

## Short communication

Patient-mediated interventions to improve professional practice: a summary of a Cochrane systematic review\*

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## Abstract

### Objective

To assess the effectiveness of patient-mediated interventions on healthcare professionals' performance.

### Methods

We conducted a systematic Cochrane review according to established guidelines. We searched predefined databases in 2016 and 2017. Two review authors independently assessing studies for inclusion, extracted data, assessed risk of bias, performed meta-analyses, and used GRADE to assess the certainty of the evidence.

### Results

We included 26 studies with a total of 12 552 patients. We found that patient-reported health information interventions probably improve healthcare professionals' adherence to recommended clinical practice (moderate certainty evidence). We also found that patient information interventions and patient education interventions may improve healthcare professionals' adherence to recommended clinical practice (low certainty evidence).

### Conclusion

Our findings strengthen the belief that patient-mediated interventions have the potential to improve professional practice, especially patient-reported health information interventions. The impact of these interventions on patient health and satisfaction, adverse events and resource use, is more uncertain.

### Practice implications

Our findings show that patient-mediated interventions are relevant approaches to improve professional practice. It seems fair to imply that patient-mediated interventions, and especially those where the patient herself provides information about own health, concerns or needs, demonstrate the importance of reciprocity when communicating with, and involving patients.

### Introduction

Healthcare professionals are important contributors to healthcare quality and patient safety, but their performance is not always in line with recommended clinical practice.

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 [1]. Reminders, such as computer-generated reminders delivered on paper to healthcare professionals, probably improve professional practice [2]. Printed educational material may also improve professional practice, but the effect seems small, and the certainty of the evidence is low [3]. Educational meetings or educational outreach visits may result in modest improvements in professional practice [4, 5]. Using local opinion leaders may improve professional practice [6], as may financial incentives [7]. Another recent Cochrane review shows that healthcare professionals provided with clinical practice guidelines accompanied by tools developed by guideline producers probably improve their adherence to clinical guidelines [8]. Organisational interventions, such as provision of pharmaceutical care, medication reviews, follow-up visits by a healthcare, 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 [9].

We defined 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" [10].

### Methods

Our protocol was published in December 2016 [11]. More information on methods, such as detailed inclusion criteria can be found in the Cochrane review [\(ref\)](#).

We searched the Cochrane Central Register of Controlled Trials (CENTRAL) and MEDLINE (Ovid) in March 2017, ClinicalTrials.gov and the International Clinical Trials Registry (ICTRP) in September 2017, and Open Grey, 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. The selection criteria were randomised studies comparing patient-mediated interventions to either usual care or other interventions to improve professional practice. 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) for more details see the Cochrane review [\(ref\)](#).

## Results

We identified 12 045 records from the electronic and supplementary searches of which 26 studies were included [12-37] with a total of 12552 patients. The number of healthcare professionals included ranged from 12 to 167 in the studies where this was reported.

The included studies evaluated three 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 (where patients for instance are informed about, or reminded to attend recommended care), and 3) patient education interventions (intended to increase patients' knowledge about their condition and options of care, for instance).

We categorised six studies as patient-reported health information interventions [14, 17, 20, 22, 27, 33]. We categorised fourteen studies as patient information interventions. They were typically given as written or electronic reminders, prompts, handouts, posters etc. [15, 18, 19, 25, 26, 29, 31, 36, 37] or video or web-based information [13, 16, 21, 32, 35]. The remaining six studies were patient education interventions [12, 23, 24, 28, 30, 34]. These varied greatly in content from video and electronic based education or training [23, 28, 34], to in-person communication or coaching interventions [12, 24], to a multi session nurse-led patient education intervention [30].

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

Risk of bias assessments and information extracted and summarised from each study are briefly described in figure 1 and table 1, respectively.

For each type of patient-mediated intervention a separate meta-analysis was produced and the certainty of the evidence assessed. The results are presented in Summary of findings tables (see table 2, 3 and 4).

### **Patient-reported health information interventions**

Patient-reported health information interventions probably improve healthcare professionals' adherence to recommended clinical practice (moderate certainty evidence) (see table 2). 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, usual care, or similar intervention). 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, adverse events, and resource use were rarely or poorly reported.

### **Patient information interventions**

Patient information interventions may improve healthcare professionals' adherence to recommended clinical practice (low certainty evidence) (see table 3). We found that for every 100 patients consulted or treated, 33 (95% CI 25 to 43) are in accordance with recommended clinical practice compared to 20 per 100 in the comparison group (no intervention, usual care, enhanced care or similar intervention). Patient information interventions may have little or no effect on desirable patient health outcomes and patient satisfaction (low certainty of the 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. There were no reports of any adverse events or about resource use in the included studies.

### **Patient education interventions**

Patient education interventions may slightly improve healthcare professionals' adherence to recommended clinical practice (low certainty evidence) (see table 4). We found that for every 100 patients consulted or treated, 43 (95% CI 35 to 53) are in accordance with recommended clinical practice compared to 36 per 100 in the comparison group (no intervention, usual care, enhanced care or similar intervention). 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.

## *Discussion and conclusion*

### **Limitations**

We considered the effect size for the primary outcome to be small to moderate, similar to the effects of various other interventions to improve professional practice [1-9].

The majority of the studies were carried out in USA (21 of 26 studies), which may limit the applicability of the findings to other settings. In addition, most studies aimed at improving professional practice among physicians, usually in a primary care setting. Improved professional practice should translate to improvements in patient outcomes. The combination of low quality evidence for many professional practice-outcomes and scarcity of data on patient health outcomes hindered us from drawing any inferences on the association between the two.

### **Implication for practice**

We have moderate certainty in the positive effect patient-reported health information interventions have on professional practice. Moderate certainty reflects that this research provides a good indication of the likely effect. It thus seems fair to imply that patient-mediated interventions, and especially those where the patient herself provides information about own health, concerns or needs, demonstrate the importance of reciprocity when communicating with, and involving patients.

### **Implications for research**

There are several systematic reviews on, for instance patient education, that report on relevant patient health outcomes [38-51]. However, they do not provide answers about impact on professional practice, as this is rarely measured or reported. It would be of great interest to assess if a patient education intervention defined as a "patient-mediated intervention" would have the same effect on patient health as a patient education intervention defined as "non-patient-mediated intervention". Does the added focus on healthcare professionals' performance add an important gain in patient health? The effect on patient health reported in our included studies can thus more likely provide answers to the linkage, if any, between health outcomes and clinical performance more than studies that do not measure clinical performance simultaneously

### **Conclusion**

Our findings strengthen the belief that patient-mediated interventions have the potential to improve professional practice, especially patient-reported health information interventions. We are not, however, able to conclude about the effect these patient-mediated interventions have on patient health and satisfaction, adverse events and resource use, because of both uncertainty and lack of evidence.

### *Contributions of authors*

Marita S Fønhus 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.

Therese K Dalsbø 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.

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

Marit Johansen designed and carried out most of the searches.

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

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

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### *Declarations of interest*

None of the authors declared any conflict of interest.

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# Tables

Table 1. Study characteristics

Study	Patient health condition	Patient age	Type of healthcare professionals	Healthcare service provided	Healthcare setting	Country	Type of P-M intervention	Delivery of intervention	Frequency/length	Comparison	Primary outcome	Secondary outcomes
Alder 2005 [12]	Upper respiratory tract symptoms	Children mean age 3 years	Physicians	Identification, treatment or management	Primary care	USA	Patient education	Practice site	Once	Enhanced usual care	Professional performance	Patient satisfaction
Aragones 2010 [13]	At risk	Adults 50 years or older	Physicians	Preventive care	Primary care	USA	Patient information	Practice site	Once	No intervention or usual care	Professional performance	No relevant
Brody 1990 [14]	Mental health problems	Adults 50 years or older	Physicians	Identification, treatment or management	Primary care	USA	Patient-reported health information	Practice site	Once	No intervention or usual care	Professional performance	-Patient health -Patient satisfaction
Caskey 2011 [15]	None known (general)	Not reported	Physicians	Preventive care	Primary care	USA	Patient information	Practice site	Once	No intervention or usual care	Professional performance	No relevant
Christy 2013 [16]	At risk	Adults 50 years or older	Physicians	Preventive care	Primary care	USA	Patient information	Practice site	Once	Similar type of intervention	Professional performance	No relevant
Goldberg 2012 [17]	Asthma	Children mean age 7-8 years	Physicians	Identification, treatment or management	Specialist care	USA	Patient-reported health information	Practice site	Once	No intervention or usual care	Professional performance	No relevant
Herman 1995 [18]	At risk	Adults 50 years or older	Physicians	Preventive care	Primary care	USA	Patient information	Practice site	Once	Similar type of intervention	Professional performance	No relevant
Jacobson 1999 [19]	At risk	Adults 50 years or older	Physicians and nurses and/or physician assistants	Preventive care	Primary care	USA	Patient information	Practice site	Once	Enhanced usual care	Professional performance	No relevant
Kattan 2006 [20]	Asthma	Children mean age 7-8 years	Physicians and nurses and/or physician assistants	Identification, treatment or management	Specialist and primary care	USA	Patient-reported health information	Home, by telephone	3 months or less	No intervention or usual care	Professional performance	-Patient health -Resource use
Katz 2011 [21]	At risk	Adults 50 years or older	Physicians	Preventive care	Primary care	USA	Patient information	Practice site	Once	Similar type of intervention	Professional performance	No relevant
Kenealy 2005 [22]	At risk	Adults 50 years or older	Physicians	Preventive care	Primary care	New Zealand	Patient-reported health information	Practice site	Once	No intervention or usual care	Professional performance	No relevant
Khan 2011 [23]	Diabetes	Adults 50 years or older	Physicians	Identification, treatment or management	Primary care	USA	Patient education	Practice site	Once	Similar type of intervention	Professional performance	Patient health
Kravitz 2012 [24]	Cancer	Adults 50 years or older	Physicians	Identification, treatment or management	Specialist and primary care	USA	Patient education	Practice site	Once	Similar type of intervention	Professional performance	Patient health



Study	Patient health condition	Patient age	Type of healthcare professionals	Healthcare service provided	Healthcare setting	Country	Type of P-M intervention	Delivery of intervention	Frequency/length	Comparison	Primary outcome	Secondary outcomes
Krol 2004 [25]	Dyspepsia	Adults 50 years or older	Physicians	Identification, treatment or management	Primary care	The Netherlands	Patient information	Home, by post	Once	No intervention or usual care	Professional performance	Patient health
Leveille 2009 [26]	Musculoskeletal pain, depression and/or mobility difficulty	Adults 50 years or older	Physicians	Identification, treatment or management	Primary care	USA	Patient information	Home, electronically	3 months or less	Enhanced usual care	Professional performance	-Patient health -Patient satisfaction
Mazonson 1996 [27]	Mental health problems	Adults younger than 50 years	Physicians	Identification, treatment or management	Primary care	USA	Patient-reported health information	Practice site	Once	No intervention or usual care	Professional performance	No relevant
McAlister 2005 [28]	Heart-related disease	Adults 50 years or older	Physicians	Identification, treatment or management	Primary care	Canada	Patient education	Home, by post	Once	No intervention or usual care	Professional performance	No relevant
McKinstry 2006 [29]	Hypertension	Adults 50 years or older	Physicians and nurses and/or physician assistants	Identification, treatment or management	Primary care	Scotland	Patient information	Home, by post	Once	Similar type of intervention	Professional performance	Patient health
Miaskowski 2004 [30]	Cancer	Adults 50 years or older	Physicians	Identification, treatment or management	Specialist and primary care	USA	Patient education	Home, in-person	3 months or less	Similar type of intervention	Professional performance	Patient health
Mouland 1997 [31]	Mental health problems	Adults 50 years or older	Physicians	Identification, treatment or management	Primary care	Norway	Patient information	Home, by post	Once	No intervention or usual care	Professional performance	Patient health
Nagykaldi 2012 [32]	None known (general)	Adults 50 years or older	Physicians and nurses and/or physician assistants	Preventive care	Primary care	USA	Patient information	Home, electronically	Over 1 year	No intervention or usual care	Professional performance	No relevant
Quinn 2008 [33]	Diabetes	Adults younger than 50 years	Physicians	Identification, treatment or management	Primary care	USA	Patient-reported health information	Home, electronically	Over 1 year	Similar type of intervention	Professional performance	-Patient health -Patient satisfaction
Thiboutot 2013 [34]	Hypertension	Adults 50 years or older	Physicians	Identification, treatment or management	Primary care	USA	Patient education	Home, electronically	Over 1 year	Enhanced usual care	Professional performance	Patient health
Thomas 2003 [35]	At risk	Adults 50 years or older	Physicians and nurses and/or physician assistants	Preventive care	Primary care	USA	Patient information	Practice site	Once	Enhanced usual care	Professional performance	No relevant
Turner 1990 [36]	None known (general)	Adults 50 years or older	Physicians	Preventive care	Primary care	USA	Patient information	Practice site	Once	No intervention or usual care	Professional performance	No relevant
Wright 2012 [37]	None known (general)	Adults younger than 50 years	Physicians	Preventive care	Primary care	USA	Patient information	Home, electronically	3 months or less	Enhanced usual care	Professional performance	No relevant

Table 2. Summary of findings table for patient-reported health information interventions

## Patient-reported health 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-reported health information interventions

**Comparison:** Different types of comparisons (no intervention, usual care, enhanced care or similar intervention)

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				
<b>Adherence to recommended clinical practice</b>	<b>17 per 100</b>	<b>26 per 100</b> (23 to 30)	<b>RR 1.59</b> (1.41 to 1.81)	3865 (4 randomised trials)	⊕⊕⊕⊖ <b>MODERATE</b> <sup>1</sup>	Patient-reported health information interventions probably improve healthcare professionals' adherence to recommended clinical practice compared to comparison (no intervention, usual care, or similar intervention)
<b>Desirable patient health outcomes</b>	<b>32 per 100</b>	<b>52 per 100</b> (38 to 100)	<b>RR 1.62</b> (0.95 to 2.76)	79 (1 randomised trial)	⊕⊖⊖⊖ <b>VERY LOW</b> <sup>2,3</sup>	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
<b>Undesirable patient health outcomes</b>	Not reported	-	-	-	-	None of the included studies reported on undesirable patient health outcomes
<b>Patient satisfaction</b> Number of satisfied patients	<b>39 per 100</b>	<b>94 per 100</b> (49 to 100)	<b>RR 2.45</b> (1.27 to 4.74)	26 (1 randomised trial)	⊕⊖⊖⊖ <b>VERY LOW</b> <sup>2,3</sup>	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
<b>Patient satisfaction</b> The degree of satisfaction (unknown scale, but higher score means higher degree of satisfaction)	The mean patient satisfaction score <b>was 4.3 points</b>	The mean patient satisfaction <b>was 0.4 points higher</b> (0.12 higher to 0.68 higher)	-	79 (1 randomised trial)	⊕⊖⊖⊖ <b>VERY LOW</b> <sup>2,4</sup>	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
<b>Adverse events</b>	Not reported	-	-	-	-	None of the included studies reported on adverse events
<b>Resource use</b>	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; **OR**: Odds 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

Table 3. Summary of findings table for patient information interventions

## 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:** Different types of comparisons (no intervention, usual care, enhanced care or similar intervention)

Outcomes	Anticipated absolute effects* (95% CI)		Relative effect (95% CI)	№ of participants (studies)	Certainty of the evidence (GRADE)	What happens?
	Risk with comparisons	Risk with patient information interventions				
<b>Adherence to recommended clinical practice</b>	<b>20 per 100</b>	<b>33 per 100</b> (25 to 43)	<b>RR 1.66</b> (1.26 to 2.19)	3772 (12 randomised trials)	⊕⊕⊖⊖ <b>LOW</b> <sup>12</sup>	Patient information interventions may improve healthcare professionals' adherence to recommended clinical practice compared to comparison (no intervention, usual care, enhanced care or similar intervention)
<b>Desirable patient health outcomes</b>	<b>55 per 100</b>	<b>54 per 100</b> (43 to 68)	<b>RR 0.99</b> (0.79 to 1.24)	261 (1 randomised trial)	⊕⊕⊖⊖ <b>LOW</b> <sup>5,6</sup>	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 (similar intervention)
<b>Undesirable patient health outcomes</b>	<b>28 per 100</b>	<b>27 per 100</b> (15 to 48)	<b>RR 0.94</b> (0.53 to 1.67)	246 (2 randomised trials)	⊕⊖⊖⊖ <b>VERY LOW</b> <sup>13</sup>	We are uncertain about the effect of patient information interventions on undesirable patient outcomes because the certainty of the evidence is very low
<b>Patient satisfaction</b> Number of satisfied patients	<b>89 per 100</b>	<b>92 per 100</b> (83 to 100)	<b>RR 1.03</b> (0.93 to 1.13)	186 (1 randomised trial)	⊕⊕⊖⊖ <b>LOW</b> <sup>5,6</sup>	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 (similar intervention)
<b>Patient satisfaction</b> The degree of satisfaction (on a 1-10 scale where 10 is highest degree of satisfaction)	The mean patient satisfaction score was <b>9.1 points</b>	The mean patient satisfaction was <b>0.3 points higher</b> (0.01 higher to 0.59 higher)	-	186 (1 randomised trial)	⊕⊕⊖⊖ <b>LOW</b> <sup>4,5</sup>	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 (enhanced care or similar intervention)
<b>Adverse events</b>	Not reported	-	-	-	-	None of the included studies reported on adverse events
<b>Resource use</b>	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; **OR**: Odds 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

Table 4. Summary of findings table for patient education interventions

## Patient education 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 education interventions

**Comparison:** Different types of comparisons (no intervention, usual care, enhanced care or similar intervention)

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	36 per 100	43 per 100 (35 to 53)	RR 1.20 (0.98 to 1.48)	1382 (5 randomised trials)	⊕⊕⊖⊖ LOW <sup>1,2</sup>	Patient education interventions may slightly improve healthcare professionals' adherence to recommended clinical practice compared to comparison (usual care, enhanced care or similar intervention)
Desirable patient health outcomes	66 per 100	72 per 100 (63 to 81)	RR 1.09 (0.96 to 1.23)	500 (1 randomised trial)	⊕⊕⊕⊖ LOW <sup>3,4</sup>	Patient education interventions may slightly increase the number of people with desirable health outcomes compared to comparison (enhanced care).
Undesirable patient health outcomes	Not reported	-	-	-	-	None of the included studies reported on undesirable patient health outcomes
Patient satisfaction	Not reported	-	-	-	-	None of the included studies reported on patient satisfaction
Number of satisfied patients	Not reported	-	-	-	-	None of the included studies reported on patient satisfaction
Patient satisfaction	Not reported	-	-	-	-	None of the included studies reported on 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

\*The risk in the intervention group (and its 95% confidence interval) is based on the assumed risk in the comparison group and the **relative effect** of the intervention (and its 95% CI). **CI:** Confidence interval; **RR:** Risk ratio; **OR:** Odds ratio

### GRADE Working Group grades of evidence

**High 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.

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