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Fønhus MS, Dalsbø TK, Johansen M, Fretheim A, Skirbekk H, Flottorp SA

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[Intervention Review]

Patient-mediated interventions to improve professional practice

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ABSTRACT

Background

Healthcare professionals are important contributors to healthcare quality and patient safety, but their performance does not always follow recommended clinical practice. There are many approaches to influencing practice among healthcare professionals. These approaches include audit and feedback, reminders, educational materials, educational outreach visits, educational meetings or conferences, use of local opinion leaders, financial incentives, and organisational interventions. In this review, we evaluated the effectiveness of patient-mediated interventions. These interventions are aimed at changing the performance of healthcare professionals through interactions with patients, or through information provided by or to patients. Examples of patient-mediated interventions include 1) patient-reported health information, 2) patient information, 3) patient education, 4) patient feedback about clinical practice, 5) patient decision aids, 6) patients, or patient representatives, being members of a committee or board, and 7) patient-led training or education of healthcare professionals.

Objectives

To assess the effectiveness of patient-mediated interventions on healthcare professionals' performance (adherence to clinical practice guidelines or recommendations for clinical practice).

Search methods

We searched MEDLINE, Ovid in March 2018, Cochrane Central Register of Controlled Trials (CENTRAL) in March 2017, and ClinicalTrials.gov and the International Clinical Trials Registry (ICTRP) in September 2017, and OpenGrey, the Grey Literature Report and Google Scholar in October 2017. We also screened the reference lists of included studies and conducted cited reference searches for all included studies in October 2017.

Selection criteria

Randomised studies comparing patient-mediated interventions to either usual care or other interventions to improve professional practice.

Data collection and analysis

Two review authors independently assessed studies for inclusion, extracted data and assessed risk of bias. We calculated the risk ratio (RR) for dichotomous outcomes using Mantel-Haenszel statistics and the random-effects model. For continuous outcomes, we calculated the mean difference (MD) using inverse variance statistics. Two review authors independently assessed the certainty of the evidence (GRADE).

Main results

We included 25 studies with a total of 12,268 patients. The number of healthcare professionals included in the studies ranged from 12 to 167 where this was reported. The included studies evaluated four types of patient-mediated interventions: 1) patient-reported health information interventions (for instance information obtained from patients about patients' own health, concerns or needs before a clinical encounter), 2) patient information interventions (for instance, where patients are informed about, or reminded to attend recommended care), 3) patient education interventions (intended to increase patients' knowledge about their condition and options of care, for instance), and 4) patient decision aids (where the patient is provided with information about treatment options including risks and benefits). For each type of patient-mediated intervention a separate meta-analysis was produced.

Patient-reported health information interventions probably improve healthcare professionals' adherence to recommended clinical practice (moderate-certainty evidence). We found that for every 100 patients consulted or treated, 26 (95% CI 23 to 30) are in accordance with recommended clinical practice compared to 17 per 100 in the comparison group (no intervention or usual care). We are uncertain about the effect of patient-reported health information interventions on desirable patient health outcomes and patient satisfaction (very low-certainty evidence). Undesirable patient health outcomes and adverse events were not reported in the included studies and resource use was poorly reported.

Patient information interventions may improve healthcare professionals' adherence to recommended clinical practice (low-certainty evidence). We found that for every 100 patients consulted or treated, 32 (95% CI 24 to 42) are in accordance with recommended clinical practice compared to 20 per 100 in the comparison group (no intervention or usual care). Patient information interventions may have little or no effect on desirable patient health outcomes and patient satisfaction (low-certainty evidence). We are uncertain about the effect of patient information interventions on undesirable patient health outcomes because the certainty of the evidence is very low. Adverse events and resource use were not reported in the included studies.

Patient education interventions probably improve healthcare professionals' adherence to recommended clinical practice (moderate-certainty evidence). We found that for every 100 patients consulted or treated, 46 (95% CI 39 to 54) are in accordance with recommended clinical practice compared to 35 per 100 in the comparison group (no intervention or usual care). Patient education interventions may slightly increase the number of patients with desirable health outcomes (low-certainty evidence). Undesirable patient health outcomes, patient satisfaction, adverse events and resource use were not reported in the included studies.

Patient decision aid interventions may have little or no effect on healthcare professionals' adherence to recommended clinical practice (low-certainty evidence). We found that for every 100 patients consulted or treated, 32 (95% CI 24 to 43) are in accordance with recommended clinical practice compared to 37 per 100 in the comparison group (usual care). Patient health outcomes, patient satisfaction, adverse events and resource use were not reported in the included studies.

Authors' conclusions

We found that two types of patient-mediated interventions, patient-reported health information and patient education, probably improve professional practice by increasing healthcare professionals' adherence to recommended clinical practice (moderate-certainty evidence). We consider the effect to be small to moderate. Other patient-mediated interventions, such as patient information may also improve professional practice (low-certainty evidence). Patient decision aids may make little or no difference to the number of healthcare professionals' adhering to recommended clinical practice (low-certainty evidence).

The impact of these interventions on patient health and satisfaction, adverse events and resource use, is more uncertain mostly due to very low certainty evidence or lack of evidence.

PLAIN LANGUAGE SUMMARY

Patient-mediated interventions to improve professional practice

What is the aim of the review?

Patient-mediated interventions to improve professional practice (Review)
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Our aim with this Cochrane review was to assess whether patients can change the performance of healthcare professionals. We collected and analysed all relevant studies to answer this question and found 25 studies.

Key message

This review suggests that patients may change healthcare professionals' practice through the following three strategies: 1) strategies where patients give healthcare professionals information about themselves; 2) strategies where patients are given healthcare information; and 3) strategies where patients take part in patient education. Patient decision aids may make little or no difference to healthcare professionals' practice, however, the certainty is low, and these results should be interpreted carefully. We still need more research about the best ways in which patients can change professional practice and about the impact it has on patients' health.

What was studied in the review?

Many strategies have been tested to see if they can improve healthcare professionals' practice and make sure that patients receive the best available care. These strategies include sending reminders to healthcare professionals, giving them further education, or giving them financial rewards. These strategies have mostly had only small or moderate effects. Another way of changing what healthcare professionals do is through the patients themselves. These strategies are called 'patient-mediated interventions'.

What are the main results of the review?

The studies in this review assessed different patient-mediated strategies compared to usual care or no strategies.

Strategies where patients give information to healthcare professionals

In these studies, patients gave information about their own health, concerns or needs to the doctor. This was usually done by filling in a questionnaire in the waiting area before a consultation. The doctor was then given this information before or at the consultation. The review shows that these strategies:

- probably improve the extent to which healthcare professionals follow recommended clinical practice (moderate-certainty evidence).

We are uncertain about the effect of these strategies on patient health, patient satisfaction and resource use because these outcomes were not measured in the studies or because the certainty of the evidence is very low.

Strategies where information was given to patients

In these studies, patients were given information about recommended care or were reminded to use services, for instance to go for a check-up. The review shows that these strategies:

- may improve the extent to which healthcare professionals follow recommended clinical practice (low-certainty evidence);

- may have little or no effect on patient satisfaction (low-certainty evidence);

- may have little or no effect on some patient health outcomes, such as the number of patients who reach controlled blood pressure (low-certainty evidence). However, we are uncertain about the effect of these strategies on other patient health outcomes because the certainty of the evidence is very low. We also lack information to draw conclusions about resource use.

Patient education strategies

In these studies, patients took part in patient education such as self-management programmes, for instance to increase their knowledge about their condition. The review shows that these strategies:

- probably improve the extent to which healthcare professionals follow recommended clinical practice (moderate-certainty evidence);

- may slightly improve some patient health outcomes such as the number of patients who reach controlled blood pressure (low-certainty evidence). However, we are uncertain about the effect of these strategies on other patient health outcomes, patient satisfaction and resource use because these outcomes were not measured in the included studies.

Patient decision aid strategies

In the one study that assessed effect of patient decision aids, patients were given a decision aid consisting of a booklet, personal worksheet, and audiotape to make decisions about their medical management. The review shows that these strategies:

- may have little or no effect on the extent to which healthcare professionals follow recommended clinical practice (low-certainty evidence)

We are uncertain about the effect of these strategies on patient health, patient satisfaction and resource use because these outcomes were not measured in the studies or because the certainty of the evidence is very low.

How up-to-date is this review?

We searched for studies up to March 2018 and ongoing studies up to October 2017.

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

Patient-reported health information interventions versus comparisons to improve professional performance						
<p>Patient or population: general patient population, “at risk” patient population and patient population with a specific condition or disease Setting: primary care (mostly) Intervention: patient-reported health information interventions Comparison: no intervention or usual care</p>						
Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	No. of participants (studies)	Certainty of the evidence (GRADE)	What happens?
	Risk with comparisons	Risk with patient-reported health information interventions				
Adherence to recommended clinical practice (0-3 months follow-up)	17 per 100	26 per 100 (23 to 30)	RR 1.59 (1.41 to 1.81)	3865 (4 RCTs ^A)	⊕⊕⊕○ MODERATE ¹	Patient-reported health information interventions probably improve healthcare professionals’ adherence to recommended clinical practice compared to no intervention or usual care
Desirable patient health outcomes (0-3 months follow-up)	32 per 100	52 per 100 (38 to 100)	RR 1.62 (0.95 to 2.76)	79 (1 RCT ^B)	⊕○○○ VERY LOW ^{2,3}	We are uncertain about the effect of patient-reported health information interventions on desirable patient health outcomes because the certainty of the evidence is very low

Undesirable patient health outcomes	Not reported	-	-	-	-	None of the included studies reported on undesirable patient health outcomes
Patient satisfaction Number of satisfied patients (0-3 months follow-up)	38 per 100	94 per 100 (49 to 100)	RR 2.45 (1.27 to 4.74)	26 (1 RCT ^C)	⊕○○○ VERY LOW ²³	We are uncertain about the effect of patient-reported health information interventions on the number of satisfied patients because the certainty of the evidence is very low
Patient satisfaction The degree of satisfaction (unknown scale, but higher score means higher degree of satisfaction) (0-3 months follow-up)	The mean patient satisfaction score was 4.3 points	The mean patient satisfaction was 0.40 points higher (0.12 higher to 0.68 higher)	-	79 (1 RCT ^B)	⊕○○○ VERY LOW ²⁴	We are uncertain about the effect of patient-reported health information interventions on the degree of patient satisfaction because the certainty of the evidence is very low
Adverse events	Not reported	-	-	-	-	None of the included studies reported on adverse events
Resource use (0-3 months follow-up)	The findings are narratively presented in Table 3. The researchers in this study reported a total cost of 69.20 US \$ per child					We did not judge the certainty of the evidence for this outcome

* **The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; RR: Risk ratio, RCT: randomised trial

GRADE Working Group grades of evidence

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

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

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

Very low certainty: 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 Downgraded one level because we judged only 1 of 4 studies to have low risk of bias

² Downgraded one level because we judged the study to have potential risk of bias

³ Downgraded two levels for imprecision because of very few events (and one small study only)

⁴ Downgraded two levels for imprecision because of a very small sample size (and one small study only)

^A Goldberg 2012; Kenealy 2005; Mazonson 1996; Quinn 2008

^B Brody 1990

^C Quinn 2008

BACKGROUND

Description of the condition

Healthcare professionals' performance is not always in line with recommended clinical practices (McGlynn 2003; Runciman 2012; Schuster 1998; Seddon 2001). Reducing the gap between recommended and actual clinical practice is a key element of healthcare quality improvement. Recommended practices are typically formulated in clinical practice guidelines. Clinical practice guidelines have the potential to improve the quality of healthcare and patient outcomes by providing specific recommendations for professional practice (Grol 2003; Schuster 1998; Seddon 2001). Adherence to clinical practice guidelines is thus frequently used as a measure of the quality of healthcare. Various interventions are proposed as means to improve the performance of healthcare professionals, e.g. audit and feedback, reminders, educational material, educational outreach visits, educational meetings or conferences, use of local opinion leaders, financial incentives, organisational interventions, and patient-mediated interventions.

Description of the intervention

Several definitions of patient-mediated intervention have been proposed (Grimshaw 2004; Légaré 2014; Robertson 2006). Here we define patient-mediated interventions according to Légaré 2014: "any intervention aimed at changing the performance of healthcare professionals through interactions with patients, or information provided by or to patients".

Overall, experimental studies of interventions to improve professional practice have yielded small to moderate effects. A Cochrane review shows that audit and feedback probably improves professional practice, but the effectiveness ranges from little or no effect to a substantial effect (Ivers 2012). Reminders, such as computer-generated reminders delivered on paper to healthcare professionals, probably improve professional practice (Arditi 2017). Printed educational material may also improve professional practice, but the effect seems small, and the certainty of the evidence is low (Giguère 2012). Educational meetings or educational outreach visits may result in modest improvements in professional practice (Forsetlund 2009; O'Brien 2007). Using local opinion leaders may improve professional practice (Flodgren 2011a), as may financial incentives (Flodgren 2011b). Another recent Cochrane review shows that healthcare professionals provided with clinical practice guidelines accompanied by tools developed by guideline producers probably adhere more to clinical guidelines (Flodgren 2016). Organisational interventions, such as provision of pharmaceutical care, medication reviews, and follow-up visits by a healthcare professional including a pharmacist, nurse or physician, probably make little or no difference to the number of medication errors

by primary healthcare professionals that lead to hospital admissions, emergency department visits, or death among adult patients (Khalil 2017).

Direct involvement of patients or their representatives in decision-making processes is seen both as an ethical imperative, and as a promising approach for quality improvement (Richards 2013). Interventions to promote shared decision-making (Légaré 2014) and patient-centred care (Dwamena 2012), including patient-mediated interventions, have been reviewed elsewhere. Also, the effectiveness of the use of decision aids among people facing treatment or screening decisions has been reviewed elsewhere (Stacey 2017). The focus of the Stacey 2017 Cochrane review was on people's decision-making processes, behaviour and health, and on outcomes related to health care system cost, use. The studies included in this decision aids review most likely did not address outcomes directly related to changing professional practice and would therefore not be eligible for inclusion in our review.

In this review we focus specifically on the effects of using patient involvement as a means to improving healthcare professionals' performance. This can be done through interactions with patients, or information provided by or to patients. Examples of such interventions include:

- patient-reported health information where patients provide information about their own health, concerns, or needs before a clinical encounter;
- patient information where patients are informed about recommended care;
- patient education/training/counselling to increase patients' knowledge about their condition;
- patient decision aids to ensure that the choices about treatment and management reflect recommended care and the patients' values and preferences;
- patient feedback about clinical practice;
- patients being members of committees or boards of healthcare organisations;
- patient-led training or education of healthcare professionals.

We have used adherence to clinical practice guidelines and recommendations as a measure for quality of professional practice, as is commonly done, for example in Cochrane reviews of interventions to improve healthcare worker performance (Arditi 2017; Flodgren 2011a; Flodgren 2011b; Flodgren 2016; Forsetlund 2009; Giguère 2012; O'Brien 2007; Tzortziou Brown 2016). It is worth noting that adherence to guidelines is not necessarily what a patient wants. A patient-mediated intervention could therefore improve professional practice without improving shared decision-making, and vice versa. Still, it seems reasonable to assume that most recommended clinical practices are in the best interest of the patient, and therefore also in line with the care most patients would want. The importance of patient involvement at all levels of healthcare services is widely recognised. Patients are, in general, positive to engaging in improving the quality of the care they receive (Schwappach 2010a). Also, patient information materials devel-

oped in collaboration with patients is probably more relevant, readable, understandable, and effective in improving knowledge among patients (Nilsen 2006).

On the other hand, concerns have been raised about how patient involvement can affect patients' trust in healthcare professionals and their experience of receiving healthcare (Hrisos 2013; Luszczynska 2007; McGunkin 2006). In addition, patients' comfort level with active involvement may vary considerably, as some might feel that they can appear rude or disrespectful and that this may upset the healthcare professional and, consequently, might compromise their healthcare (Hrisos 2013). Patients may also find it hard to overcome distrust if the independence, agency, or expertise of healthcare professionals is questioned (Plomp 2010).

The patient's socioeconomic status has been shown to correlate with the degree of involvement in treatment decisions (Willems 2005). Patients from higher social classes may get more information from their healthcare professionals because they often communicate more actively (they ask more questions and are more opinionated) and show more affective expressiveness (Willems 2005).

Most healthcare professionals, like patients, welcome patient involvement to improve healthcare safety (Davis 2012a; Davis 2012b; Hrisos 2013; Schwappach 2010b; Schwappach 2011; Schwappach 2013). When patients question or challenge healthcare professionals' practice, however, the healthcare professionals' morale and professional integrity may suffer negative consequences (Hrisos 2013; Schwappach 2010b). Thus, in some situations or cases, the unwanted consequences of patient-mediated interventions may negatively affect both the patient and the health-

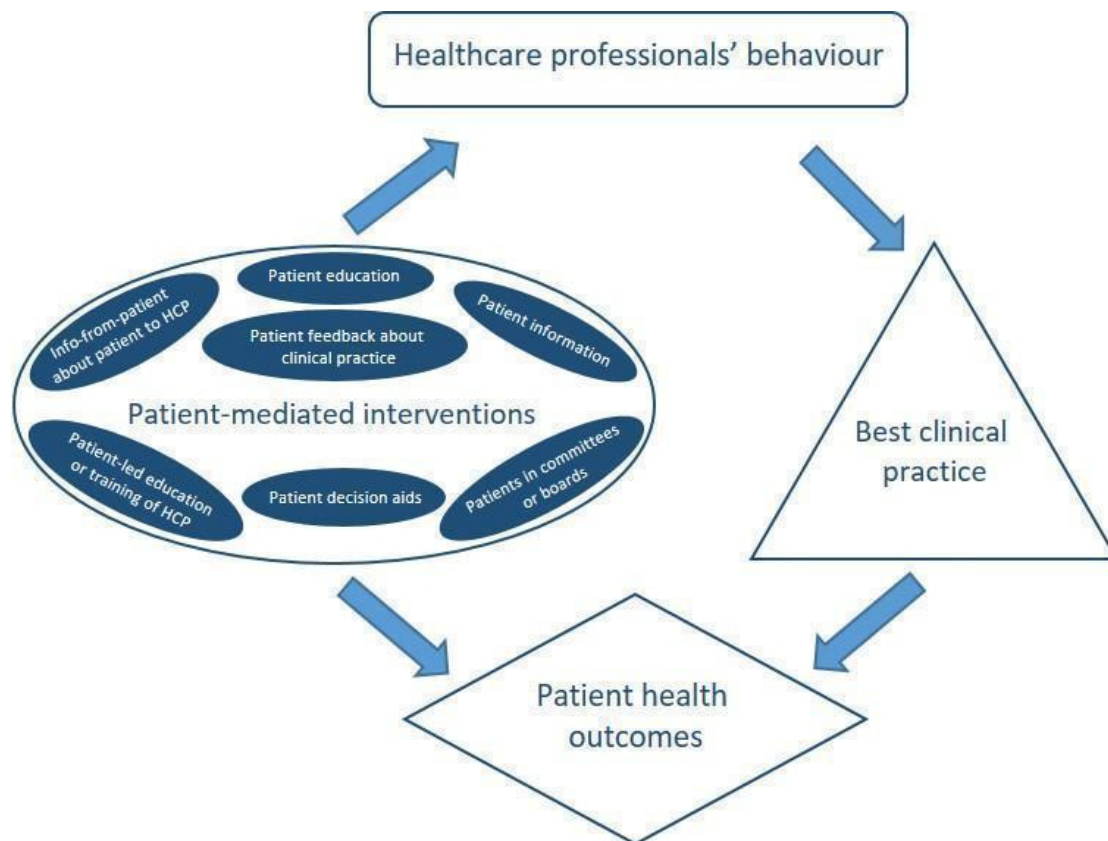
care professional and, thus, the patient-healthcare professional relationship.

To avoid tensions between healthcare professionals and patients, a conceptual common ground or consensus on how to set treatment and management goals has been recommended (Sugavanam 2013). Collaboration and communication are important factors and communication in the form of discussions may also lead to more reciprocal, trustful relationships and more open information exchanges (Skirbekk 2011).

How the intervention might work

Despite being regarded as a promising approach for improving healthcare systems and being the focus of research, the theoretical foundation for patient-mediated interventions seems meagre. Very few, if any, of the studies to evaluate the effectiveness of such interventions have reported use of theory in the development and design of the intervention (Gagliardi 2016; Ng 2017). Still, if healthcare professionals are well-informed about recommended clinical practices through patients or patients' representatives, or if patients are empowered to ask for appropriate health care, it seems reasonable to believe that this can influence professional practice. Table 1 shows examples of patient-mediated interventions, how they might influence healthcare workers' behaviour, and possible adverse effects. In Figure 1, we present a summary of various types of patient-mediated interventions and indicate two mechanisms through which they can improve patient outcomes: directly, and indirectly through improving the care provided by health professionals. This review focuses on the latter mechanism.

Figure 1. Summary figure of different examples of patient-mediated interventions and proposal of where within the healthcare system the direct interaction may take place.



Why it is important to do this review

Although many systematic reviews exist that have assessed the effect of different patient involvement or patient-directed interventions, these have mainly focused on patient outcomes, such as satisfaction, well-being, and health. For example, there are series of Cochrane reviews on patient education/self-management programs for various conditions, including musculoskeletal-related conditions (Kroon 2014; Parreira 2017; Poquet 2016), lung-related conditions (Kelly 2018; Lenferink 2017; McCallum 2017; Peytremann-Bridevaux 2015; Zwerink 2014), stroke (Fryer 2016), heart-related conditions (Anderson 2017; Clarkesmith 2017), diabetes type 2 (Attridge 2014; McBain 2016), and cancer-related conditions (Bennett 2016). The purpose of our review, however, is to assess the effect patients can have on healthcare professionals' performance. Similarly, there are Cochrane reviews on interventions to promote shared decision-making (Légaré 2014) and a patient-centred approach (Dwamena 2012), but these have not focused on the effects on professional practice, i.e. adherence to clinical practice guidelines or recommendations.

Previous systematic reviews have covered patient-mediated interventions as one of a wide range of interventions aimed at improving professional practice (Davis 1995; Grimshaw 2004; Oxman 1995). Some studies have found mixed effects on professional practice for patient-mediated interventions (Davis 1995; Oxman 1995), while others have reported moderate to large effects (Grimshaw 2004). The certainty of the evidence in these systematic reviews varies, but is generally low, making it impossible to draw firm conclusions about the effectiveness of these interventions. It is important to do this review as there are, to our knowledge, no recently updated systematic reviews that have assessed the effectiveness of patient-mediated interventions on healthcare professionals' practice.

OBJECTIVES

To assess the effects of patient-mediated interventions on health-

care professionals' clinical performance (adherence to clinical practice guidelines or recommendations).

METHODS

Criteria for considering studies for this review

Types of studies

We included randomised and cluster-randomised studies comparing a patient-mediated intervention to no intervention, usual care or other interventions to improve professional practice. We included full-text studies, conference abstracts, and unpublished data.

Types of participants

We included practicing healthcare professionals and those in post-graduate training responsible for patient care. We excluded undergraduate students or non-professional (lay) healthcare workers.

Types of interventions

Types of interventions included

Interventions aimed at changing the performance of healthcare professionals through interactions with patients, or information provided by or to patients, including:

- patient-reported health information where patients provide information about their own health, concerns, or needs before a clinical encounter;
- patient information where patients are informed about recommended care;
- patient education/training/counselling to increase patients' knowledge about their condition;
- patient feedback about clinical practice;
- patient decision aids to ensure that the choices about treatment and management reflect recommended care and the patients' values and preferences;
- patients being members of committees or boards;
- patient-led training or education of healthcare professionals.

See [Table 1](#) for more detailed information and examples.

We excluded studies where patient-mediated intervention was a small component in a multi-component package. We also excluded studies that did not include authentic patients (such as studies including standardised or simulated patients).

Types of comparisons included

We included studies where patient-mediated interventions were compared with common practice/usual care, or any other intervention to improve professional practice (including comparisons of different types of patient-mediated interventions).

Types of outcome measures

Primary outcomes

Adherence to recommended clinical practice or clinical practice guidelines by healthcare professionals.

Secondary outcomes

We only included studies that reported relevant primary outcomes. Thus, we extracted secondary outcomes from studies that also reported on adherence to recommended clinical practice or clinical practice guidelines.

- Patient outcomes
 - health outcomes
 - satisfaction with the care they receive
 - acceptance, confidence in, or satisfaction with the intervention
 - experiences/perceptions of healthcare professionals' acceptance, confidence in or satisfaction with the intervention
- Healthcare professional outcomes
 - satisfaction with the care they provide
 - acceptance, confidence in or satisfaction with the intervention

We also included data on resource use, adverse events and issues of equity in the included studies.

Search methods for identification of studies

Electronic searches

We searched the following electronic databases for primary studies without any language or time limits.

- The Cochrane Central Register of Controlled Trials (CENTRAL), part of the Cochrane Library (www.cochranelibrary.com) (searched March 10, 2017)
- MEDLINE and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily 1946 to August 24, 2018, Ovid (searched August 28, 2018 with time limit up to March 10, 2018)

We tested whether or not to search Embase, using the phrase 'patient mediated' in title and abstract. We screened all records that

were unique to Embase, found none to be eligible and therefore omitted Embase from our search.

See [Appendix 1](#) for all strategies used, including the MEDLINE strategy, which was peer reviewed using the Peer Review of Electronic Search Strategies (PRESS) checklist ([Sampson 2008](#)).

Searching other resources

Grey literature (searched October 2017)

- Open Grey (www.opengrey.eu)
- Grey Literature Report (www.greylit.org)
- Google Scholar (scholar.google.com)

Trial registries (searched September 2017)

- International Clinical Trials Registry Platform (ICTRP), World Health Organization (WHO) (www.who.int/ictip)
- ClinicalTrials.gov, US National Institutes of Health (NIH) (clinicaltrials.gov)

We also:

- screened the reference lists of all included studies for relevant studies;
- conducted cited reference searches for all included studies using Web of Science, Clarivate Analytics (searched October 2017).

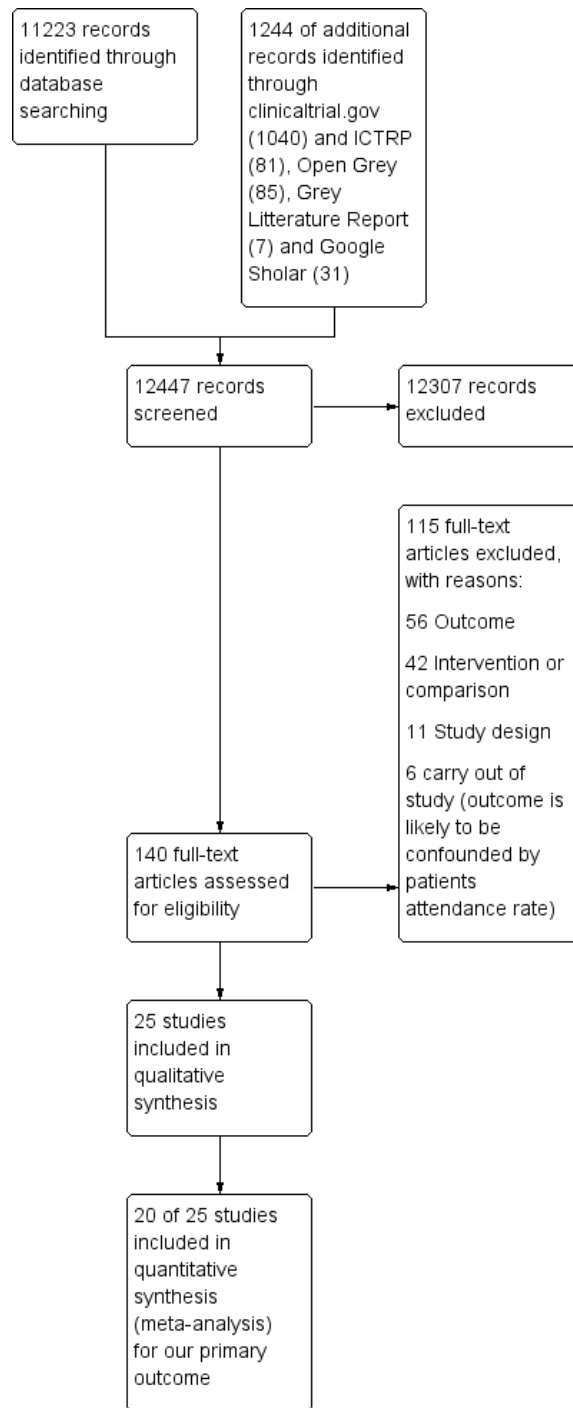
An Information Specialist (MJ) and a review author (MSF) carried out the searches.

Data collection and analysis

Selection of studies

Two review authors (MSF and TKD) screened titles and abstracts independently to assess which studies met the inclusion criteria. We retrieved full-text copies of all papers that were potentially relevant, including those where the description of the population, intervention, comparison or outcomes was insufficient in the abstract to make a decision about inclusion. Review authors MSF and TKD independently assessed the full-text copies of the papers for relevance. We resolved any disagreements by discussion and consensus with a third review author (AF). We kept a log of the selection process to complete a PRISMA flow diagram ([Moher 2009](#)) using Covidence ([Covidence](#)) (see [Figure 2](#)). We described studies that initially appeared to meet the inclusion criteria but later were excluded, including the reasons for exclusion, in the [Characteristics of included studies](#) table.

Figure 2. Study flow diagram.



Data extraction and management

Review authors MSF and TKD independently extracted data from each included study using a modified version of the EPOC Data Collection Checklist (EPOC 2017a). We resolved any disagreements by discussion and by consensus. When needed, a third review author (AF) was consulted. Missing or unclear data from a published study were marked clearly on the data collection form. Missing or unclear data were sought from the corresponding author of a published paper.

Assessment of risk of bias in included studies

Review authors MSF and TKD independently assessed the risk of bias in accordance with the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011), and in line with the Cochrane Effective Practice and Organisation of Care Group suggested risk of bias criteria (EPOC 2017b). We resolved any discrepancies through discussion.

We assessed the risk of bias according to the following domains:

- random sequence generation;
- allocation concealment;
- blinding of participants and personnel;
- blinding of outcome assessment;
- incomplete outcome data;
- selective outcome reporting;
- other biases (for cluster-randomised studies, we judged five additional sources of potential biases under “other biases”).

We judged each potential source of bias as high, low, or unclear and provided a quote from the study report together with a justification for our judgement in the ‘Risk of bias’ table.

Assessment of bias in conducting the systematic review

We conducted the review according to the published protocol and report any deviations from it in the Differences between protocol and review section of the systematic review.

Measures of treatment effect

For the dichotomous outcomes, we analysed data based on the number of events and the number of people or cases assessed in the intervention and comparison groups. We used these to calculate the risk ratio (RR) with 95% confidence interval (CI). For continuous outcomes, we analysed the data based on the mean, standard deviation (SD) and number of people assessed for both the intervention and comparison groups to calculate mean difference (MD) and 95% CI.

All relevant outcomes reported in the studies were collected along with data on how they were measured (self-report, medical record, other objective primary or secondary outcome). For all relevant primary and secondary outcomes, we extracted the intervention effect estimates with relevant CIs, and the method of statistical analysis used to calculate it, as reported by the authors of the study. We extracted data from all time points and categorised them into one of three follow-up time intervals (0 to 3 months, more than 3 months to 12 months, more than 12 months). Studies reporting one outcome in multiple follow-up intervals were only reported once in our meta-analyses, with the longest follow-up. Also, if a study reported multiple data within one interval, we used the data with the longest follow-up within that interval.

When the same study reported more than one relevant primary outcome (adherence outcome), we used the primary outcome as defined by the study authors. If a primary outcome was not clearly defined or multiple outcomes were defined as primary or secondary outcomes, we calculated and used the median value from all relevant primary outcomes. When calculating the median from even numbers of outcomes, we chose the outcome with reporting from the most participants. In cases where the number of participants contributing to the outcome was the same, we randomly selected the outcome (flipping coin).

Unit of analysis issues

We found eligible studies with cluster designs (studies in which the unit of allocation is not a person, but a group of people for instance in a clinic). Studies in which comparisons are allocated as groups of people should account for clustering in their analysis. Standard statistical methods assume independence of observation, and for cluster-design studies the use of these will generally result in artificially small P values and overly narrow CIs for the effect estimates (Ukoumunne 1999), if analysed at the individual level rather than at the cluster level.

We re-analysed studies with potential unit of analysis errors by using the information on the size number of clusters and the value of the intra-cluster correlation coefficient (ICC). If no ICC was reported, we used the median ICC value from similar studies found in the University of Edinburgh’s Database of ICCs (ABDN 2015). We used the following formula, as suggested by *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011): $n \text{ patients} / (1 + \text{ICC (average cluster size - 1)})$.

Dealing with missing data

We attempted to contact study authors in order to verify key study characteristics and to obtain missing numerical outcome data where possible. In cases where this was unsuccessful, we have

reported the data as 'not reported' and have not attempted to impute the missing values. The potential impact of the missing data is explored in the 'Assessment of risk of bias' section of the review.

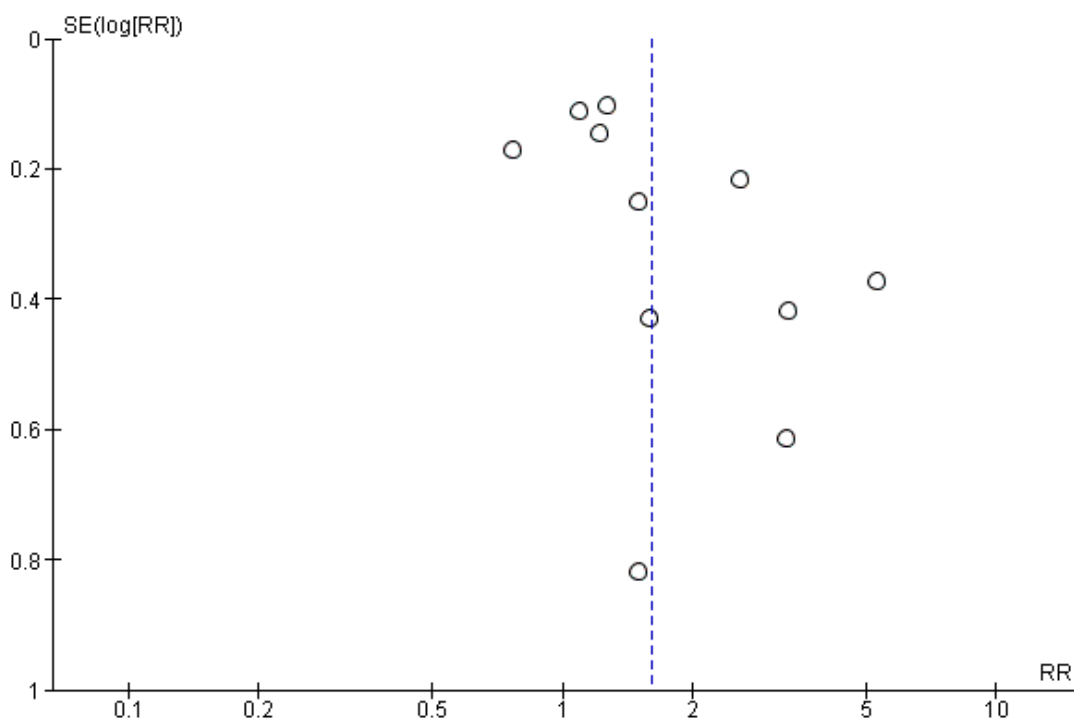
Assessment of heterogeneity

By examining study populations, interventions and outcomes, we considered if the studies were similar enough to be pooled in a meta-analysis. We assessed the degree of statistical heterogeneity by visual examination of the scatter of effect estimates on forest plots and by using the χ^2 and I^2 statistics (Higgins 2003).

Assessment of reporting biases

The tendency for inconclusive results to remain unpublished may impact the findings of a systematic review. We attempted to obtain study protocols to assess selective outcome reporting. Another important factor that might introduce biases is the small-study effects. We planned to use funnel plots to assess small-study effects for 10 or more studies investigating a particular outcome according to Egger 1997 (for continuous outcomes) and Harbord 2006 (for dichotomous outcomes). A funnel plot was created for the patient information comparison which had 12 studies in the meta-analysis Figure 3. Even though we did not find clear evidence for a publication bias, we cannot rule out the possibility. Also, we failed to find more studies with few participants and negative effect estimates, and we should therefore be cautious when we interpret that we have little to indicate a potential publication bias in our result.

Figure 3. Funnel plot of comparison: 2 Patient information interventions versus comparisons, outcome: 2.1 Adherence to recommended practice.



Data synthesis

We grouped patient-mediated interventions according to the six categories listed under [Types of interventions](#), and categorised the

interventions of the included studies accordingly. We then prepared tables summarising the findings of studies for each type of relevant primary and secondary outcome.

We prepared separate meta-analyses for each type of intervention

and visualised the different types of comparisons in the forest plot. We carried out the meta-analyses by using Review Manager 5 (RevMan 2014). We used random-effects meta-analysis for combining data, as we anticipated that there may be natural heterogeneity between studies attributable to the variation across similar interventions, populations and implementation strategies. For continuous variables, we used the inverse-variance method while for dichotomous variables we used the method proposed by Mantel-Haenszel.

For the included studies with three or more arms, we only extracted data from the two most relevant comparisons for our question.

Summary of findings

We summarised the findings of the different types of patient-mediated interventions for the following outcomes in 'Summary of findings' tables.

- Adherence to recommended clinical practice or clinical practice guidelines by healthcare professionals
- Patient health outcomes (desirable and undesirable health outcomes)
- Patients' satisfaction with the care they receive
- Adverse events
- Resource use

Two review authors (MSF and TKD) independently assessed the certainty of the evidence (high, moderate, low, and very low) using the five GRADE considerations (study limitations, consistency of effect, imprecision, indirectness, and publication bias). We used methods and recommendations described in Section 8.5 and Chapter 12 of Higgins 2011 and the EPOC worksheets (EPOC 2017c), using GRADEpro software (GRADEpro GDT 2015). We resolved disagreements on certainty ratings by discussion and consulted a third review author (AF) when disagreement persisted. Our decisions to down- or upgrade are presented in footnotes in the tables. We used plain language statements to report these findings in the review (EPOC 2017d).

Subgroup analysis and investigation of heterogeneity

We assessed heterogeneity between studies by visually inspecting forest plots and, if possible, by performing subgroup analyses (see below). Since the importance of inconsistency depends on several factors, we used the guide to interpret heterogeneity as outlined in the *Cochrane Handbook for Systematic Reviews of Interventions* (Higgins 2011): 0% to 40% might not be important; 30% to 60% may represent moderate heterogeneity; 50% to 90% may represent substantial heterogeneity; and 75% to 100% would be considerable heterogeneity.

When the effect estimates varied considerably across studies of similar types of patient-mediated interventions, we explored whether the following factors could explain the observed variation.

- Direction of change required (increase current behaviour, decrease current behaviour, mix, or unclear). Hypothesis: effect on increasing a behaviour is larger than that on decreasing behaviour.

- Recipient (physician; other healthcare professionals). Hypothesis: clinical practice is more difficult to change among physicians than among non-physicians.

- Risk of bias (high; unclear; low). Hypothesis: effect sizes are smaller when risk of bias is low.

- Baseline clinical performance (continuous measure of healthcare professionals' compliance with recommended clinical practice or clinical guidelines). Hypothesis: when baseline clinical performance is low, effect sizes are larger.

Sensitivity analysis

We did not perform any sensitivity analysis.

RESULTS

Description of studies

See [Characteristics of included studies](#); [Characteristics of excluded studies](#).

Results of the search

We identified a total of 12,247 records from the electronic and supplementary searches (11,003 from electronic database searching and 1244 of additional records identified through clinical-trial.gov (1040) and ICTRP (81), Open Grey (85), Grey Literature Report (7) and Google Scholar (31)) [Figure 2](#). Two review authors (MSF and TKD) independently screened 12,247 titles and abstracts and found 12,107 records to be irrelevant and these were directly excluded. Full-text publications were retrieved for 139 of the 140 potential relevant studies. For one study we only had information presented in an abstract ([Caskey 2011](#)). We included 25 studies ([Alder 2005](#); [Aragones 2010](#); [Brody 1990](#); [Caskey 2011](#); [Christy 2013](#); [Goldberg 2012](#); [Herman 1995](#); [Jacobson 1999](#); [Kattan 2006](#); [Kenealy 2005](#); [Khan 2011](#); [Kravitz 2012](#); [Krol 2004](#); [Leveille 2009](#); [Mazonson 1996](#); [McAlister 2005](#); [McKinstry 2006](#); [Miaskowski 2004](#); [Mouland 1997](#); [Nagykaldi 2012](#); [Quinn 2008](#); [Thiboutot 2013](#); [Thomas 2003](#); [Turner 1990](#); [Wright 2012](#)). We also identified two ongoing studies ([NCT01904656](#); [NCT02686775](#)).

Included studies

The 25 included studies are described in detail in the [Characteristics of included studies](#).

Study design

Fifteen studies were randomised at the individual level. Twelve of these studies had the patient as the unit of randomisation (Alder 2005; Christy 2013; Jacobson 1999; Kattan 2006; Khan 2011; Kravitz 2012; Leveille 2009; McKinstry 2006; Miaskowski 2004; Mouland 1997; Quinn 2008; Thomas 2003), and three had the healthcare professional as the unit (Aragones 2010; Goldberg 2012; Turner 1990). Ten studies were cluster-randomised studies. Among the cluster-randomised studies, five had the healthcare professional as the unit of randomisation (Caskey 2011; Kenealy 2005; Krol 2004; Mazonson 1996; Thiboutot 2013), and five had the healthcare practice as the unit of randomisation (Brody 1990; Herman 1995; McAlister 2005; Nagykaladi 2012; Wright 2012). Cluster-randomisation may lead to misleading findings unless the results are adjusted for clustering effects. The idea is to reduce the size of each trial to its 'effective sample size' to prevent artificially small P values. To prevent this 'unit of analysis error' caused by clustering, we re-analysed the studies included in our meta-analyses by using the information on the number of clusters and the assumed value of the intra-cluster correlation coefficient (ICC). We have analysed the impact of clustering effects among all the ten cluster-randomised studies. For the five studies in which healthcare professionals were the unit of randomisation (Caskey 2011; Kenealy 2005; Krol 2004; Mazonson 1996; Thiboutot 2013), the median ICC among similar studies for our primary outcome was 0.000 (95% CI; 0, 0.142) according to the University of Edinburgh's Database of ICCs (ABDN 2015). The effective sample sizes of these studies were thus the same as reported by the study authors. The effective sample size for the five studies in which the healthcare practice was the unit of randomisation (Brody 1990; Herman 1995; McAlister 2005; Nagykaladi 2012; Wright 2012), the median ICC among similar studies for our primary outcome in the University of Edinburgh's Database of ICCs (ABDN 2015) was 0.076 (95% CI, 0, 0.219). We did not attempt to re-analyse studies that were not pooled in a meta-analysis (Brody 1990; Nagykaladi 2012). The effective total sample sizes for the three cluster-randomised studies included in our meta-analyses (Herman 1995; McAlister 2005; Wright 2012) were calculated and are listed in Table 2.

Most of the studies had two comparison arms, except for Brody 1990, Herman 1995 and Thomas 2003, which had three arms, and Alder 2005 and Kenealy 2005, which had four arms. We selected and analysed data from two relevant arms per study (see [Characteristics of included studies](#) for description).

Population/participants

Patients

The total number of patients included in the studies of this review was 12,268 (the total number of patients would be 16,700

if we had included all comparison arms in the studies). The included sample size varied from 40 participants (Alder 2005) to 3189 (Kenealy 2005). The number of patients contributing to our meta-analyses for the primary outcome is 8749. Ten studies were on preventive care with a general patient population (Caskey 2011; Nagykaladi 2012; Turner 1990; Wright 2012) or an 'at risk' patient population (Aragones 2010; Christy 2013; Herman 1995; Jacobson 1999; Kenealy 2005; Thomas 2003), of which all except one study (Jacobson 1999) defined risk based on an age-threshold, often 50 years or older. One study, which was on vaccination, defined 'at risk' as having a chronic condition. The preventive service provided in the studies included cancer screening (Aragones 2010; Christy 2013; Herman 1995), diabetes screening (Kenealy 2005), vaccination (Caskey 2011; Jacobson 1999; Nagykaladi 2012; Thomas 2003), and both vaccination and cancer screening (Turner 1990; Wright 2012). Fifteen studies were on identification, treatment or management of patients with certain conditions such as mental health problems (Brody 1990; Mazonson 1996; Mouland 1997), asthma (Goldberg 2012; Kattan 2006), diabetes (Khan 2011; Quinn 2008), cancer (Kravitz 2012; Miaskowski 2004), hypertension (McKinstry 2006; Thiboutot 2013), heart-related disease (McAlister 2005), dyspepsia (Krol 2004), and musculoskeletal pain, depression and mobility difficulty (Leveille 2009), and upper respiratory tract symptoms (Alder 2005).

Most studies included adult patients except for three studies (Alder 2005; Goldberg 2012; Kattan 2006) in which the children's mean age varied between three years (Alder 2005) and seven/eight years (Goldberg 2012; Kattan 2006). The total number of children included in our analyses was 1054. In two of these three studies the children were mostly female (Alder 2005; Goldberg 2012). Among the 22 studies with adult patients, 18 studies had a mean patient age of 50 years or more. The mean patient age was below 50 years in three studies (Mazonson 1996; Quinn 2008; Wright 2012), and age was not reported in one study (Caskey 2011). In seventeen of the 22 studies with adult patients over fifty per cent of participants were women. One study recruited only women (Herman 1995), one study did not report on gender (Caskey 2011), and three studies included mostly men (Kenealy 2005; Khan 2011; McAlister 2005). Among the 25 included studies one study recruited only Latino immigrants (Aragones 2010), and another study only African-Americans (Christy 2013).

Healthcare professionals

All studies involved physicians, but in five studies nurses and physician assistants were also included (Jacobson 1999; Kattan 2006; McKinstry 2006; Nagykaladi 2012; Thomas 2003). The number of healthcare professionals included in the studies was not consistently reported, but for the studies where this information was available the total number ranged from 8 to 167 (see [Characteristics of included studies](#) for further details).

Settings

All studies were carried out in the USA apart from five: one in Canada (McAlister 2005), in New Zealand (Kenealy 2005), in Norway (Mouland 1997), in Scotland (McKinstry 2006), and in the Netherlands (Krol 2004). Most studies were conducted in a primary care setting. Three studies were within both specialist and primary care settings (Kattan 2006; Kravitz 2012; Miaskowski 2004), and one study was within specialist care (Goldberg 2012).

Interventions and comparisons

Interventions

We categorised six studies as patient-reported health information interventions (Brody 1990; Goldberg 2012; Kattan 2006; Kenealy 2005; Mazonson 1996; Quinn 2008). We categorised 13 studies as patient-information interventions. These included written or electronic reminders, prompts, handouts, posters etc. (Caskey 2011; Herman 1995; Jacobson 1999; Krol 2004; Leveille 2009; McKinstry 2006; Mouland 1997; Turner 1990; Wright 2012) or video or web-based information (Aragones 2010; Christy 2013; Nagykaladi 2012; Thomas 2003). Five studies were patient-education interventions (Alder 2005; Khan 2011; Kravitz 2012; Miaskowski 2004; Thiboutot 2013). These varied greatly in content from electronic based education or training (Khan 2011; Thiboutot 2013), to in-person communication or coaching interventions (Alder 2005; Kravitz 2012), to a multi session nurse-led patient-education intervention (Miaskowski 2004). The remaining study was about patient decision aids (McAlister 2005).

We did not identify any studies fulfilling our inclusion criteria that involved other patient-mediated interventions such as patient feedback about clinical practice, patients being members of committees or boards, or patient-led training or education of healthcare professionals.

Fourteen studies delivered the intervention at the practice site (Alder 2005; Aragonos 2010; Brody 1990; Caskey 2011; Christy 2013; Goldberg 2012; Herman 1995; Jacobson 1999; Kenealy 2005; Khan 2011; Kravitz 2012; Mazonson 1996; Thomas 2003; Turner 1990). The remaining studies delivered the intervention outside the practice, including in the patient's home, in person (Miaskowski 2004), by telephone (Kattan 2006), electronically (e-mail or web portal) (Leveille 2009; Nagykaladi 2012; Quinn 2008; Thiboutot 2013; Wright 2012), or by post (Krol 2004; McAlister 2005; McKinstry 2006; Mouland 1997). Among the studies where the intervention was delivered outside the practice, four studies had a "one-time delivery" of the intervention (Krol 2004; McAlister 2005; McKinstry 2006; Mouland 1997) and seven studies had continuous intervention delivery over three months or less (Kattan 2006; Leveille 2009; Miaskowski 2004; Wright 2012), or over a year (Nagykaladi 2012; Quinn 2008; Thiboutot 2013).

Comparisons

The comparisons were categorised as "no intervention" in 11 studies (Brody 1990; Caskey 2011; Goldberg 2012; Herman 1995; Kattan 2006; Kenealy 2005; Mazonson 1996; Mouland 1997; Nagykaladi 2012; Quinn 2008; Turner 1990) and "usual care" in 14 studies (Alder 2005; Aragonos 2010; Christy 2013; Jacobson 1999; Khan 2011; Kravitz 2012; Krol 2004; Leveille 2009; McAlister 2005; McKinstry 2006; Miaskowski 2004; Thiboutot 2013; Thomas 2003; Wright 2012). Among the 11 studies within the "no intervention" comparison category, five studies had a "pure" "no intervention" comparison (Brody 1990; Goldberg 2012; Kattan 2006; Mazonson 1996; Nagykaladi 2012), while in the remaining six, both groups received a non-patient-mediated intervention component (Caskey 2011; Herman 1995; Kenealy 2005; Mouland 1997; Quinn 2008; Turner 1990). These non-patient-mediated intervention components were typically information or reminders given to healthcare professionals in both groups. Among the 14 studies within the "usual care" comparison category, two studies were described as having a "usual care" comparison without further description (Aragones 2010; Krol 2004), six studies used a placebo-like usual care-comparison, where the comparison group typically received patient information not related to the health condition(s) being studied (Alder 2005; Jacobson 1999; Leveille 2009; Thiboutot 2013; Thomas 2003; Wright 2012) and six studies used a patient information-like usual care-comparison, where the comparison group was given minimal patient information about the health condition being studied as part of usual care (Christy 2013; Khan 2011; Kravitz 2012; McAlister 2005; McKinstry 2006; Miaskowski 2004). This was typically untailored or standard information brochures about the health condition being studied and could be given to both the comparison group and patient-mediated intervention group (Kravitz 2012; McAlister 2005; McKinstry 2006) or to the comparison group only (Christy 2013; Khan 2011; Miaskowski 2004).

Outcomes

Primary outcomes

The primary outcome, adherence to recommended clinical practice, was reported in all 25 studies. The outcomes we defined as primary were defined as primary outcomes in eight studies (Caskey 2011; Goldberg 2012; Jacobson 1999; Kenealy 2005; Krol 2004; Leveille 2009; Mazonson 1996; Wright 2012), and secondary outcomes in eight studies (Aragones 2010; Christy 2013; McAlister 2005; McKinstry 2006; Miaskowski 2004; Quinn 2008; Thiboutot 2013; Thomas 2003). The outcomes were not categorised into primary and secondary outcomes in nine studies (Alder 2005; Brody 1990; Herman 1995; Kattan 2006; Khan 2011; Kravitz 2012; Mouland 1997; Nagykaladi 2012; Turner 1990). All studies except for one (Brody 1990), reported the primary outcome in a dichotomous way.

Secondary outcomes

Secondary outcomes that matched our inclusion criteria were reported in 12 of the 25 included studies (Alder 2005; Brody 1990; Herman 1995; Kattan 2006; Khan 2011; Kravitz 2012; Krol 2004; Leveille 2009; McKinstry 2006; Miaskowski 2004; Quinn 2008; Thiboutot 2013).

Eight of the 12 studies reported patient health outcomes (Brody 1990; Khan 2011; Kravitz 2012; Krol 2004; Leveille 2009; McKinstry 2006; Miaskowski 2004; Thiboutot 2013). Patient satisfaction with the care they received was reported in four studies (Alder 2005; Brody 1990; Leveille 2009; Quinn 2008), and resource use was reported in one study (Kattan 2006).

None of the included studies reported on:

- patients' acceptance, confidence in, or satisfaction with the intervention;
- patients' experiences / perceptions of healthcare professionals acceptance, confidence in or satisfaction with the intervention;
- healthcare professionals' satisfaction with the care they provide;
- healthcare professionals' acceptance, confidence in or satisfaction with the intervention;
 - adverse events;
 - equity.

For all included outcomes, we narratively report effect estimates as reported by the authors of the study (Table 2; Table 3), and also report how these data were collected (self-report or medical record) (Characteristics of included studies).

When the same study reported more than one relevant primary outcome (adherence outcome), we used the primary outcome as defined by the study authors. If a primary outcome was not clearly defined (Herman 1995; Khan 2011; Turner 1990), or multiple outcomes were defined as primary (Goldberg 2012; Wright 2012) or secondary outcomes (McKinstry 2006; Thiboutot 2013), we calculated and used the median value from all relevant primary outcomes. When calculating the median from even numbers of

outcomes (Goldberg 2012; Herman 1995; Khan 2011; McKinstry 2006; Turner 1990; Wright 2012), we chose the outcome with reporting from the most participants (Herman 1995; McKinstry 2006; Turner 1990; Wright 2012). In cases where the number of participants contributing to the outcome was the same, we randomly selected the outcome (flip of a coin) (Goldberg 2012; Khan 2011).

The time points at which our primary outcomes were measured was within the 0-3 months interval in most of the studies except from four studies (Krol 2004; McAlister 2005; McKinstry 2006; Mouland 1997), in which our primary outcomes were measured within the 3-12 months interval.

Excluded studies

We excluded 115 studies, see [Characteristics of excluded studies](#). Fifty-six studies were excluded on the basis of outcomes and 42 studies on the basis of interventions or comparisons. The remaining studies were excluded on the basis of study design (11 studies) and the way the studies were carried out (no guarantee that a clinical encounter took place and thus the outcome is likely to be confounded by patients' attendance rates) (six studies).

Risk of bias in included studies

The judgments for the risk of bias from the 25 included studies are summarised in [Figure 4](#) and [Figure 5](#). We found 10 studies with adequate randomisation generation (Goldberg 2012; Jacobson 1999; Kattan 2006; Kenealy 2005; Khan 2011; Kravitz 2012; McAlister 2005; McKinstry 2006; Mouland 1997; Thiboutot 2013). Two studies had high risk of allocation bias due to lack of a random sequence generation (Thomas 2003; Turner 1990). Thirteen studies had unclear reporting of the randomisation (Alder 2005; Aragonés 2010; Brody 1990; Caskey 2011; Christy 2013; Herman 1995; Krol 2004; Leveille 2009; Mazonson 1996; Miaskowski 2004; Nagykaldi 2012; Quinn 2008; Wright 2012).

Figure 4. 'Risk of bias' graph: review authors' judgements about each risk of bias item presented as percentages across all included studies.

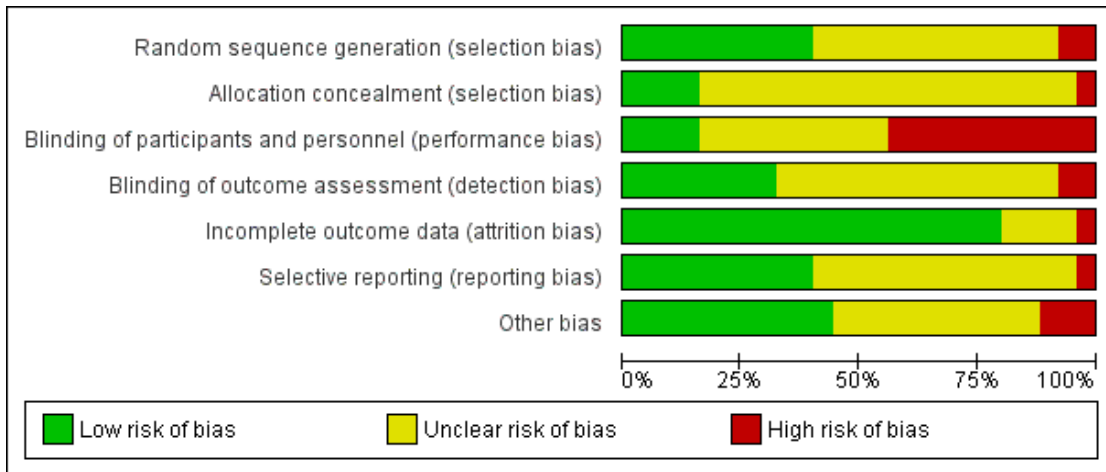


Figure 5. 'Risk of bias' summary: review authors' judgements about each risk of bias item for each included study.

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Selective reporting (reporting bias)	Other bias
Alder 2005	?	?	?	?	+	?	?
Aragones 2010	?	?	-	+	+	+	+
Brody 1990	?	?	?	+	?	?	+
Caskey 2011	?	?	?	?	?	?	?
Christy 2013	?	?	?	?	+	+	?
Goldberg 2012	+	?	?	?	+	+	?
Herman 1995	?	?	?	?	?	-	+
Jacobson 1999	+	?	+	-	?	?	?
Kattan 2006	+	+	-	+	+	?	?
Kenealy 2005	+	+	-	+	+	?	+
Khan 2011	+	?	-	?	+	?	?
Kravitz 2012	+	+	+	+	+	+	+
Krol 2004	?	?	?	?	+	?	+
Leveille 2009	?	?	?	?	+	+	+
Mazonson 1996	?	?	-	?	+	?	+
McAlister 2005	+	+	-	+	+	+	+
McKinstry 2006	+	?	-	+	+	+	+
Miaskowski 2004	?	?	+	?	+	+	+
Mouland 1997	+	?	-	?	+	?	?
Nagykaldi 2012	?	?	-	?	-	+	-
Quinn 2008	?	?	-	-	+	?	?
Thiboutot 2013	+	?	+	+	+	+	-
Thomas 2003	-	-	-	?	+	?	?
Turner 1990	-	?	?	?	+	?	?
Wright 2012	?	?	?	?	+	?	-

Allocation

Random sequence generation

Ten studies reported adequate randomisation generation (Goldberg 2012; Jacobson 1999; Kattan 2006; Kenealy 2005; Khan 2011; Kravitz 2012; McAlister 2005; McKinstry 2006; Mouland 1997; Thiboutot 2013). Thirteen studies had unclear reporting of the sequence generation (Alder 2005; Aragonés 2010; Brody 1990; Caskey 2011; Christy 2013; Herman 1995; Krol 2004; Leveille 2009; Mazonson 1996; Miaskowski 2004; Nagykaldi 2012; Quinn 2008; Wright 2012) and two studies had high risk of bias due to lack of a random sequence generation (Thomas 2003; Turner 1990).

Allocation concealment

We judged allocation concealment to be adequate in four studies (Kattan 2006; Kenealy 2005; Kravitz 2012; McAlister 2005). Twenty studies had unclear reporting of allocation concealment (Alder 2005; Aragonés 2010; Brody 1990; Caskey 2011; Christy 2013; Goldberg 2012; Herman 1995; Jacobson 1999; Khan 2011; Krol 2004; Leveille 2009; Mazonson 1996; McKinstry 2006; Miaskowski 2004; Mouland 1997; Nagykaldi 2012; Quinn 2008; Thiboutot 2013; Turner 1990; Wright 2012) and one study had high risk of bias due to lack of adequate allocation concealment.

Blinding

We judged participants and personnel to be blinded in four studies (Jacobson 1999; Kravitz 2012; Miaskowski 2004; Thiboutot 2013) and not blinded in 11 studies (Aragonés 2010; Kattan 2006; Kenealy 2005; Khan 2011; Mazonson 1996; McAlister 2005; McKinstry 2006; Mouland 1997; Nagykaldi 2012; Quinn 2008; Thomas 2003). We judged the remaining 10 studies (Alder 2005; Brody 1990; Caskey 2011; Christy 2013; Goldberg 2012; Herman 1995; Krol 2004; Leveille 2009; Turner 1990; Wright 2012) to have unclear risk of bias because these studies did not sufficiently describe participant and personnel blinding.

We judged outcome assessors to be blinded in eight studies (Aragonés 2010; Brody 1990; Kattan 2006; Kenealy 2005; Kravitz 2012; McAlister 2005; McKinstry 2006; Thiboutot 2013) and not blinded in two studies (Jacobson 1999; Quinn 2008). We judged the remaining 15 studies (Alder 2005; Caskey 2011; Christy 2013; Goldberg 2012; Herman 1995; Khan 2011; Krol 2004; Leveille 2009; Mazonson 1996; Miaskowski 2004; Mouland 1997; Nagykaldi 2012; Thomas 2003; Turner 1990; Wright 2012) to have unclear risk of bias because these studies did not sufficiently describe blinding of outcome assessors.

Incomplete outcome data

We found no indication of incomplete outcome data in most of the studies (Alder 2005; Aragonés 2010; Christy 2013; Goldberg 2012; Kattan 2006; Kenealy 2005; Khan 2011; Kravitz 2012; Krol 2004; Leveille 2009; Mazonson 1996; McAlister 2005; McKinstry 2006; Miaskowski 2004; Mouland 1997; Quinn 2008; Thiboutot 2013; Thomas 2003; Turner 1990; Wright 2012). We judged one study (Nagykaldi 2012) to have high risk of bias and four studies (Brody 1990; Caskey 2011; Herman 1995; Jacobson 1999;) to have unclear risk of attrition bias.

Selective reporting

We could not decide if there was a risk of selective reporting in more than half of the studies (Alder 2005; Brody 1990; Caskey 2011; Jacobson 1999; Kattan 2006; Kenealy 2005; Khan 2011; Krol 2004; Mazonson 1996; Mouland 1997; Quinn 2008; Thomas 2003; Turner 1990; Wright 2012). We judged one study (Herman 1995) to have high risk of bias and 10 to have low risk of bias (Aragonés 2010; Christy 2013; Goldberg 2012; Kravitz 2012; Leveille 2009; McAlister 2005; McKinstry 2006; Miaskowski 2004; Nagykaldi 2012; Thiboutot 2013).

Other potential sources of bias

We inspected all the studies for potential bias due to baseline imbalance in key characteristics and baseline outcome imbalance. We found high risk of baseline imbalance in key characteristics in two studies (Alder 2005; Wright 2012). We judged 11 studies to have low risk of bias (Aragonés 2010; Brody 1990; Christy 2013; Kenealy 2005; Khan 2011; Leveille 2009; Mazonson 1996; McAlister 2005; McKinstry 2006; Miaskowski 2004; Nagykaldi 2012) and 12 to have unclear risk of baseline imbalance (Caskey 2011; Goldberg 2012; Herman 1995; Jacobson 1999; Kattan 2006; Kravitz 2012; Krol 2004; Mouland 1997; Quinn 2008; Thiboutot 2013; Thomas 2003; Turner 1990). For baseline outcome imbalance, five out of 25 had low risk (Khan 2011; McAlister 2005; McKinstry 2006; Miaskowski 2004; Mouland 1997), while the remaining 20 had unclear risk. Only two (McAlister 2005; McKinstry 2006) of the 25 studies reported the relevant primary outcome at baseline, one reported one of the primary outcomes, but not the one used for the meta-analysis (Mouland 1997) while three studies reported secondary outcomes at baseline (Khan 2011; McKinstry 2006; Miaskowski 2004).

Ten studies were cluster-randomised studies (Brody 1990; Caskey 2011; Herman 1995; Kenealy 2005; Krol 2004; Mazonson 1996; McAlister 2005; Nagykaldi 2012; Thiboutot 2013; Wright 2012) and we searched for information about five additional sources of potential biases. There was high risk of bias in three of the ten

studies (Nagykaldi 2012; Thiboutot 2013; Wright 2012) and low risk of bias in six studies (Brody 1990; Herman 1995; Kenealy 2005; Krol 2004; Mazonson 1996; McAlister 2005). The remaining study was judged to be unclear (Caskey 2011). The rationale for all the judgements are presented in the table of [Risk of bias in included studies](#).

Among the 15 individual randomised studies (Alder 2005; Aragonés 2010; Christy 2013; Goldberg 2012; Jacobson 1999; Kattan 2006; Khan 2011; Kravitz 2012; Leveille 2009; McKinstry 2006; Miaskowski 2004; Mouland 1997; Quinn 2008; Thomas 2003; Turner 1990) we found no indication of other risk of bias in five of these studies (Aragonés 2010; Kravitz 2012; Leveille 2009; McKinstry 2006; Miaskowski 2004,) but the remaining ten studies were unclear (Alder 2005; Christy 2013; Goldberg 2012; Jacobson 1999; Kattan 2006; Khan 2011; Mouland 1997; Quinn 2008; Thomas 2003; Turner 1990).

Thus all in all, we found no indication of other risk of bias in 11 studies (Aragonés 2010; Brody 1990; Herman 1995; Kenealy 2005; Kravitz 2012; Krol 2004; Leveille 2009; Mazonson 1996; McAlister 2005; McKinstry 2006; Miaskowski 2004), high risk of bias in three studies (Nagykaldi 2012; Thiboutot 2013; Wright 2012), and unclear risk in eleven studies (Alder 2005; Caskey 2011; Christy 2013; Goldberg 2012; Jacobson 1999; Kattan 2006; Khan 2011; Mouland 1997; Quinn 2008; Thomas 2003; Turner 1990).

Effects of interventions

See: [Summary of findings for the main comparison Patient-reported health information interventions versus comparisons to improve professional performance](#); [Summary of findings 2 Patient information interventions versus comparisons to improve professional performance](#); [Summary of findings 3 Patient education interventions versus comparisons to improve professional performance](#); [Summary of findings 4 Patient decision aid interventions versus comparisons to improve professional performance](#)

See [Summary of findings for the main comparison](#); [Summary of findings 2](#); [Summary of findings 3](#), and [Summary of findings 4](#) for patient-mediated interventions versus comparisons. The comparisons were categorised as “no intervention” and “usual care” (see [Types of interventions](#)) and these comparisons were merged for analysis and reporting because they appeared quite similar.

Adherence to recommended clinical practice was our primary outcome. We included 20 studies and a total of 8749 patients in our meta-analyses. Our meta-analyses show that patient-reported health information interventions and patient education interventions probably improve professional performance and the two other types of patient-mediated interventions may improve professional performance (patient information) or may have little or no impact (patient decision aids) ([Analysis 1.1](#); [Analysis 2.1](#); [Analysis 3.1](#); [Analysis 4.1](#)).

Patient-reported health information interventions

Primary outcome

Adherence to recommended clinical practice

Six studies about patient-reported health information interventions reported on our primary outcome (Brody 1990; Goldberg 2012; Kattan 2006; Kenealy 2005; Mazonson 1996; Quinn 2008). We included four studies (Goldberg 2012; Kenealy 2005; Mazonson 1996; Quinn 2008) in our meta-analysis ([Analysis 1.1](#)). We report on two studies narratively ([Table 2](#)) due to incomplete outcome reporting (Kattan 2006) or because the outcome was reported as a continuous variable (Brody 1990). The effect estimate expressed as risk ratio (RR), is 1.59 (95% confidence interval (CI) 1.41 to 1.81; 4 studies, 3865 patients) ([Analysis 1.1](#)).

In absolute numbers: for every 100 patients consulted or treated in the patient-reported health information group there probably are 26 (95% CI 23 to 30) that are in accordance with recommended clinical practice compared to 17 per 100 in the comparison group (no intervention or usual care). We judged the certainty of the evidence as moderate. We can thus conclude that patient-reported health information interventions probably improve healthcare professionals' adherence to recommended clinical practice compared to no intervention, usual care, or other interventions.

The two studies not included in the meta-analysis reported findings in favour of the patient-reported health information intervention (Kattan 2006) or no effect (Brody 1990) - see [Table 2](#).

Secondary outcomes

Patient outcomes

Desirable patient health outcomes

One study (Brody 1990), reported on desirable health outcomes dichotomously (increase in control over stress) for patient-reported health information interventions. The result for this outcome is presented in [Analysis 1.2](#). The relative effect estimate, RR, is 1.62 (95% CI 0.95 to 2.76; 1 study, 79 patients). We judged the certainty of the evidence as very low. We are thus uncertain about the effect of patient-reported health information interventions on desirable patient health outcomes because the certainty of the evidence is very low.

Undesirable patient health outcomes

None of the included studies reported on this outcome.

Patient satisfaction

One study (Quinn 2008), reported on patient satisfaction dichotomously for patient-reported health information interventions and is presented in Analysis 1.3. The relative effect estimate, RR, is 2.45 (95% CI 1.27 to 4.74; 1 study, 26 patients). We judged the certainty of the evidence as very low. We are thus uncertain about the effect of patient-reported health information interventions on the number of satisfied patients because the certainty of the evidence is very low.

Another study (Brody 1990) reported on patient satisfaction continuously for patient-reported health information interventions and is presented in Analysis 1.4. Our summary shows that the mean difference (MD) in the degree of satisfaction is 0.40 points higher (95% CI 0.12 to 0.68 higher; 1 study, 79 patients). We judged the certainty of the evidence as very low. We are thus uncertain about the effect of patient-reported health information interventions on the degree of patient satisfaction because the certainty of the evidence is very low.

Other patient outcomes

None of the included studies reported on other patient outcomes (patients' acceptance, confidence in, or satisfaction with the intervention; patients' experiences / perceptions of healthcare professionals acceptance, confidence in or satisfaction with the intervention).

Healthcare professional outcomes

None of the included studies reported on any healthcare professional outcomes.

Resource use

One study reported on cost-effectiveness (Kattan 2006), and is narratively presented in Table 3. The researchers in this study reported a total cost of 69.20 US \$ per child per year. When this cost was added to the cost of healthcare services use for the year by intervention children and compared with the cost of healthcare service use by children in the comparison group, there was a saving of \$337.00 per child in the intervention group. The researchers reported that the intervention had a 97% chance of being cost saving. We did not judge the certainty of the evidence for this outcome.

Adverse events

None of the included studies reported on this outcome.

Equity

None of the included studies reported on this outcome.

Patient information interventions

Primary outcome

Adherence to recommended clinical practice

Thirteen studies about patient information interventions (Aragones 2010; Caskey 2011; Christy 2013; Herman 1995; Jacobson 1999; Krol 2004; Leveille 2009; McKinstry 2006; Mouland 1997; Nagykaldi 2012; Thomas 2003; Turner 1990; Wright 2012) reported on our primary outcome. Eleven studies (Aragones 2010; Christy 2013; Herman 1995; Jacobson 1999; Krol 2004; Leveille 2009; McKinstry 2006; Mouland 1997; Thomas 2003; Turner 1990; Wright 2012) were included in our meta-analysis (Analysis 2.1) and two studies (Caskey 2011; Nagykaldi 2012) narratively (Table 2) due to incomplete outcome reporting. The effect estimate expressed as RR, is 1.60 (95% CI 1.20 to 2.13; 11 studies, 3502 patients) (Analysis 2.1).

In absolute numbers: for every 100 patients consulted or treated in the patient information group there may be 32 (95% CI 24 to 42) that are in accordance with recommended clinical practice compared to 20 per 100 in the comparison group (no intervention or usual care). We judged the certainty of the evidence as low. We can thus conclude that patient information interventions may improve healthcare professionals' adherence to recommended clinical practice compared to no intervention, usual care, or other interventions.

The two studies not included in the meta-analysis (Caskey 2011; Nagykaldi 2012) reported findings in favour of the patient information intervention - see Table 2.

There was statistical heterogeneity ($I^2 = 79%$) for the pooled primary outcome for patient information interventions (see Analysis 2.1). The planned subgroup analyses of explanatory factors (risk of bias, direction of change required, type of recipient, and baseline clinical performance) were carried out for two of the predetermined factors; risk of bias (see Analysis 2.2) and the direction of change required (see Analysis 2.3). Since the target group (recipients) in all the studies were physicians, 'type of recipient' could not explain the observed statistical heterogeneity. The baseline clinical performance was generally poorly reported so we decided not to carry out a subgroup analysis for this variable either. The two subgroup analyses we carried out did not provide any explanation for the observed statistical heterogeneity.

Secondary outcomes

Patient outcomes

Desirable patient health outcomes

One study (McKinstry 2006) reported on desirable health outcomes (controlled blood pressure) for patient information interventions. The result for this outcome is presented in [Analysis 2.4](#). The relative effect estimate, RR, is 0.99 (95% CI 0.79 to 1.24; 1 study, 261 patients). We judged the certainty of the evidence as low. We can thus conclude that there may be little or no difference in the number of people with desirable health outcomes among people in the patient information intervention group compared to those in the comparison group (usual care).

Undesirable patient health outcomes

Two studies (Krol 2004; Leveille 2009) reported on undesirable health outcomes (high dyspepsia severity or fair to poor health) for patient information interventions. The result is presented in [Analysis 2.5](#). The relative effect estimate, RR, is 0.94 (95% CI 0.53 to 1.67; 2 studies, 246 patients). We judged the certainty of the evidence as very low. We are thus uncertain about the effect of patient information interventions on undesirable patient outcomes because the certainty of the evidence is very low.

Patient satisfaction

One study (Leveille 2009) report on patient satisfaction dichotomously for patient information interventions and is presented in [Analysis 2.6](#). The relative effect estimate, RR, is 1.03 (95% CI 0.93 to 1.13; 1 study, 186 patients). We judged the certainty of the evidence as low. We can thus conclude that there may be little or no difference in the number of satisfied patients among those in the patient information intervention group compared to those in the comparison group (usual care).

The same study (Leveille 2009) reported on patient satisfaction continuously for patient information interventions and is presented in [Analysis 2.7](#). Our summary shows that the in the degree of satisfaction is 0.30 points higher (95% CI 0.01 to 0.59 higher; 1 study, 186 patients) on a scale from one to ten (in which ten is best). We judged the certainty of the evidence as low. We can thus conclude that there may be little or no difference in the degree of satisfaction among patients in the patient information intervention group compared to those in the comparison group (usual care).

Other patient outcomes

None of the included studies reported on other patient outcomes (patients' acceptance, confidence in, or satisfaction with the intervention; patients' experiences/perceptions of healthcare professionals acceptance, confidence in or satisfaction with the intervention).

Healthcare professional outcomes

None of the included studies reported on any healthcare professional outcomes.

Resource use

None of the included studies reported on this outcome.

Adverse events

None of the included studies reported on this outcome.

Equity

None of the included studies reported on this outcome.

Patient education interventions

Primary outcome

Adherence to recommended clinical practice

Five studies about patient education interventions reported on our primary outcome (Alder 2005; Khan 2011; Kravitz 2012; Miaskowski 2004; Thiboutot 2013). Four studies (Khan 2011; Kravitz 2012; Miaskowski 2004; Thiboutot 2013) were included in our meta-analysis ([Analysis 3.1](#)) and one study (Alder 2005) was reported descriptively ([Table 2](#)) due to incomplete outcome reporting. The effect estimate expressed as RR, is 1.31 (95% CI 1.12 to 1.54; 4 studies, 1029 patients) ([Analysis 3.1](#)).

In absolute numbers: for every 100 patients consulted or treated in the patient education group there may be 46 (95% CI 39 to 54) that are in accordance with recommended clinical practice compared to 35 per 100 in the comparison group (no intervention or usual care). We judged the certainty of the evidence as moderate. Thus we can conclude that patient education interventions probably improve healthcare professionals' adherence to recommended clinical practice compared no intervention or usual care.

The study not included in the meta-analysis (Alder 2005) reported findings in favour of the patient education intervention and is summarised in [Table 2](#).

Secondary outcomes

Patient outcomes

Desirable patient health outcomes

One study ([Thiboutot 2013](#)) reported on desirable health outcomes (controlled blood pressure) for patient education interventions. The result for this outcome is presented in [Analysis 3.2](#). The relative effect estimate, RR, is 1.09 (95% CI 0.96 to 1.23; 1 study, 500 patients). We judged the certainty of the evidence as low. We can thus conclude that patient education interventions may slightly increase the number of people with desirable health outcomes compared to usual care.

Undesirable patient health outcomes

None of the included studies reported on this outcome.

Patient satisfaction

None of the included studies reported on this outcome.

Other patient outcomes

None of the included studies reported on other patient outcomes (patients' acceptance, confidence in, or satisfaction with the intervention; patients' experiences/perceptions of healthcare professionals acceptance, confidence in or satisfaction with the intervention).

Healthcare professional outcomes

None of the included studies reported on any healthcare professional outcomes.

Resource use

None of the included studies reported on this outcome.

Adverse events

None of the included studies reported on this outcome.

Equity

None of the included studies reported on this outcome.

Patient decision aid interventions

Primary outcome

Adherence to recommended clinical practice

One study about patient decision aid interventions reported on our primary outcome ([McAlister 2005](#)). The result for this outcome is presented in [Analysis 4.1](#). The effect estimate expressed as RR, is 0.86 (95% CI 0.65 to 1.15; 1 study, 353 patients).

In absolute numbers: for every 100 patients consulted or treated in the patient education group there may be 32 (95% CI 24 to 43) that are in accordance with recommended clinical practice compared to 37 per 100 in the comparison group (usual care). We judged the certainty of the evidence as low. Thus patient decision aid interventions may make little or no difference to healthcare professionals' adherence to recommended clinical practice compared to usual care.

ADDITIONAL SUMMARY OF FINDINGS *[Explanation]*

Patient information interventions versus comparisons to improve professional performance						
Patient or population: general patient population, “at risk” patient population and patient population with a specific condition or disease Setting: primary care (mostly) Intervention: patient information interventions Comparison: no intervention or usual care						
Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	No of participants (studies)	Certainty of the evidence (GRADE)	What happens?
	Risk with comparisons	Risk with patient information interventions				
Adherence to recommended clinical practice (0-12 months follow-up)	20 per 100	32 per 100 (24 to 42)	RR 1.60 (1.20 to 2.13)	3502 (11 RCTs ^A)	⊕⊕○○ LOW ¹²	Patient information interventions may improve healthcare professionals’ adherence to recommended clinical practice compared to no intervention or usual care
Desirable patient health outcomes (3-12 months follow-up)	55 per 100	54 per 100 (43 to 68)	RR 0.99 (0.79 to 1.24)	261 (1 RCT ^B)	⊕⊕○○ LOW ⁵⁶	There may be little or no difference in the number of people with desirable health outcomes among people in the patient information intervention group compared to those in the usual care group
Undesirable patient health outcomes (0-12 months follow-up)	28 per 100	27 per 100 (15 to 48)	RR 0.94 (0.53 to 1.67)	246 (2 RCTs ^C)	⊕○○○ VERY LOW ¹³	We are uncertain about the effect of patient information interventions on undesirable

						patient outcomes because the certainty of the evidence is very low
Patient satisfaction Number of satisfied patients (0-3 months follow-up)	89 per 100	92 per 100 (83 to 100)	RR 1.03 (0.93 to 1.13)	186 (1 RCT ^D)	⊕⊕○○ LOW ⁵⁶	There may be little or no difference in the number of satisfied patients among those in the patient information intervention group compared to those in the usual care group
Patient satisfaction The degree of satisfaction (on a 1-10 scale where 10 is highest degree of satisfaction) (0-3 months follow-up)	The mean patient satisfaction score was 9.1 points	The mean patient satisfaction was 0.30 points higher (0.01 higher to 0.59 higher)	-	186 (1 RCT ^D)	⊕⊕○○ LOW ⁴⁵	There may be little or no difference in the degree of satisfaction among patients in the patient information intervention group compared to those in the usual care group
Adverse events	Not reported	-	-	-	-	None of the included studies reported on adverse events
Resource use	Not reported	-	-	-	-	None of the included studies reported on resource use

* **The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; RR: Risk ratio; RCT: randomised trial

GRADE Working Group grades of evidence

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

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

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

Very low certainty: 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 Downgraded one level because all the studies were judged to have potential risk of bias,

² Downgraded one level for inconsistency because of statistical heterogeneity (I^2 is 79%)

³ Downgraded two levels for imprecision because of few events and a 95% CI that crosses the line of “no effect”

⁴ Downgraded one level for imprecision because of small study sample

⁵ Downgraded one level because we judged the study to have potential risk of bias

⁶ Downgraded one level for imprecision because of few events

^A Aragones 2010; Caskey 2011; Herman 1995; Jacobson 1999; Krol 2004; Leveille 2009; McKinstry 2006; Mouland 1997; Thomas 2003; Turner 1990; Wright 2012

^B McKinstry 2006

^C Krol 2004; Leveille 2009

^D Leveille 2009 (patient satisfaction was assessed using both a dichotomous and a continuous outcome in this study)

Patient education interventions versus comparisons to improve professional performance						
<p>Patient or population: general patient population, “at risk” patient population and patient population with a specific condition or disease Setting: primary care (mostly) Intervention: patient education interventions Comparison: no intervention or usual care</p>						
Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	No. of participants (studies)	Certainty of the evidence (GRADE)	What happens?
	Risk with comparisons	Risk with patient education interventions				
Adherence to recommended clinical practice (0-3 months follow-up)	35 per 100	46 per 100 (39 to 54)	RR 1.31 (1.12 to 1.54)	1029 (4 RCTs ^A)	⊕⊕⊕○ MODERATE ¹	Patient education interventions probably improve healthcare professionals’ adherence to recommended clinical practice compared to no intervention or usual care
Desirable patient health outcomes (0-3 months follow-up)	66 per 100	72 per 100 (63 to 81)	RR 1.09 (0.96 to 1.23)	500 (1 RCT ^B)	⊕⊕⊕○ LOW ²³	Patient education interventions may slightly increase the number of people with desirable health outcomes compared to usual care
Undesirable patient health outcomes	Not reported	-	-	-	-	None of the included studies reported on undesirable patient health outcomes

Patient satisfaction Number of satisfied patients	Not reported	-	-	-	-	None of the included studies reported on patient satisfaction
Patient satisfaction The degree of satisfaction	Not reported	-	-	-	-	None of the included studies reported on patient satisfaction
Adverse events	Not reported	-	-	-	-	None of the included studies reported on adverse events
Resource use	Not reported	-	-	-	-	None of the included studies reported on resource use

GRADE Working Group grades of evidence

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

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

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

Very low certainty: 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 Downgraded one level because most of the studies were assessed as having potential risk of bias

² Downgraded one level for imprecision because the 95% CI crosses the line of “no effect”

³ Downgraded one level because the study has potential risk of bias (allocation concealment and other biases related to cluster issues)

^A Khan 2011; Kravitz 2012; Miaskowski 2004; Thiboutot 2013

^B Thiboutot 2013

Patient decision aid interventions versus comparisons to improve professional performance						
Patient or population: patient population with a specific condition or disease Setting: primary care Intervention: patient decision aid interventions Comparison: usual care						
Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	No. of participants (studies)	Certainty of the evidence (GRADE)	What happens?
	Risk with comparisons	Risk with patient-reported health information interventions				
Adherence to recommended clinical practice (12 months follow up)	37 per 100	32 per 100 (24 to 43)	RR 0.86 (0.65 to 1.15)	353 (1 RCT ^A)	⊕⊕⊕○ LOW ¹²	There may be little or no difference in the number of healthcare professionals' adhering to recommended clinical practice in the patient decision aid group compared to usual care
Desirable patient health outcomes	Not reported	-	-	-	-	The included study did not report on desirable patient health outcomes
Undesirable patient health outcomes	Not reported	-	-	-	-	The included study did not report on undesirable patient health outcomes
Patient satisfaction Number of satisfied patients	Not reported					The included study did not report on patient satisfaction outcomes

Patient satisfaction The degree of satisfaction (unknown scale, but higher score means higher degree of satisfaction)	Not reported	-	-	-	-	The included study did not report on patient satisfaction outcomes
Adverse events	Not reported	-	-	-	-	None of the included studies reported on adverse events
Resource use	Not reported	-	-	-	-	None of the included studies reported on resource use

***The risk in the intervention group** (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI).

CI: Confidence interval; RR: Risk ratio

GRADE Working Group grades of evidence

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

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

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

Very low certainty: 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 Downgraded one level because the study was assessed as having high risk of performance bias (no blinding of patients or healthcare professionals)

² Downgraded one level for imprecision because of few events and because the 95% CI crosses the line of “no effect”

^A McAlister 2005

DISCUSSION

Summary of main results

We included 25 studies assessing a range of patient-mediated interventions to improve professional practice, compared to no intervention or usual care. The patient-mediated interventions in the included studies all fell within the predefined categories in the review protocol and are shown in [Table 1](#). The interventions in the included studies were categorised as patient-reported health information, patient information, patient education, or patient decision aids and are presented as separate analyses ([Analysis 1.1](#); [Analysis 2.1](#); [Analysis 3.1](#); [Analysis 4.1](#)). Most of the studies were carried out in a primary care setting, and about half of the studies focused on the identification, treatment or management of common long-term conditions (such as diabetes, asthma or depression) while the other half focused on preventive care (such as cancer screening or vaccination).

We found that patient-reported health information interventions and patient education interventions probably improve professional performance compared to no intervention or usual care (moderate certainty of the evidence). Other patient-mediated interventions, such as patient information, may also improve professional practice (low certainty of the evidence). Patient decision aids may have little or no impact on professional performance compared to usual care (low certainty of the evidence).

The impacts of these four types of patient-mediated intervention on health and satisfaction outcomes among patients varies.

The effects of patient-mediated interventions on the remaining predefined secondary outcomes (healthcare professionals' satisfaction with the care they provide, resource use, patients' acceptance, confidence in, or satisfaction with the intervention, patients' experiences/perceptions of healthcare professionals acceptance, confidence in or satisfaction with the intervention, healthcare professionals' acceptance, confidence in or satisfaction with the intervention, adverse events, and equity) were either not reported or were poorly reported. We therefore cannot conclude regarding these effects.

Overall completeness and applicability of evidence

We did not find any studies that had tested the effect of the other types of patient-mediated interventions that we had predefined, including patient feedback about clinical practice, patient-led training of healthcare professionals, or having patients as members of committees or boards.

The majority of the studies were carried out in USA (20 of 25 studies), which may limit the applicability of the findings to other settings. Also, most studies aimed at improving professional practice among physicians, usually in a primary care setting and the

applicability to other types of health care providers and other care settings is unclear.

Improved professional practice should translate into improvements in patient outcomes. The combination of low-certainty evidence for many professional practice-outcomes and the scarcity of data on patient health outcomes hindered us from drawing any inferences on the association between the two.

Certainty of the evidence

We used the GRADE approach to assess the certainty of the evidence. The certainty of the evidence was judged to be moderate and low for our primary outcome, adherence to recommended clinical practice; very low to low for patient health outcomes; and very low to low for patient satisfaction outcomes. See [Summary of findings for the main comparison](#); [Summary of findings 2](#); [Summary of findings 3](#); and [Summary of findings 4](#) for GRADE judgements.

Potential biases in the review process

Due to wide variation in the terms and definitions used in this field of research, we performed comprehensive literature searches that covered as many of the potentially relevant terms as possible. These searches identified a very large number of primary studies (over 12, 000) which we assessed in order to identify the 25 included studies. Given the comprehensive nature of the searches that we used, we are fairly confident that the risk that we have missed important relevant published studies is low. The decision to merge 'no intervention' and 'usual care' comparisons is based on our interpretation of the comparison group descriptions in the studies. These descriptions varied greatly and made the grouping challenging. However, we are fairly confident that the two comparisons are sufficiently similar to be merged. Two review authors independently screened potentially eligible studies for inclusion and assessed risk of bias in the included studies. None of the review authors had any conflicts of interest.

Agreements and disagreements with other studies or reviews

The effect size for the primary outcome is considered small to moderate, and is in agreement with findings of previous systematic reviews assessing the effects of different interventions to improve professional practice. Audit and feedback probably improves professional practice, but the effectiveness ranges from little or no effect to a substantial effect ([Ivers 2012](#)). Reminders, such as computer-generated reminders delivered on paper to healthcare professionals, probably improve professional practice ([Arditi 2017](#)). Printed educational material may also improve professional practice, but the effect seems small, and the certainty of the evidence is

low (Giguère 2012). Educational meetings or educational outreach visits may result in modest improvements in professional practice (Forsetlund 2009; O'Brien 2007). Using local opinion leaders may improve professional practice (Flodgren 2011a), as may financial incentives (Flodgren 2011b). Another recent Cochrane review shows that clinical practice guidelines accompanied by tools intended to improve the use of the guideline probably improve adherence to clinical practice (Flodgren 2016). Organisational interventions, such as provision of pharmaceutical care, medication reviews, follow-up visits by a healthcare professional including a pharmacist, nurse or physician, probably make little or no difference in medication errors by primary healthcare professionals in adult patients that lead to hospital admissions, emergency department visits, and death (Khalil 2017).

AUTHORS' CONCLUSIONS

Implications for practice

Our findings show that some patient-mediated interventions are relevant approaches to improving professional practice.

We are moderately certain about the positive effects that patient-reported health information and patient education can have on professional practice. Thus, it seems reasonable to conclude that these types of patient mediated interventions can contribute to improving the quality of health care services.

However, we cannot be certain that all types of patient-mediated interventions are relevant due to lack of relevant research for several types of interventions such as patient feedback about clinical practice, patients being members of committees or boards, or patient-led training or education of healthcare professionals. We also know too little about the effects on patients' acceptance, confidence in, or satisfaction with the intervention; patients' experiences / perceptions of healthcare professionals' acceptance, confidence in or satisfaction with the intervention; healthcare professionals' satisfaction with the care they provide; healthcare professionals' acceptance, confidence in or satisfaction with the intervention; adverse events; and equity.

Implications for research

Patient-mediated interventions can be defined in various ways, and a common taxonomy or understanding of the term is lacking (Ng 2017). Consequently, categorising various types of patient-mediated interventions can be challenging - as we experienced when we prepared this review. For instance, to draw a clear line between patient information and patient education interventions has not been straight forward and is, to a large extent, limited to our interpretation of their definitions. The field would likely benefit from having a common framework for defining and classifying

patient-mediated interventions. As with many other behavioural change interventions, the interventions in this field are sometimes based on explicit theoretical approaches, but often they are not (Gagliardi 2016; Ng 2017). The importance of basing interventions on theory is contested (Oxman 2005), but a clearer understanding of the mechanisms through which patient-mediated interventions may work would likely be helpful.

In addition to the challenge of categorising different types of patient-mediated interventions, we also had difficulties with the categorisation of comparisons. Terms like "usual care", "standard care", "common practice", "enhanced usual care", "no intervention" etc. are often used, but these are not necessarily self-explanatory: Usual care can vary tremendously across time and study setting. This, and the fact that many studies do not describe what "usual care" entailed, makes it hard to assess how similar the comparison groups were in the different studies. In future studies more emphasis should be put in carefully describing both the intervention under study and the conditions that applied to the comparison group.

There are several systematic reviews on, for instance, patient education that have reported on relevant patient health outcomes (Anderson 2017; Attridge 2014; Bennett 2016; Clarkesmith 2017; Fryer 2016; Kelly 2018; Kroon 2014; Lenferink 2017; McBain 2016; McCallum 2017; Parreira 2017; Peytremann-Bridevaux 2015; Poquet 2016; Zwerink 2014). These do not, however, provide answers about impacts on professional practice. It would be of great interest to assess if a patient education intervention that meets this review's definition of a 'patient-mediated' intervention would have the same effect on patient health as a patient education intervention not defined as "patient-mediated intervention". Where interventions have an added focus on healthcare professionals' performance, does this lead to important gains in patient health? The effects on patient health reported in the studies included in this review can thus more likely provide answers regarding the linkage, if any, between health outcomes and clinical performance more than studies that do not measure clinical performance simultaneously.

From our findings, little can be said about the resource use and cost-effectiveness of these types of interventions, as these outcomes were not usually assessed. Also, we know little about the relative effect of patient-mediated interventions compared to other approaches directed at healthcare professionals, such as audit and feedback, reminders, education etc., as we did not identify any studies that compared these interventions.

We did not find any studies reporting on patients' trust in healthcare professionals. We therefore need more studies that compare patients' trust levels after different patient-mediated interventions to enable us to draw conclusions about these effects. In future studies it would be of great interest to compare how patient-mediated interventions affect the communicative common ground between a patient and a healthcare professional.

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* *Indicates the major publication for the study*

CHARACTERISTICS OF STUDIES

Characteristics of included studies [ordered by study ID]

Alder 2005

Methods	<p>Study design: randomised trial.</p> <p>Number of study arms: 4.</p> <p>Unit of randomisation: patient (parent).</p> <p>Study period: Aug - Dec 2000.</p> <p>Measurement points of outcomes: post intervention.</p> <p>Analysis method: not reported.</p>
Participants	<p>Setting</p> <p><i>Healthcare setting:</i> primary care (2 primary care clinics).</p> <p><i>Country:</i> USA.</p> <p>Patients</p> <p><i>Inclusion/exclusion criteria:</i> parents of children aged 1 to 10, with complaints of ear pain, sore throat, cough, congestion and/or fever that had not received antibiotic therapy during the previous two weeks</p> <p><i>Numbers of patients:</i> 40 (in study n = 80 with 4 arms).</p> <p>In intervention: 20.</p> <p>In comparison: 20.</p> <p>(In arm 3 n = 20 and in arm 4 n = 20).</p> <p><i>Characteristics of patients (children):</i></p> <ul style="list-style-type: none"> • Age: intervention; 3.2 years (SD = 3.0), comparison; 3.7 years (SD = 2.7). • Gender: females total 66/80 (82.5%). Intervention; 20/20 (100%), comparison; 16/20 (80%). • Health conditions: children with complaints of ear pain, sore throat, cough, congestion and/or fever. <p>Healthcare professionals</p> <p><i>Type of healthcare professionals:</i> physicians.</p> <p><i>Inclusion/exclusion criteria:</i> not reported.</p> <p><i>Numbers of healthcare professionals:</i> totals not reported.</p> <p>In intervention: not reported.</p> <p>In comparison: not reported.</p> <p><i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: not reported.
Interventions	<p>Description of patient-mediated intervention: a combination of a communication promotion intervention and antibiotic information intervention. Antibiotic information was provided first, then, once the parent had been encouraged to use antibiotics for his or her child only when necessary, the researcher transitioned to the communication intervention</p> <p>Patient-mediated intervention category: patient education.</p> <p>Comparison: usual care (placebo-like). Child nutrition was the focus of the comparison (The study had a third and fourth arm not addressed here consisting of the patient-mediated intervention without the communication component and patient-mediated</p>

	intervention without the antibiotic information component, respectively)	
Outcomes	<p>Relevant primary outcomes Antibiotic prescriptions Measurement: not reported, but most likely patient-reported (parent). Unit of measurement: odds ratio (OR), absolute numbers not reported.</p> <p>Relevant secondary outcomes General satisfaction Interpersonal manner Time spent with doctor Measurement: patient-reported (parents). Unit of measurement: P values for group differences, absolute numbers not reported * Primary outcome in study: not reported.</p>	
Notes	<p>We attempted to contact the first author. No reply received. Findings are descriptively reported, and not included in meta-analysis</p> <p>Funding: not reported. Conflict of interest: not reported.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	Very few participants were lost (one participant in the control condition is not included in analysis)
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol not accounted for or found in clinicaltrials.gov
Other bias	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'

Methods	<p>Study design: randomised trial.</p> <p>Number of study arms: 2.</p> <p>Unit of randomisation: healthcare professional (1 patient per healthcare professional)</p> <p>Study period: Jul 2006 - May 2007.</p> <p>Measurement points of outcomes: 3 months post intervention.</p> <p>Analysis method: ITT (reported by study authors).</p>
Participants	<p>Setting</p> <p><i>Healthcare setting:</i> primary care clinic (of a large teaching hospital).</p> <p><i>Country:</i> USA.</p> <p>Participants</p> <p><i>Inclusion/exclusion criteria:</i> Latino immigrant Spanish-speaking patients, 50 years or older, who used the primary care facility as their regular source of care for at least the previous two years. Exclusion: those with current CRC screening, with gastrointestinal symptoms, a personal history of cancer, a family history of CRC, who had a visit with a physician with a patient already in the study, and those who did not consent to participate</p> <p><i>Numbers of participants:</i> 65.</p> <p>In intervention: 31.</p> <p>In comparison: 34.</p> <p><i>Characteristics of participants:</i></p> <ul style="list-style-type: none"> ● Age: intervention; 57.6 years (SD = 6.4), comparison; 58.9 years (SD = 7.05). ● Gender: females total 33/65 (51%). Intervention; 16/31 (52%), comparison; 16/34 (47%). ● Health conditions: Latino immigrant population, Spanish-speaking, 50 years or older. <p>Healthcare professionals</p> <p><i>Type of healthcare professionals:</i> physicians.</p> <p><i>Inclusion/exclusion criteria:</i> not reported.</p> <p><i>Numbers of healthcare professionals:</i> 65.</p> <p>In intervention: 31.</p> <p>In comparison: 34.</p> <p><i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> ● Age: not reported. ● Gender: females total 32/65 (50.5%). ● Experience/specialisation: not reported.
Interventions	<p>Description of patient-mediated intervention: patients were shown a Spanish language colorectal cancer educational video on a portable personal digital video device while they waited for their visits. They were also given a brochure summarising the video and a one-page reminder to hand to their physician</p> <p>Patient-mediated intervention category: patient information.</p> <p>Comparison: usual care. No more information provided.</p>
Outcomes	<p>Relevant primary outcomes</p> <p><i>Physician recommendation of screening</i></p> <p><i>Measurement:</i> medical record.</p> <p><i>Unit of measurement:</i> absolute numbers.</p> <p>Relevant secondary outcomes</p> <p>No relevant outcomes reported.</p>

Aragones 2010 (Continued)

	* Primary outcome in study: CRC screening completion. Secondary outcomes were physician recommendation of any CRC screening test recommended in the guidelines and patient adherence to physician CRC screening recommendation	
Notes	Funding: Centers for Disease Control and Prevention (CDC). Conflict of interest: none disclosed.	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Author's quote: "Randomization was performed by computer before patient recruitment."
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	High risk	Author's quote: "Intervention patients were also given a one-page reminder to hand to their physicians notifying them of 1) their patients' eligibility for CRC screening, and 2) their patients' receipt of CRC education."
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Outcomes were reviewed by a research assistant not involved in patient recruitment and blind to the randomisation assignment
Incomplete outcome data (attrition bias) All outcomes	Low risk	All participants are accounted for.
Selective reporting (reporting bias)	Low risk	Protocol is not accounted for, but found on clinicaltrials.gov (NCT00836303). No obvious deviations found
Other bias	Low risk	No indication of other biases.

Methods	<p>Study design: cluster-randomised trial.</p> <p>Number of study arms: 3 (4 arms, but two control arms were lumped together and analysed as one group)</p> <p>Unit of randomisation: practice.</p> <p>Study period: Mar - Jul 1988.</p> <p>Measurement points of outcomes: post intervention (immediately after the medical visit).</p> <p>Analysis method: not reported.</p>
Participants	<p>Setting</p> <p><i>Healthcare setting:</i> primary care (4 medical clinics).</p> <p><i>Country:</i> USA.</p> <p>Patients</p> <p><i>Inclusion/exclusion criteria:</i> patients who scored above 3 or more in 12-item version of the General Health Questionnaire (GHQ)</p> <p><i>Numbers of patients:</i> 79 (in study n = 103 with 3 arms).</p> <p>In intervention: 29.</p> <p>In comparison: 50 (from two control arms).</p> <p>(In arm 3 n = 24).</p> <p><i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: intervention; 60.1 years (SE = 2.7), comparison; 53.4 years (SE = 2.3). • Gender: females total 60/79 (75.9%). Intervention; 24/29 (83%), comparison; 36/50 (71%). • Health conditions: general patient population with an increased risk of mental health problems. <p>Healthcare professionals</p> <p><i>Type of healthcare professionals:</i> physicians.</p> <p><i>Inclusion/exclusion criteria:</i> not reported.</p> <p><i>Numbers of healthcare professionals:</i> not reported.</p> <p>In intervention: not reported.</p> <p>In comparison: not reported.</p> <p><i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: patients seen by female physicians: intervention; 4/29 (14%), comparison; 25/50 (50%). • Experience/specialisation: physician's years of training: intervention: 2.3 (SE = 0.3) years, comparison: 1.8 (SE = 0.1) years.
Interventions	<p>Description of patient-mediated intervention: physicians received information about their patient's mental health problem prior to seeing that patient</p> <p>Patient-mediated intervention category: patient-reported health information about own health/needs/concerns</p> <p>Comparison: no intervention. Two of the four clinics served as controls, since the residents in these clinics were not exposed to either of these two interventions. These two clinics differed from each other, however, in the level of the residents' awareness of this study. Residents in one of these clinics were asked to complete a questionnaire after seeing each study patient. The residents in the other clinic were not asked to complete these questionnaires and were, therefore, less likely to be cognizant of this study (The study had a third arm not addressed here consisting of the patient-mediated inter-</p>

	vention plus a counselling protocol for healthcare professionals)	
Outcomes	<p>Relevant primary outcomes <i>Counselling items by healthcare professional</i> Measurement: two separate reports: patient-reported and healthcare professionals reported Unit of measurement: average numbers of counselling items (means +/- SD). Relevant secondary outcomes <i>Patients with a psychological disorder</i> Measurement: self-report healthcare professional (physician). Control over stress Measurement: self-report by patient. * Primary outcome in study: not reported.</p>	
Notes	<p>Funding: the Robert Wood Johnson Foundation, Princeton, NJ, and the Henry J. Kaiser Family Foundation, Meulo Park, California Conflict of interest: not reported.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of outcome assessment (detection bias) All outcomes	Low risk	The post-visit patient questionnaire was administered by a second research assistant who was also blinded to the study's hypothesis and the patients intervention group
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk' (e.g. number randomised not stated, no reasons for missing data provided).The number of patients for each group and each outcome is uncertain as they do not provide enough information
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol not accounted for or found in clinicaltrials.gov

Brody 1990 (Continued)

Other bias	Low risk	<p>This is a cluster-randomised trial and thus we have judged additional sources of potential bias</p> <ul style="list-style-type: none"> ● Recruitment bias: 91% agreed to participate. ● Baseline imbalance: no demographic baseline imbalance. ● Loss of clusters: none of the clusters were lost. ● Incorrect analysis: we did not attempt to re-analyse studies that were not pooled in a meta-analysis. ● Comparability with individually randomised trials: no indication that this study had risk of herd-effect bias.
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Caskey 2011

Methods	<p>Study design: cluster-randomised trial. Number of study arms: 2. Unit of randomisation: healthcare professional. Study period: Dec 2009 - May 2010. Measurement points of outcomes: not reported. Analysis method: not reported.</p>
Participants	<p>Setting <i>Healthcare setting:</i> general internal medicine clinic. <i>Country:</i> USA.</p> <p>Patients <i>Inclusion/exclusion criteria:</i> not reported. <i>Numbers of patients:</i> 1402. In intervention: 687. In comparison: 715. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> ● Age: not reported. ● Gender: not reported. ● Health conditions: general population. <p>Healthcare professionals <i>Type of healthcare professionals:</i> physicians. <i>Inclusion/exclusion criteria:</i> not reported. <i>Numbers of healthcare professionals:</i> 12. In intervention: 6. In comparison: 6. <i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> ● Age: not reported. ● Gender: not reported. ● Experience/specialisation: not reported.

Interventions	<p>Description of patient-mediated intervention: exam-room education posters.</p> <p>Patient-mediated intervention category: patient information.</p> <p>Comparison: no intervention (placebo-like). All physicians received a clinical reminder in the medical record for vaccination at the beginning of intervention period</p>
Outcomes	<p>Relevant primary outcomes <i>Pertussis (Tdap) vaccination</i> Measurement: medical record. Unit of measurement: absolute numbers.</p> <p>Relevant secondary outcomes No relevant outcomes reported. * Primary outcome in study: only one outcome reported.</p>
Notes	<p>Abstract only.</p> <p>We attempted to contact the first author. No reply received.</p> <p>Funding: not reported.</p> <p>Conflict of interest: not reported.</p>

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol not accounted for or found in clinicaltrials.gov
Other bias	Unclear risk	<p>This is a cluster-randomised trial and thus we have judged additional sources of potential bias</p> <ul style="list-style-type: none"> Recruitment bias: insufficient

		<p>information to permit judgement of 'Low risk' or 'High risk'.</p> <ul style="list-style-type: none"> • Baseline imbalance: insufficient information to permit judgement of 'Low risk' or 'High risk'. • Loss of clusters: loss of clusters is not addressed in the available abstract. • Incorrect analysis: for the five studies in which healthcare professionals were the unit of randomisation the median ICC among similar studies for our primary outcome was 0.000 (95% CI; 0, 0.142) according to the University of Edinburgh's Database of ICCs (ABDN 2015). The effective sample sizes of these studies were thus the same as reported by the study authors. • Comparability with individually randomised trials: no indication that this study had risk of herd-effect bias.
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Christy 2013

<p>Methods</p>	<p>Study design: randomised trial. Number of study arms: 2. Unit of randomisation: patient. Study period: 2008 - 2010. Measurement points of outcomes: post intervention (1 week after). Analysis method: per protocol (reported by study authors).</p>
<p>Participants</p>	<p>Setting <i>Healthcare setting:</i> primary care clinics (11 clinics). <i>Country:</i> USA. Patients <i>Inclusion/exclusion criteria:</i> Inclusion: self-identified as black or African-American, 51-80 years, English-speaking, and currently non-adherent to CRC screening guidelines. Exclusion: personal history of CRC or adenomatous polyps requiring surveillance colonoscopy; medical condition precluding CRC screening; cognitive, speech, or hearing impairment; and current adherence to CRC screening guidelines <i>Numbers of patients:</i> 817. In intervention: 407. In comparison: 410. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: intervention: 56.8 years (SD = 6.0), comparison: 57.8 years (SD = 6.4). • Gender: females total 345/659 (52.3%). Intervention: 165/319 (52%), comparison: 180/340 (53%). • Health conditions: general primary healthcare population.

	<p>Healthcare professionals <i>Type of healthcare professionals:</i> primary care provider (physician). <i>Inclusion/exclusion criteria:</i> not reported. <i>Numbers of healthcare professionals:</i> 164. In intervention: not reported. In comparison: not reported. <i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: not reported. 	
Interventions	<p>Description of patient-mediated intervention: a clinic-based, computer-delivered tailored interactive program about colorectal cancer screening Patient-mediated intervention category: patient information. Comparison: usual care (patient information-like). Non-tailored brochure about colorectal cancer screening provided at the clinic</p>	
Outcomes	<p>Relevant primary outcomes <i>Primary care provider write an order for a colorectal cancer screening test</i> Measurement: medical records. Unit of measurement: relative numbers, odds ratio. <i>Doctor recommended fecal occult blood test (FOBT)</i> <i>Doctor recommended colonoscopy</i> Measurement: patient-reported. Unit of measurement: relative numbers, odds ratio. They were reported as predictors for another outcome “self-reported screening discussion with primary care provider” Relevant secondary outcomes No relevant outcomes reported. * Primary outcome in study: colorectal cancer screening test discussion</p>	
Notes	<p>Funding: funded by the National Cancer Institute at the National Institutes of Health Conflict of interest: none disclosed.</p>	
Risk of bias		
Bias	Authors’ judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of ‘Low risk’ or ‘High risk’
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of ‘Low risk’ or ‘High risk’
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Insufficient information to permit judgement of ‘Low risk’ or ‘High risk’

Christy 2013 (Continued)

Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	Few lost to follow-up, evenly distributed. Per protocol analysis
Selective reporting (reporting bias)	Low risk	Protocol is not accounted for, but found on clinicaltrials.gov (NCT00672828). No obvious deviations found
Other bias	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'

Goldberg 2012

Methods	<p>Study design: randomised trial.</p> <p>Number of study arms: 2.</p> <p>Unit of randomisation: healthcare professional.</p> <p>Study period: April 2011 - May 2012.</p> <p>Measurement points of outcomes: post intervention (immediately after the medical visit post intervention)</p> <p>Analysis method: ITT (reported by study authors).</p>
Participants	<p>Setting</p> <p><i>Healthcare setting:</i> hospital (children's hospital).</p> <p><i>Country:</i> USA.</p> <p>Patients</p> <p><i>Inclusion/exclusion criteria:</i></p> <p>Inclusion: 1) child aged 1-17 years presenting with a chief complaint consistent with an asthma exacerbation, such as wheeze or trouble breathing, 2) the child had a history of asthma by parent report, and 3) the visit was believed to be consistent with an asthma exacerbation by the treating attending.</p> <p>Exclusion: patients were excluded if the treating physician was not part of the study, the child had a major pulmonary or cardiac comorbid illness, the child's parent was non-English speaking, or if the child was triaged to the med-trauma bay for severe respiratory distress</p> <p><i>Numbers of patients:</i> 77 children.</p> <p>In intervention: 40.</p> <p>In comparison: 37.</p> <p><i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: mean of 8 years old. Intervention; 7.4 years (SD = 5.0), comparison; 8.8 years (SD = 4.4). • Gender: females total 52%. Intervention; 53%, comparison; 51%. • Health conditions: asthma. <p>Healthcare professionals</p> <p><i>Type of healthcare professionals:</i> physicians.</p> <p><i>Inclusion/exclusion criteria:</i> not reported.</p>

	<p><i>Numbers of healthcare professionals:</i> 17. In intervention: not reported. In comparison: not reported. <i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: all physicians involved in the study were board-certified in paediatrics and paediatric emergency medicine. 	
Interventions	<p>Description of patient-mediated intervention: parents of children with asthma filled out a questionnaire (PACCI-ED) that measures five domains of asthma health: 1) current control, 2) trajectory, 3) risk, 4) medication adherence and 5) burden. The physicians allocated to this intervention group received the PACCI-ED filled out by parents and were told what it is used for and that they could use it to complete the clinician assessment form</p> <p>Patient-mediated intervention category: patient-reported health information about own health/needs/concerns</p> <p>Comparison: no intervention. Physicians in this group had no known exposure to the PACCI-ED before or during the study. They completed the questions on the clinician assessment form also</p>	
Outcomes	<p>Relevant primary outcomes <i>Correctly identified level of chronic asthma control</i> <i>Correctly identified child's asthma trajectory</i> <i>Correctly identified level of medication adherence</i> <i>Correctly identified degree of disease burden to the family</i> Measurement: clinician assessment form. Unit of measurement: per cent. Relevant secondary outcomes Not relevant outcomes reported. * Primary outcome in study: all four outcomes.</p>	
Notes	<p>Funding: Rhode Island Hospital (described in protocol). Conflict of interest: none disclosed.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	A block randomisation scheme with block sizes of 4 was used to randomise physicians prior to beginning the study
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. The physicians were, however, not aware of the study hypothesis

Goldberg 2012 (Continued)

Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	ITT-analysis.
Selective reporting (reporting bias)	Low risk	Protocol is not accounted for, but found on clinicaltrials.gov (NCT00836303). No obvious deviations found
Other bias	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk. Unit of randomisation was the healthcare professionals and we do not know their characteristics

Herman 1995

Methods	<p>Study design: cluster-randomised trial. Number of study arms: 3. Unit of randomisation: practice (3 practices in total). Study period: Oct 1989 - Mar 1990. Measurement points of outcomes: 3 months post intervention. Analysis method: not reported.</p>
Participants	<p>Setting <i>Healthcare setting:</i> public hospital (3 practices). <i>Country:</i> USA.</p> <p>Patients <i>Inclusion/exclusion criteria:</i> all women older than 65 years attending the ambulatory medical clinic were included <i>Numbers of patients:</i> Total: 839 randomised to 3 arms (not reported the totals for the two arms relevant here) In intervention: not reported (provided only for subgroups of women) In comparison: not reported (provided only for subgroups of women) (In arm 3: n = not reported (provided only for subgroups of women)) <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> ● Age: among women without prior clinical breast examination (n = 540): intervention; 73.8 years (SD = 6.7), comparison: 73.5 years (SD = 8.5). Among women without prior mammography (n = 471): intervention; 71.4 years (SD = 6.7), comparison: 72.5 years (SD = 6.3). ● Gender: all females. ● Health conditions: general patient population of females 65 years or older.

	<p>Healthcare professionals <i>Type of healthcare professionals:</i> physicians. <i>Inclusion/exclusion criteria:</i> not reported. <i>Numbers of healthcare professionals:</i> 45 (n = 66 for all 3 arms). In intervention: 22. In comparison: 23. (In arm 3 n = 21) <i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> ● Age: not reported. ● Gender: reported as "no significant cross-group differences in gender". ● Experience/specialisation: reported as "no significant cross-group differences in physician's level of training". 		
Interventions	<p>Description of intervention patient-mediated: in the clinic assigned to intervention, educational materials were given to the patient by the nurse at each clinic visit. The nurses used the "What Every Woman Should Know About Mammography" pamphlet, as well as an additional sheet outlining the specific importance of mammography for the older woman</p> <p>Patient-mediated intervention category: patient information.</p> <p>Comparison: no intervention (placeo-like). A monograph with breast screening recommendations and a lecture on preventive services was also provided bimonthly as part of an ambulatory services lecture series (The study had a third arm not addressed here consisting of the patient-mediated intervention plus a prevention team)</p>		
Outcomes	<p>Relevant primary outcomes <i>Number of women offered mammogram</i> <i>Number of women offered clinical breast exam</i> <i>Measurement:</i> medical records. <i>Unit of measurement:</i> per cent of women. <i>Number of women offered clinical breast examination among those not previously having a clinical breast exam</i> <i>Number of women offered mammography among those not previously having a mammography</i> <i>Measurement:</i> medical records. <i>Unit of measurement:</i> absolute numbers of women without previous clinical breast examination or mammography</p> <p>Relevant secondary outcomes No relevant reported. * Primary outcome in study: not reported.</p>		
Notes	<p>Funding: the Case Western Reserve University Teaching Nursing Home Program Conflict of interest: not reported.</p>		
<i>Risk of bias</i>			
Bias	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">Authors' judgement</td> <td style="width: 33%;">Support for judgement</td> </tr> </table>	Authors' judgement	Support for judgement
Authors' judgement	Support for judgement		

Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. "The three group practices were assigned randomly to one of three study arms"
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Trained research assistant performed outcome assessment, but unclear if blinded or not
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Quote: "839 older women were seen in one of the three practices during the 6-month intervention period. Thirty one patients were excluded because of dementia or severe illness and five medical records could not be located. Final analysis included 803 women seen by the physician, nurse practitioner, or by the nurse for either a medication refill or education visit"
Selective reporting (reporting bias)	High risk	Protocol not accounted for or found in clinicaltrials.gov. Relevant outcomes were reported for a subgroup of women. Incomplete reporting to make an analysis of the total sample
Other bias	Low risk	This is a cluster-randomised trial and thus we have judged additional sources of potential bias: <ul style="list-style-type: none"> • Recruitment bias: all were asked to participate. • Baseline imbalance: no demographic baseline imbalance except for racial composition. • Loss of clusters: none of the clusters were lost. • Incorrect analysis: the effective total sample size for the three cluster-randomised studies included in our meta-analyses were calculated and are listed in Table 2.

Herman 1995 (Continued)

	<ul style="list-style-type: none"> • Comparability with individually-randomised trials: no indication that this study had risk of herd-effect bias.
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Jacobson 1999

Methods	<p>Study design: randomised trial.</p> <p>Number of study arms: 2.</p> <p>Unit of randomisation: patient.</p> <p>Study period: May - June 1998.</p> <p>Measurement points of outcomes: post intervention (immediately after the medical visit).</p> <p>Analysis method: ITT (reported by study authors).</p>
Participants	<p>Setting</p> <p><i>Healthcare setting:</i> hospital (ambulatory care clinic in a public teaching hospital)</p> <p><i>Country:</i> USA.</p> <p>Patients</p> <p><i>Inclusion/exclusion criteria:</i></p> <p>Inclusion: visits to follow management of hypertension, diabetes, heart failure, or other chronic medical problems.</p> <p>Exclusion: Patients not meeting these inclusion criteria, in addition to those with chart-documented receipt of the vaccine within the past 5 years, walk-in visits, first visits, medication-refill visits in which patients did not see their primary care providers, blind patients, patients with clinically documented dementia, and non English- speaking patients were excluded</p> <p><i>Numbers of patients:</i> 433.</p> <p>In intervention: 221.</p> <p>In comparison: 212.</p> <p><i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: total 63.08 years (SD = 12.73). Intervention; 64.2 years (SD = 13.13), comparison ; 61.92 years (SD = 12.23). • Gender: total females 300/433 (69.3%). Intervention; 161/221 (72.9%), comparison; 139/212 (65.6%). • Health conditions: general patient population with at least one indicator for vaccine such as age, cardiac disease, pulmonary disease, or alcohol abuse. <p>Healthcare professionals</p> <p><i>Type of healthcare professionals:</i> physicians (house officers) (n = 148), physician assistants (n = 2) and nurse practitioners (n = 6)</p> <p><i>Inclusion/exclusion criteria:</i> not reported.</p> <p><i>Numbers of healthcare professionals:</i> 156.</p> <p>In intervention: not reported.</p> <p>In comparison: not reported.</p> <p><i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: Not reported. • Gender: Not reported. • Experience/specialisation: the clinicians were supervised by the University faculty who review all patient care. All clinicians may initiate orders for pneumococcal vaccine,

	and attending physicians cosign these orders.
Interventions	<p>Description of patient-mediated intervention: one-page, low-literacy (below fifth-grade level) educational handout encouraging patients to “ask your doctor about the pneumonia shot”</p> <p>Patient-mediated intervention category: patient information.</p> <p>Comparison: usual care (placebo-like). 1-page, low-literacy educational handout to patients conveying information about nutrition</p>
Outcomes	<p>Relevant primary outcomes</p> <p><i>Clinician recommended vaccine</i></p> <p>Measurement: patient-reported.</p> <p>Unit of measurement: absolute numbers.</p> <p><i>Administration of the vaccine at that clinic visit</i></p> <p>Measurement: medical record.</p> <p>Unit of measurement: absolute numbers.</p> <p>Relevant secondary outcomes</p> <p>No relevant outcomes reported.</p> <p>* Primary outcome in study: administration of the vaccine at that clinic visit and discussion about the vaccine</p>
Notes	<p>Funding: the National Vaccine Program, Centers for Disease Control and Prevention and the Georgia Emerging Infections Program, Atlanta, Ga. Also funded by Indigent Care Trust Funds from the State of Georgia to the Office of Health Promotion and Disease Prevention at Grady Health Systems</p> <p>Conflict of interest: not reported.</p>

Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Block randomisation (block size = 1).
Allocation concealment (selection bias)	Unclear risk	The first patient enrolled each morning in each clinic section was systematically assigned to the intervention group
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Clinicians and patients were not informed of the nature of the study
Blinding of outcome assessment (detection bias) All outcomes	High risk	No blinding of staff members.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Fifty-eight of 221 patients in the intervention group and 57 of 212 patients in the comparison group had protocol violations

Jacobson 1999 (Continued)

		or incomplete data collection High attrition rate (over 20%), but they have performed an ITT-analysis
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol not accounted for or found in clinicaltrials.gov
Other bias	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'

Kattan 2006

Methods	<p>Study design: randomised trial. Number of study arms: 2 (2 x 2 factorial design). Unit of randomisation: patient. Study period: Oct 1998 - Aug 2000. Measurement points of outcomes: post intervention (months 4-14 while the intervention was running. Outcome time point reported as “during the intervention year”) Analysis method: ITT (reported by study authors).</p>
Participants	<p>Setting <i>Healthcare setting:</i> inpatient units of hospitals, emergency departments (EDs), and community paediatric clinics <i>Country:</i> USA.</p> <p>Patients <i>Inclusion/exclusion criteria:</i> eligibility was limited to residents of census tracts in which 20% or more of households had incomes below the federal poverty level except in Seattle, where patients could be enrolled if they met Medicaid eligibility. Other inclusion criteria included a history of 1 or more hospitalisation or 2 unscheduled visits for asthma in the previous 6 months and a positive allergy skin test to 1 or more of 11 indoor allergens. Children were excluded if they made 2 or more visits to an asthma specialist or asthma clinic in the previous 6 months or if they had any other serious chronic illness <i>Numbers of patients:</i> 937 children. In intervention: 471. In comparison: 466. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: total mean age 7.7 years (5 to 11 years). Intervention; 7.7 years, comparison; 7.6 years. No SD reported. • Gender: female total 360/937 (38.4%). Intervention; 186/471 (39.5%), comparison; 173/466 (37.1%). • Health conditions: moderate to severe asthma. <p>Healthcare professionals <i>Type of healthcare professionals:</i> physicians, nurse practitioners, physician's assistants. <i>Inclusion/exclusion criteria:</i> <i>Numbers of healthcare professionals:</i> total number not reported. In intervention: 435 healthcare professionals.</p>

	<p>In comparison: not reported.</p> <p><i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported • Gender: not reported • Experience/specialisation: 82.8% were attending physicians (355/435) and years in practice were in average 12.6 (SD = 9).
Interventions	<p>Description of patient-mediated intervention: computer-generated letters based on information collected from the child's carer through bi-monthly telephone calls (CATI calls) conducted by the centralised service for all the study sites. The letter to the physician caring for that child summarised the child's asthma symptoms, health service use, and medication use with a corresponding recommendation to step up or step down medications (in accordance with guidelines)</p> <p>Patient-mediated intervention category: patient-reported health information about own health/needs/concerns</p> <p>Comparison: no intervention. computer-generated letters were not sent to the healthcare professionals of children in the comparison group. For this group, the information from the CATI calls was used to determine what recommendation would have been generated had the child been in the intervention group</p>
Outcomes	<p>Relevant primary outcomes</p> <p><i>Change in medication when indicated (by guidelines)</i></p> <p>Measurement: patient-reported. Changes in medications were determined from the CATI call after a scheduled visit. Step up in medications was defined as an increase from no antiinflammatory use to any anti-inflammatory use or from occasional to daily anti-inflammatory use</p> <p>Unit of measurement: the number of patients with changed medication from the amount of step-up letters sent to physicians</p> <p>Relevant secondary outcomes</p> <p><i>Symptoms because of asthma per 2 weeks</i></p> <ul style="list-style-type: none"> • Maximum symptom days. • Days limited in activities for more than half day. • School days missed. <p>Measurement: patient-reported. Determined from the CATI call after a scheduled visit</p> <p>Unit of measurement: continuous. How many times or on a scale.</p> <p>* Primary outcome in study: not reported.</p>
Notes	<p>We attempted to contact the first author. No reply received.</p> <p>Funding: National Institute of Allergy and Infectious Diseases, National Institutes of Health, Department of Health and Human Services, and the National Institute of Environmental Health Sciences, National Institutes of Health, Department of Health and Human Services, and the National Center for Research Resources</p> <p>Conflict of interest: Dr Steinbach has received lecture fees from GlaxoSmithKline and consulting fees from Aventis; Dr Gruchalla is a member of the GlaxoSmithKline Allergy Fellowship Grant review committee; Dr Morgan has received consulting fees from Genentech; and Dr O'Connor is GlaxoSmithKline-Data Safety and Monitoring Board chair and Astellas Pharma-Data Safety and Monitoring Board chair</p>

<i>Risk of bias</i>		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: "Group assignments were randomly pre-assigned to study identification numbers by the coordinating centre using a random number generator with a uniform distribution and blocks of size 8 and 12 within the site"
Allocation concealment (selection bias)	Low risk	Quote: "Group assignments were supplied to sites in opaque envelopes and labelled with sequential study identification numbers, which were opened by the site interviewers on determination of the child's eligibility"
Blinding of participants and personnel (performance bias) All outcomes	High risk	Neither study staff nor participants were blinded to group assignment. Although study staff and participants were aware of group assignments, they were not aware of the content of the letter sent to PCP. Unclear if physicians were attempted blinded
Blinding of outcome assessment (detection bias) All outcomes	Low risk	The interviewers were blinded to study group assignment.
Incomplete outcome data (attrition bias) All outcomes	Low risk	Losses to follow-up was minimal and equally distributed. ITT-analysis
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk. Protocol not accounted for or found in clinicaltrials.gov
Other bias	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk

Methods	<p>Study design: cluster-randomised trial.</p> <p>Number of study arms: 4.</p> <p>Unit of randomisation: healthcare professional.</p> <p>Study period: 2 months.</p> <p>Measurement points of outcomes: post intervention (outcomes were measured during the two months the study was running)</p> <p>Analysis method: ITT (reported by study authors).</p>
Participants	<p>Setting</p> <p><i>Healthcare setting:</i> primary care (family practices).</p> <p><i>Country:</i> New Zealand.</p> <p>Patients</p> <p><i>Inclusion/exclusion criteria:</i> 50 years or older, no known diabetes, no glucose test within the last three years visiting a healthcare professional</p> <p><i>Numbers of patients:</i> 3189 (n = 5628 with 4 arms).</p> <p>In intervention: 1639.</p> <p>In comparison: 1550.</p> <p>(In arm 3 n = 983 and in arm 4 n = 1456).</p> <p><i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: intervention; 63.9 years (SD = 10.95), comparison; 64.2 years (SD = 11.3) • Gender: females total 861/3189 (27%). Intervention; 551/1639 (33.6%), comparison; 310/1550 (20%). • Health conditions: general primary care population that were 50 years or older. <p>Healthcare professionals</p> <p><i>Type of healthcare professionals:</i> family practitioners.</p> <p><i>Inclusion/exclusion criteria:</i> family practitioners were eligible for the study if they: 1) used a specific patient management computer software, 2) recorded their medical consultation notes on the computer within their consultations, 3) had received laboratory glucose results electronically for at least 1 year, 4) saw at least 10 individual patients aged 50 years or older per month, and 5) worked in the Auckland region</p> <p><i>Numbers of healthcare professionals:</i> 55 (n = 107 for all 4 arms) and 33 family practices (n = 66 for all 4 arms) randomised</p> <p>In intervention: 27 family practitioners and 16 practices.</p> <p>In comparison: 28 family practitioners and 17 practices.</p> <p>(in arm 3: n = 24 family practitioners and 16 practices. In arm 4: n = 28 family practitioners and 17 practices)</p> <p><i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: females total 49/107 (46%). Intervention; 13/27, comparison; 13/28. • Experience/specialisation: median years since family practitioner graduated was 18 (range 30) in intervention and 19 (range 28) in comparison.
Interventions	<p>Description of patient-mediated intervention: for healthcare professionals allocated to this intervention their patients filled out a diabetes risk self-assessment form and gave the filled out form to the healthcare professional (family practitioner) before the consultation. The form, which was adapted from the American Diabetes Association contained information asked patients about their age, ethnicity, weight (body mass index), whether they had a near family members with diabetes, whether they were a woman who had a baby weighing more than 4 kg at birth, and exercise habits</p>

	<p>Patient-mediated intervention category: patient-reported health information about own health/needs/concerns</p> <p>Comparison: no intervention (placebo-like). All healthcare professionals, before group assignment, were visited by research staff to inform about the study, and to provide uniform education on diabetes screening and on how to use both the computer reminder and the patient form (PROMs). A copy of a recent article on diabetes screening and a laminated card summarising the same information was also given each healthcare professional</p> <p>(The study had a third and fourth arm not addressed here consisting of reminder to healthcare professional and patient-mediated intervention plus a reminder to healthcare professional, respectively)</p>	
Outcomes	<p>Relevant primary outcomes <i>Diabetes screening of eligible patients who visited a family practitioner (according to guideline recommendations).</i></p> <p>Measurement: a visit was defined by the presence of an invoice during the study period. A patient was considered “screened” if they had a laboratory glucose test result in the computer during the study</p> <p>Unit of measurement: absolute numbers.</p> <p>Relevant secondary outcomes No relevant outcomes reported. * Primary outcome in study: diabetes screening of eligible patients who visited a family practitioner (according to guideline recommendations)</p>	
Notes	<p>First author Dr Timothy Kenealy was contacted and provided requested information</p> <p>Funding: Health Research Council of New Zealand and Auckland Faculty of the Royal New Zealand College of General Practitioners</p> <p>Conflict of interest: None disclosed.</p>	
Risk of bias		
Bias	Authors’ judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Quote: “For the first randomisation, an independent person used Excel to assign a random number between 0 and 1 to each of the 398 FPs. A prior decision was made to invite FPs assigned random numbers 0 to 0.5. An independent person used Excel to generate random numbers in blocks of 8. For the second randomisation, practices were stratified according to number of doctors (solo, 2 to 4 doctors, 5 or more doctors) , to protect the intervention groups from gross discrepancies in practice size”
Allocation concealment (selection bias)	Low risk	An independent person placed the names of intervention groups in sealed and consecutively numbered envelopes. Thus no

Kenealy 2005 (Continued)

		indication of selection bias for this cluster-randomised study
Blinding of participants and personnel (performance bias) All outcomes	High risk	Neither healthcare professionals nor patients were blinded to intervention delivery
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Outcome assessment via extracted computer records, outcome objective low possibility of assessment bias
Incomplete outcome data (attrition bias) All outcomes	Low risk	Low attrition rate among the recruited and randomised healthcare professionals
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol was not published
Other bias	Low risk	<p>This is a cluster-randomised trial and thus we have judged additional sources of potential bias:</p> <ul style="list-style-type: none"> • Recruitment bias: no indication that recruitment was biased. • Baseline imbalance: no baseline imbalance. • Loss of clusters: none of the clusters were lost. • Incorrect analysis: for the five studies in which healthcare professionals were the unit of randomisation, the median ICC among similar studies for our primary outcome was 0.000 (95% CI; 0, 0.142) according to the University of Edinburgh's Database of ICCs (ABDN 2015). The effective sample sizes of these studies were thus the same as reported by the study authors. • Comparability with individually randomised trials: no indication that this study had risk of herd-effect bias.

Methods	<p>Study design: randomised trial.</p> <p>Number of study arms: 2.</p> <p>Unit of randomisation: patient.</p> <p>Study period: Feb 2007 - Jun 2008.</p> <p>Measurement points of outcomes: 2 months post intervention.</p> <p>Analysis method: ITT (reported by study authors).</p>
Participants	<p>Setting</p> <p><i>Healthcare setting:</i> clinic (urban diabetes self-management clinic that serves uninsured patients)</p> <p><i>Country:</i> USA.</p> <p>Patients</p> <p><i>Inclusion/exclusion criteria:</i> Inclusion: 18 years or older, verbal fluency in English, and responsibility for their own diabetes self-management</p> <p><i>Numbers of patients:</i> 129.</p> <p>In intervention: 67.</p> <p>In comparison: 62.</p> <p><i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> ● Age: intervention: 52.4 years (SD = 11.4), comparison: 50.5 years (SD = 12.0). ● Gender: females total 55/129 (42.5%). Intervention; 29/67 (43%), comparison; 26/62 (42%). ● Health conditions: diabetes type 2. <p>Healthcare professionals</p> <p><i>Type of healthcare professionals:</i> physicians.</p> <p><i>Inclusion/exclusion criteria:</i> not reported.</p> <p><i>Numbers of healthcare professionals:</i> not reported.</p> <p>In intervention: not reported.</p> <p>In comparison: not reported.</p> <p><i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> ● Age: not reported. ● Gender: not reported. ● Experience/specialisation: trained in internal medicine.
Interventions	<p>Description of patient-mediated intervention: patients were given waiting room-administered, low-literacy, computer multimedia diabetes education program</p> <p>Patient-mediated intervention category: patient education.</p> <p>Comparison: usual care (patient information-like). Patients in this group read an educational brochure. In addition, a short diabetes crossword puzzle based on the brochure was distributed</p>
Outcomes	<p>Relevant primary outcomes</p> <p><i>Diabetes medication prescribed</i></p> <p><i>Antihypertensive medications prescribed</i></p> <p><i>Measurement:</i> patient self-report, routinely verified by clinic physicians</p> <p><i>Unit of measurement:</i> absolute numbers.</p> <p>Relevant secondary outcomes</p> <p><i>HbA1c</i></p> <p><i>Measurement:</i> objective measurements by use of phlebotomy at first visit and 3 months later</p> <p><i>Unit of measurement:</i> absolute numbers.</p>

	* Primary outcome in study: not reported.	
Notes	Funding: the Agency for Healthcare Research and Quality. Conflict of interest: none disclosed.	
<i>Risk of bias</i>		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Author's quote: "Random allocation took place by the research assistant pulling a card out of a box, with each card indicating group assignment (computer multimedia program vs. comparison)."
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	High risk	Participants not blinded because of the nature of the study, but physicians were blinded
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	15 in comparison group and 14 in the intervention group were lost to follow up. ITT-analysis
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk. Protocol not accounted for or found in clinicaltrials.gov
Other bias	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'

Methods	<p>Study design: randomised trial.</p> <p>Number of study arms: 2.</p> <p>Unit of randomisation: patient.</p> <p>Study period: Oct 2006 -?</p> <p>Measurement points of outcomes: post intervention for primary outcome and 2, 6 and 12 weeks post intervention for secondary outcomes</p> <p>Analysis method: ITT (reported by study authors).</p>
Participants	<p>Setting</p> <p><i>Healthcare setting:</i> medical centre (3 health systems and 1 private practice).</p> <p><i>Country:</i> USA.</p> <p>Patients</p> <p><i>Inclusion/exclusion criteria:</i></p> <p>Inclusion: patients eligible for enrolment in the study included all cognitively intact, English speaking adults obtaining care (active treatment or surveillance) from participating oncologists for selected solid tumours and who reported more than minimal cancer related pain. More than minimal pain was defined as a score of 4 or greater (on a scale of 0-10)</p> <p>Exclusion: Major surgical procedure scheduled within six weeks, enrolled in hospice, followed by pain management service, already contacted for study, difficulty thinking or expressing herself, unable to receive and/or complete mailed enrolment materials</p> <p><i>Numbers of patients:</i> 258</p> <p>In intervention: 126</p> <p>In comparison: 132</p> <p><i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: 85/257 were 54 years or younger, 99/257 55-64 years, 73/257 64 years or older. Group numbers not provided. • Gender: females total 202/257 (79%). Group numbers not provided. • Health conditions: patients with cancer and cancer-related pain. <p>Healthcare professionals</p> <p><i>Type of healthcare professionals:</i> general practitioner.</p> <p><i>Inclusion/exclusion criteria:</i> Inclusion: medical, radiation, and (after March 2008) gynaecological oncologists (including both staff physicians and clinical fellows) were deemed eligible if they saw patients at one of the participating sites and were in clinical practice at least 20% time (i.e. at least 1 full day per week)</p> <p><i>Numbers of healthcare professionals:</i> 49 in total.</p> <p>In intervention: not reported.</p> <p>In comparison: not reported.</p> <p><i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: oncologists.
Interventions	<p>Intervention:</p> <p>Description of patient-mediated intervention: patients received tailored education and coaching (TEC) in a private space just before the index visit by a health educator (lay individuals who had undertaken 30-40 hours of study-specific training)</p> <p>Patient-mediated intervention category: patient education (coaching).</p> <p>Comparison: usual care (patient information-like). Patients in this group received enhanced usual care where health educator verbally reviewed selected aspects of a National</p>

	Cancer Institute booklet on pain control	
Outcomes	<p>Relevant primary outcomes <i>Physician-directed adjustment in analgesia (new type of or dose/amount adjustment of existing)</i> Measurement: patient-reported. Unit of measurement: absolute numbers. Relevant secondary outcomes No relevant outcomes reported. * Primary outcome in study: not reported.</p>	
Notes	<p>Funding: the American Cancer Society and the National Institute of Mental Health Conflict of interest: none disclosed.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Author's quote: "computer generated, stratified, blocked-randomization scheme to assure balanced assignment within physicians and encoded three-digit treatment assignment sequences to preserve concealment"
Allocation concealment (selection bias)	Low risk	See comment above.
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Author's quote: "To preserve blinding, treatment assignment (0/1) was encoded as a set of 3-digit numbers maintained by the study statistician. The encoded sequences were printed on two adhesive labels, one affixed to the patient's Enrollment Interview form and another to the Tracking Sheet in each patient's Case Report File (CRF)"
Blinding of outcome assessment (detection bias) All outcomes	Low risk	See comment above.
Incomplete outcome data (attrition bias) All outcomes	Low risk	In total, 7 were lost to follow-up, 3 in comparison group and 4 in intervention group. ITT- analysis
Selective reporting (reporting bias)	Low risk	Protocol accounted for and exists on clinicaltrials.gov (NCT00283166). No obvious deviations found
Other bias	Low risk	No indication of other biases.

Methods	<p>Study design: cluster-randomised trial.</p> <p>Number of study arms: 2.</p> <p>Unit of randomisation: healthcare professional.</p> <p>Study period: 2001.</p> <p>Measurement points of outcomes: 12 and 20 weeks post intervention.</p> <p>Analysis method: not reported.</p>
Participants	<p>Setting</p> <p><i>Healthcare setting:</i> primary care (general practice).</p> <p><i>Country:</i> the Netherlands.</p> <p>Patients</p> <p><i>Inclusion/exclusion criteria:</i></p> <p>Inclusion: patients who had been using proton pump inhibitors (PPIs) on prescription (from their general practitioner) for at least 12 weeks. Exclusion: younger than 18 years, not able to fill in a questionnaire in the Dutch language, serious disease, oesophagitis grade C or D</p> <p><i>Numbers of patients:</i> 160 randomised.</p> <p>In intervention: 88.</p> <p>In comparison: 72.</p> <p><i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: total 74/113 were 55 years or older. Intervention; 42/63 were 55 years or older, comparison; 32/50 were 55 years or older. • Gender: females total 67/113. Intervention; 39/63 (62%), comparison; 28/50 (56%). • Health conditions: patients with dyspepsia. <p>Healthcare professionals</p> <p><i>Type of healthcare professionals:</i> general practitioner.</p> <p><i>Inclusion/exclusion criteria:</i> not reported.</p> <p><i>Numbers of healthcare professionals:</i> 20 in total.</p> <p>In intervention: 11.</p> <p>In comparison: 9.</p> <p><i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: not reported.
Interventions	<p>Description of patient-mediated intervention: a simple information leaflet was sent to patients by the GPs in the intervention group. The leaflet gave information about updated recommendations made to GPs about the clinical management of dyspepsia and emphasised the importance of reducing inappropriate use of PPIs. Suggestions were made to reduce or stop using PPIs and advice was given on how to reduce the use and when to seek help from the GP for this. Patients made their own decisions about whether to visit the GP or not. GPs received instruction in a brief visit from a researcher and a flowchart based on the content of the updated Dutch guideline</p> <p>Patient-mediated intervention category: patient information.</p> <p>Comparison: usual care. No more information provided.</p>
Outcomes	<p>Relevant primary outcomes</p> <p><i>Stopped or reduced PPI dose</i></p> <p><i>Stopped prescribed PPI</i></p>

	<p><i>Had increased PPI dose</i> Measurement: medical record. Unit of measurement: absolute numbers. Relevant secondary outcomes Patient outcomes <i>Dyspesia severity high</i> Measurement: medical record. Unit of measurement: absolute numbers. Mental health Vitality Measurement: patient-reported. Unit of measurement: mean. * Primary outcome in study: stopped or reduced PPI dose.</p>	
Notes	<p>Funding: not reported. Conflict of interest: none disclosed.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Author's quote: "The GPs were allocated at random to either the experimental group or the control group by an independent statistician"
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	Relatively high attrition rate, but evenly distributed with explanations
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol not accounted for or found in clinicaltrials.gov
Other bias	Low risk	This is a cluster-randomised trial and thus we have judged additional sources of potential bias:

Krol 2004 (Continued)

		<ul style="list-style-type: none"> ● Recruitment bias: Author's quote: "Twenty GP's were recruited" and no indication that this was biased. ● Baseline imbalance: patient groups were similar at baseline. ● Loss of clusters: none of the clusters were lost. ● Incorrect analysis: for the five studies in which healthcare professionals were the unit of randomisation, the median ICC among similar studies for our primary outcome was 0.000 (95% CI; 0, 0.142) according to the University of Edinburgh's Database of ICCs (ABDN 2015). The effective sample sizes of these studies were thus the same as reported by the study authors. ● Comparability with individually randomised trials: no indication that this study had risk of herd-effect bias.
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Leveille 2009

<p>Methods</p>	<p>Study design: randomised trial. Number of study arms: 2. Unit of randomisation: patient. Study period: Aug 2005 - Aug 2006. Measurement points of outcomes: post intervention (in the medical visit) for primary outcome and 1 week and 3 months after the medical visit (post intervention) for secondary outcomes Analysis method: ITT (reported by study authors).</p>
<p>Participants</p>	<p>Setting <i>Healthcare setting:</i> hospitals and primary care (2 hospital-based practices and 2 community-based affiliated practices) <i>Country:</i> USA. Patients <i>Inclusion/exclusion criteria:</i> Inclusion: patients were eligible to participate if they were aged 20 years or older and screened positive for any of our 3 target conditions: chronic musculoskeletal pain, mobility difficulty, or depression Exclusion: patients currently receiving care for their chronic condition from a specialist physician or therapist <i>Numbers of patients:</i> 241. In intervention: 121. In comparison: 120. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> ● Age: total 52.4 years (SD = 12.25), intervention; 51.9 years (SD = 13.1),

	<p>comparison; 52.9 years (SD = 11.3).</p> <ul style="list-style-type: none"> • Gender: females total 138/241 (57.3%). Intervention; 71/121 (58.7%), comparison; 67/120 (55.8%). • Health conditions: primary care patients with chronic conditions scheduled with primary care practitioner appointments. <p>Healthcare professionals <i>Type of healthcare professionals:</i> primary care practitioners. <i>Inclusion/exclusion criteria:</i> not reported. <i>Numbers of healthcare professionals:</i> not reported. <i>In intervention:</i> not reported. <i>In comparison:</i> not reported. <i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: not reported.
Interventions	<p>Description of patient-mediated intervention: patients received a standardised <i>PatientSite</i> message from the nurse e-coach that provided a brief description of the screened condition(s) and general tips on how to communicate more effectively with one's primary care practitioner</p> <p>Patient-mediated intervention category: patient information.</p> <p>Comparison: usual care (placebo-like). Patients received a general message through PatientSite containing URL links to US Government web sites with general health information (home pages for the US Department of Health and Human Services and the Centers for Disease Control and Prevention) (placebo)</p> <p>Primary care practitioners immediately were sent PatientSite messages notifying them of the conditions for which their patients screened positive, regardless of group assignment</p>
Outcomes	<p>Relevant primary outcomes <i>Screened condition identified in the index visit</i> Measurement: medical record. Unit of measurement: absolute numbers.</p> <p>Relevant secondary outcomes <i>Rate the medical care in visit</i> Measurement: patient-reported. Unit of measurement: on 0-10 scale (best = 10), mean ± SD. Doctor definitely showed concern about health/feelings. Doctor definitely spent enough time. Measurement: patient-reported. Unit of measurement: absolute numbers of patients reporting the outcome occurring/happening</p> <p><i>Pain subscale SF-36 (moderate-severe)</i> Measurement: patient-reported. Unit of measurement: absolute number of patients reporting the outcome occurring/happening</p> <p><i>Average pain rating (0-10, 10 is most)</i> Measurement: patient-reported. Unit of measurement: on 0-10 scale (worst/most = 10), mean ± SD.</p> <p>* Primary outcome in study: detection and treatment of the target conditions and symp-</p>

Leveille 2009 (Continued)

	tom burden related to these conditions	
Notes	Funding: The Robert Wood Johnson Foundation (RWJF) Health e-Technologies Initiative Conflict of interest: Not reported.	
<i>Risk of bias</i>		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Author's quote: "Patients who screened positive and were eligible for the study were automatically randomized to the control or intervention groups stratified by provider"
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information about the sequence generation process to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	Described in detailed flow chart and equal lost to follow-up in both arms. ITT-analysis
Selective reporting (reporting bias)	Low risk	Protocol not accounted for, but found at clinicaltrial.gov (NCT00130416). No serious protocol deviations
Other bias	Low risk	No indication of other biases.

Mazonson 1996

Methods	Study design: cluster-randomised trial. Number of study arms: 2. Unit of randomisation: healthcare professional. Study period: about 1 year. Measurement points of outcomes: post intervention. Analysis method: not reported.
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<p>Participants</p>	<p>Setting <i>Healthcare setting:</i> primary care (Health Maintenance Organisation (HMO)). <i>Country:</i> USA.</p> <p>Patients <i>Inclusion/exclusion criteria:</i> Inclusion: 21-65 years and symptoms of anxiety and/or depression on Hopkins Symptom Checklist (SCL-90) above 'threshold' on two occasions Exclusion: previously diagnosed mental health condition or received treatment in the past 6 months <i>Numbers of patients:</i> 618. In intervention (patient-mediated intervention): 389. In comparison: 229. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> ● Age: Intervention; 42 years (SD = 10), comparison group; 44 years (SD = 11). Range 21-65. ● Gender: Females total 336/573. Intervention; 218/357 (61%), comparison; 118/216 (55%). ● Health conditions: General primary care population that were at risk of having or developing anxiety or depression symptoms. <p>Healthcare professionals <i>Type of healthcare professionals:</i> Primary care physicians. <i>Inclusion/exclusion criteria:</i> Not reported. <i>Numbers of healthcare professionals:</i> 75 healthcare professionals, representing 23 practices. In intervention (patient-mediated intervention): 40. In comparison: 35. <i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> ● Age: not reported. ● Gender: not reported. ● Experience/specialisation: mean year of residency completed was 1982 in intervention group and 1978 in comparison group. In the intervention group 66% of the speciality was family practice and 34% was internal medicine. In the comparison group these numbers were 74% and 26%, respectively. In the intervention group 97% had a board certification and in the comparison group the number was 91%. Mean years in practice was 11.2 (Sd = 10.3) in intervention group and 13.5 (SD = 9.7) in comparison group. Years in current practice was 10 (SD = 11.2) in intervention group and 11.9 (SD = 10.1) in comparison group. The number of patients seen per day was 24.2 (SD = 4.6) in intervention group and 25.1 (SD = 7.1) in comparison group.
<p>Interventions</p>	<p>Description of patient-mediated intervention: the intervention was designed to provide patient self-reported information on anxiety and depression symptoms and disorders to primary care physicians. Patients filled out the forms and a mental health patient profile was created that summarised and given to the treating physician. Along with the patient profile created, the physicians were offered additional support and information from the study researchers in a 1 hour face-to face meeting. Follow-up information in the patient profiles was provided to the physician at 11 weeks and 5 months. The patients were not aware of their scores</p> <p>Patient-mediated intervention category: patient-reported health information about own health/needs/concerns</p> <p>Comparison: no intervention. No feedback of PROMs scores to physicians or patients.</p>

	The patient profiles were provided to the comparison physicians after the study	
Outcomes	<p>Relevant primary outcomes <i>Recognition of mental health problems (any chart notation or description related to anxiety, stress, depression, or other mental health condition)</i> Measurement: medical records. Unit of measurement: absolute numbers.</p> <p>Relevant secondary outcomes No relevant outcomes reported. * Primary outcome in study: chart notation of anxiety, depression, or other mental health diagnoses or symptoms, referral to mental health specialists, prescription of psychotropic medications, hospitalisation, and office visits</p>	
Notes	<p>Funding: the Upjohn Company. Conflict of interest: one author was a former employee at the company that funded the study</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	High risk	No indication of attempting to blind the participants or personnel
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	Most physicians in both groups stayed on and all the patient was accounted for
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol not accounted for or found in clinicaltrials.gov
Other bias	Low risk	<p>This is a cluster-randomised trial and thus we have judged additional sources of potential bias:</p> <ul style="list-style-type: none"> Recruitment bias: no differences between those asked to participate and the 59% who agreed to participate.

Mazonson 1996 (Continued)

		<ul style="list-style-type: none"> • Baseline imbalance: no baseline difference in participating physicians. However, there were several baseline differences among patients. • Loss of clusters: none of the clusters were lost. • Incorrect analysis: for the five studies in which healthcare professionals were the unit of randomisation, the median ICC among similar studies for our primary outcome was 0.000 (95% CI; 0, 0.142) according to the University of Edinburgh's Database of ICCs (ABDN 2015). The effective sample sizes of these studies were thus the same as reported by the study authors. • Comparability with individually-randomised trials: no indication that this study had risk of herd-effect bias.
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McAlister 2005

<p>Methods</p>	<p>Study design: cluster-randomised trial. Number of study arms: 2. Unit of randomisation: practice. Study period: not reported. Measurement points of outcomes: 3 months and 12 months post intervention. Analysis method: ITT (reported by study authors).</p>
<p>Participants</p>	<p>Setting <i>Healthcare setting:</i> primary care (102 primary care practices). <i>Country:</i> Canada.</p> <p>Patients <i>Inclusion/exclusion criteria:</i> all adult patients with nonvalvular atrial fibrillation (diagnosed by their physician and confirmed by electrocardiogram) who were not living in an institution and had no other indication for or a contraindication to warfarin or ASA were identified in participating practices <i>Numbers of patients:</i> 446. In intervention: 228. In comparison: 218. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: intervention; 73 years (SD = 9), comparison; 71 years (SD = 10). • Gender: females total 169/434 (39%). Intervention; 95/219 (43%), comparison; 74/215 (34%). • Health conditions: patients with nonvalvular atrial fibrillation. <p>Healthcare professionals <i>Type of healthcare professionals:</i> physicians. <i>Inclusion/exclusion criteria:</i> not reported.</p>

	<p><i>Numbers of healthcare professionals:</i> not reported. In intervention: not reported. In comparison: not reported. <i>Characteristics of healthcare professionals:</i> not reported.</p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: not reported. <p><i>Numbers of primary care practices:</i> 102. In intervention: 50. In comparison: 52.</p>	
Interventions	<p>Description of patient-mediated intervention: patients received a decision aid consisting of a booklet and audiotape that are designed to be self-administered by patients at home</p> <p>Patient-mediated intervention category: patient decision aid.</p> <p>Comparison: usual care (patient information-like). All potential trial participants attended a group tutorial session before enrolment thus being provided with information about nonvalvular atrial fibrillation)</p>	
Outcomes	<p>Relevant primary outcomes <i>The proportion of patients whose therapy met the ACCP treatment recommendations</i> Measurement: assessed by telephone follow-up with patients and review of their medical, pharmacy and laboratory records Unit of measurement: absolute numbers.</p> <p>Relevant secondary outcomes No relevant outcomes reported. * Primary outcome in study: short-time effect on proportion of patients whose therapy met the ACCP treatment recommendations. Secondary outcome was the long-time effect on proportion of patients whose therapy met the ACCP treatment recommendations</p>	
Notes	<p>Funding: the Canadian Stroke Network, the Alberta Heritage Foundation for Medical Research (AHFMR), and the University Hospital Foundation, Edmonton</p> <p>Conflict of interest: none disclosed.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	Author's quote: "Randomization was done centrally to preserve allocation concealment using a computer generated sequence"
Allocation concealment (selection bias)	Low risk	See comment above. Thus no indication of selection bias for this cluster-randomised study

McAlister 2005 (Continued)

Blinding of participants and personnel (performance bias) All outcomes	High risk	Patients and providers were not blinded.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Outcome assessors were blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	All patients are accounted for. ITT-analysis.
Selective reporting (reporting bias)	Low risk	Protocol referred to (ISRCTN14429643). No serious protocol deviations
Other bias	Low risk	This is a cluster-randomised trial and thus we have judged additional sources of potential bias: <ul style="list-style-type: none"> • Recruitment bias: less than half of the patients consented to participate. • Baseline imbalance: there was no significant difference in baseline characteristics between the groups. • Loss of clusters: none of the clusters were lost. • Incorrect analysis: the effective total sample size for the three cluster-randomised studies included in our meta-analyses were calculated and are listed in Table 2. • Comparability with individually randomised trials: no indication that this study had risk of herd-effect bias.

McKinstry 2006

Methods	<p>Study design: randomised trial. Number of study arms: 2. Unit of randomisation: patient. Study period: 1 year starting 2002. Measurement points of outcomes: 1 year after intervention. Analysis method: ITT (reported by study authors).</p>
Participants	<p>Setting <i>Healthcare setting:</i> primary care (family practice). <i>Country:</i> Scotland. Patients <i>Inclusion/exclusion criteria:</i> people older than 18 years who had at least one systolic blood pressure recorded > 150 mmHg</p>

	<p><i>Numbers of patients:</i> 294. In intervention: 146. In comparison: 148. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: intervention; 64 years (SD = 10), comparison; 64 years (SD = 9). • Gender: females total 181/294 (62%). Intervention; 93/148 (62%), comparison; 88/146 (61%). • Health conditions: general patient population with high blood pressure. <p>Healthcare professionals <i>Type of healthcare professionals:</i> physicians and nurses. <i>Inclusion/exclusion criteria:</i> not reported. <i>Numbers of healthcare professionals:</i> not reported. In intervention: not reported. In comparison: not reported. <i>Characteristics of healthcare professionals:</i> not reported.</p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: not reported.
Interventions	<p>Description of patient-mediated intervention: patients were sent: 1) a standard information booklet from the British Hypertension Society (BHS), 2) a detailed guideline, and 3) a record card derived from the Lothian Hypertension Guideline which gave general information about blood pressure, but also provided the patient with clear guidelines as to how their blood pressure should be managed by medical and nursing staff, and a clear exhortation to question their care if the guideline was not being adhered to. The intervention was limited to the distribution of the guideline. Clinical staff members in the practice were fully informed of its content and were told to make use of it if patients took it with them to consultations. However, there was no follow-up mailing or telephone intervention to reinforce its use</p> <p>Patient-mediated intervention category: patient information.</p> <p>Comparison: usual care (patient information-like). Patients were sent a standard information booklet from the British Hypertension Society (BHS) by post</p>
Outcomes	<p>Relevant primary outcomes: <i>Proportion of patients prescribed statins according to guideline</i> <i>Proportion of patients prescribed aspirin according to guideline</i> Measurement: medical record. Unit of measurement: per cent correct prescriptions.</p> <p>Relevant secondary outcomes <i>Blood pressure (controlled, less than 150/90 mmHg)</i> Cholesterol Measurement: medical record. Unit of measurement: per cent correct prescriptions.</p> <p>Anxiety Depression Measurement: patient self-report. Unit of measurement: means.</p> <p>* Primary outcome in study: average systolic blood pressure. Secondary outcomes: proportion of patients with blood pressure < 150 mmHg systolic</p>

McKinstry 2006 (Continued)

	and < 90 mmHg diastolic, average cholesterol, proportion of patients prescribed statins and aspirin according to guideline, hospital anxiety and depression score	
Notes	Funding: Chief Scientist Office of the Scottish Executive. Conflict of interest: none disclosed.	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	They used computerised random number generation.
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	High risk	Patients were not blinded. At the time of taking the blood pressure the nurses were blind to the status of the patients (a few patients did, however, reveal which group they were in)
Blinding of outcome assessment (detection bias) All outcomes	Low risk	The research nurse, blind to patient randomisation, examined participants prescribing records for evidence of aspirin and statin use
Incomplete outcome data (attrition bias) All outcomes	Low risk	Losses to follow-up were minimal and equally distributed. ITT-analysis
Selective reporting (reporting bias)	Low risk	Protocol not accounted for, but found at clinicaltrial.gov (NCT00148434). No obvious protocol deviations
Other bias	Low risk	No indication of any other biases.

Miaskowski 2004

Methods	<p>Study design: randomised trial.</p> <p>Number of study arms: 2.</p> <p>Unit of randomisation: patient.</p> <p>Study period: not reported.</p> <p>Measurement points of outcomes: post intervention (measured over the 6 weeks the study took place and after the intervention)</p> <p>Analysis method: Not reported.</p>
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<p>Participants</p>	<p>Setting <i>Healthcare setting:</i> hospital (a university-based cancer centre, two community-based oncology practices, one health maintenance organisation, one outpatient radiation therapy centre, one veteran's affairs facility, and one military hospital) <i>Country:</i> USA.</p> <p>Patients <i>Inclusion/exclusion criteria:</i> Inclusion: adult oncology outpatients (18 years or older) who were able to read, write, and understand English. All patients had Karnofsky performance scores of 50 or more, average pain intensity scores of 2.5 or more, and radiographic evidence of bone metastasis <i>Numbers of patients:</i> 174. In intervention: 93. In comparison: 81. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> ● Age: intervention; 60 years (SD = 11.6), comparison; 58.8 years (SD = 12.9). ● Gender: females, intervention; 64/93 (68.8%), comparison; 59/81 (72.8%). ● Health conditions: adult patients with cancer pain from bone metastasis. <p>Healthcare professionals <i>Type of healthcare professionals:</i> physicians. <i>Inclusion/exclusion criteria:</i> not reported. <i>Numbers of healthcare professionals:</i> not reported. In intervention: not reported. In comparison: not reported. <i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> ● Age: not reported. ● Gender: not reported. ● Experience/specialisation: not reported.
<p>Interventions</p>	<p>Description of patient-mediated intervention: PRO-SELF group patients were seen by specially trained intervention nurses and received a psychoeducational intervention, were taught how to use a pillbox, and were given written instructions on how to communicate with their physician about unrelieved pain and the need for changes in their analgesic prescriptions. Patients were coached during two follow-up home visits and three phone calls on how to improve their cancer pain management</p> <p>Patient-mediated intervention category: patient education.</p> <p>Comparison: usual care (patient information-like). Patients in the standard care arm were seen by a research nurse three times and were called three times by phone between the home visits. Patients in the standard care group received the patient version of the Cancer Pain Guideline published by the Agency for Health Care Policy and Research (AHCPR) and were seen by a research nurse in their homes at weeks 1, 3, and 6. Telephone interviews were conducted at weeks 2, 4, and 5. The focus of the visits and phone calls was on monitoring patients' level of adherence with completing the diary</p>
<p>Outcomes</p>	<p>Relevant primary outcomes <i>Appropriate analgesic prescription (around-the-clock (ATC) + as-needed (PRN))</i> <i>Measurement:</i> type of opioid prescription (no opioid, only PRN opioid, only ATC opioid, both ATC + PRN opioid) <i>Unit of measurement:</i> Percent. <i>Total dose of opioid analgesics prescribed pr patient per 24 hours</i></p>

	<p>Measurement: not reported.</p> <p>Unit of measurement: changes, from baseline, in total dose of opioid analgesics (mg of morphine) prescribed on a 24-hour basis</p> <p>Relevant secondary outcomes</p> <p>Patient outcomes</p> <p>Different pain intensity measurements:</p> <p>Average pain</p> <p>Worst pain</p> <p>Least pain</p> <p>Measurement: patient self-report before bedtime for 6 weeks using a descriptive numeric rating scale that ranged from 0 (none) to 10 (excruciating)</p> <p>Unit of measurement: 1-10 score, mean.</p> <p>* Primary outcome in study: pain intensity. The secondary outcomes were opioid analgesic intake and appropriate analgesic prescription</p>	
Notes	<p>Funding: the National Cancer Institute. Additional funding from Janssen Pharmaceutica and Purdue Pharma LP</p> <p>Conflict of interest: none disclosed.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	Low risk	Both patients and clinicians at the study sites were blinded to the patient's group assignment
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	Author's quote: "Thirty-eight patients (i. e. 22 in the PRO-SELF group and 16 in the standard care group) did not complete the entire study for a variety of reasons, including increased severity of illness or intervening cancer treatments that required hospitalization (n 28; 16 in the PRO-SELF group and 12 in the standard care group) and death (n 10; six in the PRO-SELF group and four in the standard care group)."

Miaskowski 2004 (Continued)

Selective reporting (reporting bias)	Low risk	Protocol is not accounted for, but found on clinicaltrials.gov (NCT00708019). No obvious protocol deviations
Other bias	Low risk	No indication of any other biases.

Mouland 1997

Methods	<p>Study design: randomised trial. Number of study arms: 2. Unit of randomisation: patient. Study period: 1994 - 1995. Measurement points of outcomes: 4-12 months post intervention (average 6 months). Analysis method: not reported.</p>
Participants	<p>Setting <i>Healthcare setting:</i> primary care (4 primary care practices). <i>Country:</i> Norway.</p> <p>Patients <i>Inclusion/exclusion criteria:</i> Inclusion: assumed daily use of benzodiazepine for at least 3 months of 0.2 or more DDD (daily defined dose). Exclusion: chronic psychosis, severe personal disorders, serious somatic illness, alcohol or drug abuse or daily use of analgesia with codeine <i>Numbers of patients:</i> 169. In intervention: 100. In comparison: 69. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: average 64 years (range 33-90). Group numbers not reported. • Gender: females 70%. Group numbers not reported. • Health conditions: benzodiazepine users. <p>Healthcare professionals <i>Type of healthcare professionals:</i> general practitioner. Inclusion/exclusion criteria: not reported. <i>Numbers of healthcare professionals:</i> 8. In intervention: not reported. In comparison: not reported. <i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: male 8/8 (100%). • Experience/specialisation: all physicians had been in practice in over 10 years and were all specialists in family medicine (family practice).
Interventions	<p>Description of patient-mediated intervention: patients were sent a letter arguing for reduction of daily benzodiazepine intake, or cessation of the drug Patient-mediated intervention category: patient information. Comparison: no intervention (placebo-like). No letters sent to patients. All clinicians</p>

	participating in the trial was provided with information about reducing benzodiazepine use	
Outcomes	<p>Relevant primary outcomes <i>No benzodiazepines prescription</i> <i>50-90% reduction in benzodiazepines prescriptions</i> <i>0-49% reduction in benzodiazepines prescriptions</i> <i>Increase in benzodiazepines prescriptions</i> Measurement: medical record. Unit of measurement: per cent. <i>Average prescription of benzodiazepines in a 6-month period</i> Measurement: medical record. Unit of measurement: DDD (daily defined dose).</p> <p>Relevant secondary outcomes No relevant outcomes reported. * Primary outcome in study: not reported.</p>	
Notes	Funding: not reported. Conflict of interest: not reported.	
<i>Risk of bias</i>		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	The allocation of patients was decided on the basis of the birth date, but the randomisation of which dates was performed by toss a coin
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	High risk	Patients and healthcare providers knew if the patients received a letter
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	14 patients were lost to follow-up and reasons are death, institutionalised or moved to another physician; 8 in letter group and 6 in comparison group
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol not accounted for or found in clinicaltrials.gov

Other bias	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
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Nagykaldi 2012

Methods	<p>Study design: cluster-randomised trial.</p> <p>Number of study arms: 2.</p> <p>Unit of randomisation: practice.</p> <p>Study period: 1 year.</p> <p>Measurement points of outcomes: post intervention (1 year after intervention started)</p> <p>.</p> <p>Analysis method: ITT (reported by study authors).</p>
Participants	<p>Setting</p> <p><i>Healthcare setting:</i> primary care (8 Physicians Resource/Research Network clinicians practices)</p> <p><i>Country:</i> USA.</p> <p>Patients</p> <p><i>Inclusion/exclusion criteria:</i> Inclusion: patients that had been seen at least twice by the enrolled physician in the last year, were either children (less than 6 years old) or between 40 and 75 years old (women) or 50 and 75 years old (men), could understand and respond in English, and had a basic level of computer skills, and understand/respond to web content phrased at 6th grade level</p> <p><i>Numbers of patients:</i> 560.</p> <p>In intervention: not reported, but we assume 280 enrolled. No information about the group distribution after lost to follow-up</p> <p>In comparison: not reported, but we assume 280 enrolled. No information about the group distribution after lost to follow-up</p> <p><i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: intervention; 54.6 years, comparison; 50.5 years (no SD provided). • Gender: females 328/538 (61%). Intervention; 63%, comparison; 59%. • Health conditions: general primary care population. <p>Healthcare professionals</p> <p><i>Type of healthcare professionals:</i> physicians, nurse practitioners and physician assistants.</p> <p><i>Inclusion/exclusion criteria:</i></p> <p><i>Numbers of healthcare professionals:</i> not reported.</p> <p>In intervention: not reported.</p> <p>In comparison: not reported.</p> <p><i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: insufficient reported (male physicians, female nurses (n = 3)). • Experience/specialisation: not reported.
Interventions	<p>Description of patient-mediated intervention: patients were offered access to use Wellness Portal-a novel, web-based patient portal that focuses on wellness, prevention, and longitudinal health assistance. They were also encouraged to print their wellness plan and discuss the plan with their physician at their next office visit</p> <p>Patient-mediated intervention category: patient information (patient portal).</p>

	Comparison: no intervention. Patients in these practices were not given access to the portal and they did not receive personalised recommendations or a wellness plan	
Outcomes	<p>Relevant primary outcomes <i>Adults provided all recommended preventive services</i> <i>Adults given low dose aspirin, if indicated</i> <i>Adults given Pneumococcal vaccination because of chronic health conditions</i> <i>Adults given Pneumococcal vaccination because of chronic health conditions</i> <i>Children given all recommended immunisations</i></p> <p>Measurement: patient-reported via the portal web and Medical records of patients (paper and electronic) were reviewed in the practice to determine the number and type of selected preventive services received before and during the 12-month study period</p> <p>Unit of measurement: percent.</p> <p>Relevant secondary outcomes No relevant outcomes reported. * Primary outcome in study: not reported.</p>	
Notes	<p>We attempted to contact the first author. No reply received.</p> <p>Funding: not reported.</p> <p>Conflict of interest: none disclosed.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Author's quote: "Pairs of clinician practices were matched on location and practice type (urban, suburban, or rural and solo, small, or midsize) and then randomized within pairs to intervention and control arms"
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not blinded.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Author's quote: "outcome evaluations were completed without an explicit knowledge of group affiliations"
Incomplete outcome data (attrition bias) All outcomes	High risk	Lost to follow-up reported and 31.5%. It is unclear if any groups had higher attrition than others. ITT-analysis

Nagykaldi 2012 (Continued)

Selective reporting (reporting bias)	Low risk	Protocol not accounted for, but found at clinicaltrial.gov (NCT01520662). No obvious protocol deviations
Other bias	High risk	<p>This is a cluster-randomised trial and thus we have judged additional sources of potential bias:</p> <ul style="list-style-type: none"> • Recruitment bias: no indication of recruitment bias. • Baseline imbalance: no demographic baseline imbalance in the patients except for education and income. • Loss of clusters: none of the clusters were lost. • Incorrect analysis: we did not attempt to re-analyse studies that were not pooled in a meta-analysis. • Comparability with individually-randomised trials: no indication that this study had risk of herd-effect bias.

Quinn 2008

Methods	<p>Study design: randomised trial. Number of study arms: 2. Unit of randomisation: patient. Study period: 2006 (3-month study). Measurement points of outcomes: post intervention. Analysis method: not reported.</p>
Participants	<p>Setting <i>Healthcare setting:</i> primary care (one community endocrinology and two community primary care practices) <i>Country:</i> USA.</p> <p>Patients <i>Inclusion/exclusion criteria:</i> Inclusion: patients 18-70 years old who had a diagnosis of type 2 diabetes for at least 6 months. Study patients were required to have an A1c of 7.5% or more and to have been on a stable diabetes therapeutic regimen for 3 months prior to study enrolment <i>Numbers of patients:</i> 30. In intervention: 15. In comparison: 15. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: 14 patients between 20-54 years, 12 patients 55-64 years. No group numbers reported. • Gender: 17/26 females (65.38%). No group numbers reported. • Health conditions: diabetes type 2. <p>Healthcare professionals</p>

	<p><i>Type of healthcare professionals:</i> physicians. <i>Inclusion/exclusion criteria:</i> not reported. <i>Numbers of healthcare professionals:</i> not reported. <i>In intervention:</i> not reported. <i>In comparison:</i> not reported. <i>Characteristics of healthcare professionals:</i> not reported.</p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: physician specialty was primary care or endocrinology. 				
Interventions	<p>Description of patient-mediated intervention: the intervention group received cell phone based software that provided real-time feedback on patients' blood glucose levels, displayed patients' medication regimens, incorporated hypo- and hyperglycaemia treatment algorithms, and requested additional data needed to evaluate diabetes management. Patient data captured and transferred to secure servers were analysed by proprietary statistical algorithms. The system sent computer-generated logbooks (with suggested treatment plans) to intervention patients' healthcare provider (physician)</p> <p>Patient-mediated intervention category: patient-reported health information about own health/needs/concerns</p> <p>Comparison: no intervention (placebo-like). Patients randomised to this group received blood glucose (BG) monitors and adequate BG testing strips and lancets for the duration of the study. They were asked to fax or call in their BG logbooks every 2 weeks to their healthcare provider (physician) until their BG levels were stabilised in the target ranges or until their healthcare provider (physician) changed testing frequency</p>				
Outcomes	<p>Relevant primary outcomes <i>Medications titrated or changed by their healthcare provider</i> <i>Medication errors identified by their healthcare provider</i> Measurement: medical record. Unit of measurement: absolute numbers.</p> <p>Relevant secondary outcomes HbA1c Measurement: medical record. Unit of measurement: percent.</p> <p>Depression diagnosis Measurement: medical record. Unit of measurement: absolute numbers.</p> <p>Provider diabetes management improved by receipt of blood sugar measurements Measurement: patient self-report. Unit of measurement: absolute numbers.</p> <p>* Primary outcome in study: HbA1c. Secondary outcomes were on health care provider (HCP) adherence to prescribing guidelines and HCPs' adoption of the technology</p>				
Notes	<p>Funding: LifeScan, Inc. and Nokia, Inc. Conflict of interest: not reported.</p>				
<i>Risk of bias</i>					
Bias	<table border="1"> <thead> <tr> <th>Authors' judgement</th> <th>Support for judgement</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> </tbody> </table>	Authors' judgement	Support for judgement		
Authors' judgement	Support for judgement				

Quinn 2008 (Continued)

Random sequence generation (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	High risk	Not blinded.
Blinding of outcome assessment (detection bias) All outcomes	High risk	Not blinded.
Incomplete outcome data (attrition bias) All outcomes	Low risk	30 randomised and 26 analysed. Author's quote: "Characteristics for drop-out subjects were not different from the remaining study subjects"
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol not accounted for or found in clinicaltrials.gov
Other bias	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'

Thiboutot 2013

Methods	<p>Study design: cluster-randomised trial. Number of study arms: 2. Unit of randomisation: healthcare professional. Study period: 1 year. Measurement points of outcomes: post intervention (at end of study (1 year)). Analysis method: ITT (reported by study authors).</p>
Participants	<p>Setting <i>Healthcare setting:</i> primary care practices. <i>Country:</i> USA. Patients <i>Inclusion/exclusion criteria:</i> Inclusion: Age 21 years or older, fluent in English, at least 2 high blood pressure readings in the previous 12 months (130/80 mmHg or higher for patients with diabetes or chronic kidney disease, 140/90 mmHg or higher for patients without), and their physician was participating in the study Exclusion: Receiving care from another physician for hypertension treatment (e.g. cardiologist), hospitalised for a psychiatric disorder in the past 3 years, participating in another clinical research study, pregnant or planned to become pregnant in the next 12</p>

	<p>months, planning on moving out of the area in the next 12 months, no personal access to the Internet at home or at work, and no personal email account</p> <p><i>Numbers of patients:</i> 500.</p> <p>In intervention: 282.</p> <p>In comparison: 218.</p> <p><i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: total 60.5 years (SD = 11.9). Intervention; 59.6 years (SD = 12.1), comparison; 61.6 years (SD = 11.4). • Gender: females total 288/500 (57.6%). Intervention; 165/282 (58.5%), comparison; 123/218 (56.4%). • Health conditions: general patient population with high blood pressure. <p>Healthcare professionals</p> <p><i>Type of healthcare professionals:</i> primary care physicians.</p> <p><i>Inclusion/exclusion criteria:</i> physicians that were board-certified in internal medicine or family practice, did not have specialty training in nephrology or cardiology, were clinically active (at least 50% of their time spent providing direct primary care), were not planning to retire in the next two years, listed as retired, part-time or inactive</p> <p><i>Numbers of healthcare professionals:</i> 54.</p> <p>In intervention: 27.</p> <p>In comparison: 27.</p> <p><i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: not reported.
Interventions	<p>Description of patient-mediated intervention: patients received a Web-based intervention for 12 months, which included: 1) Web-based hypertension feedback based on the individual patient's self-report of health variables decision rules, and tailored feedback based on recommendations from JNC 7, 2) a "pocket chart" that patients could print and take to their doctor visits to help them record their blood pressure that could later be entered into the website, and 3) automated reminders that tracked the dates of upcoming visits with their PCP to remind patients to use the website before physician visits. Patients were expected to use the website at least once each month and received reminder emails if 30 days had elapsed since the last time they used the website</p> <p>Patient-mediated intervention category: patient education.</p> <p>Comparison: usual care (placebo-like). Patients received the same components of the intervention as intervention condition patients (e.g. Web-based personalised feedback, pocket chart, email reminders), but the website focused on preventive services that were not related to hypertension care (e.g. mammography screening, tetanus immunisations) and were recommended by the USPSTF (placebo)</p>
Outcomes	<p>Relevant primary outcomes</p> <p>Hypertension screening tests(creatinine, urine protein, serum potassium)</p> <p>Measurement: medical records.</p> <p>Unit of measurement: absolute numbers.</p> <p>Doctor recommended starting a new blood pressure medication</p> <p>Measurement: patient self-report.</p> <p>Unit of measurement: absolute numbers.</p> <p>Doctor recommended increasing dose of a blood pressure medication</p>

	<p>Measurement: patient self-report. Unit of measurement: absolute numbers. Relevant secondary outcomes Patient outcomes: Controlled blood pressure Measurement: medical records. Unit of measurement: absolute numbers. * Primary outcome in study: change in blood pressure and change in the percentage of patients in each group with controlled blood pressure. Secondary outcomes were hypertension screening tests, lifestyle counselling, and medication intensification</p>	
Notes	<p>Funding: the National Heart, Lung and Blood Institute. The user interface development was done by Digital Alternatives under contract by authors To ensure fidelity to the use of the intervention, patients in both conditions were eligible to receive US \$5 for each month they used the website, for a potential total of US \$60 Conflict of interest: none disclosed.</p>	
Risk of bias		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Low risk	The primary care physicians were enrolled and randomised into 1 of 2 conditions by selecting an envelope containing a document with one of the two conditions assigned (intervention or comparison condition) from a stack of sealed envelopes. A statistician generated the order of the envelopes
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	Low risk	To minimise the potential for unblinding physicians, all recruitment letters and discussions with physicians stated that the overall goal of the study was to improve primary and secondary prevention for patients with hypertension
Blinding of outcome assessment (detection bias) All outcomes	Low risk	To reduce the chances that staff would treat patients differently, particularly while assessing outcomes, staff were blinded to the condition of the provider
Incomplete outcome data (attrition bias) All outcomes	Low risk	Low attrition rate. ITT-analysis.

Thiboutot 2013 (Continued)

Selective reporting (reporting bias)	Low risk	Protocol is not accounted for, but found on clinicaltrials.gov (NCT00377208). No obvious deviations found
Other bias	High risk	<p>This is a cluster-randomised trial and thus we have judged additional sources of potential bias:</p> <ul style="list-style-type: none"> • Recruitment bias: over 800 physicians contacted and only 54 agreed to participate. Likewise, only 17% of the patients agreed to participate. • Baseline imbalance: Authors' quote: "There were no significant differences in most variables between study groups". • Loss of clusters: none of the clusters were lost. • Incorrect analysis: for the five studies in which healthcare professionals were the unit of randomisation, the median ICC among similar studies for our primary outcome was 0.000 (95% CI; 0, 0.142) according to the University of Edinburgh's Database of ICCs (ABDN 2015). The effective sample sizes of these studies were thus the same as reported by the study authors. • Comparability with individually randomised trials: no indication that this study had risk of herd-effect bias.

Thomas 2003

Methods	<p>Study design: randomised trial. Number of study arms: 3. Unit of randomisation: patient. Study period: Aug - Sept 1998 patient charts were screened for eligibility as patients presented for their clinic visits. No more information provided Measurement points of outcomes: post intervention (immediately after clinic visit). Analysis method: ITT (reported by study authors).</p>
Participants	<p>Setting <i>Healthcare setting:</i> public hospital. <i>Country:</i> USA. Patients <i>Inclusion/exclusion criteria:</i> Inclusion: At least one of the targeted vaccine indications (age > 65 years, heart or lung disease, or diabetes) and were not previously vaccinated Exclusion: deafness, blindness, language barriers, chart-documented dementia, and in-</p>

	<p>eligible clinic visits (such as walk-in visits, first-time visits, and medication refill visits in which patients did not see a provider) <i>Numbers of patients:</i> 371 (in study n = 558 with 3 arms). In intervention: 189. In comparison: 182. (In arm 3 n = 187). <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: intervention; 63.4 years (SD = 12.7), comparison; 63.3 years (SD = 12.9). • Gender: females total 263/371 (70.9%). Intervention 1; 144/189 (76.2%), comparison; 119/182 (65.4%). • Health conditions: general primary care population at risk for complication with a pneumococcal infection. <p>Healthcare professionals <i>Type of healthcare professionals:</i> primary care physicians. <i>Inclusion/exclusion criteria:</i> not reported. <i>Numbers of healthcare professionals:</i> not reported. In intervention: not reported. In comparison: not reported. <i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: not reported.
Interventions	<p>Description of patient-mediated intervention: Patients saw a videotape and received a intervention brochure about the pneumococcal vaccine. The brochure presented minimal information about the vaccine and prompted the patient to ask his/her doctor about the pneumonia shot today Patient-mediated intervention category: patient information. Comparison: usual care (placebo-like). Patients received a brochure about nutrition (The study had a third arm not addressed here consisting of the patient-mediated intervention with a control brochure (nutrition) in stead of pneumococcal vaccine brochure)</p>
Outcomes	<p>Relevant primary outcomes <i>Primary care physician recommended vaccine</i> <i>Measurement:</i> patient self-report. <i>Unit of measurement:</i> absolute numbers. Relevant secondary outcomes No relevant outcomes reported. * Primary outcome in study: discussion of vaccine and patients receiving vaccine. Secondary outcomes were patient read brochure, patient showed brochure to primary care physician, and primary care physician recommended vaccine</p>
Notes	<p>Funding: National Vaccine Program and the CDC Emerging Infections Program. Also supported in part by Indigent Care Trust Funds from the State of Georgia to the Office of Health Promotion and Disease Prevention at Grady Health System Conflict of interest: not reported.</p>
<i>Risk of bias</i>	

Thomas 2003 (Continued)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Author's quote: "For the randomization, each eligible patient was sequentially assigned to the VB, V, or C groups by the study staff; thus, the first and then every third eligible patient was assigned to the VB group, every third eligible patient following a VB patient was assigned to the V group, and every third eligible patient following a V patient was assigned to the C group"
Allocation concealment (selection bias)	High risk	See comment above.
Blinding of participants and personnel (performance bias) All outcomes	High risk	No blinding.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	ITT-analysis.
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol not accounted for or found in clinicaltrials.gov
Other bias	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'

Turner 1990

Methods	<p>Study design: randomised trial.</p> <p>Number of study arms: 2.</p> <p>Unit of randomisation: healthcare professional.</p> <p>Study period: Sept 1987 - May 1988</p> <p>Measurement points of outcomes: post intervention, but not reported exactly time point.</p> <p>Analysis method: Not reported.</p>
Participants	<p>Setting</p> <p><i>Healthcare setting:</i> outpatient centre.</p> <p><i>Country:</i> USA.</p> <p>Patients</p> <p><i>Inclusion/exclusion criteria:</i> not reported.</p>

	<p><i>Numbers of patients:</i> 423. In intervention: 177. In comparison: 246. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> • Age: total 141/423 over 64 years (33.3%). Intervention; 65/177 (37%), comparison; 76/246 (31%). • Gender: females total 282/423 (66.6%). Intervention; 112/177 (63%), comparison; 710/246 (69%). • Health conditions: general primary care population. <p>Healthcare professionals <i>Type of healthcare professionals:</i> physicians. Inclusion/exclusion criteria: not reported. <i>Numbers of healthcare professionals:</i> 24. In intervention: 12. In comparison: 12. <i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: resident physicians (first second and third year).
Interventions	<p>Description of patient-mediated intervention: patients received a health maintenance prompt card from a clinic receptionist and instructed to keep this card, bring it to all future appointments, and show it to the physician. No attempt was made to educate about health maintenance</p> <p>Patient-mediated intervention category: Patient information.</p> <p>Comparison: no intervention (placebo-like). Patients did not receive prompt cards. A computer-prompting system was instituted to remind all residents to perform a list of preventive measures when indicated</p>
Outcomes	<p>Relevant primary outcomes <i>Pap-smear</i> <i>Breast exam</i> <i>Mammography scheduled</i> <i>Stool occult test</i> <i>Influenza vaccine</i> <i>Pneumococcal vaccine</i> Measurement: medical record. Unit of measurement: absolute numbers of indicated.</p> <p>Relevant secondary outcomes No relevant outcomes reported. * Primary outcome in study: not reported.</p>
Notes	<p>Funding: North Carolina United Way. Conflict of interest: not reported.</p>
<i>Risk of bias</i>	
Bias	<p>Authors' judgement</p> <p>Support for judgement</p>

Turner 1990 (Continued)

Random sequence generation (selection bias)	High risk	Author's quote: "The groups were randomized into control and experimental groups based on their assigned clinic day"
Allocation concealment (selection bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	No loss to follow-up.
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol not accounted for or found in clinicaltrials.gov
Other bias	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'

Wright 2012

Methods	<p>Study design: cluster-randomised trial. Number of study arms: 2. Unit of randomisation: practices. Study period: Sept 2005 - Mar 2007. Measurement points of outcomes: 60 days post intervention. Analysis method: ITT and on-treatment (reported by study authors).</p>
Participants	<p>Setting <i>Healthcare setting:</i> primary care (11 primary care practices). <i>Country:</i> USA. Patients <i>Inclusion/exclusion criteria:</i> Inclusion: To participate in this study, patients had to have an active Patient gateway account and a primary care provider assigned in the Longitudinal Medical Record (LMR) <i>Numbers of patients:</i> 3979 eligible to start with, 856 eligible to receive reminders (indications) In intervention: 396. In comparison: 460. <i>Characteristics of patients:</i></p> <ul style="list-style-type: none"> Age: intervention; 47.0 years (SD = 12.7), comparison; 51.2 years SD = 12.8).

	<p>The distribution among the eligible to receive reminders was not reported.</p> <ul style="list-style-type: none"> • Gender: intervention; 1432/2,219 (64.5%), comparison; 965/1,760 (54.8). The distribution among the eligible to receive reminders was not reported. • Health conditions: general adult primary care population. <p>Healthcare professionals <i>Type of healthcare professionals:</i> physicians. <i>Inclusion/exclusion criteria:</i> not reported. <i>Numbers of healthcare professionals:</i> 167. <i>In intervention:</i> not reported. <i>In comparison:</i> not reported. <i>Characteristics of healthcare professionals:</i></p> <ul style="list-style-type: none"> • Age: not reported. • Gender: not reported. • Experience/specialisation: not reported. <p>Practices <i>Numbers of practices:</i> 11. <i>In intervention:</i> 7. <i>In comparison:</i> 4.</p>
Interventions	<p>Description of patient-mediated intervention: patients with an active Patient gateway account in the intervention arm could receive any of six types of health maintenance reminders as indicated: bone density testing, cholesterol testing, influenza vaccination, mammography, Pap smear and pneumococcal vaccination. Information was transmitted to the LMR, through which the patient's PCP could review eJournals and order screenings. Providers received reminders when a patient was due for a health maintenance procedure</p> <p>Patient-mediated intervention category: patient information.</p> <p>Comparison: usual care (placebo-like). Patients in the active control arm were invited to complete eJournals that allowed them to review and modify medication and allergy lists and diabetes management information (placebo). Providers received reminders when a patient was due for a health maintenance procedure. The primary difference between the arms was the content of the modules patients reviewed after opening an eJournal</p>
Outcomes	<p>Relevant primary outcomes <i>Influenza vaccines</i> <i>Mammography</i> <i>Pap smears</i> <i>Pneumovax</i> <i>Bone density</i> <i>Cholesterol</i> <i>Measurement:</i> not reported, but most likely medical record. <i>Unit of measurement:</i> absolute numbers of those indicated.</p> <p>Relevant secondary outcomes No relevant outcomes reported. * Primary outcomes in study: adherence to guideline-based care recommendations (all outcomes here within)</p>
Notes	<p>Funding: AHRQ. Conflict of interest: none disclosed.</p>

<i>Risk of bias</i>		
Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	Author's quote: "Randomization was carried out by the study statistician who had no further role in the project"
Allocation concealment (selection bias)	Unclear risk	Insufficient information about the allocation procedure. Cluster-randomised study and thus increased risk of selection bias
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'
Incomplete outcome data (attrition bias) All outcomes	Low risk	All participants are accounted for. ITT-analysis.
Selective reporting (reporting bias)	Unclear risk	Insufficient information to permit judgement of 'Low risk' or 'High risk'. Protocol not accounted for or found in clinicaltrials.gov
Other bias	High risk	<p>This is a cluster-randomised trial and thus we have judged additional sources of potential bias</p> <ul style="list-style-type: none"> • Recruitment bias: no mention of exclusion criteria, but only eligible patients was invited. Author's quote: "Once the study commenced, eligible patients were invited to participate via a secure PG message (signed by principal investigators BM and JW) that included a link to a consent form". • Baseline imbalance: author's quote: "due to the use of cluster randomization in this study, there were small but significant differences between study arms". • Loss of clusters: not reported. • Incorrect analysis: the effective total sample size for the three cluster-randomised studies included in our meta-analyses were calculated and are listed in

Table 2.

- Comparability with individually randomised trials: no indication that this study had risk of herd-effect bias.

ASA: acetylsalicylic acid
 CEC: colorectal cancer
 CI: confidence interval
 ICC: intra-cluster correlation coefficient
 ITT: intention-to-treat
 SD: standard deviation
 SE: standard error

Characteristics of excluded studies [ordered by study ID]

Study	Reason for exclusion
Adams 2014	No relevant professional performance outcomes reported
Alexander 2011	Not patient-mediated intervention(s)
Altiner 2007	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Amble 2015	No relevant professional performance outcomes reported
Anderson 2004	No relevant professional performance outcomes reported
Ansari 2003	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Atherton-Naji 2001	The relevant professional performance outcomes are not reported with recommended or desired direction
Barr 2001	No relevant professional performance outcomes reported
Basch 1999	No relevant professional performance outcomes reported
Becker 1989	No relevant professional performance outcomes reported
Besette 2011	The relevant professional performance outcomes is likely to be confounded by patients attendance rates
Bickman 2011	No relevant professional performance outcomes reported
Bird 1990	No relevant professional performance outcomes reported

(Continued)

Bloomfield 2005	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Branch 1999	No relevant professional performance outcomes reported (skills rather than performance)
Brinkman 2007	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Brodey 2005	No relevant professional performance outcomes
Burack 1994	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Burack 1996	No relevant professional performance outcomes reported
Burack 1998	No relevant professional performance outcomes reported
Burack 2003	No relevant professional performance outcomes reported
Campbell 1997	No relevant professional performance outcomes reported
Chang 2012	Not a RCT
Chodosh 2015	No relevant professional performance outcomes reported
Chou 2011	No relevant professional performance outcomes reported
Clementz 1990	No relevant professional performance outcomes reported
Clever 2006	Not a RCT
Clover 1992	No relevant professional performance outcomes reported
Cohen-Cline 2014	No relevant professional performance outcomes reported
Cooper 2011	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Cooper 2013	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Corson 2011	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Costanza 2007	No relevant professional performance outcomes reported

(Continued)

Datto 2003	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Deeb 1988	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Dietrich 2013	No relevant professional performance outcomes reported
Dolan 2002	No relevant professional performance outcomes reported
Early 2015	No relevant professional performance outcomes reported
Echeverry 2003	Not a RCT
Feder 1999	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Finlay 1999	No relevant professional performance outcomes reported
Fisher 2011	No relevant professional performance outcomes reported
Fleisher 1999	No relevant professional performance outcomes reported
Flottorp 2002	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Fluckiger 2012	No relevant professional performance outcomes reported
Fortuna 2014	No relevant professional performance outcomes reported
Förberg 2017	Not patient-mediated intervention(s)
Gabbay 2012	Not patient-mediated intervention(s)
Gallagher 2010	No relevant professional performance outcomes reported. Author contacted. No reply received
Garcia 2013	Not patient-mediated intervention(s)
Garcia 2015	Not patient-mediated intervention(s)
Gersch 2014	No relevant professional performance outcomes reported
Ghadieh 2015	No relevant professional performance outcomes reported
Ginson 2000	Not patient-mediated intervention(s)
Gooding 2012	Not a RCT

(Continued)

Grace 2005	Not a RCT
Greco 2001	No relevant professional performance outcomes reported
Haskard 2008	No relevant professional performance outcomes reported
Hornberger 1997	No relevant professional performance outcomes reported
Jager 2017	The patient-mediated intervention is one of two or more components in an intervention package. It is not the main component
Katz 2011	Comparison of two similar patient-mediated interventions (differ by one intervention component)
Kinugasa 2014	Not a RCT
Kravitz 2005	Not patient-mediated intervention(s)
Lafata 2007	The relevant professional performance outcomes is likely to be confounded by patients attendance rates
Lawton 2017	No relevant professional performance outcomes reported
Levy 2013	No relevant professional performance outcomes reported
Linder 2009	Not patient-mediated intervention(s)
Little 2004	No relevant professional performance outcomes reported. Author contacted and reply received
Liu 2016	Not patient-mediated intervention(s)
Lynch 2004	No relevant professional performance outcomes reported
Manfredi 1998	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Marshall 2016	Not patient-mediated intervention(s)
Marteau 2010	No relevant professional performance outcomes reported
Menon 2011	The relevant professional performance outcomes is likely to be confounded by patients attendance rates
Michalopoulou 2010	Not a RCT
Mitchell 2005	Not patient-mediated intervention(s)
Mohler 1995	No relevant professional performance outcomes reported
Myers 2007	No relevant professional performance outcomes reported

(Continued)

Myers 2008	No relevant professional performance outcomes reported
Myers 2011	No relevant professional performance outcomes reported
O'Connor 2009	The relevant professional performance outcomes is likely to be confounded by patients attendance rates
Olsson 2012	No relevant professional performance outcomes reported
Ornstein 1991	The relevant professional performance outcomes is likely to be confounded by patients attendance rates
Osborn 2010	Not patient-mediated intervention(s)
Osman 1994	The relevant professional performance outcomes are not reported with recommended or desired direction
Osman 2002	The relevant professional performance outcomes are not reported with recommended or desired direction
Persell 2008	No relevant professional performance outcomes reported
Porter 2006	Not a RCT
Raisch 1999	Not a RCT
Reinders 2010	Not a RCT
Rise 2012	No relevant professional performance outcomes reported
Robling 2012	Not patient-mediated intervention(s)
Roland 1989	No relevant professional performance outcomes reported
Rosenthal 2005	Not patient-mediated intervention(s)
Rosser 1991	The relevant professional performance outcomes is likely to be confounded by patients attendance rates
Rubenstein 1995	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Sherrard 2015	No relevant professional performance outcomes reported
Simon 2012	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Smeele 1999	Not patient-mediated intervention(s)
Smit 2005	The patient-mediated intervention is one of two or more components in an intervention package. It is not the main component

(Continued)

Solomon 2007	The patient-mediated intervention is one of two or more components in an intervention package. It is not the main component
Sonnichsen 2010	The patient-mediated intervention is one of two or more components in an intervention package. It is not the main component
Spahr 2006	Not a RCT
Spaic 2013	The patient-mediated intervention is one of two or more components in an intervention package. It is not the main component
Thapar 2002	No relevant professional performance outcomes reported
Valanis 2002	No relevant professional performance outcomes reported
Vallès 2002	Not patient-mediated intervention(s)
Vallès 2003	Not patient-mediated intervention(s)
Vickrey 2006	The patient-mediated intervention is one of two or more components in an intervention package. It is not the main component
Vingerhoets 2001	No relevant professional performance outcomes reported
Wasson 1999	The patient-mediated intervention is one of two or more components in an intervention package directed at providers
Wensing 2003	No relevant professional performance outcomes
Wilson 1993	No relevant professional performance outcomes
Wynia 2010	Not patient-mediated intervention(s)
Zermansky 2001	Not patient-mediated intervention(s)

RCT: randomised trial

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

NCT01904656

Trial name or title	CBPR Strategies to Increase colorectal cancer screening in Ohio Appalachia
Methods	RCT
Participants	<p>Inclusion Criteria:</p> <ul style="list-style-type: none"> • 51-75 years • Have a working phone number • Resident of one of the 12 study counties • Lived in that study county since the start of the project • No prior history of CRC, familial/hereditary cancer syndrome (e.g. hereditary non-polyposis CRC), polyps, or inflammatory bowel disease (Crohn's disease) • Not currently pregnant • Be in good health (i.e. no contraindications to CRC screening) <p>Exclusion Criteria:</p> <ul style="list-style-type: none"> • No working phone number • Not a resident of one of the 12 study counties • Does not live in the study county since the start of the project • Has a prior history of CRC, familial/hereditary cancer syndrome (e.g. hereditary non-polyposis CRC), polyps, or inflammatory bowel disease (Crohn's disease) • Is currently pregnant • Not in good health(i.e.has contraindications for CRC screening)
Interventions	<p>Intervention: "Get Behind your health". Patients are exposed to the "Get Behind Your Health!" media campaign intervention comprising 3 phases: the media campaign, the medical chart reminder, and a combination of media campaign and chart reminder</p> <p>Comparison: patients are exposed to a Healthy Eating "Peaches!"- media campaign intervention comprising 3 phases: the media campaign, the medical chart reminder, and a combination of media campaign and chart reminder. Patients also undergo telephone interviews during years 2-4</p>
Outcomes	<p>Primary Outcomes</p> <p>Rates of colorectal cancer screening-within-guidelines</p>
Starting date	September 2009
Contact information	Principal Investigator: Electra Paskett, Ohio State University
Notes	Status September 2017: Ongoing, but not recruiting participants

NCT02686775

Trial name or title	The PACO Project: a clinical study of a PATient COach program in vulnerable lung cancer Patients (PACO)
Methods	RCT
Participants	<p>Inclusion Criteria:</p> <ul style="list-style-type: none"> • Diagnosed with non-small cell lung cancer or small cell lung cancer

	<ul style="list-style-type: none"> • Referred for further treatment at the oncology ward OR • Must either 1) Live alone (irrespective of education) or 2) Have no formal education beyond secondary school, or 3) Have one or more co-morbidities, or 4) a performance status of 1-2, or 5) be more than 65 years old at time of inclusion. <p>Exclusion Criteria:</p> <ul style="list-style-type: none"> • Dementia • Being institutionalised • No proficiency of Danish
Interventions	<p>Intervention:patient coach: 5 face-to-face sessions of approximately 1-2 hours duration and 3 phone calls from inclusion to one month after end of first line treatment. Deviations from this schedule might depend on the treatment modules and on the wishes and needs of the patient. Several patients will continue directly into palliative care and the coach will thus support this transition</p> <p>Comparison: standard care</p>
Outcomes	<p>Primary Outcomes</p> <p>Receipt of first-line treatment according to clinical guidelines</p>
Starting date	January 2016
Contact information	Principal Investigator: Susanne O Dalton, Danish Cancer Society Research Center, sanne@cancer.dk
Notes	Status September 2017: Currently recruiting participants

CBPR: Community-Based Participatory Research

CRC: colorectal cancer

RCT:randomised trial

DATA AND ANALYSES

Comparison 1. Patient-reported health information interventions versus comparisons

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Adherence to recommended practice	4	3865	Risk Ratio (M-H, Random, 95% CI)	1.59 [1.41, 1.81]
2 Desirable patient health outcomes (increased control over stress)	1	79	Risk Ratio (M-H, Random, 95% CI)	1.62 [0.95, 2.76]
3 Patient satisfaction (with care). Number of satisfied patients	1	26	Risk Ratio (M-H, Random, 95% CI)	2.45 [1.27, 4.74]
4 Patient satisfaction (with healthcare professional). The degree of satisfaction	1	79	Mean Difference (IV, Random, 95% CI)	0.40 [0.12, 0.68]

Comparison 2. Patient information interventions versus comparisons

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Adherence to recommended practice	11	3502	Risk Ratio (M-H, Random, 95% CI)	1.60 [1.20, 2.13]
2 Adherence to recommended practice. Risk of bias	11	3502	Risk Ratio (M-H, Random, 95% CI)	1.60 [1.20, 2.13]
2.1 Low risk	0	0	Risk Ratio (M-H, Random, 95% CI)	0.0 [0.0, 0.0]
2.2 Unclear risk	10	3131	Risk Ratio (M-H, Random, 95% CI)	1.48 [1.12, 1.95]
2.3 High risk	1	371	Risk Ratio (M-H, Random, 95% CI)	2.57 [1.68, 3.92]
3 Adherence to recommended practice. Direction of behaviour	11	3502	Risk Ratio (M-H, Random, 95% CI)	1.60 [1.20, 2.13]
3.1 Increasing a certain behaviour	9	3249	Risk Ratio (M-H, Random, 95% CI)	1.46 [1.10, 1.94]
3.2 Reducing a certain behaviour	2	253	Risk Ratio (M-H, Random, 95% CI)	3.29 [1.67, 6.48]
4 Desirable patient health outcomes (controlled blood pressure)	1	261	Risk Ratio (M-H, Random, 95% CI)	0.99 [0.79, 1.24]
5 Undesirable patient health outcomes (dyspepsia severity is high, fair to poor health)	2	246	Risk Ratio (M-H, Random, 95% CI)	0.94 [0.53, 1.67]
6 Patient satisfaction (with healthcare professional). Number of satisfied patients	1	186	Risk Ratio (M-H, Random, 95% CI)	1.03 [0.93, 1.13]

7 Patient satisfaction (with care). The degree of satisfaction	1	186	Mean Difference (IV, Random, 95% CI)	0.30 [0.01, 0.59]
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Comparison 3. Patient education interventions versus comparisons

Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Adherence to recommended practice	4	1029	Risk Ratio (M-H, Random, 95% CI)	1.31 [1.12, 1.54]
2 Desirable patient health outcomes (controlled blood pressure)	1	500	Risk Ratio (M-H, Random, 95% CI)	1.09 [0.96, 1.23]

Comparison 4. Patient decision aids

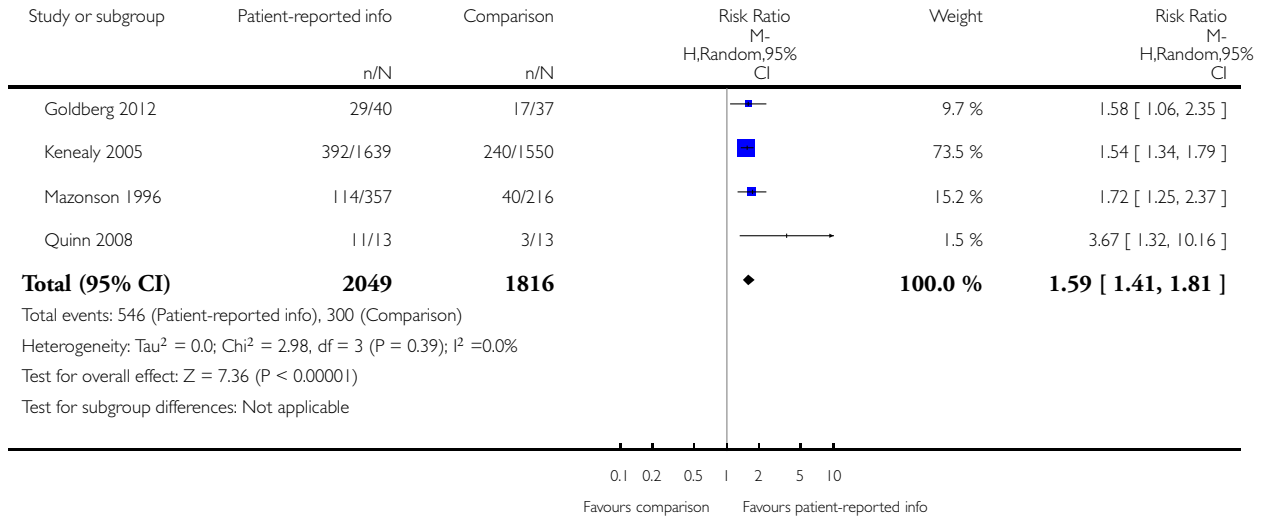
Outcome or subgroup title	No. of studies	No. of participants	Statistical method	Effect size
1 Adherence to recommended practice	1	353	Risk Ratio (M-H, Random, 95% CI)	0.86 [0.65, 1.15]

Analysis 1.1. Comparison 1 Patient-reported health information interventions versus comparisons, Outcome 1 Adherence to recommended practice.

Review: Patient-mediated interventions to improve professional practice

Comparison: 1 Patient-reported health information interventions versus comparisons

Outcome: 1 Adherence to recommended practice

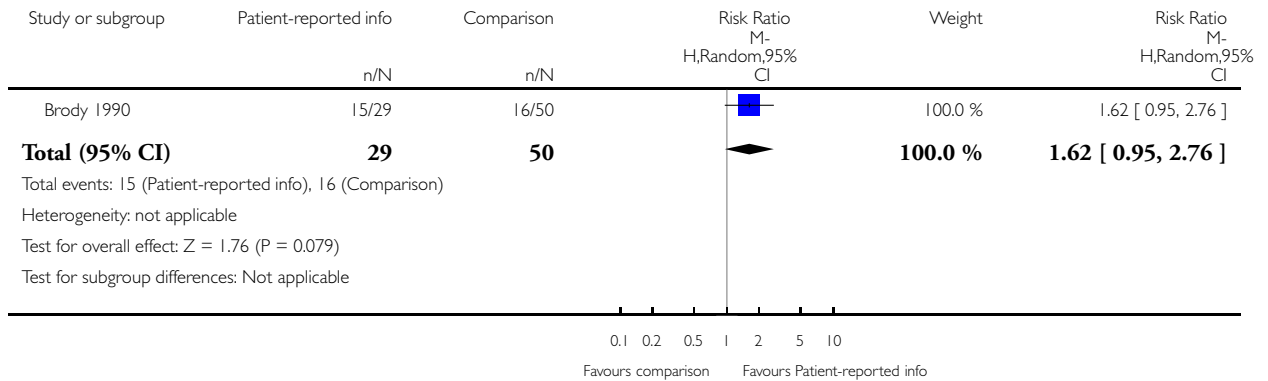


Analysis 1.2. Comparison 1 Patient-reported health information interventions versus comparisons, Outcome 2 Desirable patient health outcomes (increased control over stress).

Review: Patient-mediated interventions to improve professional practice

Comparison: 1 Patient-reported health information interventions versus comparisons

Outcome: 2 Desirable patient health outcomes (increased control over stress)

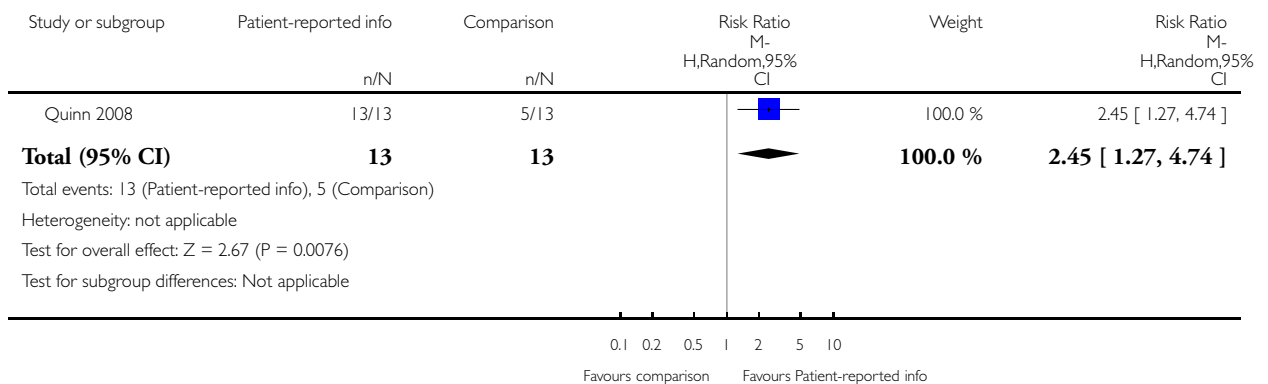


Analysis 1.3. Comparison 1 Patient-reported health information interventions versus comparisons, Outcome 3 Patient satisfaction (with care). Number of satisfied patients.

Review: Patient-mediated interventions to improve professional practice

Comparison: 1 Patient-reported health information interventions versus comparisons

Outcome: 3 Patient satisfaction (with care). Number of satisfied patients

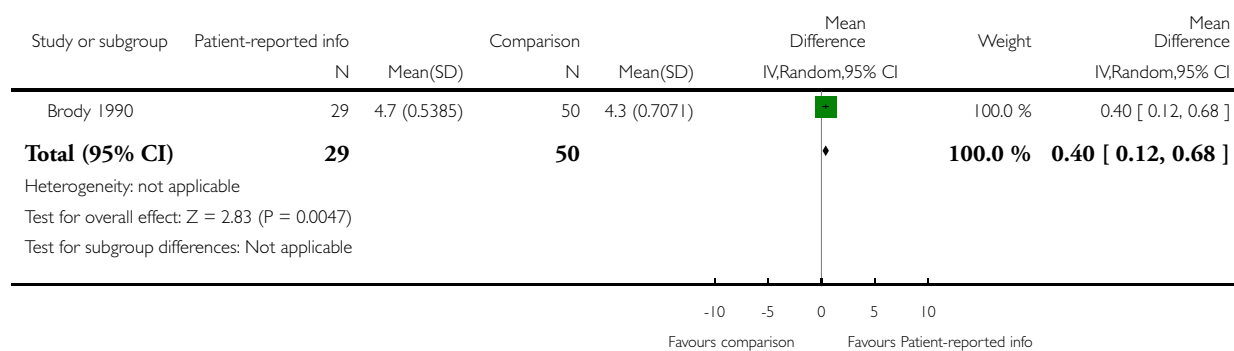


Analysis 1.4. Comparison 1 Patient-reported health information interventions versus comparisons, Outcome 4 Patient satisfaction (with healthcare professional). The degree of satisfaction.

Review: Patient-mediated interventions to improve professional practice

Comparison: 1 Patient-reported health information interventions versus comparisons

Outcome: 4 Patient satisfaction (with healthcare professional). The degree of satisfaction

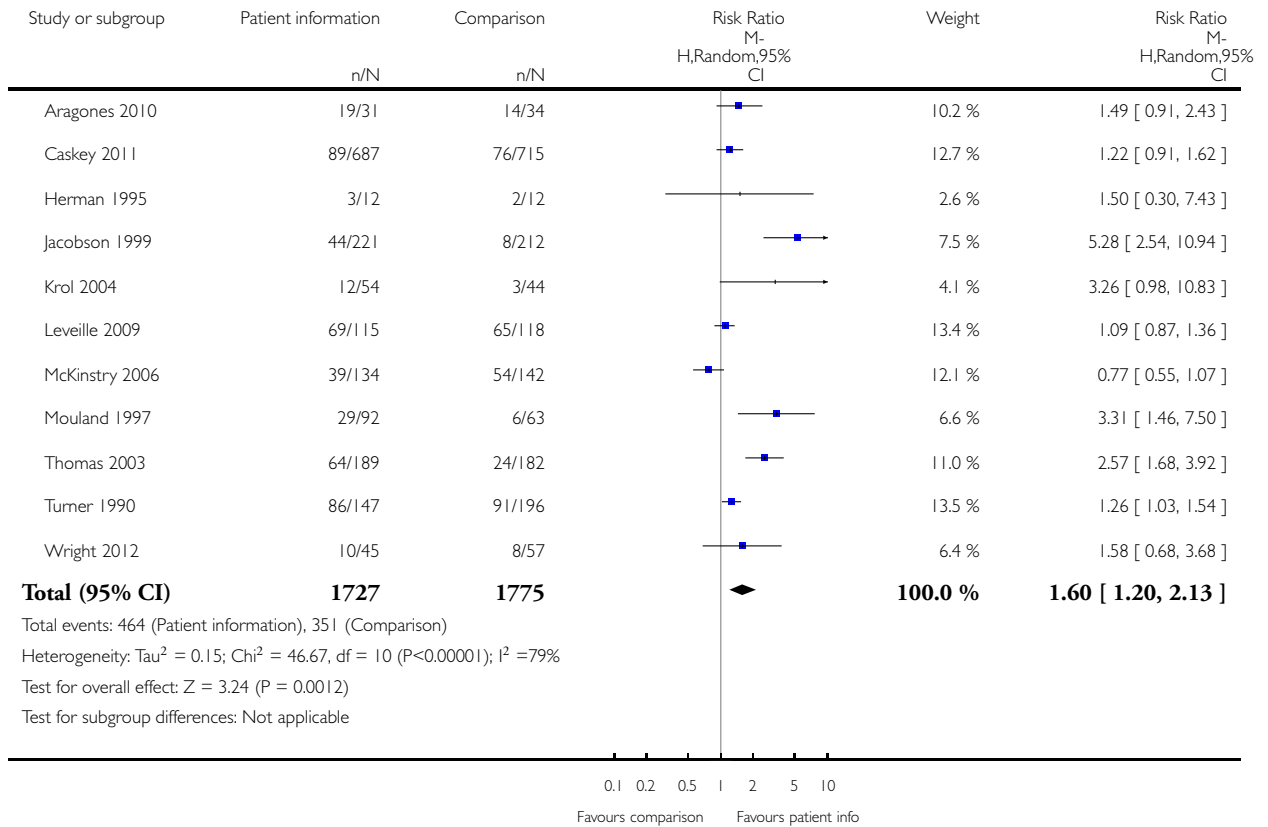


Analysis 2.1. Comparison 2 Patient information interventions versus comparisons, Outcome 1 Adherence to recommended practice.

Review: Patient-mediated interventions to improve professional practice

Comparison: 2 Patient information interventions versus comparisons

Outcome: 1 Adherence to recommended practice

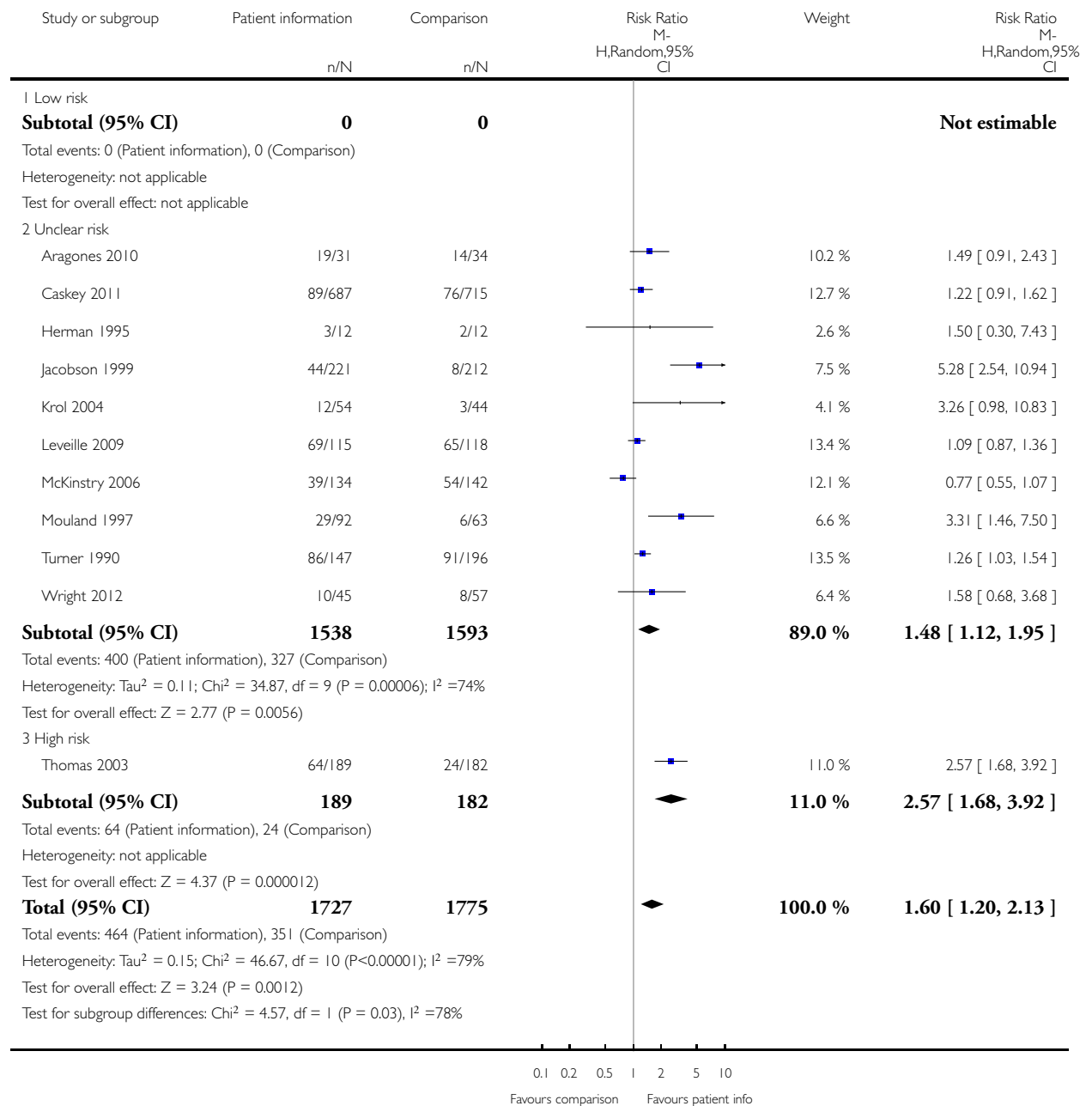


Analysis 2.2. Comparison 2 Patient information interventions versus comparisons, Outcome 2 Adherence to recommended practice. Risk of bias.

Review: Patient-mediated interventions to improve professional practice

Comparison: 2 Patient information interventions versus comparisons

Outcome: 2 Adherence to recommended practice. Risk of bias

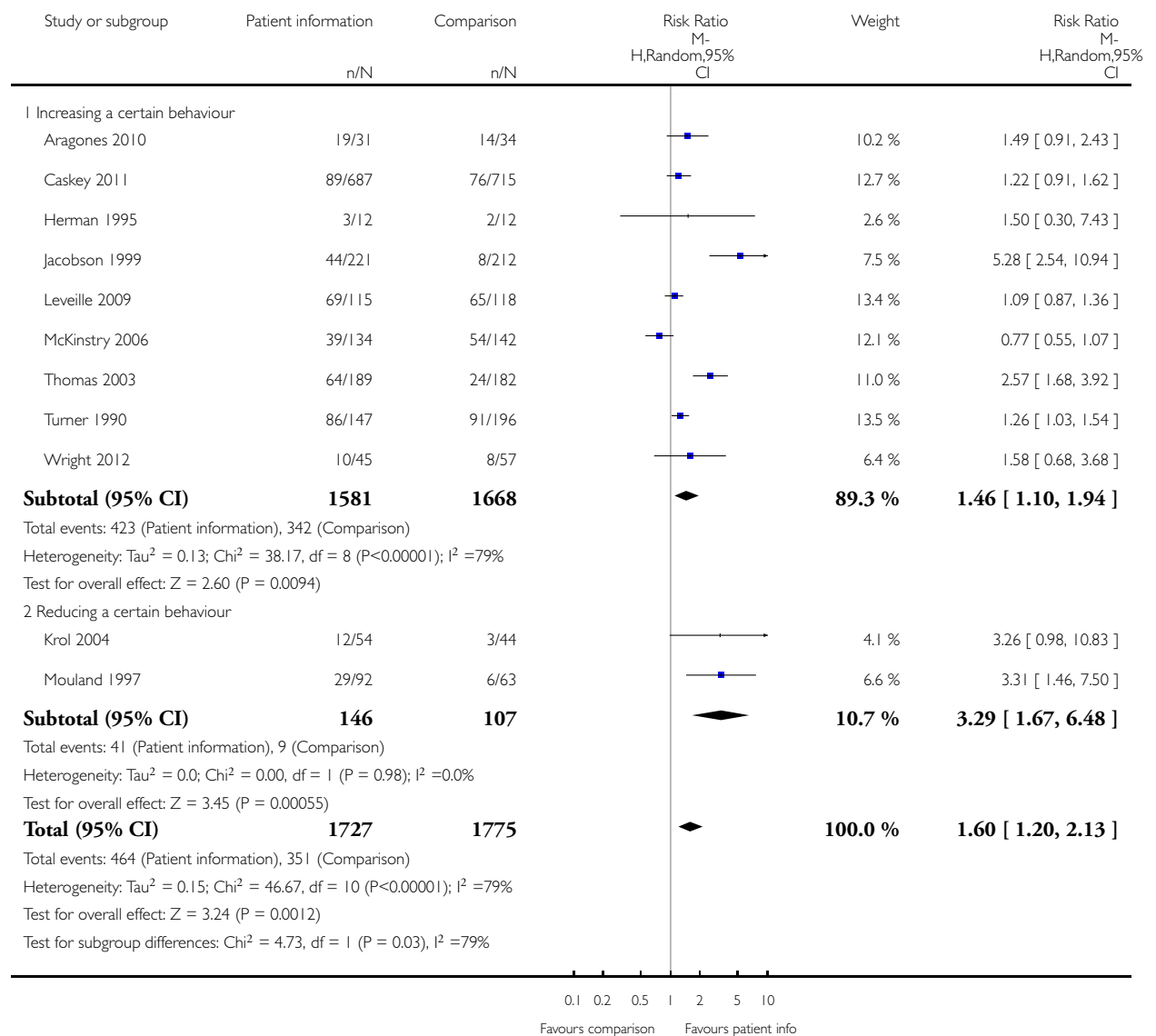


Analysis 2.3. Comparison 2 Patient information interventions versus comparisons, Outcome 3 Adherence to recommended practice. Direction of behaviour.

Review: Patient-mediated interventions to improve professional practice

Comparison: 2 Patient information interventions versus comparisons

Outcome: 3 Adherence to recommended practice. Direction of behaviour

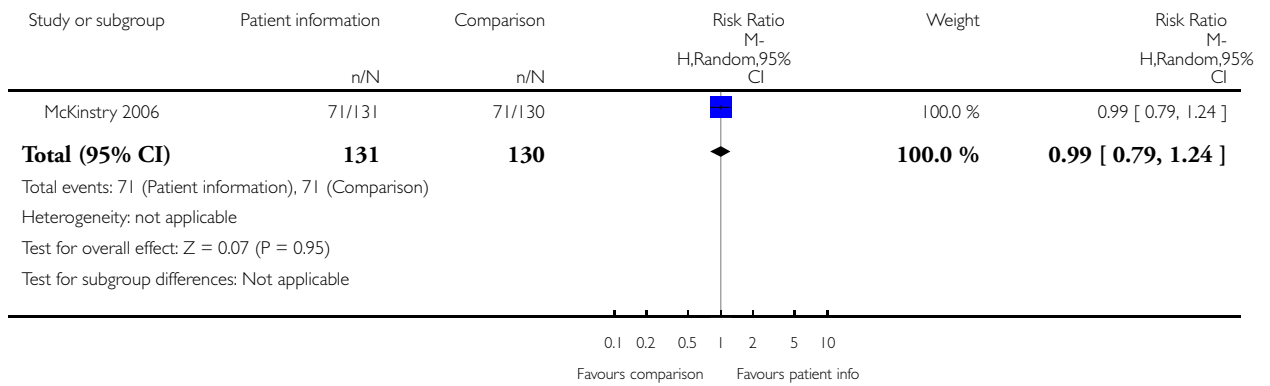


Analysis 2.4. Comparison 2 Patient information interventions versus comparisons, Outcome 4 Desirable patient health outcomes (controlled blood pressure).

Review: Patient-mediated interventions to improve professional practice

Comparison: 2 Patient information interventions versus comparisons

Outcome: 4 Desirable patient health outcomes (controlled blood pressure)

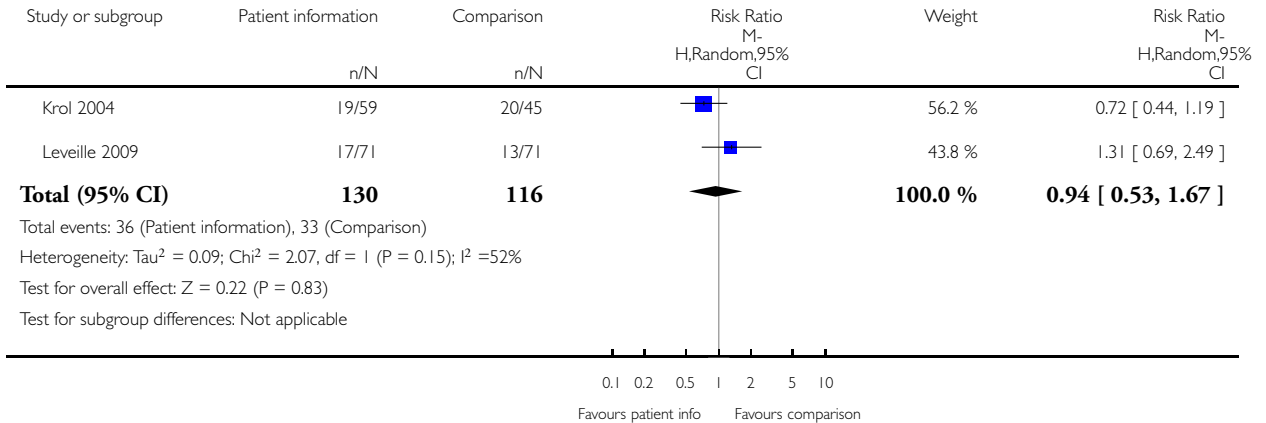


Analysis 2.5. Comparison 2 Patient information interventions versus comparisons, Outcome 5 Undesirable patient health outcomes (dyspepsia severity is high, fair to poor health).

Review: Patient-mediated interventions to improve professional practice

Comparison: 2 Patient information interventions versus comparisons

Outcome: 5 Undesirable patient health outcomes (dyspepsia severity is high, fair to poor health)

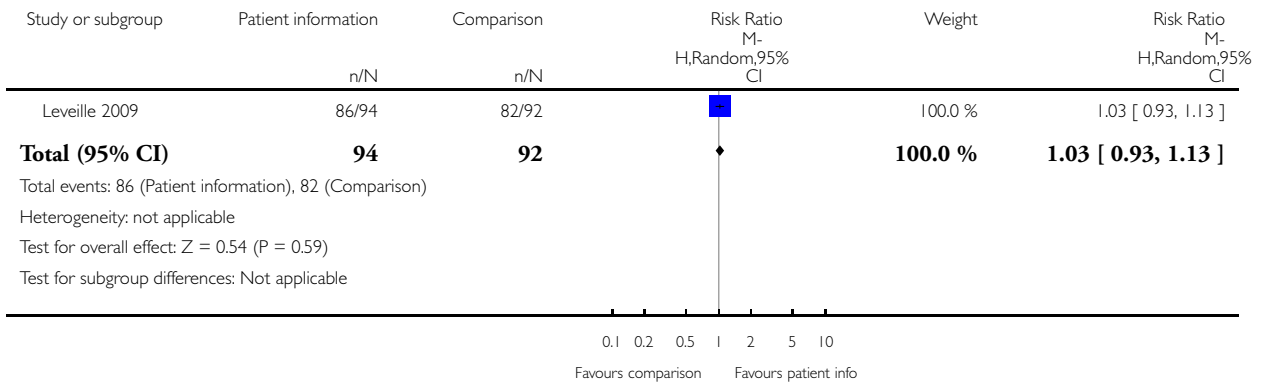


Analysis 2.6. Comparison 2 Patient information interventions versus comparisons, Outcome 6 Patient satisfaction (with healthcare professional). Number of satisfied patients.

Review: Patient-mediated interventions to improve professional practice

Comparison: 2 Patient information interventions versus comparisons

Outcome: 6 Patient satisfaction (with healthcare professional). Number of satisfied patients

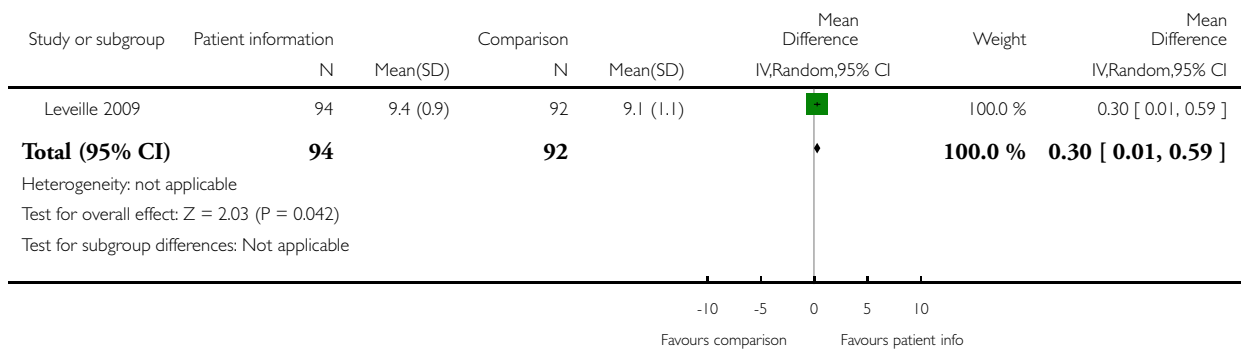


Analysis 2.7. Comparison 2 Patient information interventions versus comparisons, Outcome 7 Patient satisfaction (with care). The degree of satisfaction.

Review: Patient-mediated interventions to improve professional practice

Comparison: 2 Patient information interventions versus comparisons

Outcome: 7 Patient satisfaction (with care). The degree of satisfaction

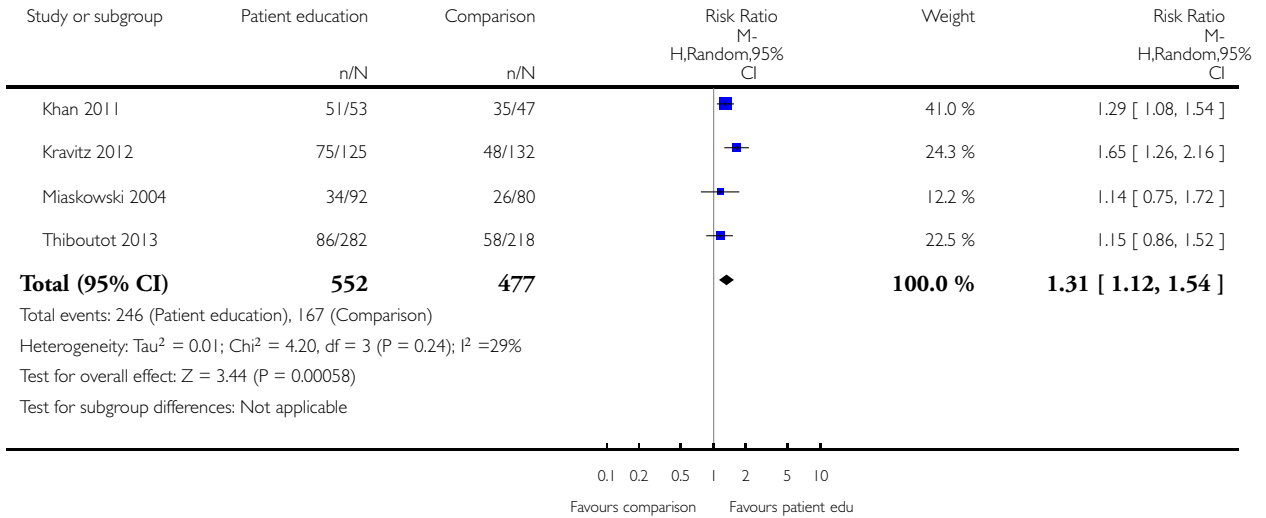


Analysis 3.1. Comparison 3 Patient education interventions versus comparisons, Outcome 1 Adherence to recommended practice.

Review: Patient-mediated interventions to improve professional practice

Comparison: 3 Patient education interventions versus comparisons

Outcome: 1 Adherence to recommended practice

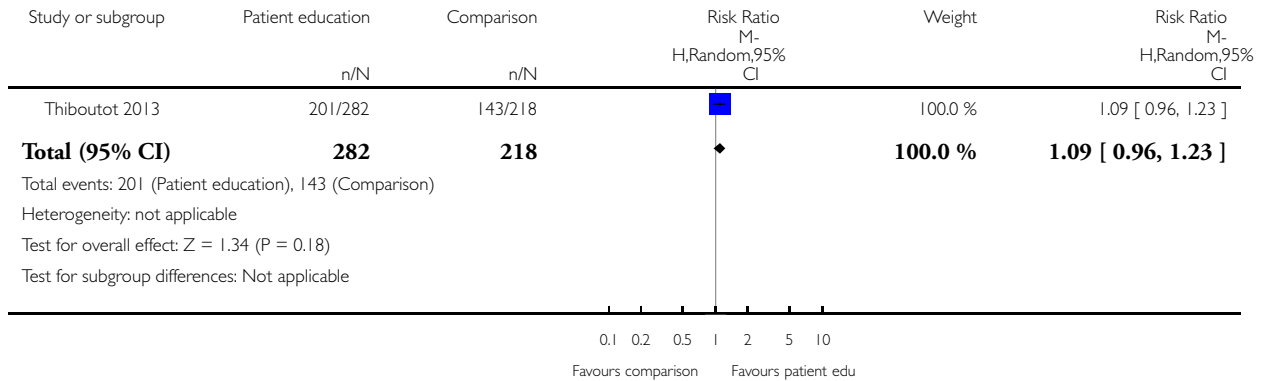


Analysis 3.2. Comparison 3 Patient education interventions versus comparisons, Outcome 2 Desirable patient health outcomes (controlled blood pressure).

Review: Patient-mediated interventions to improve professional practice

Comparison: 3 Patient education interventions versus comparisons

Outcome: 2 Desirable patient health outcomes (controlled blood pressure)

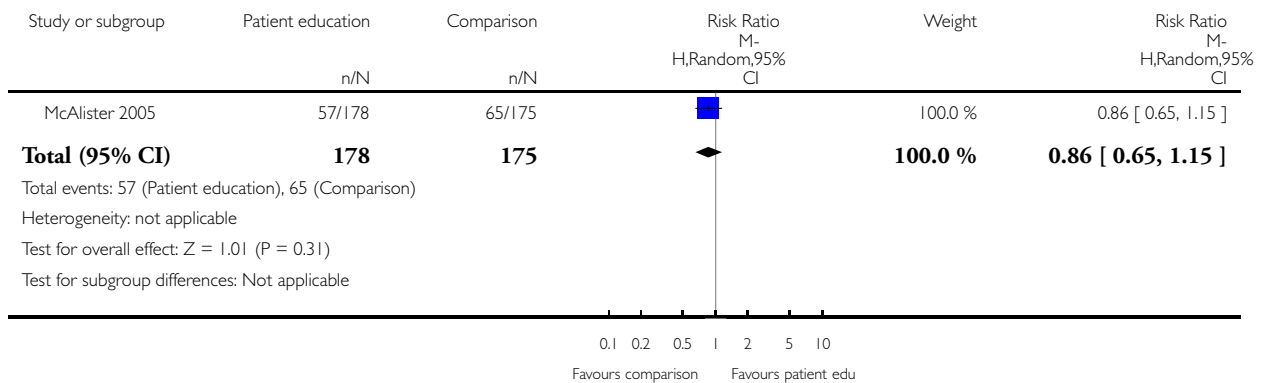


Analysis 4.1. Comparison 4 Patient decision aids, Outcome 1 Adherence to recommended practice.

Review: Patient-mediated interventions to improve professional practice

Comparison: 4 Patient decision aids

Outcome: 1 Adherence to recommended practice



ADDITIONAL TABLES

Table 1. Examples of patient-mediated interventions

Examples of different types of patient-mediated interventions	An example	Possible mechanisms of action	How it might have positive effects	How it might have adverse effects
Patient-reported health information about own health/needs/concerns or other relevant outcomes (collecting information from patients and giving it to professionals before, or during a clinical encounter)	The patient or carer completes a questionnaire or form in the waiting area before a consultation. The doctor is then given this information before or during the consultation	Information to healthcare professionals from patients → clinical encounter → impact on healthcare professionals' performance	Information from patients about own health/needs/concerns might ensure that professionals get important information that they might otherwise not have received. This information might prompt professionals to improve their practice and provide recommended health care	This might distract healthcare professionals from focusing on other things or lead to longer consultations without measurable improvements in the quality of care, if the information that is collected turns out not to be important
Patient information where patients are informed about recommended care	The patient is given a brochure with information about cancer screening	Information to patient from others → clinical encounter → impact on healthcare professionals' performance	Giving recommendations or evidence to patients might lead them to ask for recommended care, and professionals might respond by providing it	Healthcare professionals might feel threatened by this or disagree with the information given to patients. Patients might become distrustful of the healthcare professionals
Patient education/ training/ counselling to increase patients' knowledge about their condition	The patient signs up for a group-based self-management program where she is provided with information about her condition and becomes part of a patient group for sharing of experiences to increase self-efficacy and coping	Activation of patient by others → clinical encounter → impact on healthcare professionals' performance	Education/training/counselling to increase patients' knowledge about their condition, which can increase their self-efficacy and self-care skills. This in turn, might encourage patients to get more involved in decisions about their treatment and management and professionals might respond by providing recommended health care	Healthcare professionals might feel threatened by this or disagree with the patient. It might increase healthcare professionals' burden if they need to spend more time finding answers to patients' questions. Patients might feel more uncomfortable if they have more questions but do not feel comfortable asking them. Patients might not like the answers they are given. This might lead to longer consultations without measurable improvements in the quality of care

Table 1. Examples of patient-mediated interventions (Continued)

<p>Patient feedback about clinical practice (collecting information from patients after an encounter)</p>	<p>After the patient has used a healthcare service, she might be asked about her experience with the service or doctor. This information is then fed back to the doctors and/or hospital</p>	<p>Information to healthcare professionals from patients → impact on healthcare professionals' performance</p>	<p>Clinical performance feedback from patients might ensure that professionals get important information that they might otherwise not have received. This information might prompt professionals to improve their practice and provide recommended health care</p>	<p>This might distract healthcare professionals from focusing on other things or lead to longer consultations without measurable improvements in the quality of care, if the information that is collected turns out not to be important</p>
<p>Patient decision aids to ensure that the choices about treatment and management reflect recommended care and the patients' values and preferences</p>	<p>The patient is provided with information about treatment options including risks and benefits. The patient considers this information, either alone or with a healthcare professional, to reach a decision in accordance with her values and preferences</p>	<p>Activation of patient by others → clinical encounter → impact on healthcare professionals' performance</p>	<p>Giving recommendations or evidence to patients and encouraging them to engage with their own values and preferences for treatment options might encourage healthcare professionals to provide recommended health care</p>	<p>Healthcare professionals might feel threatened by this or disagree with the patient. It might increase healthcare professionals' burden if they need to spend more time finding answers to patients' questions. Patients might feel more uncomfortable if they have more questions but do not feel comfortable asking them. Patients might not like the answers they are given. This might lead to longer consultations without measurable improvements in the quality of care</p>
<p>Patients, or patient representatives, being members of a committee or board</p>	<p>A patient representative from a patient organisation is, on behalf of a patient group, part of a hospital board. The board may discuss patient care and make decisions about professional practice within the hospital</p>	<p>Information to healthcare professionals from patients → committee or board meeting → impact on healthcare professionals' performance</p>	<p>Patients being part of a prioritisation or agenda deciding process at the health system level might influence professional practice and result in giving patients the recommended health care</p>	<p>Healthcare professionals on the committee or board might feel threatened by this or disagree with the patients' prioritisation or decisions. This might in turn, lead to poor implementation of recommendations or guidelines made within this format</p>
<p>Patient-led training or education of healthcare professionals</p>	<p>Patients taking part in training of doctors, e.g. to improve communication</p>	<p>Information and/or activation of healthcare professionals by patients</p>	<p>Patients being part of the education or training of healthcare professionals</p>	<p>Healthcare professionals might feel threatened by this or disagree with the</p>

Table 1. Examples of patient-mediated interventions (Continued)

	tion skills, how to perform physical examinations or the importance of certain clinical procedures	→ impact on healthcare professionals' performance	professional might influence professional practice and result in providing recommended health care	patient trainer or educator. This might result in non-adherence to the care recommended in this training or education
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Table 2. Descriptive reporting of all relevant primary outcomes from included studies

Study	Primary outcomes	Findings
Alder 2005	Antibiotic prescriptions (Recommended clinical practice is less antibiotic prescriptions to children with ear-nose-throat infections)	Author's quote: "A significant protective effect is demonstrated for the SCT-based communication intervention (OR = 0.171, p = 0.042)" N= 40 (20 patients in each comparison group).
Aragones 2010	Physician recommendation of colorectal cancer screening (Recommended clinical practice is to increase screening)	Intervention: 19/31 (61.3%) Comparison: 14/34 (41.2%) Outcome also included in meta-analysis
Brody 1990	Number of counselling items done by healthcare professional (Desired practice is more counselling of people with mental problems)	Patient-reported Intervention: 2.8 (se=1.62), N= 29 Comparison: 2.9 (se=1.41), N= 50 Healthcare professional reported Intervention: 2.8 (se=1.62), N= 29 Comparison: 2.9 (se=1.41), N= 50 ** did not attempt to accounting for clustering because the study was not pooled in a meta-analysis
Caskey 2011	Pertussis (Tdap) vaccination (Desired practice is to increase vaccination)	Intervention: 89/687 (13%) Comparison: 76/715 (10.6%) Outcome also included in meta-analysis ** with accounting for clustering (ICC = 0.000), the effective total sample size remained the same
Christy 2013	1. Primary care provider write an order for a colorectal cancer screening test 2. Doctor recommended fecal occult blood test (FOBT) 3. Doctor recommended colonoscopy (Desired practice is to increase screening)	1. Doctor recommendation of FOBT: OR=1.15 (95% CI: 0.81, 1.63), p=0.420 N= 659 (intervention: 319 and comparison: 340) 2. Doctor recommendation of colonoscopy: OR=1.34 (95% CI: 0.93, 1.92), p=0.114 N= 659 (intervention: 319 and comparison: 340) 3. Authors quote: "PCPs of those who received the computer-delivered tailored intervention were more likely to write orders for a CRC screening test (OR=1.48; 95% CI=[1.11, 1.96]; p-value=0.007)."

Table 2. Descriptive reporting of all relevant primary outcomes from included studies (Continued)

Goldberg 2012	<p>1. Correctly identified level of chronic asthma control 2. Correctly identified child's asthma trajectory 3. Correctly identified level of medication adherence 4. Correctly identified degree of disease burden to the family (Desired practice is more accurate identification of asthma morbidity)</p>	<p>1. Intervention: 17/40 (43%) Comparison: 7/37 (19%) 2.* Intervention: 29/40 (72%) Comparison: 17/37 (45%) 3. Intervention: 29/40 (72%) Comparison: 18/37 (48%) 4. Intervention: 30/40 (74%) Comparison: 13/37 (35%) * outcome also included in meta-analysis (median outcome)</p>
Herman 1995	<p>1. Number of women offered mammogram 2. Number of women offered clinical breast exam 3. Number of women offered mammogram among those not previously having a mammogram 4. Number of women with a documented clinical breast exam among those not previously having a clinical breast exam (Desired practice is to increase preventive services)</p>	<p>1. Intervention: 28.4%, N=not reported Comparison: 19.4%, N=not reported 2. Intervention: 25%, N=not reported Comparison: 17.9%, N=not reported 3. Intervention: 50/159 (31.4%) Comparison: 29/161 (18%) 4.* Intervention: 40/183 (21.9%) **3/13 when adjusted for clustering Comparison: 34/192 (17.9%) **2/13 when adjusted for clustering * outcome also included in meta-analysis (median outcome of 3 and 4) ** with accounting for clustering (ICC=0.076), the effective total sample size was 39 patients (13 patients to each group, if evenly distributed between 3 arms)</p>
Jacobson 1999	<p>1. Clinician recommended vaccine 2. Administration of the vaccine at that clinic visit (Desired practice is to increase vaccination)</p>	<p>1. Intervention: 60/221 (27.1%) Comparison: 13/212 (6.1%) 2.* Intervention: 44/221 (19.9%) Comparison: 8/212 (3.8%) * outcome also included in meta-analysis (primary outcome defined by study author)</p>
Kattan 2006	<p>Change in medication when indicated by NAEPP guideline recommended practice (Change according to recommended clinical practice)</p>	<p>Intervention: 105 persons stepped up per 1332 step-up letters* sent to providers Comparison: 49 persons stepped up per 1117 "non-sent potential" step-up letters* sent to providers *identified cases in need of stepping up medication (referred to as step-up letters that could have been sent 1-6 times per patient that needed step-up)</p>
Kenealy 2005	<p>Diabetes screening of eligible patients who visited a family practitioner (Recommended clinical practice is to increase screening of eligible people)</p>	<p>Intervention: 392/1639 (23.9%) Comparison: 240/1550 (15.5%) Outcome also included in meta-analysis ** with accounting for clustering (ICC = 0.000), the effective total sample size remained the same</p>

Table 2. Descriptive reporting of all relevant primary outcomes from included studies (Continued)

Khan 2011	1. Diabetes medication prescriptions 2. Hypertension medications (Desired practice is intensification of diabetes therapy)	1.* Intervention: 51/53 (96.2%) Comparison: 35/47 (74.5%) 2. Intervention: 43/53 (81.1%) Comparison: 30/47 (63.8%) * outcome also included in meta-analysis (median outcome)
Kravitz 2012	Physician-directed adjustment in analgesia	Intervention: 75/125 (60%) Comparison: 48/132 (36.4%) Outcome also included in meta-analysis
Krol 2004	1. Stopped or reduced PPI dose 2. Stopped prescribed PPI 3. Had increased PPI dose (Desired practice is reduction in PPI medication)	1.* Intervention: 12/54 (22.2%) Comparison: 3/44 (6.8%) 2. Intervention: 7/54 (13%) Comparison: 2/44 (4.5%) 3. Intervention: 3/54 (5.6%) Comparison: 6/44 (13.6%) * outcome also included in meta-analysis (primary outcome defined by study author) ** with accounting for clustering (ICC = 0.000), the effective total sample size remained the same
Leveille 2009	Screened condition identified at the index visit (Desired practice is to increase identification of mental problems)	Intervention: 69/115 (60%) Comparison: 65/118 (55.1%) Outcome also included in meta-analysis
Mazonson 1996	Recognition of mental health problems (Desired practice is to increase identification of mental problems)	Intervention: 114/357 (31.9%) Comparison: 40/216 (18.5%) Outcome also included in meta-analysis ** with accounting for clustering (ICC = 0.000), the effective total sample size remained the same
McAlister 2005	1. The proportion of patients whose therapy met the ACCP treatment recommendations - at 3 months 2. The proportion of patients whose therapy met the ACCP treatment recommendations - at 12 months	1. Intervention: 89/219 (40.6%) Comparison: 79/215 (36.7%) 2.* Intervention: 70/219 (32%) Comparison: 80/215 (37.4%) * outcome also included in meta-analysis (secondary outcome defined by study authors, but we predefined in our protocol that we would choose the outcome with the longest follow-up as our primary outcome.) ** with accounting for clustering (ICC = 0.076), the effective total sample size was 353 patients (178 patients in intervention group and 175 patients in comparison group)
McKinstry 2006	1. Proportion of patients prescribed statins according to guideline 2. Proportion of patients prescribed aspirin according	1.* Intervention: 39/134 (29%) Comparison: 54/142 (38%) 2. Intervention: 53/88 (60%)

Table 2. Descriptive reporting of all relevant primary outcomes from included studies (Continued)

	to guideline (Recommended clinical practice is adherence to hypertension treatment Guidelines)	Comparison: 55/95 (58%) * outcome also included in meta-analysis (median outcome)
Miaskowski 2004	Appropriate analgesic prescription (around the clock plus as needed)	Intervention: 34/92 (37%) Comparison: 26/80 (32.5%) Outcome also included in meta-analysis
Mouland 1997	<ol style="list-style-type: none"> 1. No benzodiazepines prescription 2. 50-90% reduction in benzodiazepines prescriptions 3. 0-49% reduction in benzodiazepines prescriptions 4. Increase in benzodiazepines prescriptions 5. Average prescriptions of benzodiazepines (defined daily doses) (Recommended clinical practice is less benzodiazepines prescriptions in mental health)	<ol style="list-style-type: none"> 1.* Intervention: 29/92 (32%) Comparison: 6/63 (10%) 2. Intervention: Approximately 25%, N=92 Comparison: Approximately 22%, N=63 3. Intervention: Approximately 36%, N=92 Comparison: Approximately 47%, N=63 4. Intervention: Approximately 8%, N=92 Comparison: Approximately 20%, N=63 5. Intervention: Before: 24.63 DDD/month (range 5-80). After: 12.40 DDD/ month (range 0-70), N=92 Comparison: Before: 29.02 ODD/ month (range 4-108). After: 22.39 DDD/ month (range 0 - 102), N=63 * outcome also included in meta-analysis (the only relevant outcome reported dichotomously with complete numbers)
Nagykaldi 2012	<ol style="list-style-type: none"> 1. Adults provided all recommended preventive services 2. Adults given low dose aspirin, if indicated 3. Adults given Pneumococcal vaccination because of chronic health conditions 4. Adults given Pneumococcal vaccination because of chronic health conditions 5. Children given all recommended immunizations (Desired practice is increased coverage of preventive services)	<ol style="list-style-type: none"> 1. Intervention: 84.4%, N=not reported Comparison: 67.6%, N=not reported 2. Intervention: 78.6%, N=not reported Comparison: 52.3%, N=not reported 3. Intervention: 82.5%, N=not reported Comparison: 53.9%, N=not reported 4. Intervention: 86.3%, N=not reported Comparison: 44.6%, N=not reported 5. Intervention: 95.5%, N=not reported Comparison: 87.2%, N=not reported ** did not attempt to accounting for clustering because the study was not pooled in a meta-analysis
Quinn 2008	<ol style="list-style-type: none"> 1. Medications titrated or changed by their healthcare professional 2. Medication errors identified by their healthcare professional (Desired practice is to follow prescribing guidelines)	<ol style="list-style-type: none"> 1.* Intervention: 11/13 (84.6%) Comparison: 3/63 (23.1%) 2. Intervention: 7/13 (53.4%) Comparison: 0/13 (0%) * outcome also included in meta-analysis (median outcome)
Thiboutot 2013	<ol style="list-style-type: none"> 1. Perform serum creatinine tests 2. Perform urine protein tests 3. Perform serum potassium tests 	<ol style="list-style-type: none"> 1. Intervention: 211/282 (74.8%) Comparison: 156/218 (71.6%) 2.* Intervention: 86/282 (30.5%)

Table 2. Descriptive reporting of all relevant primary outcomes from included studies (Continued)

	<p>4. Doctor recommended starting a new blood pressure medication</p> <p>5. Doctor recommended increasing dose of a blood pressure medication (Desired practice is medication intensification among patients whose blood pressure was not at target)</p>	<p>Comparison: 58/218 (26.6%)</p> <p>3. Intervention: 209/282 (74.1%) Comparison: 153/218 (70.2%)</p> <p>4. Intervention: 21/179 (11.7%) Comparison: 13/149 (8.7%)</p> <p>5. Intervention: 18/168 (10.7%) Comparison: 13/144 (9%)</p> <p>* outcome also included in meta-analysis (median outcome)</p> <p>** with accounting for clustering (ICC = 0.000), the effective total sample size remained the same</p>
Thomas 2003	<p>Primary care physician recommended vaccine (Recommended clinical practice is to increase vaccination)</p>	<p>Intervention: 64/189 (33.9%) Comparison: 24/182 (13.2%)</p> <p>Outcome also included in meta-analysis</p>
Turner 1990	<p>1. Perform pap-smear</p> <p>2. Perform breast exam</p> <p>3. Schedule mammography</p> <p>4. Stool occult test</p> <p>5. Give influenza vaccine</p> <p>6. Give pneumococcal vaccine (Recommended clinical practice is to increase vaccination)</p>	<p>1. Intervention: 28/94 indicated (29.8%) Comparison: 30/151 indicated (19.9%)</p> <p>2. Intervention: 44/84 indicated (52.4%) Comparison: 58/118 indicated (49.2%)</p> <p>3. Intervention: 18/147 indicated (12.2%) Comparison: 25/130 indicated (19.2%)</p> <p>4.* Intervention: 86/132 indicated (65.2%) Comparison: 91/196 indicated (46.4%)</p> <p>5. Intervention: 59/86 indicated (68.6%) Comparison: 51/177 indicated (28.8%)</p> <p>6. Intervention: 19/86 indicated (22.1%) Comparison: 29/118 indicated (24.6%)</p> <p>* outcome also included in meta-analysis (median outcome)</p>
Wright 2012	<p>1. Give influenza vaccines</p> <p>2. Perform mammography</p> <p>3. Perform pap smears</p> <p>4. Give pneumococcal vaccine</p> <p>5. Test bone density</p> <p>6. Test cholesterol (Recommended clinical practice is to increase vaccination)</p>	<p>1.* Intervention: 50/227 (22%) Comparison: 40/285 (14%)</p> <p>2. Intervention: 51/105 (48.6%) Comparison: 28/95 (29.5%)</p> <p>3. Intervention: 25/61 (41%) Comparison: 7/67 (10.4%)</p> <p>4. Intervention: 11/86 (12.8%) Comparison: 10/113 (8.9%)</p> <p>5. Intervention: 2/24 (8.3%) Comparison: 3/132 (2.3%)</p> <p>6. Intervention: 20/43 (46.5%) Comparison: 14/48 (29.2%)</p> <p>* outcome also included in meta-analysis (median outcome)</p> <p>** with accounting for clustering (ICC = 0.076), the effective total sample size was 102 patients (45 patients in intervention group and 57 patients in comparison group)</p>

Table 3. Descriptive reporting of all relevant secondary outcomes from included studies

Study	Secondary outcomes	Findings
Alder 2005	Patient satisfaction with the care they receive 1. General satisfaction 2. Interpersonal manner 3. Time spent with doctor	Author's quote: "Significant associations were observed for General Satisfaction (p = 0.002), Interpersonal Manner (p = 0.010), and Time Spent with Doctor (p = 0.002)"
Aragones 2010	No relevant secondary outcomes reported	
Brody 1990	Patient health outcomes 1. Patients with a psychological disorder (outcome could not be categorised into our categories because desired direction not provided) 2. Control over stress Patient satisfaction with the care they receive 3. Patient report of rating of amount of time spent counselling (1=no time, 5= >15 minutes) 4. Patient report of rating of satisfaction with physician (scale range not reported, higher score means better)	1. Intervention: 71%, N= 29 Comparison: 56%, N=50 2. Authors quote: "...52% felt they experienced some increase in their sense of control over stress following the medical visit." "... 32% of control patients who indicated some beneficial changes in their control over stress 3. Intervention: 2.9 (se=0.2), N= 29 Comparison: 2.5 (se=0.1), N=50 4. Intervention: 4.7 (se=0.1), N= 29 Comparison: 4.3 (se=0.1), N=50
Caskey 2011	No relevant secondary outcomes reported	
Christy 2013	No relevant secondary outcomes reported	
Goldberg 2012	No relevant secondary outcomes reported	
Herman 1995	No relevant secondary outcomes reported	
Jacobson 1999	No relevant secondary outcomes reported	
Kattan 2006	Patient health outcomes Maximum symptom days (outcome could not be categorised into our categories) Resource use Intervention cost and cost effectiveness	Author's quote: "It took 40 minutes per child to reach the caretaker and make the assessment call, enter the data, and mail the letter. In calculating the costs, we used an hourly wage of \$15 for a clerical employee. There were 6 calls per child per year resulting in a cost of \$60. We estimated \$10 for supplies and informational materials for the PCP. Because some PCPs had 1 child in the study, the cost for these materials on a per child basis was \$9.20. The intervention was estimated to cost \$69.20 per child over the year. When this cost was added to the cost of health services use for the year by intervention children and compared with the cost of health service use by control children, there was a savings of \$337.00 per child in the intervention group. The Monte Carlo simulations, using the observed distributions of symptom days and resource use, showed that the intervention had a 97% chance of being cost saving."

Table 3. Descriptive reporting of all relevant secondary outcomes from included studies (Continued)

Kenealy 2005	No relevant secondary outcomes reported	
Khan 2011	Patient health outcomes HbA1c (outcome could not be categorised into our categories)	Intervention: Before: 9.1 (sd=2.5). After: 7.6 (sd=1.8), N= 53 Comparison: Before: 9.4 (sd=2.7). After: 8.6 (sd=2.5), N=47
Kravitz 2012	Patient health outcomes 1. Pain severity 2. Pain-related impairment	1. Pain severity. Coefficient 0.05 (95% CI -0.39, 0.49) p=0.81. Pain severity is the mean of worst and average pain, scaled 0-10, with 10 representing maximal pain (Intervention group N= 126, comparison group N= 132) 2. Pain-related impairment. Coefficient -0.08 (95% CI -0.28, 0.12) p=0.44. Pain impairment is scaled 1-5, with 5 representing maximal impairment (Intervention group N= 126, comparison group N= 132)
Krol 2004	Patient health outcomes 1. Dyspesia severity is high 2. Mental health (RAND-36, higher score means a more favourable health state) 3. Vitality (RAND-36, higher score means a more favourable health state)	1. Intervention: Before: 29/63. After: 19/59 Comparison: Before 23/50. After: 20/45 2.* Intervention: Before: 23.5, N=63. After: 22.6, N= 59 Comparison: Before: 24, N=50. After: 23.1, N=45 3.* Intervention: Before: 17, N=63. After: 16.5, N= 59 Comparison: Before: 16, N=50. After: 16.4, N=45 * No sd (standard deviation) provided
Leveille 2009	Patient satisfaction with the care they receive (at 1 week) 1. Rate the medical care in visit (on a 1-10 scale, 10 is best) 2. Doctor definitely showed concern about health/feelings 3. Doctor definitely spent enough time Patient health outcomes (at 3 months) 4. Fair to poor health 5. Pain subscale SF-36 (moderate-severe) 6. Average pain rating (on a 1-10 scale, 10 is most) (outcome could not be categorised into our categories)	1. Intervention: 9.4 (sd=0.9), N=94 Comparison: 9.1 (sd=1.1), N=92 2. Intervention: 86/94 Comparison: 82/92 3. Intervention: 75/94 Comparison: 68/92 4. Intervention: Before: 19/71. After: 17/71 Comparison: Before: 15/71. After: 13/71 5. Intervention: Before: 40/64. After: 36/64 Comparison: Before: 38/59. After: 35/59 6. Intervention: Before: 4.5 (sd=2.2). After: 3.3 (sd=2.9), N= 64 Comparison: Before: 5.1 (sd=2.0). After: 3.8 (sd=3.1), N=59
Mazonson 1996	No relevant secondary outcomes reported	
McAlister 2005	No relevant secondary outcomes reported	
McKinstry 2006	Patient health outcomes 1. Blood pressure (controlled, systolic and diastolic) 2. Cholesterol (outcome could not be categorised into our categories)	1. Intervention: Controlled: Before: 64/148, after: 71/131. Systolic: Before: 147 mmHg (sd=19), N=148, after:

Table 3. Descriptive reporting of all relevant secondary outcomes from included studies (Continued)

		<p>148 mmHg (sd=22), N= 131 Diastolic: after: 84 mmHg (sd=10), after: 80 mmHg (sd=12), N=131 Comparison: Controlled: Before: 69/146, after: 71/130 Systolic: Before: 146 mmHg (sd=19), N=146, after: 148 mmHg mmHg (sd=21), N=130 Diastolic: Before: 82 mmHg (sd=11), N=146, after: 80 mmHg (sd=12), N=130 2. Intervention: Before: 5.4 (sd=1.2), N= 148, after: 5.2 mmol/L (sd=1.0), N=131 Comparison: Before: 5.4 (sd=1.1), N= 146, 5.2 mmol/L (sd=1.1), N=130</p>
Miaskowski 2004	Patient health outcomes (average pain)	<p>Author's quote: "For average pain, a significant group time interaction ($P < 0.0001$) as well as significant main effects of group ($P < 0.026$) and time ($P < 0.0001$) were found. Tests of simple effects within the two groups showed a significant decrease in average pain scores over time in the intervention group ($P < 0.0001$) but not in the standard care group ($P = 0.857$)." Self-report before bedtime for 6 weeks using a descriptive numeric rating scale that ranged from 0 (none) to 10 (excruciating)</p>
Mouland 1997	No relevant secondary outcomes reported	
Nagykaldi 2012	No relevant secondary outcomes reported	
Quinn 2008	<p>Patient health outcomes 1. HbA1c 2. Depression diagnosis (outcome could not be categorised into our categories because desired direction not provided) Patient satisfaction with the care they receive 3. Healthcare provider's diabetes management improved by receipt of blood sugar measurements (patient survey)</p>	<p>1.* Intervention: Before: 9.51%. After: 7.48%, N=13 Comparison: Before: 9.05%. After: 8.37%, N=13 2. Intervention: 1/13 (9.1%) Comparison: 3/13 (20%) 3. Intervention: 13/13 (100%) Comparison: 5/13 (27.5%) *No sd (standard deviation) provided</p>
Thiboutot 2013	Patient health outcomes (controlled blood pressure)	<p>Intervention: 201/282 (71.3%) Comparison: 143/218 (65.6%)</p>
Thomas 2003	No relevant secondary outcomes reported	
Turner 1990	No relevant secondary outcomes reported	
Wright 2012	No relevant secondary outcomes reported	

APPENDICES

Appendix I. Search strategies

CENTRAL, Cochrane Library (searched 10.03.2017)

ID	Search	Hits
#1	“patient mediated”:ti,ab,kw	11
#2	MeSH descriptor: [Patient Participation] this term only	1111
#3	MeSH descriptor: [Patient Education as Topic] this term only	7967
#4	MeSH descriptor: [Feedback] this term only	1131
#5	MeSH descriptor: [Reminder Systems] this term only	792
#6	MeSH descriptor: [Self Care] this term only	3714
#7	#2 or #3 or #4 or #5 or #6	12898
#8	MeSH descriptor: [Professional Practice] this term only	128
#9	MeSH descriptor: [Family Practice] this term only	2190
#10	MeSH descriptor: [General Practice] this term only	355
#11	MeSH descriptor: [Quality of Health Care] this term only	1061
#12	MeSH descriptor: [Quality Improvement] this term only	447
#13	MeSH descriptor: [Guideline Adherence] this term only	972
#14	MeSH descriptor: [Practice Patterns, Physicians'] this term only	1270
#15	MeSH descriptor: [Practice Patterns, Nurses'] this term only	106
#16	MeSH descriptor: [Practice Patterns, Dentists'] this term only	20
#17	MeSH descriptor: [Physician-Patient Relations] this term only	1271
#18	MeSH descriptor: [Nurse-Patient Relations] this term only	355
#19	MeSH descriptor: [Dentist-Patient Relations] this term only	61
#20	#8 or #9 or #10 or #11 or #12 or #13 or #14 or #15 or #16 or #17 or #18 or #19	7140

(Continued)

#21	#7 and #20	1272
#22	("patient directed intervention" or "patient directed interventions" or intervention* directed near/2 patient*):ti,ab,kw	90
#23	"patient education":ti,ab,kw	10133
#24	(patient* near/3 (education* next program* or "tailored education")):ti,ab,kw	561
#25	("self care intervention" or "self care interventions"):ti,ab,kw	68
#26	"self management" next (intervention* or program*):ti,ab,kw	1019
#27	patient* near/1 activat*:ti,ab,kw	287
#28	patient* next (guideline* or recommendation*):ti,ab,kw	40
#29	patient* next (leaflet* or pamphlet* or booklet* or instruction* or information or questionnaire):ti,ab,kw	1234
#30	patient*:ti,ab,kw and motivational next interview*:ti,ab,kw	941
#31	((patient* near/3 challenge*) near/3 (care or treatment* or practice or physician* or practitioner* or doctor*)):ti,ab,kw	38
#32	(patient* near/3 (raise* next concern* or raise* next issue* or ask* next question*)):ti,ab,kw	38
#33	(patient* near/3 remind*):ti,ab,kw	354
#34	(patient* and (remind* near/3 telephone or remind* near/3 phone or remind* near/3 letter or remind* near/3 mail or remind* near/3 email)):ti,ab,kw	373
#35	(patient* near/3 feedback):ti,ab,kw	600
#36	(physician* or doctor*) near/3 feedback:ti,ab,kw	179
#37	"patient reported information":ti,ab,kw	8
#38	("patient reported questionnaire" or "patient reported questionnaires"):ti,ab,kw	32
#39	patient next profile*:ti,ab,kw	130

(Continued)

#40	((“patient involvement” or “patient participation”) and quality):ti,ab,kw	515
#41	#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	14877
#42	(physician* or doctor* or practitioner* or provider* or consultation or “family practice” or “general practice” or “clinical practice” or “professional practice” or “primary care” or “primary health care” or “primary healthcare” or “secondary care” or “secondary health care” or “secondary healthcare” or hospital*):ti,ab,kw	143300
#43	(reduc* or enhanc* or improv* or (change near/6 practice) or “change performance” or “change behavior” or “change behaviour” or increas* or decreas*):ti,ab,kw	554640
#44	#41 and #42 and #43	5703
#45	#1 or #21 or #44 in Trials	5990

MEDLINE and Epub Ahead of Print, In-Process & Other Non-Indexed Citations and Daily 1946 to August 24, 2018, Ovid (searched 28.08.2018)

#	Searches	Results
1	patient mediated.ti,ab,kf.	61
2	Patient Participation/	22861
3	Patient Education as Topic/	80213
4	Patient Reported Outcome Measures/	1943
5	Feedback/	28584
6	Reminder Systems/	3114
7	Self Care/	30687
8	or/2-7	155439
9	Professional Practice/	16265
10	Family Practice/	64024

(Continued)

11	General Practice/	11707
12	“Quality of Health Care”/	67356
13	Quality Improvement/	17750
14	Guideline Adherence/	28614
15	Practice Patterns, Physicians’/	52980
16	Practice Patterns, Nurses’/	2169
17	Practice Patterns, Dentists’/	2106
18	Physician-Patient Relations/	68359
19	Nurse-Patient Relations/	34113
20	Dentist-Patient Relations/	8027
21	or/9-20	337326
22	(reduc* or enhanc* or improv* or (change adj6 practice) or change performance or change behavior or change behaviour or increas* or decreas*).ti,ab,kf	8975775
23	8 and 21 and 22	8145
24	(patient directed intervention? or (intervention? directed adj2 patient?)).ti,ab,kf	72
25	patient education.ti,ab,kf.	16486
26	(patient* adj3 (education* program* or tailored education)).ti,ab,kf	1811
27	self care intervention?.ti,ab,kf.	172
28	(self management adj (intervention? or program*)).ti,ab,kf.	2184
29	(patient* adj1 activat*).ti,ab,kf.	1743
30	(patient* adj (guideline? or recommendation?)).ti,ab,kf.	729
31	(patient* adj (leaflet? or pamphlet? or booklet? or instruction? or information or questionnaire?)).ti,ab,kf	10898
32	(patient* and motivational interview*).ti,ab,kf.	1440

(Continued)

33	(patient* adj3 challenge* adj3 (care or treatment? or practice or physician* or practitioner? or doctor*)).ti,ab,kf	982
34	(patient* adj3 (raise* concern? or raise* issue? or ask* question?)).ti,ab,kf	515
35	(patient* adj3 remind*).ti,ab,kf.	1040
36	((patient* and remind*) adj3 (telephone or phone or letter or mail or email)).ti,ab,kf	860
37	(patient* adj3 feedback).ti,ab,kf.	2574
38	((physician* or doctor?) adj3 feedback).ti,ab,kf.	687
39	patient reported information.ti,ab,kf.	75
40	patient reported questionnaire?.ti,ab,kf.	172
41	patient profile?.ti,ab,kf.	1869
42	((patient involvement or patient participation) and quality).ti,ab,kf	984
43	or/24-42	42686
44	(physician* or doctor* or practitioner* or provider* or consultation or family practice or general practice or clinical practice or professional practice or primary care or primary health care or primary healthcare or secondary care or secondary health care or secondary healthcare or hospital*).ti,ab,kf	1918261
45	(reduc* or enhanc* or improv* or (change adj6 practice) or change performance or change behavior or change behaviour or increas* or decreas*).ti,ab,kf	8975775
46	43 and 44 and 45	13491
47	23 or 46	20461
48	Randomized Controlled Trial.pt.	467427
49	Controlled Clinical Trial.pt.	92607
50	pragmatic clinical trial.pt.	851
51	(randomis* or randomiz* or randomly).ti,ab.	786868

(Continued)

52	(trial or groups).ti,ab.	2231237
53	or/48-52	2702126
54	exp Animals/	21744614
55	Humans/	17254039
56	54 not (54 and 55)	4490575
57	review.pt.	2420138
58	meta analysis.pt.	91815
59	news.pt.	191071
60	comment.pt.	731439
61	editorial.pt.	466391
62	cochrane database of systematic reviews.jn.	13773
63	comment on.cm.	731434
64	(systematic review or literature review).ti.	116961
65	or/56-64	7991812
66	53 not 65	2067813
67	1 or (47 and 66)	5491
68	remove duplicates from 67	5478
69	limit 68 to ed=20170310-20180310	422
70	68 not (1\$ or 2\$).ed.	428
71	70 and (201703* or 201704* or 201705* or 201706* or 201707* or 201708* or 201709* or 201710* or 201711* or 201712* or 201801* or 201802* or 201803*).dt	0
72	69 or 71	422

OpenGrey

Patient* AND (doctor OR doctors OR physician* OR practitioner* OR nurse*) AND (guideline* OR procedure* or recommendation* or practice*)

Grey Literature Report

“patient involvement”

Google Scholar

1. allintitle:patient involvement, physician
2. allintitle: patient involvement, practitioner
3. allintitle: patient involvement, doctor

ClinicalTrials.gov

1. Intervention/treatment: Behavioral AND Outcomes: Recommended OR evidence based OR clinical practice OR guideline
2. Intervention/treatment: Behavioral AND Outcomes: Doctor OR physician OR provider OR resident OR practitioner
3. Intervention/treatment: Patient-mediated

ICTRP

1. Intervention: Behavioural AND (doctor OR physician OR provider OR resident OR practitioner)
2. Intervention: patient-mediated

WHAT'S NEW

Last assessed as up-to-date: 10 March 2018.

Date	Event	Description
14 September 2018	Amended	Additional error in abstract corrected.
13 September 2018	Amended	Minor error in abstract corrected.

CONTRIBUTIONS OF AUTHORS

MSF led the work with and wrote the protocol, performed some of the searches, screened studies for inclusion, extracted data, assessed risk of bias, assessed certainty of the evidence (GRADE), and drafted the review.

TKD assisted with the protocol, screened studies for inclusion, extracted data, assessed risk of bias, assessed certainty of the evidence (GRADE), and commented on drafts of the review.

AF assisted with the protocol, assisted with screening of studies for inclusion, and commented on drafts of the review.

MJ designed and carried out most of the searches.

SF provided general advices on the protocol and commented on drafts of the review.

HS provided general advices on the protocol and commented on drafts of the review.

DECLARATIONS OF INTEREST

Marita S Fønhus: none known.

Therese K Dalsbø: none known.

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