Medicine, Biological Sciences and Psychology, University of Leicester, 22-28 Princess Road West, LE1 6TP Leicester, UK jk208@le.ac.uk
Notes	—

Morello 2012

Trial name or title	The 6-PACK programme to decrease falls and fall-related injuries in acute hospitals: protocol for an economic evaluation alongside a cluster randomised controlled trial
Methods	Multicentre cluster-randomised controlled trial (RCT)
Participants	Conducted in 24 wards from 6 hospitals, across Australia
Interventions	Targeted nurse delivered falls prevention programme for reducing in-hospital falls and fall-related injuries
Outcomes	Outcome and hospitalisation cost data will be prospectively collected on approximately 16,000 patients admitted to the participating wards during the 12-month trial period
Starting date	2013?
Contact information	renata.morello@monash.edu
Notes	Author contacted Protocol for an economic evaluation alongside a cluster-RCT

Sinnema 2011

Trial name or title	Randomised controlled trial of tailored interventions to improve the management of anxiety and depressive disorders in primary care
Methods	Cluster-randomised controlled trial
Participants	Patients and GPs in 22 general practices
Interventions	1. An educational intervention targeted at GPs, comprising 1 day of training at the start and 1 feedback at 6 months (in both study arms) 2. one or more interventions tailored to prospectively identified barriers in the local context of GPs (only in intervention arm)
Outcomes	Proportion of patients appropriately recognised to have anxiety and/or depressive disorder
Starting date	2009

Sinnema 2011 *(Continued)*

Contact information	Sinnema hsinnema@trimbos.nl Netherlands Institute of Mental Health and Addiction (Trimbos-institute), Utrecht, the Netherlands
Notes	Study initiated in 2009 and planned to take 3.5 years

BMI: body mass index
CGI-I:Clinical Global Impression Scale – Improvement
COPD: chronic obstructive pulmonary disease
GP: general practitioner
HADS:Hospital Anxiety and Depression Scale
mMRC: Medical Research Council Dyspnea Scale
PGI: Patient Global Impression – Improvement
PIM: potentially inappropriate medication
RCT: randomised controlled trial

ADDITIONAL TABLES

Table 1. Tailored interventions: effects on professional practice and healthcare outcomes

Risk of bias	Study ID	Primary outcome(s)	Effect size	Authors' conclusions
Tailored intervention compared to no intervention				
Unclear	Avorn 1983	1. Prescribing of targeted drugs (amount and costs) No suitable dichotomous outcome reported	Costs reduced in intervention arm versus control by 14% (P value = 0.0001)	Academic-based 'detailing' was a useful and cost-effective way to improve the quality of drug therapy decisions and reduce unnecessary expenditures
Unclear	Avorn 1992	1. Residents not on psychoactive drugs	1. Decrease of 27% in intervention arm and 8% in control arm (P value = 0.02)	An educational programme targeted to physicians, nurses, and aides can reduce the use of psychoactive drugs in nursing homes without adversely affecting the overall behaviour and level of functioning of the patient
High	Callahan 1994	1. Frequency of recording a depression diagnosis 2. Stopping medications associated with depression 3. Initiating antidepressant medication 4. Psychiatry referral	1. 12% control and 32% intervention arm (P value < 0.01) 2. 22% control and 23% intervention arm 3. 8% control and 26% intervention arm (P value < 0.01) 4. 14% control and 12% intervention arm	Intensive screening and feedback of patient-specific treatment recommendations increased the recognition and treatment of late life depression by GPs
Low	Fairall 2012	1. Time to death 2. Proportion with undetectable viral loads	1. Time to death did not differ (hazard ratio 0.94, 95% CI 0.76 to 1.15) 2. Viral load suppression was similar in each	Expansion of primary care nurses' role to include ART initiation and represcription can be done safely, but might not reduce time to ART or mortality

Table 1. Tailored interventions: effects on professional practice and healthcare outcomes *(Continued)*

			group, 72% in the intervention and 70% in the control groups; risk difference 1.1% (95% CI -2.4 to 4.6)	
Low	Figueiras 2006	1.Number of reported adverse drugs reactions (ADRs) 2. Number of serious ADRs 3. Number of high causality ADRs 4. Number of unexpected ADRs 5. Number of new-drug related ADRs Results not in a suitable format	1. RR 10.23 (95% CI 3.81 to 27.51) 2. RR 6.32 (95% CI 2.09 to 19.16) 3. RR 8.75 (95% CI 3.05 to 25.07) 4. RR 30.21 (95% CI 4.54 to 200.84) 5. RR 8.04 (95% CI 2.10 to 30.83)	The intervention increased reporting of ADRs, with effect maximal at 4 months, but no longer from 13 months after intervention
Low	Flottorp 2002	1. Rate of antibiotic use 2. Rate of laboratory test use 3. Rate of telephone consultations	1. 3% less likely to receive antibiotics after intervention in sore throat arm (P value = 0.032), no change in UTI arm 2. Women in UTI arm 5.1% (P value = 0.046) less likely to have lab test after intervention. No change in sore throat arm 3. No change	Passively delivered, complex interventions targeted at identified barriers to change had little effect in changing practice
Unclear	Goodwin 2001	1. Rate of up-to-date preventative services Results reported as percentages, numbers of patients not given	1. Intervention: 31% to 42%, control: 35% to 37% (P value = 0.015)	An approach to increasing preventive service delivery that is individualised to meet particular practice needs can increase global preventive service delivery rates
High	Hux 1999	1. Median antibiotic cost 2. Antibiotic choice - first line Results reported as percentages, numbers of patients not given	1. Change of 0.05% intervention versus 3.37% control, P value < 0.002 2. Change of 2.6% versus -1.7%, P value < 0.01	A simple programme of confidential feedback and educational materials blunted cost increases, increased the use of first-line antibiotics, and was highly acceptable to Ontario primary care physicians
Unclear	Looijmans 2007	1. The proportion of healthcare workers vaccinated against influenza	1. Uptake was 9% higher than in the control group (RR 1.59, 95% CI 1.08 to 2.34)	The intervention resulted in higher, though moderate, influenza vaccine uptake among healthcare workers in nursing homes
High	Matchar 2002	1. % time in target range 2. Rate of thromboembolic events No suitable dichotomous outcome reported	1. Difference (intervention minus control) adjusted for minor baseline differences was 5% (95% CI -5% to 14%), P value = 0.32 2. No difference	A properly administered anticoagulation service can successfully manage the anticoagulation of most patients with atrial fibrillation; however, these services did not improve anticoagulation compared to usual care

Table 1. Tailored interventions: effects on professional practice and healthcare outcomes *(Continued)*

Unclear	Murphy 2009	The proportion of patients at 18-month follow-up above target levels for (1) blood pressure, (2) cholesterol, and (3) hospital admissions	1. intervention (systolic) 27.2% versus 32.8 % in controls, OR 1.52 (0.99 to 2.30); 2. 15.2% versus 16.4%, OR 1.13 (0.63 to 2.03); 325.8% versus 34.0%, OR 1.56 (1.53 to 2.60)	There was a reduction in hospital admissions, but no other clinical benefits, possibly because of a ceiling effect
Unclear	Ross-Degnan 1996	1. Sales of oral rehydration salts Results reported as percentages, numbers of patients not given	1. Increased by 21% in intervention arms compared to controls (P value < 0.05)	Face-to-face training of pharmacy attendants, which targets deficits in knowledge and specific problem behaviours, can result in short-term improvements in product sales and communication with customers
High	Santoso 1996	1. Prescribing of oral rehydration solution 2. Prescribing of antimicrobials 3. Prescribing of antidiarrhoeals Results reported as percentages, numbers of patients not given	1. Increase after intervention, but not after both interventions 2. Reduction in antimicrobial usage for both face-to-face (77.4% to 60.4%, P value < 0.001) and seminar (82.3% to 72.3%, P value < 0.001) interventions, versus control (82.6% to 79.3%) 3. Reduced after both interventions	The small group face-to-face intervention did not appear to offer greater impacts over large seminars in improving the appropriate use of drugs in acute diarrhoea
Unclear	Schouten 2007	1. Guideline-adherent antibiotic prescription 2. Adjustment of antibiotic to renal function 3. Switches in therapy 4. Streamlining of therapy 5. Gram staining and culture of sputum samples (No primary outcome specified)	1. Difference between intervention and control hospitals OR 2.63 (95% CI 1.57 to 4.42) 2. OR 12.9 (95% CI 3.64 to 45.8) 3. OR 1.20 (95% CI 0.02 to 76.51) 4. OR 1.94 (95% CI 0.34 to 11.03) 5. OR 1.13 (95% CI 0.64 to 2.00) Baseline: 1.24 (0.43 to 3.56) Follow-up: 2.21 (0.79 to 6.17)	For some indicators, the intervention led to improvements. Secular trends may have had an effect on indicators that did not improve to a greater extent in the intervention group
Low	Scott 2013	1. Administration of alteplase in patients with stroke in emergency departments	1. Increase from 1.25% to 2.79% in intervention hospitals, 1.25% to 2.10% in controls (RR 1.37, 95% CI 0.96 to 1.93)	The increase in use of alteplase was smaller than the effect to which the study was powered
Unclear	Van Gaal 2011	1. The incidence of adverse events per patient week (the sum of the in-	At follow-up, the rate was 0.06 in the intervention	It is possible to implement multiple guidelines simultaneously

Table 1. Tailored interventions: effects on professional practice and healthcare outcomes *(Continued)*

		cidents of pressure ulcers, urinary tract infections, and falls divided by the total number of weeks)	group, 0.09 in the control group (RR 0.57, 95% CI 0.34 to 0.95)	
Unclear	Zwarenstein 2007	1. Asthma symptom score	The decline in score on 1-year follow-up was 4.08 in the intervention group and 3.24 in the control group (adjusted for baseline, OR 1.48, 95% CI 1.00 to 2.20)	Educational outreach was effective in reducing children's asthma symptoms
Tailored intervention compared to non-tailored intervention				
Unclear	Baker 2001	1. 3 or more symptoms recorded at diagnosis 2. Suicide risk assessed at diagnosis 3. Treated with antidepressant or cognitive therapy 4. Therapeutic dose of antidepressant 5. Reviewed after 3 weeks 6. Suicide risk reassessed 7. 2 or more follow-up consultations 8. Treated for 4 months or more	1. OR 1.9 (97% CI 0.9 to 3.8) 2. OR 5.6 (95% CI 2.8 to 11.3) 3. OR 2.5 (95% CI 0.7 to 9.2) 4. OR 1.3 (95% CI 0.6 to 3.2) 5. OR 1.1 (95% CI 0.5 to 2.4) 6. OR 0.7 (95% CI 0.2 to 3.0) 7. OR 2.0 (95% CI 0.9 to 4.0) 8. OR 1.2 (95% CI 0.6 to 2.4) (ORs adjusted for baseline) Baseline: 1.10 (0.74 to 1.64) Follow-up: 1.57 (0.98 to 2.51)	The findings suggest that this approach to implementation may be effective and should be further investigated
Unclear	Beeckman 2013	1. Residents receiving fully adequate pressure ulcer prevention in bed 2. Residents receiving fully adequate prevention in a chair	1. 4.6% in intervention group, 1.5% in control group 2. 60.0% in intervention group, 13.2% in control group, P value = 0.003	Positive effects were observed when residents were in a chair, but not when in bed
Low	Cheater 2006	1. Nurse performance assessed by examining patients' nursing records against a list of review criteria (primary outcome)	Mean improvement in aggregate compliance scores in percentage points: 1. -2.3 (95% CI -1.63 to 1.7) for audit and feed-	In comparison with educational materials alone, the implementation methods did not improve care at 6 months follow-up

Table 1. Tailored interventions: effects on professional practice and healthcare outcomes *(Continued)*

			back compared to control 2. 0.9 (-3.3 to 5.1) for educational outreach compared to control	
Unclear	Coenen 2004	1. Antibiotic prescribing rate by GPs for adult patients with acute cough	1. OR 0.56 (95% CI 0.36 to 0.87) Risk of prescribing antibiotics for intervention group versus controls, adjusted for relevant clinical symptoms	Implementing a guideline for acute cough is successful in optimising antibiotic prescribing
Unclear	Engers 2005	1. Referrals to a therapist 2. Prescription of pain medication on a time-contingent basis 3. Prescription of paracetamol versus NSAIDs No baseline data reported	Intervention compared to control: 1. OR 0.8 (95% CI 0.5 to 1.4) 2. OR 1.0 (95% CI 0.3 to 3.0) 3. OR 2.0 (95% CI 0.8 to 5.5)	The intervention modestly improved implementation of the Dutch low back pain guideline by GPs
High	Evans 1997	1. Rate of diagnosis of asthma 2. Continuity of care (patients returning) 3. Use of recommended treatments (inhaled ß agonists) 4. Received patient education	1. 40/1000 versus 16/1000, P value < 0.01 2. 42% versus 12%, P value < 0.001 3. 52% versus 15%, P value < 0.001 4. 71% versus 58%, P value < 0.01	The intervention substantially increased child health staff's ability to identify children with asthma, involve them in continuing care, and provide them with state-of-the-art care for asthma
Unclear	Foy 2004	1. Assessment appointment within 5 days 2. Ascertainment of cervical cytology history 3. Screening or antibiotic prophylaxis for genital tract infection 4. Misoprostol used for cervical priming and early and mid-trimester abortion 5. Supply of contraception at discharge Results reported as percentages	Difference between intervention and control groups 1. OR 0.89 (95% CI 0.50 to 1.58) 2. OR 0.93 (95% CI 0.36 to 2.40) 3. OR 1.70 (95% CI 0.71 to 5.99) 4. OR 1.00 (95% CI 0.27 to 1.77) 5. OR 1.11 (95% CI 0.48 to 2.53)	The intervention was ineffective, possibly because of high pre-intervention compliance and limited impact of the intervention on barriers outside the control of clinical staff
Low	Fretheim 2006	1. Proportion of patients prescribed a thiazide among patients prescribed an antihypertensive for the first time	1. Prescribing thiazides relative risk intervention versus control 1.94 (1.49 to 2.49)	The intervention had an impact on prescribing patterns, but not on other outcomes

Table 1. Tailored interventions: effects on professional practice and healthcare outcomes *(Continued)*

		2. Proportion of those started on antihypertensive or cholesterol-lowering treatment having a cardiovascular risk assessment 3. Proportion satisfying treatment goals for BP or cholesterol	2. Risk assessment done relative risk intervention versus control 1.04 (0.60 to 1.71) 3. Treatment goal achieved, intervention versus control relative risk 0.98 (0.93 to 1.02)	
Unclear	Karuza 1995	1. Physician vaccination rates for influenza Results reported as percentages, numbers of patients not given	1. The intervention arm had a higher adjusted vaccination rate (62.39%) compared to controls (46.46%), P value < 0.001	Interventions using small groups can be useful in facilitating adoption of guidelines by physicians
Unclear	Langham 2002	1. Adequate recording of 3 risk factors n/N not reported	1. Difference of 10.5% (95% CI -3.9 to 24.9) between information and no information and 6.6% (95% CI -8.9 to 22.0) between evidence and no evidence	Adequate risk factor recording did not differ between the information (versus not information) or the evidence (versus not evidence) intervention groups
Unclear	Lakshminarayan 2010	Adherence to indicators for stoke care for (1) acute care; (2) in-hospital care; (3) discharge care	1. OR 1.8 (95% CI 0.44 to 7.6); 2. OR 1.05 (0.83 to 1.3); 3. OR 1.04 (0.64 to 1.7)	No intervention effect was demonstrated, although there was a secular trend
Unclear	Leviton 1999	1. Use of corticosteroids	1. Use increased by 108% in active dissemination hospitals and by 75% in usual dissemination hospitals (P value < 0.01)	An active, focused dissemination effort increased the effectiveness of usual dissemination methods when combined with key principles to change physician practices
Unclear	Simon 2005	1. Proportion of patients with hypertension receiving a diuretic or beta-blocker	Difference between control and group detailing OR 1.40 (95% CI 1.11 to 1.76) Difference between control and individual detailing OR 1.30 (95% CI 0.95 to 1.79) Difference between group and individual detailing OR 1.10 (95% CI 0.86 to 1.42)	Both detailing interventions resulted in an approximately 13% absolute increase in guideline-recommended drugs
Unclear	Soumerai 1998	1. Appropriateness of the prescribing of selected drugs (aspirin in eligible elderly patients) Data reported as percentages, numbers not given	1. Median change +0.13 in intervention and -0.03 in controls, P value = 0.04	Working with opinion leaders and providing performance feedback can accelerate adoption of some beneficial acute myocardial infarction therapies
Unclear	Van Bruggen 2008	1. % of patients with poor control achieving HbA1c of < 8%	70% in the intervention and 58% in the control groups achieved adequate control (not af-	The process of diabetes care did improve, but intermediate outcomes hardly changed

Table 1. Tailored interventions: effects on professional practice and healthcare outcomes *(Continued)*

			ter controlling for baseline value, potential confounders and clustering)

ADR: adverse drugs reaction
ART: antiretroviral treatment
BP: blood pressure
CI: confidence interval
GP: general practitioner
NSAID: non-steroidal anti-inflammatory drug
OR: odds ratio
RR: risk ratio
UTI: urinary tract infection

Table 2. Effect sizes used in the meta-regression (adjusted for clustering)

Study ID	Outcome	Baseline odds ratios (95% CI)	Follow-up odds ratios (95% CI)
Avorn 1992	Residents not on antipsychotic drugs	0.90 (0.42 to 1.90)	1.08 (0.49 to 2.34)
Baker 2001	Antidepressants in therapeutic dose	1.10 (0.74 to 1.64)	1.57 (0.98 to 2.51)
Beeckman 2013	Fully adequate prevention of ulcers	1.02 (0.35 to 2.94)	10.59 (3.56 to 31.45)
Callahan 1994	Depression diagnosis	1.23 (0.57 to 2.63)	2.65 (1.40 to 5.03)
Cheater 2006	Recording of management criteria	1.37 (0.85 to 2.22)	1.65 (0.99 to 2.71)
Coenen 2004	Antibiotics not prescribed	0.80 (0.49 to 1.32)	1.07 (0.59 to 1.92)
Evans 1997	Returning asthma patients from previous year	0.94 (0.48 to 1.83)	2.88 (1.28 to 6.46)
Flottorp 2002	Antibiotics not prescribed	1.12 (0.94 to 1.31)	1.26 (1.06 to 1.50)
Fretheim 2006	Thiazides prescribed for hypertension	0.63 (0.42 to 0.95)	1.68 (1.20 to 2.35)
Leviton 1999	Use of antenatal corticosteroids	1.00 (0.65 to 1.51)	1.59 (0.88 to 2.83)
Looijmans 2010	Uptake of flu vaccine	0.98 (0.63 to 1.52)	1.71 (1.10 to 2.65)
Murphy 2009	Numbers below the target level for BP	0.99 (0.68 to 1.41)	1.31 (0.87 to 1.96)
Schouten 2007	% where key quality indicators performed	1.24 (0.43 to 3.56)	2.21 (0.79 to 6.17)
Scott 2013	Use of alteplase for stroke	1.00 (0.14 to 7.05)	1.34 (0.36 to 4.92)
Simon 2005	Beta-blockers or diuretics prescribed for hypertension	1.03 (0.88 to 1.21)	1.40 (1.18 to 1.65)

Note: Odds ratio = odds of outcome in treatment group/odds of outcome in control group, calculated at baseline and follow-up and adjusted for clustering
BP: blood pressure
CI: confidence interval

APPENDICES

Appendix 1. MEDLINE strategy

Interface: OVID SP

Search dates: December 2012; March 2013; May 2014

1 (tailor$ and (intervention? or strategy or strategies)).ti. (422)

2 (tailor$ adj2 (intervention? or strategy or strategies)).ab. (2720)

3 (tailor$ adj4 (physician? or practitioner? or doctor? or practice or nurse or nurses or service or services or hospital)).ti,ab. (879)

4 ((influence? or influencing) and (implement$ or uptake)).ti. (1456)

5 ((prescriber? or physician? or practitioner?) adj3 feedback).ti,ab. (507)

6 ((nurse or nurses or pharmacist? or prescriber?) adj2 feedback).ti,ab. (119)

7 (target$ adj2 intervention? adj3 (doctor? or "health care professional?" or "health$ professional?" or nurse? or nursing or physician? or practice? or practitioner? or provider?)).ti,ab. (253)

8 (target$ adj2 (clinician? or doctor? or nurse? or nursing or pharmacist? or physician? or practitioner? or prescriber? or provider?)).ti,ab. (1073)

9 Educational outreach.ti,ab. (282)

10 (encourage adj2 ("use" or prescribing)).ti. (34)

11 ((GP or gp's) adj2 barrier?).ti,ab. (94)

12 opinion leader?.ti,ab. (737)

13 (barrier? and delivery).ti. (393)

14 (practitioner? resistance or physician? Resistance).ti,ab. (80)

15 (barrier? and (facilitator? or enabler? or professional? or physician? or practitioner? or provider?)).ti. (1109)

16 (barrier? adj3 (guideline? or implement$)).ab. (1939)

17 (barrier? and (guideline? or implement$)).ti. (468)

18 Practice pattern?.ti. (1272)

19 (practice pattern? adj3 (impact or influenc$ or implement$ or effect or effectiveness)).ab. (133)

20 (practice pattern? adj3 (change? or changing or improv$)).ab. (363)

21 (motivat$ adj2 (practitioner? or physician? or provider?)).ti,ab. (424)

22 (guideline adherence/ or (guideline adj2 (adher$ or implement$ or compliance or comply$ or impact)).ti,ab.) and (difficult$ or failure or problem? or barrier? or facilitator? or enabler?).ti. (656)

23 (barrier? and evidence-based).ti. (123)

24 ((suboptimal$ or sub-optimal$) adj2 (drug? or medication? or prescribing or care)).ti,ab. (808)

25 (appropriate prescribing or optimal prescribing).ti,ab. (252)

26 "appropriate drug use".ti,ab. (49)

27 (improve adj2 "use").ti. (139)

28 (clinical clerkship/ or education, dental, continuing/ or education, medical, continuing/ or education, nursing, continuing/ or education, pharmacy, continuing/ or education, professional, retraining/) and ((improve? or improving or improvement?) adj2 (care or service or services)).ti,ab. (520)

29 (guideline? and adherence).ti. (869)

30 (barrier? and delivery).ti. (393)

31 (barrier? and (guideline? or implement$)).ti. (468)

32 feedback.ti,ab. and exp Education, Continuing/ (735)

33 exp *education, continuing/ and quality of health care/ (462)

34 or/1-33 (17647)

35 exp Health Personnel/ or exp Nursing/ or exp medicine/ or general practice/ or family practice/ or (physician? or nurse or nurses or nursing or practitioner? or (primary adj2 care) or provider? or therapist? or counsellor?).ti. or (care or therapy or management or health).ti,hw. or (clinical or medical or medicine or physician?).ti,hw. (4900243)

36 34 and 35 [Results before Filters] (13363)

37 multicenter study.pt. (155099)

38 ((practice or practices or medication) adj2 pattern?).ti,ab. (5187)

39 (professional practice or professional practices).ti,ab. (3243)

40 improve management.ti. (52)

41 or/37-40 [Filter terms] (163184)

42 (randomized controlled trial or controlled clinical trial).pt. or randomized.ab. or placebo.ab. or clinical trials as topic.sh. or randomly.ab. or trial.ti. (827906)

43 exp animals/ not humans.sh. (3825957)

44 42 not 43 [Cochrane RCT Filter 6.4.d Sens/Precision Maximizing] (765059)

December 2012

45 (2009$ or 2010$ or 2011$ or 2012$).ep,ed,yr. [2012-2009 Results code ML1.7-2009-2012] (4263470)

46 36 and 44 and 45 [RCT Results 2009-2012] (806) [Exported]

47 (36 and 41 and 45) not 46 [EPOC (partial filter) results 2009-2012] (578) [Exported]

48 (36 and random$.ti,ab. and 45) not (or/46-47) [Random KW results 2009-2012] (111) [Exported]

49 ((or/1,3,7) and 45 and (or/41,44)) not (or/46-48) [Additional results] (31) [Exported]

March 2013

50 2013$.ed. (147646)

51 36 and 44 and 50 [RCT Results 2013] (46)

52 "20121221".ed. (2962)

53 ("20121221" or 2013$).ed. (150608)

54 36 and 44 and 53 [RCT Results March 2013] (47)

Note: line numbers vary because searches were run at slightly different times

50 ("20121221" or 2013$).ed. (150608)

51 36 and 44 and 50 [RCT Results 2013] (47)

52 (36 and 41 and 50) not 51 [EPOC results March 2013] (25)

53 (36 and random$.ti,ab. and 50) not (or/51-52) [Random KW results March 2013] (11)

May 2014

50 (2013$ or 2014$).ep,ed,yr. [2013-2014 Limits] (1760836)

51 36 and 44 and 50 [RCT results 2014] (343)

52 (36 and 41 and 50) not 51 [EPOC Results 2014] (224)

53 (36 and random$.ti,ab. and 50) not (or/51-52) [Random KW results 2014] (53)

54 ((or/1,3,7) and 50 and (or/41,44)) not (or/51-53) [Additional results 2014] (37)

PubMed (NCBI)

Search dates: May 2014

Search	Query	Items Found
#1	tailor* [Title] Searched PM after all other databases; did not use a filter to catch non-indexed citations and citations without abstracts; this search added only 200 unique citations to the total data set.	2706

British Nursing Index (ProQuest)

Search date: 12 March 2013

1 tailor*.ti. 148
2 (Tailor* adj2 (care OR intervention* OR treatment* OR health* OR physician* OR practitioner* OR doctor OR practice OR nurse OR nurses OR service OR services OR hospital)).ti,ab 207
3 (personali* ADJ (patient OR care OR treatment)).ti,ab 94
4 1 OR 2 OR 3 371
5 4 [Limit to: Publication Year 2009-Current]

Appendix 2. EMBASE strategy

Interface: OVID SP

Search dates: December 2012; March 2013; May 2014

1 (tailor$ and (intervention? or strategy or strategies)).ti. (470)

2 (tailor$ adj2 (intervention? or strategy or strategies)).ab. (3245)

3 (tailor$ adj4 (physician? or practitioner? or doctor? or practice or nurse or nurses or service or services or hospital)).ti,ab. (1091)

4 ((influence? or influencing) and (implement$ or uptake)).ti. (2012)

5 ((prescriber? or physician? or practitioner?) adj3 feedback).ti,ab. (666)

6 ((nurse or nurses or pharmacist? or prescriber?) adj2 feedback).ti,ab. (173)

7 (target$ adj2 intervention? adj3 (doctor? or "health care professional?" or "health$ professional?" or nurse? or nursing or physician? or practice? or practitioner? or provider?)).ti,ab. (277)

8 (target$ adj2 (clinician? or doctor? or nurse? or nursing or pharmacist? or physician? or practitioner? or prescriber? or provider?)).ti,ab. (1299)

9 Educational outreach.ti,ab. (342)

10 (encourage adj2 ("use" or prescribing)).ti. (44)

11 ((GP or gp's) adj2 barrier?).ti,ab. (113)

12 opinion leader?.ti,ab. (909)

13 (barrier? and delivery).ti. (503)

14 (practitioner? resistance or physician? Resistance).ti,ab. (86)

15 (barrier? and (facilitator? or enabler? or professional? or physician? or practitioner? or provider?)).ti. (1290)

16 (barrier? adj3 (guideline? or implement$)).ab. (2385)

17 (barrier? and (guideline? or implement$)).ti. (540)

18 Practice pattern?.ti. (1563)

19 (practice pattern? adj3 (impact or influenc$ or implement$ or effect or effectiveness)).ab. (163)

20 (practice pattern? adj3 (change? or changing or improv$)).ab. (452)

21 (motivat$ adj2 (practitioner? or physician? or provider?)).ti,ab. (540)

22 (guideline adherence/ or (guideline adj2 (adher$ or implement$ or compliance or comply$ or impact)).ti,ab.) and (difficult$ or failure or problem? or barrier? or facilitator? or enabler?).ti. (4875)

23 (barrier? and evidence-based).ti. (119)

24 ((suboptimal$ or sub-optimal$) adj2 (drug? or medication? or prescribing or care)).ti,ab. (1033)

25 (appropriate prescribing or optimal prescribing).ti,ab. (387)

26 "appropriate drug use".ti,ab. (67)

27 (improve adj2 "use").ti. (188)

28 (clinical clerkship/ or education, dental, continuing/ or education, medical, continuing/ or education, nursing, continuing/ or education, pharmacy, continuing/ or education, professional, retraining/) and ((improve? or improving or improvement?) adj2 (care or service or services)).ti,ab. (3502)

29 (guideline? and adherence).ti. (1213)

30 (barrier? and delivery).ti. (503)

31 (barrier? and (guideline? or implement$)).ti. (540)

32 feedback.ti,ab. and exp Education, Continuing/ (287)

33 exp *education, continuing/ and quality of health care/ (467)

34 or/1-33 (28273)

35 exp *medical personnel/ (125166)

36 exp *paramedical personnel/ (173293)

37 (physician? or nurse or nurses or therapist? or counsellor? or allied health).ti. (178281)

38 or/35-37 [Physicians/Nurses Med Personnel] (403088)

39 34 and 37 (2405)

40 5 or 6 or 7 or 8 or 10 or 14 (2349)

41 or/39-40 [Results before filters] (4277)

42 (multicentre or multi-centre or multicenter or multi-center).ti. (35305)

43 ((practice or practices or medication) adj2 pattern?).ti,ab. (6599)

44 (professional practice or professional practices).ti,ab. (3927)

45 improve management.ti. (80)

46 or/42-45 [Partial EPOC Filter Terms] (45848)

47 controlled clinical trial/ or controlled study/ or randomized controlled trial/ [EM] (4025253)

48 randomi?ed.ti. or ((random$ or control) adj3 (group? or cohort? or patient? or hospital$ or department?)).ab. or (controlled adj2 (study or trial)).ti. (638941)

49 (random sampl$ or random digit$ or random effect$ or random survey or random regression).ti,ab. not randomized controlled trial/ [Per BMJ Clinical Evidence filter] (48408)

50 (exp animals/ or exp invertebrate/ or animal experiment/ or animal model/ or animal tissue/ or animal cell/ or nonhuman/) and (human/ or normal human/ or human cell/) (14351082)

51 (exp animals/ or exp invertebrate/ or animal experiment/ or animal model/ or animal tissue/ or animal cell/ or nonhuman/) not 50 (5737890)

52 (or/47-48) not (or/49,51) [Trial filter based on BMJ CLinical Evidence; animal exclusions updated Dec 2012 based on new indexing in EM] (2730937)

53 (2009$ or 2010$ or 2011$ or 2012$).em,dp,yr. (4843850)

December 2012

54 41 and 52 and 53 [RCT Results 2009-2012] (299)

55 (41 and 46 and 53) not 54 [EPOC partial filter results 2009-2012] (86)

56 (41 and random$.ti,ab. and 53) not (54 or 55) [Random & KW results 2009-2012] (98)

57 ((or/1,3,7) and 53 and (or/46,52)) not (or/54-56) [High value Key words with no filter] (199)

March 2013

58 ("201252" or 2013$).em. (273568)

59 41 and 52 and 58 [RCT Results 2013] (12)

60 (41 and 46 and 58) not 59 [EPOC partial filter results 2013] (12)

61 (41 and random$.ti,ab. and 58) not (59 or 60) [Random & KW results 2013] (4)

62 ((or/1,3,7) and 58 and (or/46,52)) not (or/59-61) [High value Key words with no filter] (12)

May 2014

58 (2013$ or 2014$).em,dp,yr. [2013-2014 EM limits] (2163456)

59 41 and 52 and 58 [RCT Results 2014] (121)

60 (41 and 46 and 58) not 59 [EPOC partial filter results 2014] (53)

61 (41 and random$.ti,ab. and 58) not (59 or 60) [Random & KW results 2014] (44)

62 ((or/1,3,7) and 58 and (or/46,52)) not (or/59-61) [High value Key words with no filter] (111)

Appendix 3. CINAHL strategy

CINAHL (Ebsco)

Search dates: December 2012; March 2013

#	Query	Results
	(S1 or S3 or S7) AND (S48 or S39) **[March 2013]** *Limiters - Published Date from: 20130101-20130321*	35
S52	(S1 or S3 or S7) AND (S48 or S39) *Limiters - Published Date from: 20091001-20121231**[December 2012]***	**709**
S51	S34 AND (TI random* or AB random*) *Limiters - Published Date from: 20091001-20121231*	**232**
S50	(S34 and S39) NOT S49 *Limiters - Published Date from: 20091001-20121231*	**132**
S49	S34 and S48 *Limiters - Published Date from: 20091001-20121231*	**275**
S48	S40 OR S41 OR S42 OR S43 OR S44 OR S45 OR S46 OR S47	137,865
S47	TI controlled AND TI (trial or trials or study or experiment* or intervention)	15,931
S46	AB ((multicent* n2 design*) or (multicent* n2 study) or (multicent* n2 studies) or (multicent* n2 trial*)) or AB ((multi-cent* n2 design*) or (multi-cent* n2 study) or (multi-cent* n2 studies) or (multi-cent* n2 trial*))	5,903
S45	TI multicentre or multicenter or multi-centre or multi-center	3,900
S44	TI (cluster N2 trial* or cluster N2 study or cluster N2 group or cluster N2 groups or cluster N2 cohort or cluster N2 design or cluster N2 experiment*) OR AB (cluster N2 trial* or cluster N2 study or cluster N2 group or cluster N2 groups or cluster N2 cohort or cluster N2 design or cluster N2 experiment*)	1,454
S43	TI (control group or control groups OR control* experiment* or control* design or controlled study) OR AB (control group OR control groups or control* cohort* or controlled experiment* controlled design or controlled study)	44,895
S42	TI random* or AB random*	98,033
S41	TI (“clinical study” or “clinical studies”) or AB (“clinical study” or “clinical studies”)	6,327
S40	(MM "Clinical Trials+")	7,551
S39	S35 OR S36 OR S37 OR S38	13,003
S38	TI improve management	455
S37	TI ((professional practice or professional practices)) OR AB ((professional practice or professional practices))	7,215
S36	TI (((practice or practices or medication) N2 pattern#)) OR AB (((practice or practices or medication) N2 pattern#))	1,497
S35	TI (multicentre or multicenter or multi-centre or multi-center)	3,864

(Continued)

S34	S32 AND S33	6,770
S33	(MN "Health Personnel+" or MH "Nursing+" or MH "medicine+" or MH "family practice") OR TI ((physician# or nurse or nurses or nursing or practitioner# or (primary N2 care) or provider# or therapist# or counsellor#)) OR TI ((care or therapy or management or health)) OR MW ((care or therapy or management or health)) OR TI ((clinical or medical or medicine or physician#)) OR MW ((clinical or medical or medicine or physician#))	1,624,839
S32	S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 OR S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 OR S19 OR S20 OR S21 OR S22 OR S23 OR S24 OR S25 OR S26 OR S27 OR S28 OR S29 OR S30 OR S31	7,918
S31	MM "education, continuing" AND MH quality of health care	18
S30	(TI (feedback) or AB (feedback)) AND MH "Education, Continuing+"	167
S29	TI (guideline# and adherence)	363
S28	(MH "education, medical, continuing" or MH "education, nursing, continuing" or MH "refresher courses" OR clinical clerkship OR education, dental, continuing OR education, pharmacy, continuing) AND (TI (((improve# or improving or improvement#) N2 (care or service or services))) OR AB (((improve# or improving or improvement#) N2 (care or service or services))))	234
S27	TI (improve N2 "use")	138
S26	TI "appropriate drug use" OR AB "appropriate drug use"	6
S25	TI ((appropriate prescribing or optimal prescribing)) OR AB ((appropriate prescribing or optimal prescribing))	225
S24	TI (((suboptimal* or sub-optimal*) N2 (drug# or medication# or prescribing or care))) OR AB (((suboptimal* or sub-optimal*) N2 (drug# or medication# or prescribing or care)))	254
S23	TI (barrier# and evidence-based)	108
S22	((MH "guideline adherence" or TI (guideline N2 (adher* or implement* or compliance or comply* or impact))) OR (MH "guideline adherence" or AB (guideline N2 (adher* or implement* or compliance or comply* or impact)))) AND TI ((difficult* or failure or problem# or barrier# or faciltator# or enabler#))	171
S21	TI ((motivat* N2 (practitioner# or physician# or provider#))) OR AB ((motivat* N2 (practitioner# or physician# or provider#)))	158
S20	AB (practice pattern# N3 (change# or changing or improv*))	115
S19	AB (practice pattern# N3 (impact or influenc* or implement* or effect or effectiveness))	52
S18	TI Practice pattern#	485
S17	TI (barrier# and (guideline# or implement*))	257
S16	AB (barrier# N3 (guideline# or implement*))	1,029
S15	TI (barrier# and (facilitator# or enabler# or professional# or physician# or practitioner# or provider#))	745

(Continued)

S14	TI ((practitioner# resistance or physician# Resistance)) OR AB ((practitioner# resistance or physician# Resistance))	120
S13	TI (barrier# and delivery)	35
S12	TI opinion leader# OR AB opinion leader#	248
S11	TI (((GP or gp's) N2 barrier#)) OR AB (((GP or gp's) N2 barrier#))	7
S10	TI (encourage N2 ("use" or prescribing))	35
S9	TI Educational outreach OR AB Educational outreach	137
S8	TI ((target* N2 (clinician# or doctor# or nurse# or nursing or pharmacist# or physician# or practitioner# or prescriber# or provider#))) OR AB ((target* N2 (clinician# or doctor# or nurse# or nursing or pharmacist# or physician# or practitioner# or prescriber# or provider#)))	876
S7	TI ((target* N2 intervention# N3 (doctor# or "health care professional#" or "health* professional#" or nurse# or nursing or physician# or practice# or practitioner# or provider#))) OR AB ((target* N2 intervention# N3 (doctor# or "health care professional#" or "health* professional#" or nurse# or nursing or physician# or practice# or practitioner# or provider#)))	182
S6	TI (((nurse or nurses or pharmacist# or prescriber#) N2 feedback)) OR AB (((nurse or nurses or pharmacist# or prescriber#) N2 feedback))	157
S5	TI (((prescriber# or physician# or practitioner#) N3 feedback)) OR AB (((prescriber# or physician# or practitioner#) N3 feedback))	197
S4	TI ((influence# or influencing) and (implement* or uptake))	100
S3	TI ((tailor* N4 (physician# or practitioner# or doctor# or practice or nurse or nurses or service or services or hospital))) OR AB ((tailor* N4 (physician# or practitioner# or doctor# or practice or nurse or nurses or service or services or hospital)))	492
S2	AB (tailor* N2 (intervention# or strategy or strategies))	1,382
S1	TI (tailor* and (intervention# or strategy or strategies))	255

Appendix 4. *The Cochrane Library* strategy

Interface: Wiley

Search dates: December 2012, March 2013, and May 2014

This strategy was run across all databases in The Cochrane Library.

#1 (tailor* and (intervention or strategy or strategies)):ti 200

#2 (tailor* near/2 (intervention or strategy or strategies)):ab 456

#3 (tailor* near/4 (physician or practitioner or doctor or practice or nurse or nurses or service or services or hospital)):ti,ab 103

#4 ((influence or influencing) and (implement* or uptake)):ti 43

#5 ((prescriber or physician or practitioner) near/3 feedback):ti,ab 104

#6 (("nurse" or "nurses" or pharmacist or prescriber) near/2 feedback):ti,ab 23

#7 (target* near/2 intervention near/3 (doctor or "health care professional*" or "health* professional*" or nurse or nursing or physician or "practice" or "practices" or practitioner or provider)):ti,ab 34

#8 (target* near/2 (clinician or doctor or nurse or nursing or pharmacist or physician or practitioner or prescriber or provider)):ti,ab 88

#9 "Educational outreach":ti,ab 88

#10 ("encourage" near/2 ("use" or prescribing)):ti 4

#11 ((GP or gp's) near/2 barrier):ti,ab 1

#12 "opinion leader*":ti,ab 111

#13 (barrier and delivery):ti 3

#14 ("practitioner resistance" or "physician resistance" or "practitioners resistance" or "physicians resistance"):ti,ab 0

#15 (barrier and (facilitator or enabler or professional or physician or practitioner or provider)):ti 47

#16 (barrier near/3 (guideline or implement*)):ab 99

#17 (barrier and (guideline or implement*)):ti 17

#18 "Practice pattern*":ti 44

#19 ("practice pattern*" near/3 (impact or influenc* or implement* or effect or effectiveness)):ab 11

#20 ("practice pattern*" near/3 (change or changing or improv*)):ab 23

#21 (motivat* near/2 (practitioner or physician or provider)):ti,ab 22

#22 MeSH descriptor: [Guideline Adherence] this term only 535

#23 (guideline near/2 (adher* or implement* or compliance or comply* or impact)):ti,ab 431

#24 (difficult* or failure or problem or barrier or faciltator or enabler):ti 13144

#25 (#22 or #23) and #24 39

#26 (barrier and evidence-based):ti 19

#27 ((suboptimal* or sub-optimal*) near/2 (drug or medication or prescribing or care)):ti,ab 38

#28 ("appropriate prescribing" or "optimal prescribing"):ti,ab 18

#29 "appropriate drug use":ti,ab 4

#30 ("improve" near/2 "use"):ti 32

#31 MeSH descriptor: [Clinical Clerkship] this term only 110

#32 MeSH descriptor: [Education, Dental, Continuing] this term only 13

#33 MeSH descriptor: [Education, Medical, Continuing] this term only 550

#34 MeSH descriptor: [Education, Nursing, Continuing] this term only 229

#35 MeSH descriptor: [Education, Pharmacy, Continuing] this term only 22

#36 MeSH descriptor: [Education, Professional, Retraining] this term only 6

#37 ((improve or improving or improvement) near/2 ("care" or "service" or "services")):ti,ab 1318

#38 (#31 or #32 or #33 or #34 or #35 or #36) and #37 39

#39 (guideline and adherence):ti 86

#40 (barrier and delivery):ti 3

#41 (barrier and (guideline or implement*)):ti 17

#42 feedback:ti,ab 3887

#43 MeSH descriptor: [Education, Continuing] explode all trees 874

#44 #42 and #43 99

#45 MeSH descriptor: [Quality of Health Care] this term only 759

#46 #43 and #45 25

#47 #1 or #2 or #3 or #4 or #5 or #6 or #7 or #8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19 or #20 or #21 or #25 or #26 or #27 or #28 or #29 or #30 or #38 or #39 or #40 or #41 or #44 or #46 1576

#48 MeSH descriptor: [Health Personnel] explode all trees 4671

#49 MeSH descriptor: [Nursing] explode all trees 2741

#50 MeSH descriptor: [Medicine] explode all trees 9007

#51 MeSH descriptor: [General Practice] this term only 72

#52 MeSH descriptor: [Family Practice] this term only 2067

#53 (physician or nurse or nurses or nursing or practitioner or (primary near/2 care) or provider or therapist or counsellor):ti 9283

#54 ("care" or therapy or management or "health"):ti,kw 201685

#55 (clinical or medical or medicine or physician):ti,kw 144913

#56 #48 or #49 or #50 or #51 or #52 or #53 or #54 or #55 291624

December 2012

#57 #47 and #56 from 2009 to 2012 = 367

March 2013

CDSR--Cochrane Database of Systematic Reviews = 11

CENTRAL--Cochrane Central Database of Controlled Trials = 24

DARE--Database of Abstracts of Reviews of Effectiveness = 2

EED--Economic Evaluations Database = 1

HTA—Health Technology Assessment Database = 0

Cochrane Methods Register = 0

May 2014

CDSR--Cochrane Database of Systematic Reviews = 175

CENTRAL--Cochrane Central Database of Controlled Trials = 10

DARE--Database of Abstracts of Reviews of Effectiveness = 10

EED--Economic Evaluations Database = 3

HTA—Health Technology Assessment Database = 4

Cochrane Methods Register = 0

Appendix 5. PubMed strategy

Search dates: May 2014

Search	Query	Items Found
#1	tailor* [Title]	2706 [1000 were duplicates]

Appendix 6. BNI strategy

Interface: ProQuest

Search date: 12 March 2013

1 tailor*.ti. 148
2 (Tailor* adj2 (care OR intervention* OR treatment* OR health* OR physician* OR practitioner* OR doctor OR practice OR nurse OR nurses OR service OR services OR hospital)).ti,ab 207
3 (personali* ADJ (patient OR care OR treatment)).ti,ab 94
4 1 OR 2 OR 3 = 371 [2009-2014] *The search strategy used prior to 2009 was different and is presented in* Appendix 9.

Appendix 7. EPOC Specialised Register strategy

EPOC Specialised Register, Reference Manager 12

Search date: December 2012 [The Register has not been updated since 2012]

Connector	Field	Search	Results
	All Non-Indexed Fields	{tailored} OR {tailor}	258
OR	All Indexed Fields	{tailored} OR {tailor}	258
AND	Date Added	{11-2009} OR {12-2009} OR {2010} OR {2011} OR {2012}	90

Appendix 8. Trial register search strategies

Search date: March 2013

We searched all registers (ISRCTN; Action Medical Research; NIH Clinical Trials.gov; Wellcome Trust; and UK Trials Register) included in the metaRegister of Controlled Trials (mRCT): http://www.controlled-trials.com/mrct/.

Note: Multiple search strings were used to prevent the interface from crashing.

Strategy A

("tailor intervention" OR "tailored interventions" OR "tailoring interventions" OR "tailored care" OR "tailoring care" OR "customised intervention") AND (physician OR physicians OR doctor OR doctors OR nurse OR nurses OR provider OR providers)

Strategy B

("tailored strategies" OR "outreach strategies" OR "targeted intervention" OR "personalized intervention" OR "focused strategy" OR "focused strategies") AND (physician OR physicians OR doctor OR doctors OR nurse OR nurses OR provider OR providers)

Strategy C

("personalized strategy" OR "focused effort" OR "focused method" OR "focused strategies" OR "focused intervention" OR "focused interventions") AND (physician OR PHYSICIANS OR doctor OR doctors OR nurse OR nurses OR provider OR providers)

Strategy D

("physician tailored" OR "focused intervention" OR "barrier to change" or "barriers to change")

Strategy E

"tailored message" OR "tailored messaging" OR "tailored messages" OR "tailored intervention" OR "tailored interventions" OR "tailored multifaceted" OR "tailored reminder" OR "tailored reminders"

Strategy F

"physician tailored" OR "nurse tailored" OR "provider tailored" OR tailor AND physician OR Tailored and Physicians OR tailored AND nurse OR tailored AND nurses OR tailored AND provider OR tailored AND providers

Appendix 9. Database search strategies pre-2009

MEDLINE (OVID)

1. tailor$.ti,ab.
2. (tailor$ adj3 intervention?).ti,ab.
3. (tailor$ adj2 care).ti,ab.
4. (tailor$ adj2 strateg$).ti,ab.
5. *Education, Medical, Continuing/
6. *Education, Continuing/
7. (education$ adj2 (program$ or intervention$ or outreach$ or strateg$) adj4 (target$ or enhanc$ or improv$ or reduc$ or facilitat$)).ti,ab.
8. ((targeted or personal$ or tailor$ or outreach) adj2 (professional or physician$ or doctor$ or practitioner$ or nurse$)).ti,ab.
9. (intervention strateg$ adj3 (professional or physician$ or doctor$ or practitioner$ or nurse$)).ti,ab.
10. ((target$ or provider-focus$) adj (intervention$ or program$ or education$)).ti,ab.
11. (personali?ed adj3 (information or education$ or program$ or intervention$)).ti,ab.
12. motivational intervention$.ti.
13. motivational interview$.ti,ab.
14. (dissemination adj2 (strateg$ or effort$ or method$)).ti,ab.
15. (focused adj (strateg$ or effort$ or method$)).ti,ab.
16. or/1-15
17. randomized controlled trial.pt.
18. controlled clinical trial.pt.
19. randomized controlled trials.sh.
20. random allocation.sh.
21. double blind method.sh.
22. single-blind method.sh.
23. or/17-22
24. clinical trial.pt.
25. exp clinical trial/
26. (clin$ adj2 trial$).ti,ab.
27. ((singl$ or doubl$ or trebl$ or tripl$) adj2 (blind$ or mask$)).ti,ab.
28. placebos.sh.
29. placebo$.ti,ab.
30. random$.ti,ab.
31. research design.sh.
32. or/24-31
33. 23 or 32
34. animal/
35. human/
36. 34 not (34 and 35)
37. 33 not 36
38. 16 and 37
39. comment.pt.
40. editorial.pt.
41. 39 or 40
42. 38 not 41

43.review.pt.
44.42 not 43
45.meta-analysis.pt.
46.44 not 45

EMBASE (OVID)

1. tailor$.ti,ab.
2. (tailor$ adj3 intervention?).ti,ab.
3. (tailor$ adj2 care).ti,ab.
4. (tailor$ adj2 strateg$).ti,ab.
5. *Education, Medical, Continuing/
6. *Education, Continuing/
7. (education$ adj2 (program$ or intervention$ or outreach$ or strateg$) adj4 (target$ or enhanc$ or improv$ or reduc$ or facilitat$)).ti,ab.
8. ((targeted or personal$ or tailor$ or outreach) adj2 (professional or physician$ or doctor$ or practitioner$ or nurse$)).ti,ab.
9. (intervention strateg$ adj3 (professional or physician$ or doctor$ or practitioner$ or nurse$)).ti,ab.
10. ((target$ or provider-focus$) adj (intervention$ or program$ or education$)).ti,ab.
11. (personali?ed adj3 (information or education$ or program$ or intervention$)).ti,ab.
12. motivational intervention$.ti.
13. motivational interview$.ti,ab.
14. (dissemination adj2 (strateg$ or effort$ or method$)).ti,ab.
15. (focused adj (strateg$ or effort$ or method$)).ti,ab.
16. or/1-15
17. Clinical trial/
18. Randomized controlled trial/
19. Randomization/
20. Single blind procedure/
21. Double blind procedure/
22. Crossover procedure/
23. Placebo/
24. Randomi?ed controlled trial$.tw.
25. Rct.tw.
26. Random allocation.tw.
27. Randomly allocated.tw.
28. Allocated randomly.tw.
29. (allocated adj2 random).tw.
30. Prospective study/
31. (clin$ adj2 trial$).ti,ab.
32. ((singl$ or doubl$ or trebl$ or tripl$) adj2 (blind$ or mask$)).ti,ab.
33. random$.ti,ab.
34. or/17-33
35. 16 and 34
36. animal/
37. human/
38. 36 not (36 and 37)
39. 35 not 38
40. case study/
41. case report.tw.
42. letter/
43. or/40-42
44. 39 not 43
45. review.pt.
46. 44 not 45

47.randomized controlled trial/
48.controlled clinical trial/
49.clinical trial/
50.multicenter study/
51.single blind procedure/
52.double blind procedure/
53.experimental design/
54.randomi?ed controlled trial$.tw.
55.rct.tw.
56.controlled.ti.
57.(clin$ adj2 trial$).ti,ab.
58.(control$ adj2 (clinical or group$ or trial$ or study or studies or design$ or method$)).ti,ab.
59.((multicent$ or multi-cent$ or multisite? or multi-site?) adj (study or studies or trial$)).ti,ab.
60.((singl$ or doubl$ or trebl$ or tripl$) adj blind$).ti,ab.
61.or/47-60
62.16 and 61
63.62 not (38 or 43 or 45)
64.63 not 46

Cumulative Index to Nursing and Allied Health Literature (CINAHL)

1. CINAHL tailor$.ti,ab
2. CINAHL (tailor* adj2 intervention*).ti
3. CINAHL (tailor$ adj2 care).ti
4. CINAHL *EDUCATION, MEDICAL, CONTINUING/
5. CINAHL *EDUCATION, CONTINUING/
6. CINAHL (education$ adj2 program$).ti
7. CINAHL (education$ adj2 intervention$).ti
8. CINAHL (education$ adj2 outreach$).ti
9. CINAHL (education$ adj2 strateg$).ti
10.CINAHL 6 or 7 or 8 or 9
11.CINAHL ((target$ OR enhanc$ OR improv$ OR reduc$ OR facilitat$)).ti,ab
12.CINAHL 10 AND 11
13.CINAHL (target$ adj2 professional$).ti
14.CINAHL (target$ adj2 physician$).ti
15.CINAHL (target$ adj2 doctor$).ti
16.CINAHL (target$ adj2 practitioner$).ti
17.CINAHL (target$ adj2 nurse$).ti
18.CINAHL (personal$ adj2 professional$).ti
19.CINAHL (personal$ adj2 physician$).ti
20.CINAHL (personal$ adj2 doctor$).ti
21.CINAHL (personal$ adj2 practitioner$).ti
22.CINAHL (personal$ adj2 nurse$).ti
23.CINAHL (tailor$ adj2 professional$).ti
24.CINAHL (tailor$ adj2 doctor$).ti
25.CINAHL (tailor$ adj2 practitioner$).ti
26.CINAHL (tailor$ adj2 nurse$).ti
27.CINAHL (outreach adj2 professional$).ti
28.CINAHL (outreach adj2 physician$).ti
29.CINAHL (outreach adj2 doctor$).ti
30.CINAHL (outreach adj2 nurse$).ti
31.CINAHL (intervention adj3 professional).ti
32.CINAHL (intervention adj3 physician$).ti

33. CINAHL (intervention adj3 doctor$).ti
34. CINAHL (intervention adj3 practitioner$).ti
35. CINAHL (intervention adj3 nurse$).ti
36. CINAHL (target$ adj2 intervention$).ti
37. CINAHL (target$ adj2 program$).ti
38. CINAHL (target$ adj2 education$).ti
39. CINAHL ((provider-focus$ adj2 intervention$)).ti,ab
40. CINAHL ((provider-focus$ adj2 education$)).ti,ab
41. CINAHL ((provider-focus$ adj2 program$)).ti,ab
42. CINAHL (personali?ed adj3 information).ti
43. CINAHL ((personali?ed adj3 education$)).ti
44. CINAHL ((personali?ed adj3 program$)).ti
45. CINAHL (personali?ed adj3 intervention$).ti
46. CINAHL (motivational AND intervention$).ti,ab
47. CINAHL (motivational AND interview$).ti,ab
48. CINAHL (dissemination adj2 strateg$).ti
49. CINAHL (dissemination adj2 effort$).ti
50. CINAHL (dissemination adj2 method$).ti
51. CINAHL (focused ADJ strateg$).ti
52. CINAHL (focused ADJ effort$).ti
53. CINAHL (focused ADJ method$).ti
54. CINAHL 1 OR 2 OR 3 OR 4 OR 5 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35 OR 36 OR 37 OR 38 OR 39 OR 40 OR 41 OR 42 OR 43 OR 44 OR 45 OR 46 OR 47 OR 48 OR 49 OR 50 OR 51 OR 52 OR 53
55. CINAHL exp CLINICAL TRIALS/
56. CINAHL RANDOM ASSIGNMENT/
57. CINAHL (random AND allocation).ti,ab
58. CINAHL DOUBLE-BLIND STUDIES/
59. CINAHL SINGLE-BLIND STUDIES/
60. CINAHL ((clin$ adj2 trial$)).ti
61. CINAHL (singl$ ADJ blind$ OR double ADJ blind$ OR tripl$ ADJ blind$ OR trebl$ ADJ blind$).ti,ab
62. CINAHL PLACEBOS/
63. CINAHL random$.ti
64. CINAHL 55 OR 56 OR 57 OR 58 OR 59 OR 60 OR 61 OR 62 OR 63
65. CINAHL 54 AND 64

British Nursing Index (BNI)

1. BNI tailor$.ti,ab
2. BNI (tailor* adj2 intervention*).ti
3. BNI (tailor$ adj2 care).ti
4. BNI (education$ adj2 program$).ti
5. BNI (education$ adj2 intervention$).ti
6. BNI (education$ adj2 outreach$).ti
7. BNI (education$ adj2 strateg$).ti
8. BNI 4 or 5 or 6 or 7
9. BNI ((target$ OR enhanc$ OR improv$ OR reduc$ OR facilitat$)).ti,ab
10. BNI 8 AND 9
11. BNI (target$ adj2 professional$).ti
12. BNI (target$ adj2 physician$).ti
13. BNI (target$ adj2 doctor$).ti
14. BNI (target$ adj2 practitioner$).ti
15. BNI (target$ adj2 nurse$).ti
16. BNI (personal$ adj2 professional$).ti

17. BNI (personal$ adj2 physician$).ti
18. BNI (personal$ adj2 doctor$).ti
19. BNI (personal$ adj2 practitioner$).ti
20. BNI (personal$ adj2 nurse$).ti
21. BNI (tailor$ adj2 professional$).ti
22. BNI (tailor$ adj2 doctor$).ti
23. BNI (tailor$ adj2 practitioner$).ti
24. BNI (tailor$ adj2 nurse$).ti
25. BNI (outreach adj2 professional$).ti
26. BNI (outreach adj2 physician$).ti
27. BNI (outreach adj2 doctor$).ti
28. BNI (outreach adj2 nurse$).ti
29. BNI (intervention adj3 professional).ti
30. BNI (intervention adj3 physician$).ti
31. BNI (intervention adj3 doctor$).ti
32. BNI (intervention adj3 practitioner$).ti
33. BNI (intervention adj3 nurse$).ti
34. BNI (target$ adj2 intervention$).ti
35. BNI (target$ adj2 program$).ti
36. BNI (target$ adj2 education$).ti
37. BNI ((provider-focus$ adj2 intervention$)).ti,ab
38. BNI ((provider-focus$ adj2 education$)).ti,ab
39. BNI ((provider-focus$ adj2 program$)).ti,ab
40. BNI (personali?ed adj3 information).ti
41. BNI ((personali?ed adj3 education$)).ti
42. BNI ((personali?ed adj3 program$)).ti
43. BNI (personali?ed adj3 intervention$).ti
44. BNI (motivational AND intervention$).ti,ab
45. BNI (motivational AND interview$).ti,ab
46. BNI (dissemination adj2 strateg$).ti
47. BNI (dissemination adj2 effort$).ti
48. BNI (dissemination adj2 method$).ti
49. BNI (focused ADJ strateg$).ti
50. BNI (focused ADJ effort$).ti
51. BNI (focused ADJ method$).ti
52. BNI 1 OR 2 OR 3 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35 OR 36 OR 37 OR 38 OR 39 OR 40 OR 41 OR 42 OR 43 OR 44 OR 45 OR 46 OR 47 OR 48 OR 49 OR 50 OR 51
53. BNI exp CLINICAL TRIALS/
54. BNI (random AND allocation).ti,ab
55. BNI ((clin$ adj2 trial$)).ti
56. BNI (singl$ ADJ blind$ OR double ADJ blind$ OR tripl$ ADJ blind$ OR trebl$ ADJ blind$).ti,ab
57. BNI random$.ti
58. BNI 53 OR 54 OR 55 OR 56 OR 57
59. BNI 52 AND 58

Health Management Information Consortium (HMIC)

1. HMIC tailor$.ti,ab
2. HMIC (tailor* adj2 intervention*).ti
3. HMIC (tailor$ adj2 care).ti
4. HMIC (education$ adj2 program$).ti
5. HMIC (education$ adj2 intervention$).ti
6. HMIC (education$ adj2 outreach$).ti

7. HMIC (education$ adj2 strateg$).ti
8. HMIC 4 or 5 or 6 or 7
9. HMIC ((target$ OR enhanc$ OR improv$ OR reduc$ OR facilitat$)).ti,ab
10. HMIC 8 AND 9
11. HMIC (target$ adj2 professional$).ti
12. HMIC (target$ adj2 physician$).ti
13. HMIC (target$ adj2 doctor$).ti
14. HMIC (target$ adj2 practitioner$).ti
15. HMIC (target$ adj2 nurse$).ti
16. HMIC (personal$ adj2 professional$).ti
17. HMIC (personal$ adj2 physician$).ti
18. HMIC (personal$ adj2 doctor$).ti
19. HMIC (personal$ adj2 practitioner$).ti
20. HMIC (personal$ adj2 nurse$).ti
21. HMIC (tailor$ adj2 professional$).ti
22. HMIC (tailor$ adj2 doctor$).ti
23. HMIC (tailor$ adj2 practitioner$).ti
24. HMIC (tailor$ adj2 nurse$).ti
25. HMIC (outreach adj2 professional$).ti
26. HMIC (outreach adj2 physician$).ti
27. HMIC (outreach adj2 doctor$).ti
28. HMIC (outreach adj2 nurse$).ti
29. HMIC (intervention adj3 professional).ti
30. HMIC (intervention adj3 physician$).ti
31. HMIC (intervention adj3 doctor$).ti
32. HMIC (intervention adj3 practitioner$).ti
33. HMIC (intervention adj3 nurse$).ti
34. HMIC (target$ adj2 intervention$).ti
35. HMIC (target$ adj2 program$).ti
36. HMIC (target$ adj2 education$).ti
37. HMIC ((provider-focus$ adj2 intervention$)).ti,ab
38. HMIC ((provider-focus$ adj2 education$)).ti,ab
39. HMIC ((provider-focus$ adj2 program$)).ti,ab
40. HMIC (personali?ed adj3 information).ti
41. HMIC ((personali?ed adj3 education$)).ti
42. HMIC ((personali?ed adj3 program$)).ti
43. HMIC (personali?ed adj3 intervention$).ti
44. HMIC (motivational AND intervention$).ti,ab
45. HMIC (motivational AND interview$).ti,ab
46. HMIC (dissemination adj2 strateg$).ti
47. HMIC (dissemination adj2 effort$).ti
48. HMIC (dissemination adj2 method$).ti
49. HMIC (focused ADJ strateg$).ti
50. HMIC (focused ADJ effort$).ti
51. HMIC (focused ADJ method$).ti
52. HMIC 1 OR 2 OR 3 OR 10 OR 11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17 OR 18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25 OR 26 OR 27 OR 28 OR 29 OR 30 OR 31 OR 32 OR 33 OR 34 OR 35 OR 36 OR 37 OR 38 OR 39 OR 40 OR 41 OR 42 OR 43 OR 44 OR 45 OR 46 OR 47 OR 48 OR 49 OR 50 OR 51
53. HMIC exp CLINICAL TRIALS/
54. HMIC (random AND allocation).ti,ab
55. HMIC ((clin$ adj2 trial$)).ti
56. HMIC (singl$ ADJ blind$ OR double ADJ blind$ OR tripl$ ADJ blind$ OR trebl$ ADJ blind$).ti,ab

57.HMIC PLACEBOS/
58.HMIC random$.ti
59.HMIC 53 OR 54 OR 55 OR 56 OR 57 OR 58
60.HMIC 52 AND 59

Appendix 10. Variables considered for inclusion in the meta-regression analysis

Variable	Previous version	Comments	Decision for new version
Risk of bias	In analysis	Update based on *Cochrane Handbook* requirements	Keep
Concealment of allocation	In analysis	Incorporated into risk of bias	Remove
Level of tailoring	In analysis	Not predictive	Remove
Rigour of determinants analysis	In analysis	Not predictive; it is difficult to assess the quality of determinants analyses in studies since there is limited evidence on which methods should be used with different topics and settings	Remove
Use of a theory when developing an intervention	In analysis	Theories of human behaviour potentially help explain why a determinant affects practice and indicate which interventions are most likely to address the determinants	Keep
The presence or absence of administrative constraints	In analysis	Not predictive; the presence of administrative constraints may not be consistently reported in studies	Remove
Whether adjustment was made for local factors	New	In some studies, adjustments were made at the level of the cluster (clinical team, hospital), and these adjustments could potentially improve the intervention effect	Add
Number of domains addressed	New	A checklist of determinants including broad domains was developed since the last version of the review	Add

Appendix 11. Stata code for meta-regression analysis

```
*Analysis

*No adjustment for clustering

*calculate baseline odds ratio

gen orbase= nintb*(NcontB-nconb)/(nconb*(NintB-nintb))

gen logorbase= log(orbase)

gen Vlogorbase=(1/nintb)+(1/nconb)+(1/(NcontB- nconb)) + (1/(NintB- nintb))

gen SElogorbase=sqrt(Vlogorbase)

*calculate follow-up odds ratio

gen orfoll= nintf*(NcontF-nconf)/(nconf*(NintF-nintf))

gen logorfoll= log(orfoll)

gen Vlogorfoll=(1/nintf)+(1/nconf)+(1/(NcontF- nconf)) + (1/(NintF- nintf))
```

```
gen SElogorfoll=sqrt(Vlogorfoll)
*meta-analysis at baseline + follow-up unadjusted for clustering
metan logorbase SElogorbase, graph
metan logorfoll SElogorfoll, graph
*Adjusted for clustering
*calculate the design effect
gen DEb=1+((K-1)*ICCb)
gen DEf=1+((K-1)*ICCf)
*calculate adjusted cell n's for 2X2 table (baseline)
gen eveintba=nintb/DEb
gen noeveintba=(NintB-nintb)/DEb
gen eveconba=nconb/DEb
gen noeveconba=(NcontB-nconb)/DEb
gen orbasead= (eveintba*(noeveconba))/(eveconba*(noeveintba))
gen logorbasead= log(orbasead)
gen Vlogorbasead=(1/eveintba)+(1/eveconba)+(1/noeveconba) + (1/noeveintba)
gen SElogorbasead=sqrt(Vlogorbasead)
*calculate adjusted cell n's for 2X2 table (follow-up)
gen eveintfo=nintf/DEf
gen noeveintfo=(NintF-nintf)/DEf
gen eveconfo=nconf/DEf
gen noeveconfo=(NcontF-nconf)/DEf
gen orfollad= (eveintfo*(noeveconfo))/(eveconfo*(noeveintfo))
gen logorfollad= log(orfollad)
gen Vlogorfollad=(1/eveintfo)+(1/eveconfo)+(1/noeveconfo) + (1/noeveintfo)
gen SElogorfollad=sqrt(Vlogorfollad)
*meta-analysis at baseline + follow-up adjusted for clustering
metan logorbasead SElogorbasead if controltype==1,
metan logorfollad SElogorfollad if controltype==1,
metan logorbasead SElogorbasead if controltype==2,
metan logorfollad SElogorfollad if controltype==2,
*meta-regression adjusting for baseline and cluster
metareg logorfollad logorbasead, eform wsse(SElogorfollad)
metareg logorfollad logorbasead if controltype==1, eform wsse(SElogorfollad)
metareg logorfollad logorbasead if controltype==2, eform wsse(SElogorfollad)
```

metareg logorfollad logorbasead if controltype==2 study!=3, eform wsse(SElogorfollad)

*Beeckman removed

*meta-regression plot

twoway (scatter logorfollad logorbasead [weight=SElogorfollad], msymbol(circle_hollow)) (line graphy3 graphx1), ytitle(Log odds ratio at follow-up) xtitle(Log odds ratio at baseline) legend(off)

twoway (scatter logorfollad logorbasead [weight=SElogorfollad] if controltype==1, msymbol(circle_hollow)) (line graphy1 graphx1), ytitle(Log odds ratio at follow-up) xtitle(Log odds ratio at baseline) legend(off)

twoway (scatter logorfollad logorbasead [weight=SElogorfollad] if controltype==2, msymbol(circle_hollow)) (line graphy2 graphx1), ytitle(Log odds ratio at follow-up) xtitle(Log odds ratio at baseline) legend(off)

*Exploring heterogeneity

*Risk of bias (1=low, 2=unclear/high)

metareg logorfollad logorbasead Bias, eform wsse(SElogorfollad)

metareg logorfollad logorbasead Bias if controltype==1, eform wsse(SElogorfollad)

metareg logorfollad logorbasead Bias if controltype==2, eform wsse(SElogorfollad)

*theory for barriers- yes/no

metareg logorfollad logorbasead theory, eform wsse(SElogorfollad)

metareg logorfollad logorbasead theory if controltype==1, eform wsse(SElogorfollad)

metareg logorfollad logorbasead theory if controltype==2, eform wsse(SElogorfollad)

*adjustment (1=yes, 2=no/unclear)

metareg logorfollad logorbasead adjustment, eform wsse(SElogorfollad)

metareg logorfollad logorbasead adjustment if controltype==1, eform wsse(SElogorfollad)

metareg logorfollad logorbasead adjustment if controltype==2, eform wsse(SElogorfollad)

*number of determinant domains

metareg logorfollad logorbasead domains, eform wsse(SElogorfollad)

metareg logorfollad logorbasead domains if controltype==1, eform wsse(SElogorfollad)

metareg logorfollad logorbasead domains if controltype==2, eform wsse(SElogorfollad)

*Sensitivity analyses carried out using highest ICCs from literature, rather than the average

*calculate the design effect for highest ICCs

gen DEb_H=1+((K-1)*UpperICC)

gen DEf_H=1+((K-1)*UpperICC)

*calculate adjusted cell n's for 2X2 table (baseline)

gen eveintba_H=nintb/DEb_H

gen noeveintba_H=(NintB-nintb)/DEb_H

gen eveconba_H=nconb/DEb_H

gen noeveconba_H=(NcontB-nconb)/DEb_H

gen orbasead_H= (eveintba_H*(noeveconba_H))/(eveconba_H*(noeveintba_H))

gen logorbasead_H= log(orbasead_H)

gen Vlogorbasead_H=(1/eveintba_H)+(1/eveconba_H)+(1/noeveconba_H) + (1/noeveintba_H)

gen SElogorbasead_H=sqrt(Vlogorbasead_H)

*calculate adjusted cell n's for 2X2 table (follow-up)

gen eveintfo_H=nintf/DEf_H

gen noeveintfo_H=(NintF-nintf)/DEf_H

gen eveconfo_H=nconf/DEf_H

gen noeveconfo_H=(NcontF-nconf)/DEf_H

gen orfollad_H=(eveintfo_H*(noeveconfo_H))/(eveconfo_H*(noeveintfo_H))

gen logorfollad_H= log(orfollad_H)

gen Vlogorfollad_H=(1/eveintfo_H)+(1/eveconfo_H)+(1/noeveconfo_H) + (1/noeveintfo_H)

gen SElogorfollad_H=sqrt(Vlogorfollad_H)

*meta-regression adjusting for baseline and cluster- with SE taken from IPD cluster analyses for Baker, Davies and Evans as reported in analysis.doc

metareg logorfollad_H logorbasead_H, eform wsse(SElogorfollad_H)

metareg logorfollad_H logorbasead_H if controltype==1, eform wsse(SElogorfollad_H)

metareg logorfollad_H logorbasead_H if controltype==2, eform wsse(SElogorfollad_H)

Appendix 12. Summary of findings worksheet 1

Worksheet 1: Assessing the relative importance of outcomes and deciding which ones to include in the 'Summary of findings' table

Review: Tailored interventions to address determinants of practice: effects on professional practice and health care outcomes (Review)
Assessed by: RB, SF
Date: 10/12/14

Rate the relative importance for each outcome on a 9-point scale ranging from 1 (not important) to 9 (critical).

1-3: Not important and not included in the SoF table.

4-6: Important but not critical for making a decision (inclusion in the SoF table may depend on how many other important outcomes there are).

7-9: Critical for making a decision and should definitely be included in the SoF table.

Include potential undesirable effects (harms) and resource use (costs), as well as desirable effects (benefits).

Outcome	Initials of people assessing the relative importance of the outcomes		Consensus
	RB	SF	

(Continued)

	Relative importance (1-9)		
a) Implementation of recommended practice, e.g. clinical practice guideline recommendations	9	9	
b) Improvement in health outcomes e.g. mortality, quality of life	6	7	Few studies included clinical outcomes, and it should be noted that processes of care do not always impact on outcomes
c) Costs	7	7	The studies did not provide information on costs, however
d) Adverse effects, e.g. deterioration in performance of aspects of care not targeted by the intervention	7	7	The studies did not provide evidence of such adverse outcomes

Appendix 13. Summary of findings worksheet 2

Worksheet 2: Assessing the certainty of evidence across studies for an outcome

Comparison 1. Interventions tailored to address identified determinants of practice compared to no intervention

Certainty assessment of evidence for each outcome

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	Certainty (overall score)
Outcome: Implementation of recommended practice, e.g. clinical practice guideline recommendations							
17 (7 studies included in meta-regression)	Cluster-RCTs (4)	Borderline risk of bias (-0.5)	Inconsistency between studies, and between outcomes within studies (-0.5)	No serious indirectness	No serious imprecision	None	Moderate (3)
Outcome:							
Healthcare outcomes	Cluster-RCTs				Insufficient data in the included studies		
Outcome:							
Costs	Cluster-RCTs				Insufficient data in the included studies		
Outcome:							
Adverse events	Cluster-RCTs				Insufficient data in the included studies		

4	Randomised trials (4)	Serious risk of bias (-0.5)	Important inconsistency (-0.5)	No serious indirectness	No serious imprecision	None	Moderate (3)

Comparison 2: Interventions tailored to address identified determinants of practice compared to non-tailored interventions

Certainty assessment of evidence for each outcome

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	Certainty (overall score)
Outcome: Implementation of recommended practice, e.g. clinical practice guideline recommendations							
15 (8 studies included in meta-regression)	Cluster-RCTs (4)	Borderline risk of bias (-0.5)	Important inconsistency (-0.5)	No indirectness	No imprecision	None	3
Outcome:							
Healthcare outcomes	Cluster-RCTs				Insufficient data in the included studies		
Outcome:							
Costs	Cluster-RCTs				Insufficient data in the included studies		
Outcome:							
Adverse events	Cluster-RCTs				Insufficient data in the included studies		
4	Randomised trials (4)	Serious risk of bias (-0.5)	Important inconsistency (-0.5)	No serious indirectness	No serious imprecision	None	Moderate (3)

WHAT'S NEW

Date	Event	Description
22 January 2015	New citation required but conclusions have not changed	The following have been added as co-authors: Michel Wensing, Michelle Fiander, Martin P Eccles, Maciek Godycki-Cwirko, Jan van Lieshout, Cornelia Jäger. We excluded three studies from the previous version of the review and added nine studies in this update, giving 32 studies in total. We omitted the Bayesian analysis from this update. The conclusions, however, are similar to those of the previous version.
22 January 2015	New search has been performed	New searches performed to December 2014 and nine new studies identified

HISTORY

Protocol first published: Issue 2, 1999
Review first published: Issue 3, 2005

Date	Event	Description
15 February 2010	New search has been performed	Search conducted up to October 2009. We added 11 new studies. We also added 'Risk of bias' tables and 'Summary of findings' tables' to the review.
15 February 2010	New citation required and conclusions have changed	We identified 11 new studies, providing more evidence regarding the effectiveness of the intervention.
27 May 2008	Amended	Converted to new review format.

CONTRIBUTIONS OF AUTHORS

Janette Camosso-Stefinovic and Michelle Fiander were responsible for developing, editing, and running search strategies for the review. Janette Camosso-Stefinovic was responsible for obtaining full-text articles.

All review authors assessed whether studies were relevant and extracted study data, considered the findings, and reviewed drafts of the review. Clare Gillies was responsible for the statistical analysis. Richard Baker led the review and prepared the first draft.

DECLARATIONS OF INTEREST

Richard Baker, Francine Cheater, Clare Gillies, Michel Wensing, and Signe Flottorp are authors of one or more of three of the included studies. Noelle Robertson is an author on two of the included studies. Other review authors completed data extractions for these studies. The institutions of the following authors received funding from the EU that helped to support the conduct of this review: Richard Baker, Clare Gillies, Janette Camosso-Stefinovic, Signe Flottorp, Noelle Robertson, Michel Wensing, Martin Eccles, Maciek Godycki-Cwirko, Jan van Lieshout, Cornelia Jäger.

Richard Baker, none other than as indicated above

Janette Camosso-Stefinovic, none other than as indicated above

Clare Gillies, none other than as indicated above

Elizabeth J Shaw, none

Francine Cheater, none other than as indicated above

Signe Flottorp, none other than as indicated above

Noelle Robertson, none other than ias ndicated above

Michel Wensing, none other than as indicated above

Michelle Fiander, none

Martin P Eccles, none other than as indicated above

Maciek Godycki-Cwirko, none other than as indicated above

Jan van Lieshout, none other than as indicated above

Cornelia Jäger, none other than as indicated above.

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- Norwegian Knowledge Centre for the Health Services, Norway.
- Department of Health Sciences, University of Leicester, UK.

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- Richard Baker and Martin Eccles receive National Institute of Health Research (NIHR) senior investigator awards. The opinions expressed in this review do not necessarily reflect those of the NIHR or Department of Health, UK.
- European Commission grant number 258837, tailored implementation in chronic disease, Other.

  TICD is a four-year study involving researchers from the Netherlands, Norway, Poland, Germany, and the UK, with the aim of developing methods for tailoring implementation interventions to improve the care of people with chronic conditions. The update of this review was undertaken as part of this study.

DIFFERENCES BETWEEN PROTOCOL AND REVIEW

The principal change to the protocol since the last version of the review was the addition of two meta-regression analyses of tailored interventions compared to no intervention and to non-tailored interventions. We also used different variables to investigate heterogeneity. In the previous review (Baker 2010), we included a Bayesian analysis as well as a classical analysis, but since these approaches produced similar results, we used only the classical analysis in this review. We excluded three studies from the previous version of the review in this update, and added nine studies, giving 32 studies in total. The following joined the authors of the previous version of the review in preparing this update: Michel Wensing, Michelle Fiander, Martin P Eccles, Maciek Godycki-Cwirko, Jan van Lieshout, and Cornelia Jäger.

INDEX TERMS

Medical Subject Headings (MeSH)

Outcome and Process Assessment, Health Care [*standards]; Professional Practice [*standards]; Randomized Controlled Trials as Topic

MeSH check words

Humans