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Implementation strategies for health systems in low-income countries: an overview of systematic reviews (Review)

Pantoja T, Opiyo N, Lewin S, Paulsen E, Ciapponi A, Wiysonge CS, Herrera CA, Rada G, Peñaloza B, Dudley L, Gagnon MP, Garcia Marti S, Oxman AD

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[Overview of Reviews]

Implementation strategies for health systems in low-income countries: an overview of systematic reviews

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ABSTRACT

Background

A key function of health systems is implementing interventions to improve health, but coverage of essential health interventions remains low in low-income countries. Implementing interventions can be challenging, particularly if it entails complex changes in clinical routines; in collaborative patterns among different healthcare providers and disciplines; in the behaviour of providers, patients or other stakeholders; or in the organisation of care. Decision-makers may use a range of strategies to implement health interventions, and these choices should be based on evidence of the strategies' effectiveness.

Objectives

To provide an overview of the available evidence from up-to-date systematic reviews about the effects of implementation strategies for health systems in low-income countries. Secondary objectives include identifying needs and priorities for future evaluations and systematic reviews on alternative implementation strategies and informing refinements of the framework for implementation strategies presented in the overview.

Methods

We searched Health Systems Evidence in November 2010 and PDQ-Evidence up to December 2016 for systematic reviews. We did not apply any date, language or publication status limitations in the searches. We included well-conducted systematic reviews of studies that assessed the effects of implementation strategies on professional practice and patient outcomes and that were published after April 2005. We excluded reviews with limitations important enough to compromise the reliability of the review findings. Two overview authors independently screened reviews, extracted data and assessed the certainty of evidence using GRADE. We prepared SUPPORT Summaries for eligible reviews, including key messages, 'Summary of findings' tables (using GRADE to assess the certainty of the evidence) and assessments of the relevance of findings to low-income countries.

Main results

We identified 7272 systematic reviews and included 39 of them in this overview. An additional four reviews provided supplementary information. Of the 39 reviews, 32 had only minor limitations and 7 had important methodological limitations. Most studies in the reviews were from high-income countries. There were no studies from low-income countries in eight reviews.

Implementation strategies addressed in the reviews were grouped into four categories - strategies targeting:

1. healthcare organisations (e.g. strategies to change organisational culture; 1 review);

2. healthcare workers by type of intervention (e.g. printed educational materials; 14 reviews);

3. healthcare workers to address a specific problem (e.g. unnecessary antibiotic prescription; 9 reviews);

4. healthcare recipients (e.g. medication adherence; 15 reviews).

Overall, we found the following interventions to have desirable effects on at least one outcome with moderate- or high-certainty evidence and no moderate- or high-certainty evidence of undesirable effects.

1.**Strategies targeted at healthcare workers**: educational meetings, nutrition training of health workers, educational outreach, practice facilitation, local opinion leaders, audit and feedback, and tailored interventions.

2.**Strategies targeted at healthcare workers for specific types of problems**: training healthcare workers to be more patient-centred in clinical consultations, use of birth kits, strategies such as clinician education and patient education to reduce antibiotic prescribing in ambulatory care settings, and in-service neonatal emergency care training.

3. **Strategies targeted at healthcare recipients**: mass media interventions to increase uptake of HIV testing; intensive self-management and adherence, intensive disease management programmes to improve health literacy; behavioural interventions and mobile phone text messages for adherence to antiretroviral therapy; a one time incentive to start or continue tuberculosis prophylaxis; default reminders for patients being treated for active tuberculosis; use of sectioned polythene bags for adherence to malaria medication; community-based health education, and reminders and recall strategies to increase vaccination uptake; interventions to increase uptake of cervical screening (invitations, education, counselling, access to health promotion nurse and intensive recruitment); health insurance information and application support.

Authors' conclusions

Reliable systematic reviews have evaluated a wide range of strategies for implementing evidence-based interventions in low-income countries. Most of the available evidence is focused on strategies targeted at healthcare workers and healthcare recipients and relates to process-based outcomes. Evidence of the effects of strategies targeting healthcare organisations is scarce.

PLAIN LANGUAGE SUMMARY

Implementation strategies for health systems in low-income countries

What is the aim of this overview?

The aim of this Cochrane Overview is to provide a broad summary of what is known about the effects of strategies for implementing interventions to improve health in low-income countries.

This overview is based on 39 relevant systematic reviews. Each of these reviews searched for studies that evaluated the different types of implementation strategies within the scope of the question addressed by the review. The reviews included a total of 1332 studies.

This overview is one of a series of four Cochrane Overviews that evaluate different health system arrangements.

What was studied in the overview?

A key function of health systems is implementing interventions to improve health. Coverage of essential health interventions remains low in low-income countries. Decision-makers may use a range of strategies to implement health interventions, and these choices should be based on evidence of the strategies' effectiveness.

What are the main results of the overview?

The following implementation strategies had desirable effects on at least one outcome with moderate- or high-certainty evidence and no moderate- or high-certainty evidence of undesirable effects.

Strategies targeted at healthcare workers

- Educational meetings.

- Nutrition training of health workers.

- Educational outreach (vs. no intervention).

- Practice facilitation.

- Local opinion leaders.

- Audit and feedback.

- Tailored interventions (vs. no intervention).

Strategies targeted at healthcare workers for specific types of problems

- Training healthcare workers to be more patient-centred in clinical consultations.

- Use of birth kits.

- Clinician education and patient education to reduce antibiotic prescribing in ambulatory care settings.

- In-service neonatal emergency care training.

Strategies targeted at healthcare recipients

- Mass media interventions to increase immediate uptake of HIV testing (leaflets and gain-framed videos).

- Intensive self-management and adherence, intensive disease management to improve health literacy.

- Behavioural interventions and mobile phone text messages for adherence to antiretroviral therapy.

- A one-time incentive to start or continue tuberculosis prophylaxis.

- Default reminders for patients being treated for active tuberculosis.

- Use of sectioned polythene bags for adherence to malaria medication.

- Community-based health education, and reminders and recall strategies for vaccination uptake.

- Providing free insecticide-treated bednets.

- Interventions to improve uptake of cervical screening (invitations, education, counselling, access to health promotion nurse, and intensive recruitment).

- Health insurance information and application support.

The following implementation strategies had low- or very low-certainty evidence (or no studies available) for all the outcomes that were considered.

Strategies targeted at healthcare organisations

- Strategies to improve organisational culture.

Strategies targeted at healthcare workers

- Printed educational materials.

- Internet-based learning.

- Interprofessional education.

- Teaching critical appraisal.

- Educational outreach (vs. another intervention).

- Pharmacist-provided services.

- Safety checklists for use by medical care teams in acute hospital settings.

- Tailored interventions (vs. non-tailored interventions, and interventions targeted at organisational and individual barriers vs. interventions targeted at individual barriers only).

- Interventions to encourage the use of systematic reviews in clinical decision-making.

Strategies targeted at healthcare workers for specific types of problems

- Interventions to improve handwashing.

- Interventions to reduce unnecessary caesarean section rates.

- Training of traditional birth attendants.

- Skilled birth attendance.

- Training of traditional healers about STD and HIV medicine.

Strategies targeted at healthcare recipients

- Providing information/education for promoting HIV testing (multimedia).

- Providing written medicine information.

- Single interventions to improve health literacy.

- Interventions to improve medication adherence.

- Adherence - TB (immediate versus deferred incentives; cash vs. non-cash incentive; different levels of cash incentives; incentives vs. other interventions).

- Adherence - malarial medication (blister packed tablets and capsules compared to tablets and capsules in paper envelopes; tablets in sectioned polythene bags compared to bottled syrup).

- Training of healthcare workers, home visits, and monetary incentives to improve immunisation coverage.

- Risk factor assessment to improve the uptake of cervical cancer screening.

How up to date is this overview?

The overview authors searched for systematic reviews that had been published up to 17 December 2016.

BACKGROUND

This is one of four overviews of systematic reviews of strategies for improving health systems in low-income countries (Ciapponi 2014; Herrera 2014; Wiysonge 2014). The aim is to provide broad overviews of the evidence about the effects of alternative delivery, financial and governance arrangements, and implementation strategies based on systematic reviews. This overview addresses implementation strategies.

The scope of each of the four overviews is summarised below.

1. Delivery arrangements include changes in who receives care and when, who provides care, the working conditions of those who provide care, coordination of care amongst different providers, where care is provided, the use of information and communication technology to deliver care, and the quality and safety systems in place (Ciapponi 2014).

2. Financial arrangements include changes in how funds are collected and services purchased, different insurance schemes, and the use of targeted financial incentives or disincentives (Wiysonge 2014).

3. Governance arrangements include changes in rules or processes that determine authority and accountability for health policies, organisations, commercial products and health professionals, and the involvement of stakeholders in decision-making (Herrera 2014).

4. Implementation strategies include interventions designed to bring about changes in healthcare organisations, the behaviour of healthcare professionals or the use of health services by healthcare recipients.

Healthcare systems worldwide are faced with the challenge of improving the quality and safety of care they deliver in order to improve health outcomes. However, in many cases they fail to use the best available evidence to inform decisions about the implementation of specific healthcare interventions, resulting in suboptimal outcomes and inefficiencies (McGlynn 2003). Even when there is consensus around a clear evidence-informed course of action, its implementation can be difficult, particularly if it requires complex changes in clinical routines, better collaboration among disciplines, changes in patients' behaviour, or changes in the organisation of care (Grol 2007). Effective strategies targeted at multiple levels of the healthcare system are therefore needed to implement improvements in clinical care and the organisation of health services. Outcomes that can potentially be affected by implementation strategies include healthcare recipients' outcomes (health and health behaviours), the quality or utilisation of healthcare services, resource use, healthcare provider outcomes (such as sick leave), and social outcomes (such as poverty or employment) (EPOC 2017). Impacts on these outcomes can be intended and desirable or unintended and undesirable. In addition, the effects of implementation strategies on these outcomes can either reduce or increase inequities.

Health systems in low-income countries differ from those in high-income countries in terms of the availability of resources and access to services. Thus, some problems in high-income countries are not relevant to low-income countries, such as how best to implement the delivery of expensive technologies that are not available in low-income countries. Similarly, some problems in low-income countries are not relevant to high-income countries, such as how to implement the delivery of services that are already widely available or not needed in high-income countries. Our focus in this overview was specifically on implementation strategies in low-income countries. By low-income countries we mean countries that the World Bank classifies as low or lower-middle-income (World Bank 2016). Because upper-middle-income countries often have a mixture of health systems with problems similar to both those in low-income countries and high-income countries, our focus is relevant to middle-income countries but excludes consideration of conditions that are not relevant in low-income countries and are relevant in middle-income countries.

Description of the interventions

Health system administrators can use a wide range of implementation strategies to improve health systems. Different authors have used a number of approaches to classify these (Abraham 2008; Bero 1998; Dolan 2010; Grimshaw 2001; Grol 1997; Grol 2003; Michie 2011). For this overview we have used a pragmatic approach based on the level of the healthcare system targeted by the intervention: healthcare organisations, healthcare workers, and healthcare recipients (Table 1; EPOC 2017). This approach allows an intuitive matching of the barriers identified for the implementation of specific courses of action and the strategies proposed to address them, as illustrated in Table 2. We also have included reviews of alternative interventions targeted at specific types of problems that are common in low-income countries, including problems with different types of healthcare worker practice and with the utilisation of health services by healthcare recipients (Table 1; EPOC 2017).

How the intervention might work

Different interventions might work through different mechanisms. There is a plethora of contending theories from the social and behavioural sciences that attempt to explain behaviour change. Many of these have been applied to healthcare professionals and organisations in attempts to explain how different strategies to implement improvements might work (Grol 2007; Michie 2008; Wensing 2005). Michie 2005, for example, identified 33 psychological theories relevant to the implementation of evidence-

based practice. These theories contained 128 constructs (components of the theories) that they categorised into 12 domains. In another review of a broader range of theories relevant to quality improvement, Wensing 2005 included 29 theories that focused on individuals, social context, organisations and structures. There was limited evidence to support the theories, particularly regarding change of professional practice or organisation of care. Like Michie 2005, they found substantial overlap in the factors described by the various theories, which they reduced to a list of 30 factors. More recently, Michie 2011 reviewed 19 frameworks of behaviour change interventions that can be used to characterise interventions and explain how they might work. Based on a synthesis of these frameworks, they developed a new framework called the 'behavioural change wheel' which includes three essential conditions for change and nine intervention functions that address these. The three conditions are capability, opportunity and motivation. The nine intervention functions aimed at addressing deficits in one or more of these conditions are education, persuasion, incentivisation, coercion, training, enablement, modelling, environmental restructuring and restrictions.

Logically, implementation strategies should address determinants of practice, that is, factors that prevent or enable improvements. However, our understanding of how to identify determinants and match appropriate implementation strategies to identified determinants is limited (Baker 2015; Wensing 2011), although there are several frameworks or checklists designed to facilitate this (Flottorp 2013; Krause 2014). Table 2 shows examples of how different implementation strategies might work by addressing different determinants of organisational change, healthcare worker practice, and utilisation of health services by healthcare recipients.

Why it is important to do this overview

Although there are an increasing number of studies and systematic reviews about the effects of different implementation strategies (e.g. Arnold 2005; Baker 2015; Davey 2013; Flodgren 2011; Forsetlund 2009; Giguère 2012; Gould 2010; Ivers 2012; Murthy 2012; O'Brien 2007; Opiyo 2015; Oyo-Ita 2016; Parmelli 2011; Reeves 2013; Rosenbaum 2011; Sibley 2012; Sorsdahl 2009), much of this literature is not easily accessible to policymakers and other stakeholders making decisions about how to implement improvements in their health systems. Our aim is to facilitate access to this information by providing a broad overview of the evidence from systematic reviews about the effects of alternative implementation strategies in low-income countries. Such a broad overview can help policymakers and other stakeholders to identify strategies for implementing improvements in their health systems. This overview also can help to identify needs and priorities for evaluating alternative implementation strategies, as well as priorities for systematic reviews of the effects of implementation strategies. The overview can also help to refine the framework outlined in Table 1 for considering alternative implementation strategies.

Changes in health systems are complex. They may be difficult to evaluate, the applicability of the findings of evaluations from one setting to another may be uncertain, and synthesising the findings of evaluations may be difficult. However, the alternative to well-designed evaluations is poorly designed evaluations, the alternative to systematic reviews is non-systematic reviews, and the alternative to using the findings of systematic reviews to inform decisions is making decisions without the support of this rigorous evidence. Other types of information, including context-specific information and judgments (including judgments about the applicability of the findings of systematic reviews in a specific context) are still needed. Nevertheless, this overview can help people make decisions about implementation strategies by summarising the findings of available systematic reviews, including estimates of the effects of implementing specific strategies and the certainty of those estimates. The overview can also help identify important uncertainties identified by those systematic reviews as well as where new or updated systematic reviews are needed. Finally, the overview can help to inform judgments about the relevance of the available evidence in a specific context (Rosenbaum 2011).

OBJECTIVES

To provide an overview of the available evidence from up-to-date systematic reviews about the effects of implementation strategies for health systems in low-income countries. Secondary objectives include identifying needs and priorities for future evaluations and systematic reviews on alternative implementation strategies and informing refinements of the framework for implementation strategies presented in the overview (Table 1).

METHODS

We used the methods described below in all four overviews of health system arrangements and implementation strategies in low-income countries (Ciapponi 2014; Herrera 2014; Wiysonge 2014).

Criteria for considering reviews for inclusion

We included reviews that:

- assessed the effects of implementation strategies (as defined in Background) for health systems improvement;
- had a Methods section with explicit selection criteria;
- reported at least one of the following types of outcomes: patient outcomes (health and health behaviours), the quality or utilisation of healthcare services, resource use, healthcare provider outcomes (such as sick leave) or social outcomes (such as poverty or employment);

- were relevant to low-income countries as classified by the World Bank (World Bank 2016); and
- were published after April 2005.

Judgments about relevance to low-income countries are sometimes difficult to make, and we are aware that evidence from high-income countries is not directly applicable to low-income countries. We based these judgments on an assessment of the likelihood that the implementation strategies considered in a review address a problem that is important in low-income countries, would be feasible, and would be of interest to decision-makers in low-income countries, regardless of where the included studies took place. So, for example, we excluded strategies that require technology that is not widely available in low-income countries. At least two of the overview authors made judgments about the relevance to low-income countries and discussed with the other review authors whenever there was uncertainty.

We excluded reviews that only searched for and included studies from a single high-income country due to concerns about the wider applicability of the findings of such reviews. However, we included reviews that only included studies from high-income countries if the interventions were relevant for low-income countries.

We excluded reviews published before April 2005 as these were highly unlikely to be up-to-date. We excluded reviews with methodological limitations important enough to compromise the reliability of the review findings (Appendix 1).

Search methods for identification of reviews

We searched Health Systems Evidence in November 2010 using the following filters:

1. health system topics = implementation arrangements;
2. type of synthesis = systematic review or Cochrane Review;
3. type of question = effectiveness; and
4. publication date range = 2000 to 2010.

We conducted subsequent searches using PDQ ('pretty darn quick')-Evidence, which was launched in 2012. We searched PDQ up to 17 December 2016, using the filter 'Systematic Reviews' with no other restrictions. We updated that search, excluding records that were entered into PDQ-Evidence prior to the date of the previous search.

PDQ-Evidence is a database of evidence for decisions about health systems, which is derived from the Epistemonikos database of systematic reviews (Rada 2013). It includes systematic reviews, overviews of reviews (including evidence-based policy briefs) and studies included in systematic reviews. Epistemonikos and PDQ-Evidence search the following databases with no language or publication status restrictions.

1. Cochrane Database of Systematic Reviews (CDSR).
2. PubMed.
3. Embase.
4. Database of Abstracts of Reviews of Effectiveness (DARE).
5. Health Technology Assessment Database.
6. CINAHL.
7. LILACS.
8. PsycINFO.
9. Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI-Centre) Evidence Library.
10. 3ie Systematic Reviews and Policy Briefs.
11. World Health Organization (WHO) Database.
12. Campbell Library.
13. Supporting the Use of Research Evidence (SURE) Guides for Preparing and Using Evidence-Based Policy Briefs.
14. European Observatory on Health Systems and Policies.
15. UK Department for International Development (DFID).
16. National Institute for Health and Care Excellence (NICE) public health guidelines and systematic reviews.
17. Guide to Community Preventive Services.
18. Canadian Agency for Drugs and Technologies in Health (CADTH) Rx for Change.
19. McMaster Plus KT+.
20. McMaster Health Forum Evidence Briefs.

Appendix 2 presents the detailed search strategies for PubMed, Embase, LILACS, CINAHL and PsycINFO. We screened all records in the other databases. PDQ staff and volunteers update these searches weekly for Pubmed and monthly for the other databases, screening records continually and adding new reviews to the database daily.

In addition, we screened all of the Cochrane Effective Practice and Organisation of Care (EPOC) Group systematic reviews in Archie (i.e. the Cochrane central server for managing documents) and the reference lists of relevant policy briefs and overviews of reviews.

Data collection and analysis

Selection of reviews

Two of the overview authors (NO and TP) independently screened the titles and abstracts found in PDQ-Evidence to identify reviews that appeared to meet the inclusion criteria. Two other authors (AO and SL) screened all of the titles and abstracts that could not be confidently included or excluded after the first screening to identify any additional eligible reviews. One of the overview authors screened the reference lists.

One of the overview authors (NO or TP) applied the selection criteria to the full text of potentially eligible reviews and assessed the reliability of reviews that met all of the other selection criteria (Appendix 1). Two other authors (AO or SL) independently checked these judgments.

Data extraction and management

We summarised each included review using the approach developed by the SUPPORT Collaboration (Rosenbaum 2011).

We used standardised forms to extract data on the background of the review; the interventions, participants, settings and outcomes; the key findings; and considerations of applicability, equity, economics, and monitoring and evaluation. We assessed the certainty of the evidence for the main comparisons using the GRADE approach (EPOC 2017; Guyatt 2008; Schünemann 2011a; Schünemann 2011b).

Each completed SUPPORT Summary was peer-reviewed and published on an open access website, where there are details about how the summaries were prepared, including how we assessed the applicability of the findings, impacts on equity, economic considerations, and the need for monitoring and evaluation. We describe our rationale for the criteria that we used for these assessments in the SUPPORT Tools for evidence-informed health Policymaking (Fretheim 2009; Lavis 2009; Oxman 2009a; Oxman 2009b). As noted there, "a local applicability assessment must be done by individuals with a very good understanding of on-the-ground realities and constraints, health system arrangements, and the baseline conditions in the specific setting" (Lavis 2009). In this overview we have made broad assessments of the applicability of findings from studies in high-income countries to low-income countries using the criteria described in the SUPPORT Summaries database with input from people with relevant experience and expertise in low-income countries.

Assessment of methodological quality of included reviews

We assessed the reliability of systematic reviews that met the inclusion criteria using criteria developed by the SUPPORT and SURE collaborations (Appendix 1). Based on these criteria, we categorised each review as having:

- only minor limitations;
- limitations that were important enough that it would be worthwhile to search for another systematic review and to interpret the results of this review cautiously, if a better review could not be found;
- limitations important enough to compromise the reliability of the review findings. We did not include these reviews in the overview.

Data synthesis

We describe the methods used to prepare a SUPPORT Summary of each review in detail on the SUPPORT Summaries website. Briefly, for each included systematic review we prepared a table summarising what the review authors searched for and what they found along with 'Summary of findings' tables for each main comparison, and we assessed the relevance of the findings for low-income countries. The SUPPORT Summaries include key messages, important background information, a summary of the findings of the review, and structured assessments of the relevance of the review for low-income countries. We subjected the SUPPORT Summaries to review by the lead author of each review, at least one content area expert, people with practical experience in low-income settings, and a Cochrane EPOC Group editor (AO or SL). The authors of the SUPPORT Summaries responded to each comment and made appropriate revisions, and the summaries underwent copy-editing. The editor determined whether the summary authors had adequately addressed the comments and whether the summary was ready for publication on the SUPPORT Summary website.

We organised the review using a modification of the taxonomy for health systems arrangements used by Health Systems Evidence (Lavis 2015). We adjusted the framework iteratively to ensure that we appropriately categorised all of the included reviews and that we included and logically organised all relevant health system arrangements and implementation strategies. We prepared a table listing the included reviews as well as the types of implementation strategies for which we were not able to identify a reliable, up-to-date review (Table 3). We also prepared a table of excluded reviews (Table 4), detailing reviews that addressed a question for which another (more up-to-date or reliable) review was included, reviews that were published before April 2005 (for which a SUPPORT Summary had previously been prepared), reviews with results that we did not consider transferable to low-income countries, and reviews with limitations important enough to compromise the reliability of the review findings.

We described the characteristics of the included reviews in Appendix 3 that includes the date of the last search, any important limitations, what the review authors searched for and what they found. We summarise our detailed assessments of the reliability of the included reviews in a separate table (Table 5) showing whether individual reviews met each criterion in Appendix 1.

Our structured synthesis of the findings of the overview was based on two tables. We summarised the main findings of each review in a table that included the key messages from each SUPPORT Summary (Table 6). In a second table (Table 7), we reported the direction of the results and the certainty of the evidence for each of the following type of outcomes: health and other patient outcomes; access, coverage or utilisation; quality of care; resource use; social outcomes; impacts on equity; healthcare provider outcomes; adverse effects (not captured by undesirable effects on any of the preceding types of outcomes), and any other important outcome (that did not fit into any of the preceding types of outcomes) (EPOC 2017). We categorised the direction of results as: a desirable effect, little or no effect, an uncertain effect (very low certainty evidence), no included studies, an undesirable effect, not reported (i.e. not specified as a type of outcome that the review authors considered by), or not relevant (i.e. no plausible mechanism by which the type of health system arrangement could affect the type of outcomes).

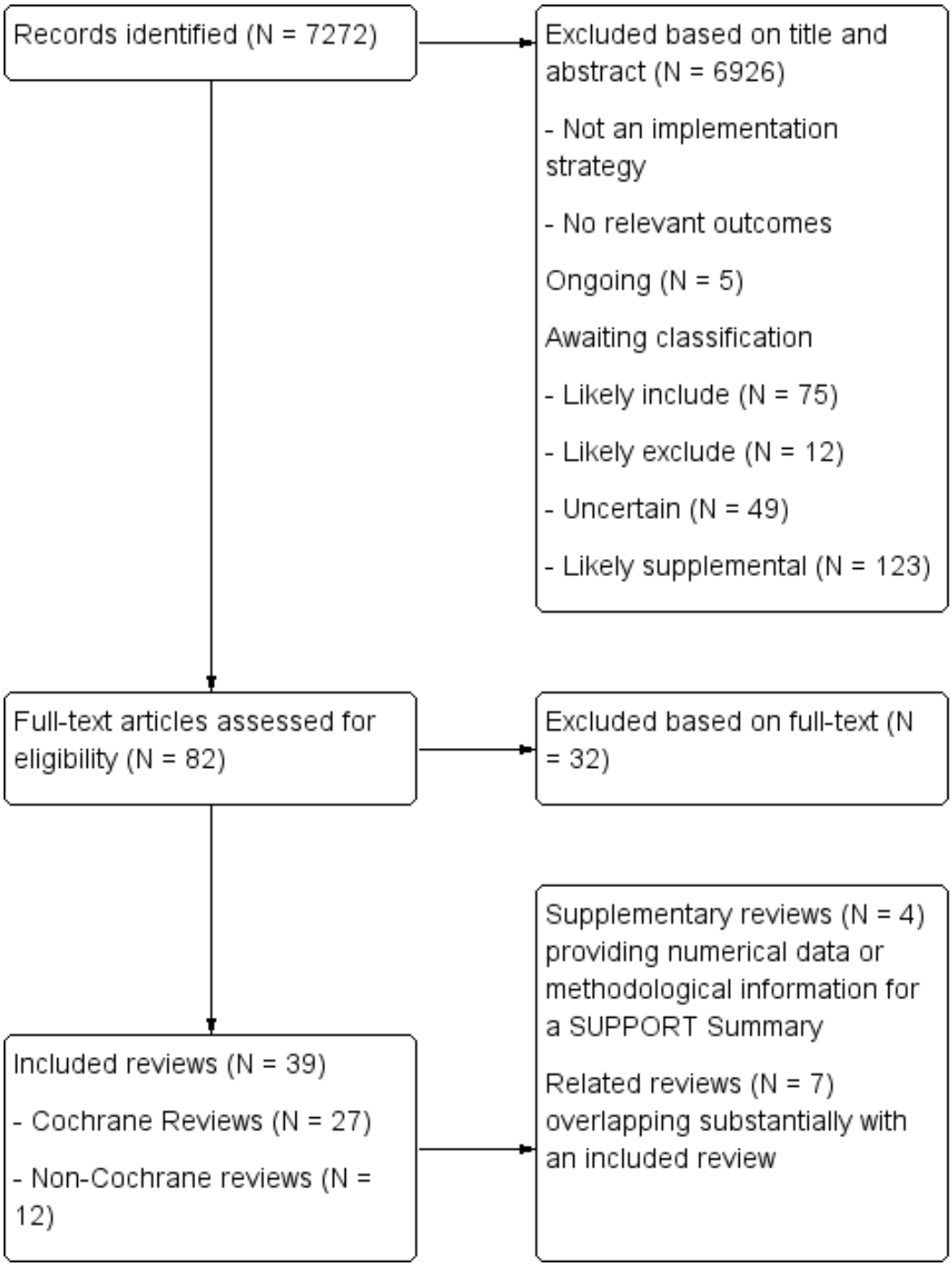
We took into account other relevant considerations besides the findings of the included reviews when drawing conclusions about implications for practice (EPOC 2017). This included considera-

tions related to the applicability of the findings and likely impacts on equity. Our conclusions about implications for systematic reviews were based on types of implementation strategies for which we were unable to find a reliable, up-to-date review and limitations identified in the included reviews. Our conclusions about implications for future evaluations were based on the findings of the included reviews (EPOC 2017).

RESULTS

We identified 7272 systematic reviews of health systems arrangements and implementation strategies. We excluded 6926 reviews from this overview following a review of titles and abstracts. We retrieved the full texts of 82 reviews for further detailed assessment. Of these, we excluded 32 reviews: 6 because they had important methodological limitations, 11 that were out-of-date, 11 that focused on an area already covered by one of the included reviews and 4 that were of limited relevance to low-income countries (Table 4). We included 39 systematic reviews published between 2005 and 2016 in this overview. In addition, four reviews provided supplementary numerical data or methodological information used in a SUPPORT Summary (Figure 1; Appendix 4). Seven related reviews were similar to one of the primary reviews. We did not prepare SUPPORT Summaries for the related reviews, and they did not contribute data to the summaries or the overview because of substantial overlap with one of the primary reviews. Following the screening of the subsequent searches of PDQ-Evidence, we identified five ongoing reviews of implementation strategies (Brennan 2009; Dudley 2009; Fønhus 2016; Pantoja 2014b; Rowe 2015); six additional systematic reviews of implementation strategies that are awaiting assessment (Baldwin 2011; Mauger Rothenberg 2012; Mundell 2013; Oluoch 2012; Rolfe 2014; Tannenbaum 2013; Appendix 5); and a number of other reviews that are awaiting classification and also need to be checked for relevance to this overview (Appendix 5).

Figure 1. Flow diagram



Description of included reviews

Of the 39 included systematic reviews, 27 were Cochrane Reviews and 12 were non-Cochrane reviews. Fifteen of the reviews were updates of earlier reviews (Baker 2015; Berkman 2011; Everett 2011; Forsetlund 2009; Giguère 2012; Gould 2010; Haynes 2008; Horsley 2011; Ivers 2012; Liu 2014; Lutge 2015; O'Brien 2007; Oyo-Ita 2016; Reeves 2013; Sibley 2012).

The reviews reported results from 1332 studies (Appendix 3). Study designs included: 710 randomised trials; 26 non-randomised trials; 34 controlled before-after studies; 50 interrupted time series; 69 repeated measures studies; and 243 other designs (cross-sectional, cohort, historical or ecological, and quasi-experimental studies). The number of studies included in each review ranged from 0 in Parmelli 2011 to 201 in Cook 2008. Dates of most recent searches in the reviews ranged from April 2004 to May 2016.

Most studies in the reviews were from the USA, the UK, Canada, the Netherlands and Australia. There were no studies from low-income countries in eight reviews (Baskerville 2012; Dwamena 2012; Horsley 2011; Jia 2014; Ranji 2008; Reeves 2013; Simoni 2006; Vidanapathirana 2005). Study settings varied and included outpatient and inpatient settings in hospitals, health centres, families, workplaces and community settings (Appendix 3). The health professionals included in the reviews were physicians, nurses, pharmacists, psychologists, dentists, social workers and traditional healers. The participants included in the reviews were children, adults and pregnant mothers. Outcomes examined included healthcare provider performance, quality of care, patient outcomes, access to care, coverage, utilisation of health services, resource use, impacts on equity and adverse effects (Table 7, Appendix 3).

Implementation strategies addressed in the reviews were grouped into four categories based on the level of the healthcare system targeted by the intervention (Table 1; Table 3).

1. Strategies targeting healthcare organisations (e.g. strategies to change organisational culture) (1 review).
2. Strategies targeting healthcare workers (e.g. printed educational materials) (14 reviews).
3. Strategies targeting healthcare workers to address a specific problem (e.g. unnecessary use of antibiotics) (9 reviews).
4. Strategies targeting healthcare recipients (e.g. medication adherence) (15 reviews).

Methodological quality of included reviews

We have summarised our assessment of the methodological quality (reliability) of the included reviews in Table 5. We judged 32 reviews to have only minor limitations. We judged the other seven reviews to have methodological limitations that were important enough to make it worthwhile to search for another systematic review or to interpret the review results cautiously, if no better review were available (Baskerville 2012; Haynes 2008; Ko 2011; Nicolson 2009; Ranji 2008).

We assessed the included reviews as being well conducted in relation to the identification, selection and critical appraisal of the included studies. However, we assessed the comprehensiveness of the search for evidence as only partially achieved in 19 reviews. We also assessed the included reviews as being well conducted in relation to the analysis of the available evidence, with only a few of them presenting limitations related to descriptions of the extent of heterogeneity (Haynes 2008; Nicolson 2009; Perrier 2011; Ranji 2008), the methods used to synthesise the evidence (Haynes 2008; Ko 2011; Nicolson 2009; Pande 2013; Perrier 2011), and the examination of factors that might explain differences in the results of included studies (Gould 2010; Nicolson 2009; Pande 2013; Ranji 2008).

Effect of interventions

We used a pragmatic approach to group the interventions assessed in the overview based on the level of the healthcare system targeted by the intervention: healthcare organisations, healthcare workers, and healthcare recipients. Additionally, for interventions targeted at healthcare workers, we distinguished reviews evaluating a specific type of intervention from those evaluating interventions for a specific problem that we considered especially relevant to low-income countries (Table 3).

We report here the main findings using plain language statements based on GRADE 'Summary of findings' tables that we prepared for each included review (EPOC 2017). The 'Summary of findings' tables are available in the SUPPORT Summaries database.

Strategies targeted at healthcare organisations

Organisational culture

One review assessed the effects of strategies to change organisational culture to improve healthcare performance but did not find any eligible studies (Parmelli 2011). It was therefore not possible to draw any conclusions about the impacts of this type of organisational intervention.

Continuous quality improvement

Continuous quality improvement (CQI) comprises improvement of organisational processes, use of structured problem-solving processes incorporating statistical methods and measurement to diagnose problems and monitor progress, use of teams including employees from multiple departments and from different organisational levels, empowerment of employees to identify quality problems and create opportunities to correct them, and an explicit focus on 'customers'. None of the included reviews assessed the effects of CQI strategies. One Cochrane Review on this topic is in progress (Brennan 2009).

Strategies targeted at healthcare workers by type of intervention

In order to give a general comparative picture of the range of effects found for this group of interventions we summarised the findings in Appendix 6. Additionally we present the specific findings for each strategy below.

Educational materials

One review assessed the effects of printed educational materials on professional practice. The review found 45 studies done in a variety of settings (e.g. outpatient, inpatient, community) and involving different healthcare professionals (e.g. physicians, nurses, allied health professionals in the field of community health) (Giguère 2012). Printed educational materials may slightly improve practice outcomes (e.g. diagnosis, prescribing, referral practices) among healthcare providers, when used alone and compared to no intervention (low-certainty evidence). There were no studies assessing the effects of these materials on patient outcomes.

Internet-based learning

Internet-based learning refers to any educational intervention delivered to healthcare workers through the Internet. This approach is intended to allow learners to participate at a time and place convenient to them and to facilitate innovation in instructional methods. It also potentially allows instruction to be tailored to the individual's needs.

One review assessing the effects of Internet-based learning in health professions found 201 studies addressing a wide range of topics and using a range of modalities for teaching and learning (Cook 2008). Compared with no intervention, Internet-based learning may improve health workers' knowledge (low-certainty evidence), but it is unclear whether it improves health professionals' skills and behaviours, or if it leads to beneficial effects on patients (very low-certainty evidence). When compared to other forms of teaching and learning, Internet-based learning may improve knowledge, but may not improve satisfaction, skills, behaviour and patient outcomes (low-certainty evidence).

Educational meetings and workshops

Four reviews were included in this category (Forsetlund 2009; Reeves 2013; Horsley 2011; Sunguya 2013).

The first review assessed the effects of educational meetings and workshops on professional practice and healthcare outcomes (Forsetlund 2009). The review identified 81 studies. Findings showed that educational meetings alone or combined with other interventions probably improve professional practice and healthcare outcomes for patients (moderate-certainty evidence). Combined interactive and didactic (lecture-based) educational meetings may be slightly more effective than didactic educational meetings alone (low-certainty evidence).

The second review assessed the effects of interprofessional education (IPE) on professional practice and healthcare outcomes (Reeves 2013). The review identified 15 studies. Compared with separate, profession-specific educational interventions or no education intervention, IPE may lead to improvements in outcomes for patients, adherence to clinical guidelines, and clinical processes (e.g. shared decisions on surgical incisions) (low-certainty evidence).

The third review assessed the effects of teaching health professionals critical appraisal skills on their knowledge (Horsley 2011). The review identified three studies. Teaching critical appraisal skills, compared to usual practice, may improve health professionals' knowledge on how to critically appraise research papers (low-certainty evidence). Effects on critical appraisal skills were uncertain. None of the studies evaluated process of care or patient-related outcomes

The final review assessed the effect of nutrition training of health workers on caregivers' feeding practices for children aged six months to two years (Sunguya 2013). The review identified ten studies. Nutrition training of health workers, compared to usual care, increases daily energy intake, feeding frequency, and consumption of targeted food items. The certainty of evidence was high. None of the included studies assessed cost or health outcomes (such the proportion of undernourished children or children with adverse health outcomes).

Local consensus processes

Consensus development processes are decision-making processes that aim to help a group of people reach agreement about a given issue. Healthcare workers have used local consensus processes to achieve agreement on clinical policies and guidelines. None of the included reviews assessed the effects of local consensus processes.

Educational outreach

Three reviews assessed the effects of educational outreach interventions on professional practice and healthcare outcomes (Baskerville 2012; O'Brien 2007; Pande 2013). Educational outreach visits entail the use of a trained person from outside the practice setting

to meet with healthcare professionals in their practice in order to provide information with the intent of improving practice, for example feedback about health worker performance. This type of face-to-face visit is also called academic detailing and educational visiting.

A review assessing the effects of educational outreach visits on professional practice and practice outcomes found 69 studies (O'Brien 2007). Educational outreach visits alone or combined with other interventions probably improve the quality of care delivered to patients (moderate-certainty evidence). For prescribing, the effects are relatively consistent (high-certainty evidence); for other types of professional performance, the effects vary widely from small to modest improvements (moderate-certainty evidence). The effects on patient outcomes were uncertain (very low-certainty evidence).

Practice facilitation is a multifaceted approach whereby skilled individuals, either internal or external to a primary care setting, promote the adoption and use of evidence-based guidelines. A review assessing the effects of practice facilitation on evidence-based practice behaviours identified 23 studies (Baskerville 2012). All of them took place in high-income countries. The use of practice facilitation probably improves the adoption of evidence-based guidelines (moderate-certainty evidence).

Another review assessing the effect of additional pharmacist-provided services included one study of strategies targeted at healthcare professionals, comparing educational outreach to usual care (Pande 2013). The findings showed that when pharmacists provide additional services targeted at health professionals, such as educational outreach visits, patient outcomes may improve (low-certainty evidence). Effects on healthcare cost were uncertain (no studies were found).

Local opinion leaders

Opinion leaders are individuals in a community or organisation who have a substantial influence on what the rest of the community or organisation does. Because of their influence, opinion leaders may be able to persuade healthcare providers to use the best available evidence when managing patients. A review assessing the effects of local opinion leaders on healthcare professional behaviour and patient outcomes found 18 studies conducted in both hospital and primary care settings (Flodgren 2011). Local opinion leaders, acting alone or in concert with other interventions, probably improve healthcare workers' adherence to desired practice (moderate-certainty evidence). None of the included studies assessed patient outcomes.

Patient-mediated interventions

Patient-mediated interventions include any intervention aimed at changing the performance of healthcare professionals through interactions with patients or information provided by or to patients. A Cochrane Review of patient-mediated interventions is in progress (Fønhus 2016).

Audit and feedback

A review assessing the effects of audit and feedback on the practice of healthcare professionals and patient outcomes identified 140 studies using a wide range of interventions with respect to their content, format, timing and source (Ivers 2012). Overall they found that interventions that include audit and feedback (alone or as a core component of a multifaceted intervention), compared with usual care, probably improve adherence to desired practice (moderate-certainty evidence) and probably lead to little difference in patient outcomes (moderate-certainty evidence). Compared with a number of educational interventions (e.g. reminders, educational outreach) and organisational, financial or patient-mediated interventions, audit and feedback probably leads to little or no difference in compliance with desired practice or patient outcomes (moderate-certainty evidence).

Reminders

One review assessed if using safety checklists improved patient safety in acute hospital settings compared to not using them. The review included nine studies that evaluated a wide variety of checklist designs as well as training on use of the checklists (Ko 2011). The findings showed that surgical safety checklists may reduce death rates and major complications within 30 days after surgery (low-certainty evidence). It was uncertain whether safety checklists improve adherence to guidelines or patient safety in intensive care units, emergency departments or acute care settings (very low-certainty evidence).

One Cochrane Review on the effects of manual paper reminders on professional practice outcomes is in progress (Pantoja 2014b). We excluded two Cochrane Reviews assessing the effects of computer-generated or onscreen reminders because of their limited relevance to low-income countries (Arditi 2012; Shojania 2009).

Tailored interventions

A range of barriers may impede changes to health professional behaviour. Change may be more likely if implementation strategies address specific barriers. A review assessing the effects of interventions tailored to address specific barriers to change on professional practice and healthcare outcomes identified 26 studies. The review found that these interventions were probably more likely to improve professional practice than no intervention or dissemination of guidelines alone (moderate-certainty evidence). However, it is uncertain whether tailored interventions are more likely to improve professional practice than non-tailored interventions, or whether tailored interventions targeted at organisational and individual barriers are more likely to improve professional practice than tailored interventions targeted only at individual barriers (very low-certainty evidence). A recent update of this review identified six additional trials but without any change to the conclusions (Baker 2015).

Multifaceted interventions

Multifaceted interventions are those including more than one of the interventions described above. Four reviews examined the effects of multifaceted interventions on professional practice and/or patient outcomes.

One review assessed the effectiveness of interventions for seeking, appraising and applying evidence from systematic reviews in clinical decisions. It included five trials in middle- and high-income countries evaluating multifaceted interventions (Perrier 2011). It is uncertain whether multifaceted interventions, such as training and workshops, improve informed decision-making by healthcare workers in low-income countries (very low-certainty evidence).

Three reviews compared the effects of multifaceted interventions to audit and feedback (Ivers 2012), educational meetings (Forsetlund 2009), and outreach visits (O'Brien 2007). In the case of audit and feedback and outreach visits, the authors found that combining the core intervention with other interventions led to a larger effect size than using the core intervention alone. However, the results were inconsistent or based on indirect comparisons. On the other hand, Forsetlund 2009 did not find relevant differences between the effects of multifaceted interventions and educational meetings alone.

Strategies targeted at healthcare workers by type of problem

In order to have a general comparative picture of the range of effects found for this group of interventions, we have summarised the findings in Appendix 7. Additionally we present specific findings for each strategy below.

Communication with patients

One review assessed the effects of interventions for health providers that aim to promote patient-centred care (PCC) in clinical consultations (Dwamena 2012). The review included 45 studies of training related to a variety of PCC skills (e.g. disease-specific training for providers and patients). Compared to no intervention, there was moderate-certainty evidence that patient-centred training probably improves patient health status (e.g. clinical outcomes), and there was low-certainty evidence that it may improve the patient-provider consultation process (e.g. the communication of treatment options) and may slightly improve patient satisfaction with the consultation and patient behaviour (e.g. attendance at follow-up consultation).

Handwashing

A review of interventions to improve hand hygiene adherence in patient care and reduce healthcare-associated infections identified four hospital-based studies (Gould 2010). This review found that compared to usual care, educational interventions may increase hand hygiene compliance (low-certainty evidence). Compared to usual care, multifaceted marketing campaigns may increase the use of hand hygiene products (low-certainty evidence), but the effects on healthcare-associated infections are uncertain (very low-certainty evidence).

Obstetric care

Four reviews examined strategies for improving obstetric care in pregnant women. The first review assessed the effects of non-clinical interventions for reducing unnecessary caesarean section rates, based on 16 studies in community and hospital settings (Khunpradit 2011). Compared to standard prenatal care, the following non-clinical interventions may decrease caesarean section rates: nurse-led relaxation, birth preparation classes for mothers, implementation of guidelines with mandatory second opinion and with support from local opinion leaders, and audit and feedback given to individual care providers (low-certainty evidence). Prenatal education and support programmes, computerised patient decision aids, decision-aid booklets and intensive group therapy may have little or no overall effect on caesarean section rates (low-certainty evidence).

The second review included studies of training traditional birth attendants (TBAs) and included six studies from rural communities (Sibley 2012). The review found that the training of untrained TBAs may reduce neonatal deaths and stillbirths, pregnancy-related haemorrhage, and puerperal sepsis, and increase referral of pregnant women with obstetric complications (low-certainty evidence). However, such training may increase the number of pregnant women with obstructed labour (low-certainty evidence). The effect of providing training to untrained TBAs on maternal mortality was uncertain (very low-certainty evidence). Also, the effect of providing additional training (on newborn resuscitation and breastfeeding) to TBAs who already have some formal training on maternal mortality, morbidity, stillbirths, neonatal deaths, exclusive breastfeeding, and advice about immediate feeding of colostrum was uncertain (very low-certainty evidence).

The third review (21 studies) assessed the effects of skilled birth attendance and emergency obstetric care on stillbirths and perinatal mortality (Yakoob 2011). Participants in the studies included 'village midwives', professional midwives, and trained traditional birth attendants. Compared to usual care, skilled birth attendance may reduce stillbirths and perinatal mortality (low-certainty evidence). The effect of alternative ways of providing emergency care on stillbirths was uncertain (very low-certainty evidence).

The fourth review included nine studies and assessed the effects of birth kits on newborn and maternal outcomes (Hundley 2012). A birth kit was defined as any disposable kit intended for routine use in the intrapartum period, specifically at the delivery of the baby. Compared with no intervention, the use of birth kits (alongside with education or topical antimicrobial): reduces puerperal sepsis and neonatal tetanus-related mortality (high-certainty evidence),

probably reduces maternal mortality, haemorrhage and neonatal mortality (moderate-certainty evidence), and may reduce neonatal sepsis (low-certainty evidence).

Prescribing antibiotics

One review assessed the effects of interventions to improve antibiotic prescribing in ambulatory settings. The review focused on the effectiveness of strategies to reduce antibiotic prescribing for acute outpatient illnesses for which antibiotics are often prescribed inappropriately, and included 43 studies (Ranji 2008). Most of the studies in the review focused on prescribing for acute respiratory tract infections. Interventions assessed included: clinician education (distribution of materials, educational meetings, educational outreach, educational workshops with or without guideline distribution); patient education (written educational materials, educational meetings); and clinician education plus other interventions (e.g. audit and feedback, patient education). Strategies such as clinician education and patient education alone or combined with audit and feedback probably reduce antibiotic prescribing in ambulatory care settings (moderate-certainty evidence). The effects of the interventions on the proportion of patients treated with appropriate antibiotics and on clinical outcomes were not reported.

Seriously ill newborn care

A review of the effects of in-service training of health professionals on emergency care of seriously ill newborns and children identified two hospital-based studies (Opiyo 2015). In-service neonatal emergency care training probably improves provider practices (i.e. increases adequate resuscitation and preparedness for resuscitation, probably decreases the frequency of inappropriate and potentially harmful resuscitation practices) (moderate-certainty evidence) and may reduce mortality in newborns requiring resuscitation (low-certainty evidence).

Quality of care for sexually transmitted diseases and HIV

One review examined the effectiveness of interventions for educating traditional healers about sexually transmitted diseases (STDs) and HIV and identified two studies (Sorsdahl 2009). The studies assessed the impact of short training courses on STDs, HIV and other related health issues (e.g. family planning). Training of traditional healers may increase their knowledge of STDs and HIV (signs and symptoms, prevention), patient management practices, and referral practice (low- to moderate-certainty evidence). Training may lead to little or no difference in the incidence of HIV/AIDS risk behaviour and traditional healers' self-reported referral practices (low-certainty evidence).

Strategies targeted at healthcare recipients

Providing information or education

Four reviews examined the effects of providing information or education on health issues to healthcare recipients. None of the studies included in these reviews was from a low-income country.
The first review assessed the effect of mass media interventions for promoting HIV testing and included 14 studies in diverse populations (Vidanapathirana 2005). Despite substantial heterogeneity in the populations studied, media used, duration and frequency of interventions, and study designs, each study showed that mass media increased initial uptake of HIV testing (high-certainty evidence). However, the initial increase in uptake of HIV tests may not be sustained in the long-term (low-certainty evidence). Mass media interventions may lead to an increase in the number of infected people diagnosed through voluntary counselling and testing.
The second review (25 studies) addressed the effects of written information about prescribed and over-the-counter medicines (Nicolson 2009). Written medicine information may lead to little or no difference in adherence to instructions compared with no written information (low-certainty evidence). None of the included studies assessed health outcomes.
The third review (128 studies) focused on the effects of health literacy interventions (e.g. simplifying the presentation of information) (Berkman 2011). Some mixed strategies such as intensive self-management and adherence interventions probably improve the use of healthcare across health literacy levels (moderate-certainty evidence). It is uncertain whether single strategies improve the use of healthcare services, health outcomes, resource use, or disparities in the use of healthcare services (very low-certainty evidence).
The fourth review (11 studies) assessed the effect of additional pharmacist-provided services targeted at patients versus usual care (Pande 2013). The intervention comprised patient education, counselling, complete pharmaceutical care follow-up, and bespoke educational booklets explaining disease, medication and lifestyle modifications. The findings showed that pharmacist-provided services targeted at patients may reduce the use of specific health services (e.g. hospital admissions, general practitioner visits), reduce patients' medication costs, and improve some clinical outcomes (low-certainty evidence).

Medication adherence

One review examined the effects of interventions to improve patient adherence to medication (Haynes 2008). The review identified 78 studies conducted in many different settings, most of which were in high-income countries. Nine studies evaluated 10 different interventions to increase short-term adherence in very diverse conditions. The interventions evaluated were: the provision of more detailed instructions to patients (4 studies), the use of

dose-dispensing units of medication (1 study), counselling about the target disease of the patients (3 studies), the use of different medication formulations (1 study) and augmented pharmacy services (1 study). It is uncertain whether interventions to increase adherence to short-term treatments improve adherence or patient outcomes (very low-certainty evidence).

Seventy-one studies evaluated 81 different interventions to increase adherence in diverse chronic conditions, including: asthma and chronic obstructive pulmonary disease (12 studies), hypertension (12 studies), diabetes (6 studies), HIV (12 studies), rheumatoid arthritis (2 studies), dyslipidemia (5 studies), mental health conditions (14 studies), epilepsy (1 study), heart failure (1 study) and ischaemic heart disease (1 study). Some studies focused on specific medications, such as oral anticoagulant therapy (1 study) and contraception (1 study). Two studies evaluated interventions to increase adherence to complex regimens in the elderly. Interventions aimed at increasing adherence to long-term treatments may improve the adherence to medications (low-certainty evidence), but it is uncertain whether interventions to increase adherence to long-term treatments improve patient outcomes (very low-certainty evidence).

The update of this review, which identified 109 additional studies, reported similar effects on adherence (Nieuwlaat 2014). However, it was not possible to prepare 'Summary of findings' tables for the update of Haynes 2008. The update found five randomised trials from the previous review to be ineligible and excluded them. Notably, review authors found 17 of the 182 trials to be at 'low risk of bias', and "generally involved complex interventions with multiple components, trying to overcome barriers to adherence by means of tailored ongoing support from allied health professionals such as pharmacists, who often delivered intense education, counselling (including motivational interviewing or cognitive behavioral therapy by professionals) or daily treatment support (or both), and sometimes additional support from family or peers. Only five of these trials reported improvements in both adherence and clinical outcomes, and no common intervention characteristics were apparent. Even the most effective interventions did not lead to large improvements in adherence or clinical outcomes". We did not assess the certainty of evidence for these outcomes as this would not have been reliable given the synthesis approach used in the updated review.

Adherence to antiretroviral therapy

Three reviews addressed strategies for improving adherence to antiretroviral therapy (ART) in patients with HIV/AIDs.

Simoni 2006 and Simoni 2010 examined the effects of patient support strategies and education for improving ART adherence. Simoni 2006 included 19 studies of the effects of a range of behavioural interventions (didactic information on ART, interactive discussions addressing cognitions, motivations, and expectations, cue dosing or cognitive-behaviour therapy, reminders such as pagers). Simoni 2010 identified 10 additional studies. These reviews found that behavioural interventions probably lead to slightly better adherence to highly active antiretroviral therapy (HAART) (moderate-certainty evidence), and they may slightly improve the number of patients with undetectable viral load (a laboratory measure of successful HAART) (low-certainty evidence). Authors identified no studies measuring patient outcomes such as morbidity and mortality, and only one included study took place in a low-income country.

Mbuagbaw 2013 focused on mobile text messaging for promoting adherence to ART. The review included three randomised trials. It found that mobile phone text messages compared to standard care improve adherence to ART for up to 12 months (high-certainty evidence) but may lead to little or no difference in mortality or loss to follow-up after up to 12 months (low-certainty evidence). Weekly text messages probably improve adherence compared to daily text messages, and interactive text messages probably improve adherence compared to non-interactive text messages (moderate-certainty evidence).

Adherence to malaria treatment

A review of the effects of unit-dose packaged treatment on treatment failure and treatment adherence in people with uncomplicated malaria identified five studies (Orton 2005). Use of blister packs, compared to tablets and capsules in paper envelopes, may improve adherence to treatment for malaria and may lead to slightly fewer treatment failures (low-certainty evidence). No studies reported adverse effects. Use of sectioned polythene bags, compared to bottled syrup, may improve adherence to treatment in children under 5 years with malaria but may increase vomiting (low-certainty evidence). It is uncertain whether there is a difference in clinical outcomes (very low-certainty evidence). Compared to paper envelopes, use of sectioned polythene bags probably improves adherence to treatment (moderate-certainty evidence), may slightly decrease treatment failures in children aged over seven years and adults with malaria (low-certainty evidence), and may lead to little if any difference in adverse events (low-certainty evidence). It is uncertain whether the use of sectioned polythene bags, compared with unsectioned bags, impacts on treatment adherence or patient outcomes (very low-certainty evidence), or on adverse events (not reported).

Adherence to anti-tuberculosis therapy

Two reviews examined strategies for improving adherence to drugs to prevent or cure tuberculosis (TB).

The first review included 11 studies and assessed the effects of material incentives given to patients undergoing diagnostic testing for TB or receiving drug therapy to prevent or cure TB (Lutge 2015). Most of the studies took place in high-income countries. Compared to routine care, cash-and non-cash incentives probably

increase health service utilisation (return visits for tuberculin skin test reading, start or continuation of treatment) (low- to moderate-certainty evidence). They may not improve completion of TB prophylaxis (low-certainty evidence), and it is uncertain if they improve completion of treatment for active TB (very low-certainty evidence). Cash incentives may slightly improve patient return for tuberculin skin test reading and completion of TB prophylaxis compared to non-cash incentives (low-certainty evidence). Immediate (compared to deferred) incentives may not improve adherence to anti-tuberculosis treatment (low-certainty evidence).

The second review assessed the effects of reminder systems aimed at reminding patients to take their TB medication or attend appointments (pre-appointment reminders) or to contact patients who have missed an appointment with default reminders (Liu 2014). The review included six trials of pre-appointment reminders and three trials of default reminders. Five studies took place in the USA, two in India and one each in Spain and Irak. For patients being treated for active TB, pre-appointment reminders may increase clinic attendance and the number of patients completing treatment (low-certainty evidence), and default reminders probably increase the number of patients completing treatment (moderate-certainty evidence) and may increase clinic attendance (low-certainty evidence). For people on TB prophylaxis, pre-appointment reminders may increase clinic attendance (low-certainty evidence). For people undergoing screening for TB, pre-appointment reminders may have little or no effect on the number of people who return to clinic for the result of their skin test (low-certainty evidence).

Insecticide-treated bednets for malaria

A review of the effects of strategies to increase ownership and use of insecticide-treated bednets (ITNs) to prevent malaria identified 10 studies (Augustincic Polec 2015). Providing free ITNs, compared to subsidised ITNs, probably increases ITN ownership among households and women attending prenatal clinics (moderate certainty evidence). Providing free ITNs also probably results in increased ITN ownership compared to households paying full price or receiving a loan (moderate certainty evidence). The review also found that providing education on the proper use of ITNs may increase the number of people and children under five years sleeping under bednets (low-certainty evidence).

Immunisation coverage

One review of intervention strategies to improve immunisation coverage identified six studies (Oyo-Ita 2016). It found that health education (evidence-based discussions, distribution of posters and leaflets, information campaigns) compared to usual care, may increase the uptake of routine childhood vaccination (low- to moderate-certainty evidence). However, the authors noted that intervention costs should be carefully considered before implementation. Another review evaluated the effects of patient reminder and recall systems to improve immunisation coverage (Jacobson Vann 2005), finding that reminders and recall strategies probably increase routine childhood vaccination uptake (moderate-certainty evidence).

Access to healthcare services

One review of interventions to increase the uptake of cervical cancer screening identified 36 studies in diverse settings (community clinics, primary care, health maintenance organisations) (Everett 2011). Compared to usual care or no intervention, invitations to attend cervical screening programmes, education, counselling, access to health prevention nurses, and intensive recruitment probably increase uptake of cervical cancer screening (moderate-certainty evidence). Risk factor assessments, photo-comic books, and message framing may lead to little or no difference on the uptake of screening (low- to moderate-certainty evidence).

A second review assessed the effects of outreach strategies to increase health insurance coverage for vulnerable populations (Jia 2014). The review included one study that compared handing out application forms in the emergency department of hospitals to routine care. The findings showed that handing out application forms in the hospital emergency department probably increases the enrolment of children in health insurance schemes (moderate-certainty evidence). The other study assessed the effects of health insurance information and application support compared with routine care. It found that health insurance information and application support probably increases the enrolment of children in health insurance schemes, leads to continuous enrolment of children in insurance schemes, decreases the mean time taken to obtain insurance for children, and leads to parental satisfaction with the process of enrolment (moderate-certainty evidence).

DISCUSSION

Summary of main results

The available evidence from 39 systematic reviews of implementation strategies relevant to health systems in low-income countries covers a range of strategies (targeted at health professionals, patients, and organisations) in diverse settings (geographical and clinical environments), disease conditions, and populations (of both health professionals and patients). The estimates of effects and certainty of the estimates for the different strategies varied. Table 8 provides a summary of the main findings, organised into the following categories.

- Interventions found to have desirable effects on at least one outcome with moderate- or high-certainty evidence and no moderate- or high-certainty evidence of undesirable effects.

- Interventions found to have at least one outcome with little or no effect with moderate- or high-certainty evidence and no moderate- or high-certainty evidence of desirable or undesirable effects.
- Interventions for which the certainty of the evidence was low or very low (or no studies were found) for all outcomes examined.

Overall completeness and applicability of evidence

There was extensive evidence for the effects of strategies targeting healthcare workers and healthcare recipients. However, we identified only one systematic review on strategies targeting healthcare organisations (Parmelli 2011), and that review did not find any eligible studies. Evidence of the effects of some interventions is not included in this overview because we did not find an eligible systematic review, even though there may be primary studies evaluating those interventions. Table 7 summarises the outcomes examined in the individual reviews. Few studies in the reviews considered equity outcomes (differential effects of interventions for disadvantaged populations, such as pregnant women, children aged under five, rural poor) (Augustincic Polec 2015; Berkman 2011; Ko 2011; Forsetlund 2009; Oyo-Ita 2016). Similarly, few of the reviews included studies that examined the costs and cost-effectiveness of interventions (Augustincic Polec 2015; Ivers 2012; Oyo-Ita 2016; O'Brien 2007; Pande 2013). The sparse economic and equity data (in comparison to effectiveness data) limit assessment of the efficiency of the interventions that we examined.

We assessed the applicability of summarised evidence in the 'relevance' section of the SUPPORT Summaries, incorporating these judgments into our assessments of the certainty of the evidence. In general, it was difficult to draw generalisable conclusions regarding the applicability of findings to low-income countries given that in most of the cases the evidence came from studies conducted in high-income countries (USA, UK, Canada, Netherlands, Australia) with very different on-the-ground realities and important differences in health system arrangements compared to low-income countries. This was particularly so for interventions that require substantial resources, advanced technology or specialised skills for their delivery (e.g. Internet-based learning (Cook 2008), mass media interventions (Vidanapathirana 2005), health literacy interventions (Berkman 2011), and educational outreach visits (O'Brien 2007; Pande 2013)), and for interventions that are complex and require substantial changes in the organisation of care.

However, there are a limited number of interventions in the included reviews where most of the evidence is from low- and middle-income countries and are likely to be applicable to low-income countries. This may be the case for free insecticide-treated bednets for malaria prevention (Augustincic Polec 2015), skilled birth attendance (Yakoob 2011), mobile phone messaging to improve adherence to ART (Mbuagbaw 2013), anti-malarial drugs packed in unit doses (Orton 2005), and hand-hygiene interventions (Gould 2010).

Certainty of the evidence

Some of the included reviews had specific methodological limitations related to the identification, selection and critical appraisal of the included studies, and the analysis of the available evidence. However, the included reviews were for the most part well conducted (Table 5). The certainty of the effect estimates for the different strategies varied, ranging from very low, for example for the effect of single interventions to improve health literacy, to high, indicating that the research provides a very good indication of the likely effect (for example, for educational outreach interventions to improve prescribing by health professionals) (Table 7).

Potential biases in the overview process

Although the searches used for PDQ-Evidence are relatively comprehensive, it is possible that we did not identify some relevant reviews. We also excluded reviews that were published prior to April 2005. It is possible that some of those reviews provide information that is still useful and that might supplement information provided by the included reviews. Although this cut-off was arbitrary, it is unlikely that we excluded a substantial amount of useful information. Fourteen of the included reviews were published before 2010, and it is possible that more recent research would change their conclusions.

Classifying the interventions in the included reviews was sometimes uncertain and required judgment. In particular, the distinction between 'delivery arrangements' (covered in Ciapponi 2014) and 'implementation strategies' was not always clear. Likewise, classifying interventions in reviews that addressed a problem (such as improving referrals from primary to secondary care) rather than a category of interventions (such as audit and feedback) was not always straightforward. There also are other ways of categorising implementation strategies (French 2012; Michie 2011). Although these judgments and differences in approaches to characterising implementation interventions are unlikely to have introduced bias into this overview, they might result in some confusion, since there is no universally agreed upon classification system for implementation interventions. Moreover, any system for categorising health system interventions is, to some extent, arbitrary. A unified taxonomy for classifying health system interventions - such as the one recently published by Lavis 2015 - could facilitate explicit and systematic synthesis and interpretation of the existing body of evidence on health systems interventions.

Judgments about the relevance of some interventions to low-income countries were sometimes difficult to make, as were judgments about the applicability of some of the findings of the in-

cluded reviews (Lavis 2009). While these judgments might have been biased, this seems unlikely. At least two of the authors of this overview assessed the eligibility of systematic reviews for inclusion, and judgments about the applicability of the findings of included reviews were made by the authors of each SUPPORT Summary, externally peer reviewed, and then reviewed by at least two authors of this overview. Our general approach has been inclusive rather than exclusive so that readers can assess for themselves the relevance of the included reviews. Similarly, our approach has been to assume that findings are applicable to low-income countries, unless there are relevant explicit differences between the settings where the studies took place and settings in low-income countries, or specific factors that would likely modify the effects in low-income countries.

An important limitation of our overview is that it depends on the findings of systematic reviews that have not used consistent methods. Although there are potential advantages of a broad review that would include all relevant implementation strategies (e.g. Grimshaw 2004; Rowe 2015), such broad reviews require a substantial investment of time and resources, are difficult to keep up-to-date, and risk duplicating efforts when there are many reliable reviews that are more focused. An optimal approach that might be possible in the future would be to have a number of focused reviews using standard methods, such as EPOC reviews, together with an overview of those reviews.

Agreements and disagreements with other studies or reviews

We identified 10 related overviews of reviews published in the last 10 years (Althabe 2008; Bloom 2005; Boaz 2011; Chan 2017; Cheung 2012; Hall 2015; Lewin 2008; Mostofian 2015; Squires 2014; Wensing 2006). These overviews addressed a range of implementation strategies, disease conditions and behaviours in diverse settings and populations. Similarly to our overview, most of the studies included in those overviews were from high-income countries, and data on patient outcomes, equity, costs and cost-effectiveness were scarce. We describe the findings of the seven overviews below.

Bloom 2005 included 26 reviews and assessed the effectiveness of continuing medical education (CME) tools and techniques for changing physician clinical practices and improving patient health outcomes. The findings showed that interactive techniques (audit/feedback, academic detailing/outreach and reminders) were most effective for simultaneously changing physician care and patient outcomes. Clinical practice guidelines and opinion leaders were found to be less effective. Didactic presentations and distribution of printed information had little or no beneficial effect for changing physician practice. These findings mostly agree with ours regarding the effects of strategies targeted at healthcare workers by type of intervention (with the exception of the possible effects of printed materials found in our overview).

Wensing 2006 included 36 reviews and assessed organisational strategies (defined as planned re-arrangements of one or more aspects of the organisation of patient care) to implement improvements in patient care. The findings showed that revision of professional roles and computer systems for knowledge management generally improved professional performance. Multidisciplinary teams, integrated care services and computer systems generally improved patient outcomes. Integrated care services led to cost savings. The benefits of quality management remained uncertain. Most of these findings agree with those from our overview.

Lewin 2008 examined the effectiveness of health systems arrangements and implementation strategies (with a particular focus on evidence relevant to primary healthcare). Five included reviews assessed strategies to change professional behaviours or performance. The strategies assessed were guideline dissemination, audit and feedback, educational outreach visits, and educational meetings. These interventions resulted in small to moderate (but important) improvements in professional performance and health outcomes. These findings are mostly similar to those reported in our overview as our findings are based on the same or more recent versions of the same systematic reviews (Baker 2015; Forsetlund 2009; Ivers 2012; O'Brien 2007). The only difference was our exclusion of the review on guideline dissemination strategies because it was published more than 10 years ago (Grimshaw 2004).

Althabe 2008 identified 23 reviews and assessed strategies for improving the quality of healthcare in maternal and child health in low- and middle-income countries. Seventeen of the reviews focused on continuing education and quality improvement, two addressed financial and reimbursement strategies, and four examined organisation of care strategies. Some of these reviews were included in this overview. The overview found that interactive workshops, reminders, multifaceted interventions, audit and feedback, and mass media interventions had small to moderate positive effects on professional practice. Educational outreach visits improved prescribing but had variable effects on other behaviours. Multifaceted interventions were not more effective than single interventions. There was little evidence on the use of financial, regulatory or organisational interventions. Although these authors used a slightly different classification to the one used in this overview, the findings were relatively similar, with only minor changes related to updated versions of some reviews.

Boaz 2011 assessed the effectiveness of interventions to increase the use of research in clinical practice. It identified 13 reviews containing 313 primary studies. The overview found that multifaceted interventions are more likely to improve practice (small to moderate effects) than single interventions (audit and feedback, computerised decision support, opinion leaders) (small effects). These findings disagree with what we found (see results for multifaceted interventions) and with another recent overview that did not find evidence supporting the effectiveness of multifaceted interventions over single interventions (Squires 2014). Disagreements in the conclusions of these overviews could be due to dif-

ferences in the evidence base examined, that is, differences in the reliability of included reviews and the included interventions.

Cheung 2012 assessed the effectiveness of reminders in changing professional behaviour in clinical settings. It included 35 systematic reviews and found that moderate improvements in provider behaviour can occur with the use of reminders. Most of these reviews assessed computerised reminders, which were excluded from our overview because we considered them not to be highly relevant to low-income country settings.

Squires 2014 evaluated the effectiveness of multifaceted interventions versus single-component interventions in changing healthcare professionals' behaviour in clinical settings. Twenty-five reviews were included: five reviews found no evidence of a relationship between the number of intervention components and the effect size. Eight reviews reported direct (non-statistical) comparisons of multifaceted to single-component interventions. Multifaceted interventions were found to be effective in four reviews, and the remaining four reviews found that multifaceted interventions had either mixed effects or were generally ineffective compared to single interventions. Twenty-three reviews indirectly compared the effectiveness of multifaceted to single interventions, and most (15 reviews) showed similar effectiveness for multifaceted and single interventions when compared to controls. Of the remaining eight reviews, six found single interventions to be generally effective while multifaceted interventions had mixed effectiveness. The authors concluded that the overview provides no evidence that multifaceted interventions are more effective than single-component interventions. As noted above, these findings agree with what we found in our overview for at least three strategies targeted at healthcare workers (audit and feedback, educational meetings, and outreach visits).

Mostofian 2015 assessed the effectiveness of interventions aimed at changing physician practice patterns through the implementation of clinical research findings and clinical guidelines in surgical settings and general practice. They identified 14 reviews covering a wide range of interventions: audit and feedback, computerised decision support systems, continuing medical education, financial incentives, local opinion leaders, marketing, passive dissemination of information, patient-mediated interventions, reminders, and multifaceted interventions. Active approaches, such as academic detailing, led to greater effects than traditional passive approaches, such as distribution of educational materials. These findings mostly agree with our results about the effects of strategies targeted at healthcare workers by type of intervention (with the exception of the possible effects of printed materials found in our overview) and are in agreement with the findings of Bloom 2005. The differences regarding 'passive approaches' could be related to the methods used to analyse the results, which were based to some extent on vote counting and on descriptions by the authors of the reviews (Mostofian 2015).

Hall 2015 evaluated the effectiveness of text-messaging interventions (TMI) on health outcomes and behaviour change in community settings. They identified 15 reviews including 228 studies with diverse study designs (randomised trials, quasi-experimental designs and observational studies) and assessing interventions for a variety of health-behaviour topics related to health promotion, disease prevention and chronic disease self-management. Six of the included reviews conducted or included meta-analyses. According to the authors almost all of the 15 reviews, extremely diverse intervention characteristics showed positive effects on diverse health behaviours. Likewise, all of the meta-analyses assessed concluded that TMIs had a statistically significant positive effect on health outcomes or health behaviours. These findings are in agreement with ours regarding TMI for adherence to antiretroviral therapy and anti-tuberculosis treatments (Liu 2014; Mbuagbaw 2013). However, readers should interpret the findings of the overview by Hall and colleagues cautiously because the included studies were at high risk of bias and had small sample sizes and short intervention durations.

Chan 2017 assessed the effectiveness of strategies to enhance the adoption and implementation of clinical practice guidelines focusing on four interventions: reminders, educational outreach visits, audit and feedback, and provider incentives. They included 55 studies, 39 systematic reviews, and 16 overviews of reviews. Using vote counting, the authors found that audit and feedback and educational outreach visits were generally effective in improving both process of care and clinical outcomes; provider incentives showed mixed effectiveness for improving both processes of care and clinical outcomes; and reminders showed mixed effectiveness for improving process of care outcomes and were generally ineffective for clinical outcomes. Despite differences in the analytical approaches, those findings are similar to what we found in our overview regarding the effectiveness of audit and feedback and educational outreach visits (Ivers 2012; O'Brien 2007). On the other hand, our findings regarding the effects of reminders on patient outcomes are more positive (Ko 2011), possibly due to differences in the settings where reminders were evaluated.

AUTHORS' CONCLUSIONS

Investigators have evaluated a wide range of strategies for implementing evidence-based interventions in low-income countries using sound systematic review methods. These strategies have been targeted at different levels in the health systems and have addressed a range of outcomes. Most of the available evidence is focused on strategies targeted at healthcare workers and recipients, and assessment of process of care outcomes. Strategies targeting healthcare organisations are scarce. Limitations of the available evidence include wide variations in settings, targeted behaviours, estimates of effects, and certainty of the evidence for the implementation strategies examined.

Implications for practice

We found moderate- or high-certainty evidence that a number of interventions had desirable effects on at least one outcome, with no moderate- or high-certainty evidence of undesirable effects (Table 8). On the other hand, the certainty of the evidence was low or very low (or no studies were found) for all outcomes examined for a number of interventions. These findings may help to distinguish interventions for which there is clear evidence of impact on at least one outcome from interventions for which there is important uncertainty about their potential effects. Additionally we identified a "middle ground" with interventions that showed little or no effect for at least one outcome with moderate or high-certainty evidence and no moderate- or high-certainty evidence of other desirable or undesirable effects. This implies that those interventions could not have a relevant impact on the outcomes assessed and they should not be considered a priority for implementation.

Implications for research

Based on the included reviews, we have identified gaps in primary research because of uncertainty about the applicability of the evidence to low-income countries (Table 9), low-certainty evidence, or a lack of studies (Table 8). In 18 out of the 39 included reviews, all or most of the studies took place in high-income settings; and in 25 of the 39 reviews there was at least one comparison where the certainty about the effects was low or there were no studies to inform an estimate of the intervention's effects. Furthermore, the included reviews rarely evaluated social outcomes, resource use, impacts on equity, and adverse (undesirable or unintended) effects (Table 7). All of the included reviews found that primary research is needed for at least one of these four types of outcomes (Table 7). This highlights the need for conducting studies assessing specific comparisons (Table 9) in low-income settings and including all relevant outcomes.

We identified five topics for which we could not identify an up-to-date systematic review but did find a review in progress (Table 10). We also identified one topic for which we did not find a up-to-date systematic review or one in progress: strategies other than handwashing targeted at healthcare-associated infections.

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* *Indicates the major publication for the study*

ADDITIONAL TABLES

Table 1. Types of implementation strategies

Implementation strategy	Definition
Targeted at healthcare organisations	
Change of organisational culture	Strategies to change organisational culture
Continuous quality improvement	Improvement of quality through improvement of organisational processes, use of structured problem-solving processes incorporating statistical methods and measurement to diagnose problems and monitor progress, use of teams including employees from multiple departments and from different organisational levels, empowering employees to identify quality problems and improvement opportunities and to take action on these, and an explicit focus on 'customers'
Targeted at healthcare worker practice - types of interventions	
Printed educational materials	Distribution of printed recommendations for clinical care, including clinical practice guidelines. The materials can be delivered personally or through mass mailings
Internet-based or computerised educational materials	Distribution of electronic recommendations for clinical care, including clinical practice guidelines. The materials are usually delivered through mass mailings and/or published in web pages
Educational meetings	Courses, workshops or other educational meetings
Local consensus processes	Formal or informal local consensus processes aimed at promoting implementation of guidelines
Educational outreach visits	Personal visits by a trained person to healthcare workers in their own setting
Local opinion leaders	The identification and use of local opinion leaders to promote implementation of guidelines

Table 1. Types of implementation strategies (*Continued*)

Audit and feedback	A summary of healthcare workers' performance over a specified period of time, given to them in a written, electronic or verbal format
Patient-mediated interventions	The use of patients to change professional practice
Reminders	Manual or computerised interventions that prompt healthcare workers to perform some action
Tailored interventions	Interventions to change practice that are selected based on an assessment of barriers to change
Multifaceted interventions	Combinations of two or more strategies to change practice
Multidisciplinary teams	Strategies to promote inter or multidisciplinary team work
Targeted at healthcare worker practice - types of problems	
Communication with patients	Strategies for improving communication with patients
Handwashing	Strategies for improving hand hygiene compliance in patient care
Obstetrics	Strategies for improving obstetric care
Healthcare-associated infections	Strategies for decreasing healthcare associated infections
Patient-centred approach	Strategies for promoting a patient-centred approach in clinical consultations
Prescribing	Strategies for improving prescribing
Prescribing antibiotics	Strategies for improving the use of antibiotics
Seriously ill newborn care	Strategies for improving the care of seriously ill newborns
Traditional birth attendants	Strategies for improving care delivered by traditional birth attendants
Traditional healers	Strategies for improving care delivered by traditional healers
Targeted at healthcare recipient use of health services - types of interventions	
Information and education provision	Strategies to enable consumers to know about programmes/policies to be implemented (e.g. mass media campaigns)
Skill and competencies acquisition	Strategies focused on the acquisition of skills relevant to the use of health services (e.g. lay healthcare workers)

Table 1. Types of implementation strategies (*Continued*)

Facilitation of communication and decision-making	Strategies to involve healthcare recipients in decision-making about programmes/policies to be implemented (e.g. communication skills training for patients)
Behaviour change support	Strategies focusing on the adoption or promotion of health and treatment behaviours such as adherence to medicines
Targeted at healthcare recipient use of health services - types of problem	
Adherence - antiretroviral drugs for human immunodeficiency virus infection/acquired immunodeficiency syndrome (HIV/AIDS)	Strategies for improving adherence to antiretroviral drugs for HIV/AIDS
Adherence - medication	Strategies for improving medication adherence
Adherence - tuberculosis	Strategies for improving tuberculosis medication adherence
Facility-based deliveries	Strategies for promoting facility-based deliveries
Immunisation coverage	Strategies for improving immunisation coverage
Access to healthcare services	Strategies for increasing use of healthcare services by specific populations

Table 2. Examples of implementation strategies to address different types of barriers[a]

Level	Determinants		Examples of implementation strategies
Healthcare organisations	Inadequate internal communication	Necessary communication between different levels of the health system may be lacking	Structured referral sheets, involvement of consultants in primary care educational activities
	Inadequate processes	Processes for outreach and receiving, referring and transferring patients may not be adequate to implement the option or the types of effective care at which the option is targeted	Redesign of processes to facilitate appropriate and efficient utilisation of services (continuous quality improvement)
	Inadequate leadership	There may be insufficient leadership to implement the option or the types of effective care at which the option is targeted	Identification of effective leaders; engagement of opinion leaders; establishment of leadership systems

Table 2. Examples of implementation strategies to address different types of barriers[a] (*Continued*)

Healthcare workers	Knowledge	Healthcare workers may be unaware of the likely impacts of the option or of the types of effective care at which the option is targeted	Dissemination of educational materials
	Competency	Healthcare workers may not feel competent or may lack competency	Educational meetings or outreach visits
	Attitudes	Healthcare workers may not agree that implementing the option or the types of effective care at which the option is targeted is important	Disseminate information regarding the size of the problem, including relevant comparisons; use opinion leaders
	Motivation to change	Healthcare workers may not be motivated to change their practices	Dissemination of information that is designed to motivate healthcare workers to change their practice; financial or other incentives; reduce the burden of changing practices
Healthcare recipients	Knowledge	People may be unaware of the likely impacts of the option or of the types of effective care at which the option is targeted	Disseminate information that is reliable and accessible, e.g. using the mass media or community healthcare workers
	Competency (skill)	People may not have the necessary skills to use the types of effective care at which the option is targeted	Provide training and support
	Attitudes	People may not agree that implementing the option or the types of effective care at which the option is targeted is important	Disseminate information regarding the size of the problem, including relevant comparisons
	Access to care	People may not have access to the types of effective care at which the option is targeted due to financial constraints or lack of transportation	Reduce financial or physical barriers to care
	Motivation to change	People may not be motivated to change their behaviours, for example by seeking types of effective care at which the option is targeted	Dissemination of information that is designed to motivate people to, for example, seek care; use financial or material incentives

[a] Adapted from Grol 2005.

Table 3. Included reviews

Implementation strategy	Included reviews
Strategies targeted at healthcareorganisations	
Organisational culture	The effectiveness of strategies to change organisational culture to improve healthcare performance (Parmelli 2011)
Continuous quality improvement	No eligible systematic review identified
Strategies targeted at healthcareworkers by type of intervention	
Educational materials	Printed educational materials: effects on professional practice and healthcare outcomes (Giguère 2012)
Internet based learning	Internet-based learning in the health professions: a meta-analysis (Cook 2008)
Educational meetings	Continuing education meetings and workshops: effects on professional practice and healthcare outcomes (Forsetlund 2009)
Educational meetings	Interprofessional education: effects on professional practice and healthcare outcomes (Reeves 2013)
Educational meetings	Teaching critical appraisal skills in healthcare settings (Horsley 2011)
Educational meetings	Effectiveness of nutrition training of health workers toward improving caregivers' feeding practices for children aged six months to two years: a systematic review (Sunguya 2013)
Local consensus processes	No eligible systematic review identified
Educational outreach	Educational outreach visits: effects on professional practice and healthcare outcomes (O'Brien 2007)
Educational outreach	Systematic review and meta-analysis of practice facilitation within primary care settings (Baskerville 2012)
Educational outreach	Effectiveness of pharmacist provided services on patient outcomes, health-service utilisation and costs in low- and middle-income countries (Pande 2013)
Local opinion leaders	Local opinion leaders: effects on professional practice and healthcare outcomes (Flodgren 2011)
Patient-mediated interventions	No eligible systematic review identified
Audit and feedback	Audit and feedback: effects on professional practice and healthcare outcomes (Ivers 2012)

Table 3. Included reviews (*Continued*)

Reminders	Systematic review of safety checklists for use by medical care teams in acute hospital settings-limited evidence of effectiveness (Ko 2011)
Tailored interventions	Tailored interventions to overcome identified barriers to change: effects on professional practice and healthcare outcomes (Baker 2015)
Multifaceted interventions	Interventions encouraging the use of systematic reviews in clinical decision-making: a systematic review (Perrier 2011)
Strategies targeted at healthcareworkers by type of problem	
Communication with patients	Training healthcare providers to be more 'patient-centred' in clinical consultations (Dwamena 2012)
Handwashing	Interventions to improve hand hygiene compliance in patient care (Gould 2010)
Obstetrics	Non-clinical interventions for reducing unnecessary caesarean section (Khunpradit 2011)
Obstetrics	Traditional birth attendant training for improving health behaviours and pregnancy outcomes (Sibley 2012)
Obstetrics	The effect of providing skilled birth attendance and emergency obstetric care in preventing stillbirths (Yakoob 2011)
Obstetrics	The effects of birth kits to on newborn and maternal outcomes (Hundley 2012)
Prescribing antibiotics	Interventions to reduce unnecessary antibiotic prescribing: a systematic review and quantitative analysis (Ranji 2008)
Seriously ill newborn care	In-service training for health professionals to improve care of the seriously ill newborn or child in low and middle-income countries (Opiyo 2015)
Quality of care for STD and HIV	Interventions for educating traditional healers about STD and HIV medicine (Sorsdahl 2009)
Strategies targeted at healthcarerecipients	
Providing information/education	Mass media interventions for promoting HIV testing. (Vidanapathirana 2005)
Providing information/education	Written information about individual medicines for consumers (Nicolson 2009)
Providing information/education	Health literacy interventions and outcomes: an updated systematic review (Berkman 2011)
Adherence - medication	Interventions for enhancing medication adherence (Haynes 2008)
Adherence - ART for HIV/AIDS	Efficacy of interventions in improving highly active antiretroviral therapy adherence and HIV-1 RNA viral load. A meta-analytic review of randomized controlled trials (Simoni 2006) Antiretroviral adherence interventions: translating research findings to the real world clinic (

Table 3. Included reviews (*Continued*)

	Simoni 2010)
Adherence - ART for HIV/AIDS	Mobile pone text messages for improving adherence to antiretroviral therapy (ART): an individual patient data meta-analysis of randomised trials (Mbuagbaw 2013)
Adherence - TB	Incentives and enablers to improve adherence in tuberculosis (Lutge 2015)
Adherence - TB	Reminder systems and late patient tracers in the diagnosis and management of tuberculosis (Liu 2014)
Adherence - malaria medication	Effects of unit-dose packaged treatment on treatment failure and treatment adherence in people with uncomplicated malaria (Orton 2005)
Facility-based deliveries	No eligible systematic review identified
Immunisation coverage	Interventions for improving coverage of child immunization in low-income and middle-income countries. (Oyo-Ita 2016) Patient reminder and patient recall systems for improving immunization rates.(Jacobson Vann 2005)
Malaria	Strategies to increase the ownership and use of insecticide-treated bednets to prevent malaria (Augustincic Polec 2015)
Access to healthcare services	Interventions targeted at women to encourage the uptake of cervical screening (Everett 2011)
Access to healthcare services	Outreach strategies for increasing health insurance coverage for vulnerable populations (Jia 2014)

ART: antiretroviral therapy.

Table 4. Excluded reviews

Review ID	Title	Reasons for exclusion
Arditi 2012	Computer-generated reminders delivered on paper to healthcare professionals; effects on professional practice and healthcare outcomes	Limited relevance to low-income countries
Beilby 1997	Trials of providing costing information to general practitioners: a systematic review	Search out-of-date
Bordley 2000	The effect of audit and feedback on immunization delivery: a systematic review	Search out-of-date
Chaillet 2006	Evidence-based strategies for implementing guidelines in obstetrics: a systematic review	Major methodological limitations

Table 4. Excluded reviews (*Continued*)

Fudickar 2012	The effect of the WHO surgical safety checklist on complication rate and communication	Major limitations
Grilli 2002	Mass media interventions: effects on health services utilisation	Search out-of-date
Grimshaw 2004	Effectiveness and efficiency of guideline dissemination and implementation strategies	Search out-of-date
Horvath 2012	Mobile phone text messaging for promoting adherence to antiretroviral therapy in patients with HIV infection	Addressed by Mbuagbaw 2013
Hulscher 2001	Interventions to implement prevention in primary care	Search out-of-date
Ioannidis 2001	Evidence on interventions to reduce medical errors: an overview and recommendations for future research	Search out-of-date
Jayaraman 2010	Advanced trauma life support training for ambulance crews	Addressed by Forsetlund 2009
Jayaraman 2009	Advanced trauma life support training for hospital staff	Addressed by Forsetlund 2009
Kendrick 2000	The effect of home visiting programmes on uptake of childhood immunization: a systematic review and meta-analysis	Search out-of-date
Lam-Antoniades 2009	Electronic continuing education in the health professions: an update on evidence from RCTs	Addressed by Cook 2008
Lee 2009	Linking families and facilities for care at birth: What works to avert intrapartum-related deaths?	Important limitations
Legare 2010	Interventions for improving the adoption of shared decision making by healthcare professionals	Limited relevance to low-income countries.
Minkman 2007	Performance improvement based on integrated quality management models: what evidence do we have? A systematic literature review	Limited relevance to low-income countries
Naikoba 2001	The effectiveness of interventions aimed at increasing handwashing in healthcare workers- a systematic review	Search out-of-date

Table 4. Excluded reviews (*Continued*)

Nglazi 2013	Mobile phone text messaging for promoting adherence to anti-tuberculosis treatment: a systematic review	Addressed by Liu 2014
Pattinson 2005	Critical incident audit and feedback to improve perinatal and maternal mortality and morbidity	Addressed by Ivers 2012
Pearce 2012	The most effective way of delivering a train-the-trainers program: a systematic review	Addressed by Forsetlund 2009
Rowe 2002	Improving communication between health professionals and women in maternity care: a structured review	Search out-of-date
Rueda 2006	Patient support and education for promoting adherence to highly active antiretroviral therapy for HIV/AIDS	Major methodological limitations
Safdar 2008	Educational interventions for prevention of healthcare-associated infection: a systematic review	Addressed by Forsetlund 2009
Shea 2009	Increasing the demand for childhood vaccination in developing countries: a systematic review	Addressed by Oyo-Ita 2016
Shojania 2009	The effects of on-screen, point of care computer reminders on processes and outcomes of care	Limited relevance to low-income countries
Smith 2009	Provider practice and user behavior interventions to improve prompt and effective treatment of malaria: do we know what works?	Major limitations
Smits 2002	Problem based learning in continuing medical education: a review of controlled evaluation studies	Search out-of-date
Sowden 2000	Mass media interventions for preventing smoking in young people	Search out-of-date
Turner 2005	What is the evidence for effectiveness of WHO guidelines for the care of children in hospitals in developing countries?	Major methodological limitations
Wafula 2010	Are interventions for improving the quality of services provided by specialized drug shops effective in sub-Saharan Africa? A systematic review	Addressed by Forsetlund 2009 and O'Brien 2007
Zedler 2011	Does packaging with a calendar feature improve adherence to self-administered medication for long-term use? A systematic review	Addressed by Haynes 2008

Table 5. Reliability of included reviews

Review	A. Identification, selection and critical appraisal of studies[a]						B. Analysis[b]						C. Overall[c]	
	1. Selection criteria	2. Search	3. Up-to-date	4. Study selection	5. Risk of bias	6. Overall	1. Study characteristics	2. Analytic methods	3. Heterogeneity	4. Appropriate synthesis	5. Exploratory factors	6. Overall	1. Other considerations	2. Reliability of the review
Baker 2015	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Baskervi 2012	+	?	+	?	+	?	?	+	+	+	+	+	+	-
Berkman 2011	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Cook 2008	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Dwamena 2012	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Everett 2011	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Flodgren 2011	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Forsetlu 2009	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Giguère 2012	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Gould 2010	+	+	+	+	+	+	+	+	+	+	?	+	+	+
Haynes 2008	+	+	+	+	?	+	+	+	?	?	NA	-	+	-
Horsley 2011	+	+	+	+	+	+	+	+	+	+	+	+	+	+

Table 5. Reliability of included reviews (*Continued*)

Hundley 2012	+	+	+	?	?	+	+	+	?	+	?	+	+	+
Ivers 2012	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Jacobson Vann 2005	+	?	+	?	+	-	+	+	+	+	+	+	+	-
Jia 2014	+	?	+	+	+	+	+	+	+	+	NA	+	+	+
Khunpradit 2011	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ko 2011	+	?	+	?	+	-	+	?	+	-	+	-	+	-
Liu 2014	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lutge 2015	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Mbuagbaw 2013	+	?	+	?	?	+	?	+	+	+	+	+	+	-
Nicolson 2009	+	+	?	+	?	-	+	+	?	?	-	-	+	-
O'Brien 2007	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Opiyo 2015	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Orton 2005	+	+	+	+	+	+	+	+	+	+	NA	+	+	+
Oyo-Ita 2016	+	?	+	+	?	+	+	+	+	+	NA	+	+	+

Table 5. Reliability of included reviews (*Continued*)

Pande 2013	+	?	+	+	+	+	+	+	+	?	?	+	+	+
Parmelli 2011[d]	+	+	+	+	+	+	NA	NA	NA	NA	NA	NA	+	+
Perrier 2011	+	+	+	+	+	+	+	+	?	?	+	+	+	+
Augustincic Polec 2015	+	+	+	+	+	+	+	+	+	+	+	+		+
Ranji 2008	+	?	+	?	+	-	+	+	?	+	-	-	+	-
Reeves 2013	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sibley 2012	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Simoni 2006	+	?	+	?	?	-	+	+	+	+	+	+	+	+
Simoni 2010	+	?	+	?	?	-	+	+	+	+	+	+	+	+
Sorsdahl 2009	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sunguya 2013	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Vidanapathirana 2005	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Yakoob 2011	+	?	+	+	+	+	+	+	+	+	+	+	+	+

[a] **A. Identification, selection and critical appraisal of studies**

1. **Selection criteria**: were the criteria used for deciding which studies to include in the review reported? (+ yes; ? can't tell/partially; − no)
2. **Search**: was the search for evidence reasonably comprehensive? (+ yes; ? can't tell/partially; − no)
3. **Up-to-date**: is the review reasonably up-to-date? (+ yes; ? can't tell/partially; − no)
4. **Study selection**: was bias in the selection of articles avoided? (+ yes; ? can't tell/partially; − no)
5. **Risk of bias**: did the authors use appropriate criteria to assess the risk for bias in analysing the studies that are included? (+ yes; ? can't tell/partially; − no)
6. **Overall**: how would you rate the methods used to identify, include and critically appraise studies? (+ only minor limitations, − important limitations)

[b] **B. Analysis**

1. **Study characteristics**: were the characteristics and results of the included studies reliably reported? (+ yes; ? can't tell/partially; − no; NA: not applicable, i.e. no studies or data)
2. **Analytic methods**: were the methods used by the review authors to analyse the findings of the included studies reported? (+ yes; ? can't tell/partially; − no; NA: not applicable, i.e. no studies or data)
3. **Heterogeneity**: did the review describe the extent of heterogeneity? (+ yes; ? can't tell/partially; − no; NA: not applicable, i.e. no studies or data)
4. **Appropriate synthesis**: were the findings of the relevant studies combined (or not combined) appropriately relative to the primary question the review addresses and the available data? (+ yes; ? can't tell/partially; − no; NA: not applicable, i.e. no studies or data)
5. **Exploratory factors**: did the review examine the extent to which specific factors might explain differences in the results of the included studies? (+ yes; ? can't tell/partially; − no; NA: not applicable, i.e. no studies or data)
6. **Overall**: how would you rate the methods used to analyse the findings relative to the primary question addressed in the review? (+ only minor limitations, − important limitations; NA: not applicable, i.e. no studies or data)

[c] **C. Overall**

1. **Other considerations**: are there any other aspects of the review not mentioned before which lead you to question the results? (+ yes; ? can't tell/partially; − no)
2. **Reliability of the review**: based on the above assessments of the methods how would you rate the reliability of the review? (+ only minor limitations, − important limitations)

[d] This was an empty review.

Table 6. Key messages of included reviews

Implementation strategy	Key messages
Strategies targeted at healthcareorganisations	
Organisational culture Effectiveness of strategies to change organisational culture to improve healthcare performance (Parmelli 2011)	➡ Strategies to improve organisational culture include: • leadership commitment and action through the clear communication of values and concerns related to the decisions taken, the reinforcement of desired behaviours during crisis periods, the use of role models, the allocation of rewards, and clear criteria for the selection and dismissal of employees; • programmes to improve job satisfaction, organisational commitment, teamwork and morale. ➡ It is uncertain whether any of these strategies to improve organisational culture are effective in changing healthcare performance, as no studies met the review's inclusion criteria ➡ The implementation of strategies to improve organisational culture should include well-designed evaluations

Table 6. Key messages of included reviews (*Continued*)

Strategies targeted at healthcareworkers by type of intervention	
Educational materials Printed educational materials: effects on professional practice and healthcare outcomes (Giguère 2012)	➡ When used alone, printed educational materials may slightly improve practice outcomes among healthcare providers, compared to no intervention ➡ The effects of printed educational materials on patient outcomes are uncertain ➡ Of the 45 studies included in the review, 44 were from high-income countries. Rigorous studies from low-income countries are needed to assess the impacts of printed educational materials on professional practice in these settings
Internet-based learning Internet-based learning in the health professions: a meta-analysis (Cook 2008)	➡ Internet-based learning methods compared with no intervention may improve health professionals' knowledge, but it is uncertain whether they improve skills and behaviours of health professionals, or if they lead to beneficial effects on patients • Practise exercises, tutorials, online discussions and longer duration courses may improve the effects of internet-based learning. ➡ It is uncertain whether Internet-based learning by health professions improves knowledge or other outcomes when compared to other forms of teaching and learning
Educational meetings Continuing education meetings and workshops: effects on professional practice and healthcare outcomes (Forsetlund 2009)	➡ Educational meetings alone or combined with other interventions probably improve professional practice and healthcare outcomes for patients ➡ Educational meetings may be more effective with higher attendance at the educational meetings; mixed interactive plus didactic educational meetings may be more effective compared to only interactive or only didactic educational meetings ➡ Educational meetings may not be effective for complex behaviours, and they may be less effective for less serious outcomes
Educational meetings Interprofessional education: effects on professional practice and healthcare outcomes (Reeves 2013)	➡ Interprofessional education may lead to improved outcomes for patients and greater patient satisfaction ➡ Interprofessional education may improve professionals' adherence to guidelines or standards ➡ It is uncertain whether interprofessional education improves collaborative behaviours among professionals, the competencies of professionals to work together in delivering care or clinical processes ➡ None of the included studies were conducted in low-income countries. The extent to which these findings are applicable to these settings is uncertain
Educational meetings Teaching critical appraisal skills in healthcare settings (Horsley 2011)	➡ Teaching critical appraisal skills to health professionals may improve their knowledge of how to critically appraise research papers

Table 6. Key messages of included reviews (*Continued*)

	➡ It is uncertain whether teaching critical appraisal skills to health professionals leads to actual changes in their critical appraisal skills ➡ We did not find any studies that evaluated the impact of teaching critical appraisal skills on processes of care or patient outcomes ➡ None of the included studies were from low-income countries
Educational meetings Effectiveness of nutrition training of health workers toward improving caregivers' feeding practices for children aged six months to two years: a systematic review (Sunguya 2013)	➡ Nutrition training of health workers increases daily energy intake of children aged 6 months to 2 years ➡ Nutrition training of health workers increases feeding frequency of children under 2 years of age ➡ Children whose caregivers are counselled by trained health workers have a higher consumption of targeted food items compared to their counterparts
Educational outreach Educational outreach visits: effects on professional practice and healthcare outcomes (O'Brien 2007)	➡ The quality of care delivered to patients: • is improved by educational outreach visits alone; and • may be improved more by educational outreach visits plus organisational changes than by educational outreach visits alone. ➡ For prescribing, the effects are relatively consistent and small, but potentially important ➡ For other types of professional performance, the effects vary more widely ➡ Educational outreach visits may not be effective in low-income countries if resources are not available to provide clinical and managerial support
Educational outreach Practice facilitation within primary care settings (Baskerville 2012)	➡ The use of practice facilitation as a multifaceted approach probably improves the adoption of evidence-based guidelines in primary care settings ➡ All studies of the effects of practice facilitation took place in high-income countries. Further research is needed to determine the effectiveness and cost implications of practice facilitation in low-income countries
Educational outreach Pharmacist-provided non-dispensing services: effects on patient outcomes, health service utilisation and costs (Pande 2013)	➡ The provision of additional services by pharmacists targeted at patients, such as patient health education and follow-up, may lead to: • a decrease in the rate of hospitalisation, general practice visits and emergency room visits; • a reduction in patients' medication costs; • improvements in some clinical outcomes. ➡ The provision of additional services by pharmacists targeted at healthcare professionals, such as educational outreach visits, may improve patient outcomes ➡ The applicability of the findings to low-income countries may be limited by pharmacist numbers, patients and physicians' attitudes to pharmacists, pharmacists' training, and laws governing pharmaceutical practice

Table 6. Key messages of included reviews (*Continued*)

Local opinion leaders Local opinion leaders: effects on professional practice and healthcare outcomes (Flodgren 2011)	➡ Opinion leaders probably influence the behaviour of healthcare professionals ➡ Patient outcome data were not reported by studies included in the review ➡ Most of the studies included in this review took place in high-income countries ➡ Rigorous studies from low-income countries are needed to fully understand the applicability of these findings to low-income country healthcare settings
Audit and feedback Audit and feedback: effects on professional practice and healthcare outcomes (Ivers 2012)	➡ Interventions that include audit and feedback (alone or as a core component of a multifaceted intervention) probably improve professionals' adherence to desired practice compared with usual care ➡ Audit and feedback may be more effective when baseline professional performance is low; when the source of the feedback is a supervisor or senior colleague; when the feedback is delivered at least monthly; when it is provided both verbally and in a written format; and when it includes both explicit targets and an action plan ➡ The effects on patient outcomes of interventions that include audit and feedback may range from little if any effect to some improvement, compared with usual care ➡ We found few randomised trials of audit and feedback in low-income countries. Audit and feedback is difficult to implement if reliable, routinely collected data are not readily available
Reminders Safety checklists for use by medical care teams in acute hospital settings (Ko 2011)	➡ Surgical safety checklists may improve death rates and major complications within 30 days after surgery ➡ It is uncertain whether safety checklists improve adherence to guidelines or patient safety in intensive care units, emergency departments or acute care settings ➡ Randomised trials are needed to inform decisions about the use of safety checklists in acute hospital settings
Tailored interventions Tailored interventions to overcome identified barriers to change: effects on professional practice and healthcare outcomes (Baker 2015)	➡ Interventions tailored to address identified barriers are probably more likely to improve professional practice than no intervention or the dissemination of guidelines alone ➡ It is uncertain whether tailored interventions are more likely to improve professional practice than non-tailored interventions ➡ Little is known about how best to identify barriers to improving professional practice and how to tailor interventions to address these barriers
Multifaceted interventions Interventions encouraging the use of systematic reviews in clinical decision-making (Perrier 2011)	➡ It is uncertain whether targeted multifaceted or single interventions (such as training) improve informed decision-making by practitioners ➡ Multifaceted interventions may improve awareness and use of evidence-based resources, such as searching for systematic reviews

Table 6. Key messages of included reviews (*Continued*)

	using online libraries ➡ None of the included studies took place in a low-income country
Strategies targeted at healthcareworkers by type of problem	
Communication with patients Training healthcare providers to be more 'patient-centred' in clinical consultations (Dwamena 2012)	➡ Patient-centred training for providers (with or without co-interventions): • may improve consultation processes, including the extent to which care is patient centred, compared with no intervention; • may slightly improve patient satisfaction with care, compared with no intervention; • may slightly improve patient health behaviours, compared with no intervention; • probably improves patient health outcomes, compared with no intervention. ➡ This review identified no studies from low- and middle-income countries
Handwashing Interventions to improve hand hygiene compliance in patient care (Gould 2010)	➡ Educational interventions may increase hand hygiene guidance compliance ➡ Multifaceted marketing campaigns may increase the use of hand hygiene products ➡ It is uncertain whether marketing campaigns decrease healthcare-associated infections ➡ Rigorous evaluation of interventions to increase hand hygiene compliance are needed
Obstetrics Non-clinical interventions for reducing unnecessary caesarean section (Khunpradit 2011)	➡ Interventions that may reduce unnecessary caesarean sections include: nurse-led relaxation training, birth preparation classes, education of local opinion leaders, and review of each delivery that does not meet guideline criteria plus a 24-hour in-house coverage system ➡ A mandatory second opinion and post-caesarean section presentation of cases may reduce repeat caesarean section rates ➡ Interventions that may have little or no overall effect on caesarean section rates include: a prenatal education support programme for vaginal birth after caesarean sections, intensive group therapy for women with fear of childbirth, decision aids, a mandatory second opinion and post-caesarean section presentation of cases, audit and feedback, childbirth education classes for primary care nurses, changes in fees for vaginal deliveries or caesarean sections, and mandatory peer review ➡ To the extent that reducing unnecessary caesarean sections is a priority, interventions to achieve this goal should be evaluated in randomised trials or interrupted time series studies and the cost-effectiveness of effective interventions should be evaluated
Obstetrics Traditional birth attendant training for improving health be-	➡ Initial training of TBAs may: • reduce neonatal mortality, stillbirths, maternal mortality,

Table 6. Key messages of included reviews (*Continued*)

haviours and pregnancy outcomes (Sibley 2012)	the frequency of haemorrhage, and puerperal sepsis; and • increase referrals of pregnant women with obstetric complications and the frequency of pregnant women with obstructed labour. ➡ Additional TBA training may: • reduce neonatal mortality; and • lead to little or no difference in stillbirths, maternal mortality, maternal morbidity, exclusive breastfeeding, and advice about immediate feeding of colostrum. ➡ Most of the included studies took place in resource-limited settings in low-income countries
Obstetrics The effect of providing skilled birth attendance and emergency obstetric care in preventing stillbirths (Yakoob 2011)	➡ Skilled birth attendance may reduce stillbirths and perinatal mortality ➡ It is uncertain what the effects of alternative ways of providing emergency obstetric care are on stillbirths or perinatal mortality
Obstetrics Birth kits (Hundley 2012)	➡ The use of birth kits (together with education and/or a topical antimicrobial) compared with no intervention: • probably reduces neonatal mortality rate; • reduces neonatal tetanus-related mortality; • may reduce neonatal sepsis; • probably reduces maternal mortality; • probably reduces haemorrhage; • reduces puerperal sepsis. ➡ Most of the included studies took place in low-income countries
Prescribing antibiotics Interventions to reduce unnecessary antibiotic prescribing: a systematic review and quantitative analysis (Ranji 2008)	➡ Strategies such as clinician education and patient education alone or combined with audit and feedback probably reduce antibiotic prescribing in ambulatory care settings ➡ The effects of the interventions on the proportion of patients treated with appropriate antibiotics and on clinical outcomes were not reported ➡ Most of the studies took place in high-income countries.
Seriously ill newborn care In-service training for health professionals to improve care of the seriously ill newborn or child in low- and middle-income countries (Opiyo 2015)	➡ In-service neonatal emergency care training of health professionals probably: • increases the proportion of adequate initial resuscitation steps; and • decreases inappropriate and potentially harmful practices per resuscitation. ➡ In-service neonatal emergency care training of health professionals may reduce mortality in newborns requiring resuscitation ➡ We found no studies that evaluated the effects of in-service neonatal emergency care training on long-term outcomes or the effects of in-service emergency care training for older children

Table 6. Key messages of included reviews (*Continued*)

Quality of care for STD and HIV Interventions for educating traditional healers about STD and HIV medicine (Sorsdahl 2009)	➡ Training traditional healers may increase their general knowledge about HIV/AIDS, as well as their knowledge about HIV/AIDS signs, symptoms and prevention ➡ Training traditional healers may improve their HIV/STD patient management practices ➡ Training traditional healers may lead to little or no difference in the incidence of HIV/AIDS risk behaviours among healers or in their referral practices ➡ Traditional healers who have received training may refer patients to allopathic health more frequently if their traditional treatment fails
Strategies targeted at healthcarerecipients	
Providing information/education Mass media interventions for promoting HIV testing (Vidanapathirana 2005)	➡ Mass media interventions lead to an increase in immediate uptake of HIV testing ➡ These initial increases in uptake of HIV testing following mass media interventions may not be sustained in the long term ➡ Mass media interventions may lead to an increase in the number of infected people diagnosed through voluntary counselling and testing ➡ These findings come from studies conducted in high-income non-endemic countries. Factors that may affect the transferability of these findings to low-income countries include access to television, radio, and print media; availability of (and user-fees for) HIV voluntary counselling and testing; the level of stigma and discrimination against people living with HIV in the community; and the maturity of the HIV epidemic
Providing information/education Written information about individual medicines for consumers (Nicolson 2009)	➡ Written medicine information may slightly improve knowledge and attitudes about medicines compared with no written information ➡ Written medicine information may lead to little or no difference in adherence to instructions compared with no written information ➡ The effect of written medicine information on health outcomes is uncertain. The review did not find studies that evaluated this ➡ Written medicine information delivered in an 'easy-to-read' format compared with a standard manufacturer's format may lead to little or no difference in knowledge about and behaviours related to medicines, but it may slightly improve attitudes towards the information presented ➡ Written numerical information about the risks of medicines may slightly improve knowledge and attitudes about medicines compared with the same information as text ➡ The effects of written medicine information are mediated by the ability to read the information presented. Low literacy levels in low-income countries could make these findings less applicable

Table 6. Key messages of included reviews (*Continued*)

Providing information/education Health literacy interventions (Berkman 2011)	➡ Some single strategies may improve comprehension for people with low health literacy, such as presenting essential information by itself, using the same denominators to present baseline risk and treatment benefit information, and adding icon arrays to numerical presentations of treatment benefit information ➡ It is uncertain whether single strategies improve the use of healthcare services, health outcomes, resource use or disparities in the use of healthcare services ➡ Some mixed strategies such as intensive self-management and adherence interventions probably improve the use of healthcare across health literacy levels ➡ Some mixed strategies such as intensive disease management programmes probably reduce disease prevalence across health literacy levels ➡ It is uncertain whether mixed strategies improve resource use or disparities in the use of healthcare services ➡ Only one of the included studies took place in a low-income country
Adherence - medication Interventions for enhancing medication adherence (Haynes 2008)	➡ It is uncertain whether interventions to increase adherence to short-term treatments improve adherence or patient outcomes ➡ Interventions aimed at increasing adherence to long-term treatments may improve adherence, but it is uncertain whether they improve patient outcomes ➡ Most of the included studies assessed complex interventions with multiple components in high-income countries. Adherence interventions may be difficult to implement in low-income countries where health systems face greater challenges
Adherence - ART for HIV/AIDS Efficacy of interventions in improving highly active antiretroviral therapy adherence and HIV-1 RNA viral load (Simoni 2006; Simoni 2010)	➡ Behavioural interventions probably lead to slightly better adherence to HAART ➡ Behavioural interventions may slightly improve the number of patients with undetectable viral load (a laboratory measure of successful HAART) ➡ We did not find any studies measuring patient outcomes such as morbidity and mortality ➡ Only one included study took place in a low-income country
Adherence - ART for HIV/AIDS Mobile phone text messages for improving adherence to antiretroviral therapy (ART) (Mbuagbaw 2013)	➡ Mobile phone text messages compared to standard care improve adherence to ART for up to 12 months ➡ Mobile phone text messages compared to standard care may lead to little or no difference in mortality or loss to follow-up after up to 12 months ➡ Weekly text messages probably improve adherence compared to daily text messages, and interactive text messages probably improve adherence compared to non-interactive text messages ➡ All studies took place in low-income countries in Africa.

Table 6. Key messages of included reviews (*Continued*)

Adherence - TB Material incentives and enablers in the management of tuberculosis (Lutge 2015)	➡ Sustained material incentives may lead to little or no difference in cure or completion of treatment for active TB, compared to no incentive ➡ It is not clear if sustained material incentives improve completion of TB prophylaxis, compared to no incentive, because findings varied across studies ➡ A single, once only incentive may increase the number of people who return to a clinic for reading of their tuberculin skin test, compared to no incentive ➡ A single, once only incentive probably increases the number of people who return to a clinic to start or continue TB prophylaxis, compared to no incentive ➡ Compared to a non-cash incentive, cash incentives may slightly increase the number of people who return to a clinic for reading of their tuberculin skin test and may increase the number of people who complete TB prophylaxis ➡ Compared to counselling or education interventions, material incentives may increase the number of people who return to a clinic for reading of their tuberculin skin test ➡ Compared to counselling or education interventions, material incentives may lead to little or no difference in the number of people who return to a clinic to start or continue TB prophylaxis or in the number of people who complete TB prophylaxis ➡ Higher cash incentives may slightly improve the number of people who return to a clinic for reading of their tuberculin skin test, compared to lower cash incentives
Adherence - TB Reminder systems to improve patient adherence to tuberculosis clinic appointments for diagnosis and treatment (Liu 2014)	➡ For patients being treated for active TB: • default reminders probably increase the number of patients completing treatment and may increase clinic attendance; • pre-appointment reminders may increase clinic attendance and the number of patients completing treatment. ➡ For people on TB prophylaxis, pre-appointment reminders may increase clinic attendance ➡ For people undergoing screening for TB, pre-appointment reminders may have little or no effect on the number of people who return to clinic for the result of their skin test ➡ Due to the low-certainty evidence, more well-designed trials are needed to establish whether reminder systems are effective in different settings, and the best way of delivering reminders, especially in low-income countries
Adherence - malaria medication Unit-dose packaged drugs for treating malaria (Orton 2005)	➡ No studies measured treatment failure on or by day 28 after initiation of treatment, which was the primary outcome in this review ➡ The use of blister packs compared to paper envelopes for antimalarial drugs may improve adherence to treatment and may slightly improve clinical outcomes. No studies reported adverse events

Table 6. Key messages of included reviews (*Continued*)

	➡ The use of sectioned polythene bags compared with bottled syrup may improve adherence to treatment in children under 5 years who have malaria, but may increase vomiting. It is uncertain whether there is a difference in clinical outcomes ➡ The use of sectioned polythene bags compared to paper envelopes for antimalarial drugs probably improves adherence to treatment and may slightly improve clinical outcomes in children over 7 years and adults with malaria. Their use may lead to little if any difference in adverse events ➡ It is uncertain whether the use of sectioned compared to unsectioned polythene bags leads to a difference in adherence, clinical outcomes or adverse events
Immunisation coverage Interventions for improving coverage of child immunization in low-income and middle-income countries (Oyo-Ita 2016) Patient reminder and patient recall systems for improving immunization rates (Jacobson Vann 2005)	➡ Community-based health education probably improves coverage of three doses of diphtheria-tetanus-pertussis vaccine (DTP3) . However, the impacts of facility-based health education on coverage of DPT3 may vary from little or no effect to potentially important benefits ➡ Health education combined with reminders may increase DTP3 coverage ➡ Training vaccination managers to provide supportive supervision for healthcare provider may have little or no effect on coverage of DTP, oral polio vaccine (OPV) and hepatitis B virus (HBV) vaccine ➡ Integrating vaccination with other healthcare services may increase DTP3 and measles vaccine coverage and may have little or no effect on BCG coverage ➡ Household monetary incentives may have little or no effect on achieving full vaccination coverage ➡ Home visits may improve OPV3 and measles coverage. ➡ Reminders and recall strategies probably increase routine childhood vaccination uptake
Malaria Strategies to increase the ownership and use of insecticide-treated bednets to prevent malaria (Augustincic Polec 2015)	➡ Providing free insecticide-treated bednets compared to providing subsidised or full market price bednets probably increases the number of pregnant women, adults and children who possess insecticide-treated bednets, but probably leads to little or no difference in appropriate use of bednets ➡ Education about appropriate use of insecticide-treated bednets may increase the number of adults and children under 5 sleeping under bednets ➡ Providing incentives to encourage the use of insecticide-treated bednets may lead to little or no difference in use ➡ The included studies took place in rural communities in Africa, India and Iran
Access to healthcare services Interventions targeted at women to encourage the uptake of cervical screening (Everett 2011)	➡ Education, counselling, access to health promotion nurse, invitations to attend cervical screening programmes and intensive recruitment probably increase the uptake of cervical screening ➡ Enhanced risk factor assessment may lead to little or no differ-

Table 6. Key messages of included reviews (*Continued*)

	ence in the uptake of screening ➡ Photo-comic book and message framing probably lead to little or no difference on the uptake of screening ➡ Most of the included studies took place in high-income countries
Access to healthcare services Outreach strategies for increasing health insurance coverage for vulnerable populations (Jia 2014)	➡ Health insurance information and application support probably: • increases the enrolment of children in health insurance schemes; • leads to continuous enrolment of children in insurance schemes: • decreases the mean time taken to obtain insurance for children; and • leads to parental satisfaction with the process of enrolment. ➡ Handing out application forms in the emergency department of hospitals probably increases the enrolment of children in health insurance schemes ➡ Only 2 studies conducted in high-income countries were included in the review • Rigorous studies are needed that evaluate the effects and costs of different outreach strategies in different countries for expanding the health insurance coverage of vulnerable populations. • The use of the outreach strategies for increasing health insurance coverage in low-income countries should be accompanied by monitoring and evaluation.

ART: antiretroviral therapy; **HAART**: highly active antiretroviral therapy; **TB**: tuberculosis.

Table 7. Intervention-outcome matrix

Implementation strategy	Direction of effects and certainty of the evidence[a]								
	Patient outcomes	Access, coverage, utilisation	Quality of care	Resource use	Social outcomes	Impacts on equity	Healthcare-provider outcomes	Adverse effects[b]	Other
Strategies targeted at healthcare organisations									
Organisational culture (Parmelli 2011)	NS	NS	NS	NS	NS	NS	NS	NS	NS

Table 7. Intervention-outcome matrix (*Continued*)

Strategies targeted at healthcare workers by type of intervention									
Printed educational materials (Giguère 2012)	?⊕ooo	NR	√⊕⊕oo[1]	NS	NR	NR	NS	NR	NR
Internet-based learning in health professions Vs no intervention (Cook 2008)	NR	NR	√⊕⊕oo[2]	NR	NR	NR	NR	NR	NR
Vs non-Internet-based learning (Cook 2008)	NR	NR	⊕⊕oo[2]	NR	NR	NR	NR	NR	NR
Educational meetings Continuing education meetings (Forsetlund 2009)	√⊕⊕⊕o	NR	√⊕⊕⊕o[1]	NR	NR	NR	NR	NR	NR
Interprofessional education (Reeves 2013)	√⊕⊕oo	NR	√⊕⊕oo[1]	NR	NR	NR	?⊕ooo[3]	NR	NR
Teaching critical appraisal (Horsley 2011)	NS	NR	NS	NR	NR	NR	NR	NR	√⊕⊕oo[4] ?⊕ooo[5]

Table 7. Intervention-outcome matrix (*Continued*)

Nutrition training of health workers Sunguya 2013	NR	NR	NR	NR	NR	NR	NR	NR	√⊕⊕⊕⊕ [6]
Educational outreach Vs no intervention O'Brien 2007	NR	NR	√⊕⊕⊕⊕ [7] √⊕⊕⊕o [8]	NR	NR	NR	NR	NR	NR
Vs another intervention O'Brien 2007	NR	NR	√⊕⊕oo [9]	NR	NR	NR	NR	NR	NR
Practice facilitation Baskerville 2012	NR	NR	√⊕⊕⊕o [1]	NR	NR	NR	NR	NR	NR
Pharmacist-provided services targeted at patients, such as patient health education and follow-up Pande 2013	√⊕⊕oo [10]	√⊕⊕oo [11]	NR	NS	NS	NR	NR	NR	√⊕⊕oo [12]
Pharmacist-provided services targeted at healthcare professionals, such as educa-	√⊕⊕oo	NR	NS	NS	NS	NR	NS	NS	NR

Table 7. Intervention-outcome matrix (*Continued*)

tional outreach visits Pande 2013									
Local opinion leaders (Flodgren 2011)	NR	NR	√⊕⊕⊕o[1]	NR	NR	NR	NR	NR	NR
Audit and feedback - (with or without other interventions) vs usual care (Ivers 2012)	⊕⊕⊕o	NR	√⊕⊕⊕o[1]	NR	NR	NR	NR	NR	NR
Audit and feedback - compared with other interventions (Ivers 2012)	⊕⊕⊕o	NR	⊕⊕⊕o[1]	NR	NR	NR	NR	NR	NR
Reminders - intensive care unit, emergency department and acute care settings (Ko 2011)	NR	NR	?⊕ooo[1]	NR	NR	NR	NR	NR	NR
Reminders - surgery setting (Ko 2011)	√⊕⊕oo[13]	NR	NR	NR	NR	NR	NR	NR	NR

Table 7. Intervention-outcome matrix (*Continued*)

Tailored interventions - Vs no intervention (Baker 2015)	NR	NR	√⊕⊕⊕o[1]	NR	NR	NR	NR	NR	NR
- Vs non-tailored interventions (Baker 2015)	NR	NR	?⊕ooo[1]	NR	NR	NR	NR	NR	NR
- Interventions targeted at organisational and individual barriers vs interventions targeted at individual barriers only (Baker 2015)	NR	NR	?⊕ooo[1]	NR	NR	NR	NR	NR	NR
Multifaceted interventions - Interventions to encourage the use of systematic reviews in clinical decision-making (Perrier 2011)	NS	NR	?⊕ooo[14]	NR	NR	NR	NS	NR	NR
Strategies targeted at healthcare workers by type of problem									

Table 7. Intervention-outcome matrix (*Continued*)

Communication with patients - interventions to promote patient-centred care Dwamena 2012	√⊕⊕⊕o [15]	NR	√⊕⊕⊕o [16]	NR	NR	NR	NR	NR	NR
Handwashing - educational interventions and marketing campaigns Gould 2010	?⊕ooo [17]	NR	√⊕⊕oo [18]	NR	NR	NR	NR	NR	√⊕⊕oo [19]
Obstetrics - non-clinical interventions to reduce unnecessary cesarean section rates Guidelines + mandatory second opinion Khunpradit 2011	?⊕⊕oo	NR	√⊕⊕oo	NR	NR	NR	NR	NR	NR
Nurse training/ insurance reform/ legislative changes/	?⊕⊕oo	NR	?⊕⊕oo	NR	NR	NR	NR	NR	NR

Table 7. Intervention-outcome matrix (*Continued*)

audit & feedback/ external peer review Khunpradit 2011									
Obstetrics - traditional birth attendants (TBA) Trained TBAs versus untrained TBA Sibley 2012	?⊕⊕oo	NR	?⊕⊕oo[20]	NR	NR	NR	NR	NR	NR
Additional TBAs training vs no additional TBA training Sibley 2012	√⊕⊕oo[21] √⊕⊕oo[22] ⊕⊕oo[23]	NR	⊕⊕oo[24]	NR	NR	NR	NR	NR	NR
Obstetrics - skilled births attendance vs usual care Yakoob 2011	√⊕⊕oo[25]	NR	NR	NR	NR	NR	NR	NR	NR
Obstetrics - birth kits Hundley 2012	√⊕⊕⊕⊕[26] √⊕⊕⊕o[27] √⊕⊕oo[28]	NR	NR	NR	NR	NR	NR	NR	NR
Prescribing antibiotics Clini-	NR	NR	√⊕⊕⊕o[29]	NR	NR	NR	NR	NR	NR

Table 7. Intervention-outcome matrix (*Continued*)

cian education with/without other intervention vs no intervention Ranji 2008									
Seriously ill newborn care - in-service neonatal emergency care training Opiyo 2015	⊕⊕oo[30]	NR	√⊕⊕⊕o[31]	NR	NR	NR	NR	NR	NR
Traditional healers - training about STD and HIV medicine Sorsdahl 2009	NR	NR	√⊕⊕oo[32] ⊕⊕oo[33]	NR	NR	NR	NR	NR	√⊕⊕oo[34]
Strategies targeted at healthcare recipients									
Providing information/education - multimedia for promoting HIV testing Vidanapathirana 2005	⊕⊕oo[35]	√⊕⊕oo[36]	NR	NR	NR	NR	NR	NR	NR
Providing information/ed-	NR	√⊕⊕⊕⊕[37]	NR	NR	NR	NR	NR	NR	NR

Table 7. Intervention-outcome matrix (*Continued*)

ucation - leaflets for promoting HIV testing Vidanapathirana 2005									
Providing information/ education - gain-framed versus loss-framed video tapes for promoting HIV testing Vidanapathirana 2005	NR	√⊕⊕⊕⊕ [38]	NR	NR	NR	NR	NR	NR	NR
Providing information: written medicine information Nicolson 2009	NS	NR	NR	NR	NR	NR	NR	NR	√⊕⊕oo [39] ⊕⊕oo [40]
Single interventions to improve health literacy (e.g. presenting essential information first, presenting informa-	?⊕ooo	?⊕ooo	NR	NS	NR	?⊕ooo	NR	NR	√⊕⊕oo [41]

Table 7. Intervention-outcome matrix (*Continued*)

tion so that the higher numbers indicate better quality) Berkman 2011									
Mixed interventions to improve health literacy (intensive self-management and adherence and intensive disease management) Berkman 2011	√⊕⊕⊕o [42]	√⊕⊕⊕o [43]	NR	?⊕ooo	NR	NS	NR	NR	NR
Adherence - medication: interventions to improve adherence to short-term treatments Haynes 2008 [44]	?⊕⊕oo [45]	NR	NR	NR	NR	NR	NR	NR	NR
Adherence - medication: interventions to improve adherence to long-term treatments	?⊕⊕oo [46] √⊕⊕oo [47]	NR	NR	NR	NR	NR	NR	NR	NR

Table 7. Intervention-outcome matrix (*Continued*)

(more than 6 months) Haynes 2008[40]									
Adherence - ART for HIV/ AIDS: behavioural interventions Simoni 2006	√⊕⊕⊕o[35]	NR	√⊕⊕oo[48]	NR	NR	NR	NR	NR	NR
Adherence - ART for HIV/ AIDS Mbuagbaw 2013	√⊕⊕⊕⊕[49] ⊕⊕oo[51]	NR	NR	NR	NR	NR	NR	NR	⊕⊕oo[52]
Adherence - TB: incentives vs routine care Lutge 2015	NR	√⊕⊕oo[50] √⊕⊕⊕o53 ?⊕ooo[54] ⊕⊕oo[55]	NR	NR	NR	NR	NR	NR	NR
Adherence - TB: immediate vs deferred incentives Lutge 2015	⊕⊕oo[56]	NR	NR	NR	NR	NR	NR	NR	NR
Adherence - TB: cash vs non-cash incentive Lutge	NR	√⊕⊕oo[57]	NR	NR	NR	NR	NR	NR	NR

Table 7. Intervention-outcome matrix (*Continued*)

2015									
Adherence - TB: different levels of cash incentives Lutge 2015	NR	√⊕⊕oo[58]	NR	NR	NR	NR	NR	NR	NR
Adherence - TB: incentives vs other interventions Lutge 2015	√⊕⊕oo[59]	√⊕⊕oo[60]	NR	NR	NR	NR	NR	NR	NR
Adherence - TB: mobile phone messages reminders Liu 2014	NR	√⊕⊕oo[61] √⊕⊕⊕o[62]		NR	NR	NR	NR	NR	NR
Adherence - malaria medication: blister packed tablets and capsules vs tablets and capsules in paper envelopes Orton 2005	√⊕⊕oo[63]	NR	NR	NR	NR	NR	NR	NR	NR
Adherence - malaria medication: tablets in	√⊕⊕oo[64] ?⊕ooo[65]	NR	NR	NR	NR	NR	NR	?⊕⊕oo[66]	NR

Table 7. Intervention-outcome matrix (*Continued*)

sectioned polythene bags vs bottled syrup Orton 2005									
Adherence - malaria medication: tablets in sectioned polythene bags vs tablets and capsules in paper envelopes Orton 2005	√⊕⊕⊕o[67] √⊕⊕oo[68]	NR	NR	NR	NR	NR	NR	⊕⊕oo[68]	NR
Adherence - malaria medication: tablets in sectioned polythene bags vs polythene bags (unsectioned) Orton 2005	?⊕ooo[70]	NR	NR	NR	NR	NR	NR	NR	NR
Immunisation coverage: health education Oyo-Ita 2016	NR	√⊕⊕⊕o[71]	NR	NR	NR	NR	NR	NR	NR

Table 7. Intervention-outcome matrix (*Continued*)

Immunisation coverage: healthcare providers training Oyo-Ita 2016	NR	⊕⊕oo[71]	NR	NR	NR	NR	NR	NR	NR
Immunisation coverage: home visits Oyo-Ita 2016	NR	√⊕⊕oo[71]	NR	NR	NR	NR	NR	NR	NR
Immunisation coverage: monetary incentives (withdrawing of monetary vouchers) Oyo-Ita 2016	NR	⊕⊕oo[71]	NR	NR	NR	NR	NR	NR	NR
Immunisation coverage: **m**ultifaceted interventions (monetary incentives + quality assurance + provision of equipment, drugs and materials) Oyo-Ita 2016	NR	⊕⊕oo[71]	NR	NR	NR	NR	NR	NR	NR
Immunisation coverage	NR	√⊕⊕⊕o[71]	NR	NR	NR	NR	NR	NR	NR

Table 7. Intervention-outcome matrix (*Continued*)

erage: reminders and recall systems Jacobson Vann 2005									
Malaria: Providing free ITNs vs subsidised ITNs Augustincic Polec 2015	NS	√⊕⊕⊕o[72] ⊕⊕⊕o[73]	NS	NS	NS	NS	NS	NS	NR
Malaria: Education about appropriate ITN use vs no education Augustincic Polec 2015	NS	√⊕⊕oo[74]	NS	NS	NS	NS	NS	NS	NR
Access to healthcare services: Interventions to improve the uptake of cervical cancer screening Invitations to attend screening (face-to-face, letter, telephone) Everett 2011	NR	√⊕⊕⊕o[75]	NR	NR	NR	NR	NR	NR	NR

Table 7. Intervention-outcome matrix (*Continued*)

Educational interventions for women Everett 2011	NR	√⊕⊕⊕o[75]	NR	NR	NR	NR	NR	NR	NR
Counselling Everett 2011	NR	√⊕⊕⊕o[75]	NR	NR	NR	NR	NR	NR	NR
Risk factor assessment Everett 2011	NR	⊕⊕oo[75]	NR	NR	NR	NR	NR	NR	NR
Other interventions (access to a health promotion nurse, intensive recruitment) Everett 2011	NR	√⊕⊕⊕o[75]	NR	NR	NR	NR	NR	NR	NR
Other interventions (photo-comic book, message framing) Everett 2011	NR	⊕⊕⊕o[75]	NR	NR	NR	NR	NR	NR	NR
Access to healthcare services - outreach strategies for increasing health	NR	√⊕⊕⊕o[76]	√⊕⊕⊕o[77]	NR	NR	NR	NR	NR	NR

Table 7. Intervention-outcome matrix (*Continued*)

insurance coverage for vulnerable populations Health insurance information and application support Jia 2014									
Handing out application forms in emergency department of hospitals Jia 2014	NR	√⊕⊕⊕o [76]	NR	NR	NR	NR	NR	NR	NR

Ratings		**Implications**
⊕⊕⊕⊕ High	This research provides a very good indication of the likely effect. The likelihood that the effect will be substantially different is low	This evidence provides a very good basis for making a decision about whether to implement the intervention. Impact evaluation and monitoring of the impact are unlikely to be needed if it is implemented
⊕⊕⊕o Moderate	This research provides a good indication of the likely effect. The likelihood that the effect will be substantially different is moderate	This evidence provides a good basis for making a decision about whether to implement the intervention. Monitoring of the impact is likely to be needed and impact evaluation may be warranted if it is implemented
⊕⊕oo Low	This research provides some indication of the likely effect. However, the likelihood that it will be substantially different is high	This evidence provides some basis for making a decision about whether to implement the intervention. Impact evaluation is likely to be warranted if it is implemented
⊕ooo Very low	This research does not provide a reliable indication of the likely effect. The likelihood that the effect will be substantially different is very high	This evidence does not provide a good basis for making a decision about whether to implement the intervention. Impact evaluation is very likely to be warranted if it is implemented

[a] √: a desirable effect; : little or no effect; ?: an uncertain effect; ×: an undesirable effect; NS: no studies were included; NR: not reported; NA: no plausible mechanism by which the type of implementation strategy might be expected to have an effect on the type of outcome.

[b] Other than adverse effects on any of the outcomes in the previous columns.

[1]Adherence to recommended practice (guidelines recommendations).
[2]Clinical behaviour end effects on patient care.
[3]Collaborative behaviour and practitioner competencies.
[4]Provider's knowledge.
[5]Provider's skills.
[6]Daily energy intake, feeding frequency, consumption of targeted food items.
[7]Prescribing.
[8]Management of patients at increased cardiovascular risk, with asthma or diabetes; or delivery of preventive services, including counselling for smoking cessation.
[9]Better documentation of care, preventive cardiovascular care or prostate specific antigen testing in primary care.
[10]Hospitalisation, general practice visits and emergency room visits.
[11]Patients' medication costs.
[12]Clinical outcomes (for diabetic and hypertensive patients such as reductions in fasting plasma glucose levels or systolic and diastolic blood pressure).
[13]Death rate and major complications.
[14]Changes in physician performance.
[15]Patient health status (included physiological measures, clinical assessments, patient self-reports of symptom resolution or quality of life; and patient self-esteem).
[16]Patient satisfaction.
[17]Healthcare-associated infections.
[18]Compliance with hand hygiene guidance.
[19]Use of hand hygiene products.
[20]Frequency of referral to emergency obstetrical care.
[21]Maternal mortality.
[22]Maternal morbidity: haemorrhage, infections, obstructed labour and referral to emergency.
[23]Neonatal deaths and stillbirths.
[24]Breastfeeding and appropriate advice about immediate feeding of colostrum.
[25]Stillbirths and perinatal mortality.
[26]Neonatal tetanus-related mortality and puerperal sepsis.
[27]Neonatal mortality, maternal mortality, haemorrhage.
[28]Neonatal sepsis.
[29]Number of patient visits at which an antibiotic is prescribed.
[30]Mortality in all resuscitation episodes.
[31]Proportion of adequate initial resuscitation steps, Inappropriate and potentially harmful practices per resuscitation.
[32]HIV/STI patient management practices.
[33]Incidence of HIV/AIDS risk behaviours and referral practices (self-reported).
[34]Traditional healers' knowledge about STDs and HIV.
[35]Number of people who were positive for HIV antibody testing.
[36]Number of people tested for HIV.
[37]Number of pregnant women taking HIV tests.
[38]Proportion of low-income ethnic minority women being HIV tested.
[39]Knowledge and attitudes about medicines.
[40]Compliance with medicine's instructions.
[41]Comprehension
[42]Disease prevalence
[43]Use of health services.
[44]See Nieuwlaat 2014 in the main text for updated findings.
[45]Adherence to medications and various clinical outcomes.
[46]Treatment outcomes.
[47]Adherence to medications.
[48]Undetectable viral load.
[49]Adherence to ART.
[50]Return for tuberculin skin test reading.

[51]Morality.
[52]Loss to follow-up.
[53]Return for start or continuation of treatment.
[54]Completion of treatment for active TB.
[55]Completion of TB prophylaxis.
[56]Adherence to anti-tuberculosis treatment.
[57]Patient return for tuberculin skin test reading and completion of TB prophylaxis.
[58]Patient return for tuberculin skin test reading.
[59]Adherence to anti-tuberculosis prophylaxis.
[60]Return to clinic for completion of treatment and prophylaxis for latent TB.
[61]Clinic attendance.
[62]Completion of TB treatment.
[63]Adherence to malaria treatment and treatment failure.
[64]Adherence to malaria treatment.
[65]Treatment failure.
[66]Number of minor adverse events in malaria treatment.
[67]Adherence to malaria treatment.
[68]Treatment failure.
[69]Incidence of itching, dizziness and other adverse events.
[70]Treatment adherence and treatment failure in malaria.
[71]Routine childhood immunisations.
[72] ITN possession among pregnant women, adults and children.
[73]Appropriate use of ITNs.
[74]ITN use by adults, ITN use by children under 5 years old.
[75]Uptake of screening.
[76]Enrolment into insurance.
[77]Parental satisfaction.

Table 8. Summary of effects of interventions and certainty of evidence

Interventions found to have desirable effects on at least one outcome with moderate- or high-certainty evidenceand no moderate- or high-certainty evidence of undesirable effects
Strategies targeted at healthcare workers by type of intervention • Educational meetings (Forsetlund 2009) • Nutrition training of health workers (Sunguya 2013) • Educational outreach (vs no intervention) (O'Brien 2007) • Practice facilitation (Baskerville 2012) • Local opinion leaders (Flodgren 2011) • Audit and feedback (with or without other interventions) vs usual care (Ivers 2012) • Tailored interventions (vs no intervention) (Baker 2015)
Strategies targeted at healthcare workers by type of problem • Communication with patients (interventions to promote patient-centred care) (Dwamena 2012) • Obstetric care (use of birth kits) (Hundley 2012) • Clinician education (with or without other interventions) (Ranji 2008) • Seriously ill newborn care (in-service neonatal emergency care training) (Opiyo 2015)

Table 8. Summary of effects of interventions and certainty of evidence (*Continued*)

Strategies targeted at healthcare recipients

- Providing information/education (leaflets for promoting HIV testing) (Vidanapathirana 2005)
- Providing information/education (gain-framed versus loss-framed video tapes for promoting HIV testing) (Vidanapathirana 2005)
- Intensive self-management and adherence, intensive disease management programmes to improve health literacy (Berkman 2011)
- Adherence - ART for HIV/AIDS (behavioural interventions) (Simoni 2006)
- Adherence - ART for HIV/AIDS (mobile text messages) (Mbuagbaw 2013)
- Adherence - TB (one time incentives vs routine care) (Lutge 2015)
- Adherence - TB (mobile phone messages reminders) (Liu 2014)
- Adherence - Malaria medication (sectioned polythene bags compared to paper envelopes) (Orton 2005)
- Immunisation coverage (health education) (Oyo-Ita 2016)
- Immunisation coverage (reminders and recall systems) (Jacobson Vann 2005)
- Providing free insecticide-treated bednets (Augustincic Polec 2015).
- Access to healthcare services - interventions to improve the uptake of cervical cancer screening (education, counselling, access to health promotion nurse, invitations to attend screening and intensive recruitment) (Everett 2011
- Access to healthcare services - outreach strategies for increasing health insurance coverage for vulnerable populations (health insurance information and application support, handing out application forms in emergency department of hospitals) (Jia 2014)

Interventions found to have at least one outcome with little or no effect with moderate- or high-certainty evidenceand no moderate- or high-certainty evidence of desirable or undesirable effects

Strategies targeted at healthcare workers by type of intervention

- Audit and feedback compared with other interventions (Ivers 2012)
- Photo-comic book and message framing to improve the update of cervical cancer screening (Everett 2011)

Interventions for which the certainty of the evidence was low or very low (or no studies were found) for all outcomes examined

Strategies targeted at healthcare organisations

- Organisational culture (Parmelli 2011)

Strategies targeted at healthcare workers by type of intervention

- Printed educational materials (Giguère 2012)
- Internet-based learning in health professions (vs no intervention) (Cook 2008)
- Internet-based learning in health professions (vs non-Internet-based learning) (Cook 2008)
- Interprofessional education (Reeves 2013)
- Teaching critical appraisal (Horsley 2011)
- Educational outreach (vs another intervention) (O'Brien 2007)
- Pharmacist-provided services targeted at patients (such as patient health education and follow-up) (Pande 2013)
- Pharmacist-provided services targeted at healthcare professionals (such as educational outreach visits) (Pande 2013)
- Reminders (intensive care unit, emergency department and acute care settings) (Ko 2011)
- Reminders (surgery setting) (Ko 2011)
- Tailored interventions (vs non-tailored interventions) (Baker 2015)
- Tailored interventions (interventions targeted at organisational and individual barriers vs interventions targeted at individual barriers only) (Baker 2015)
- Interventions to encourage the use of systematic reviews in clinical decision-making (Perrier 2011)

Table 8. Summary of effects of interventions and certainty of evidence (*Continued*)

Strategies targeted at healthcare workers by type of problem • Handwashing (educational interventions and marketing campaigns) (Gould 2010) • Obstetrics - non-clinical interventions to reduce unnecessary cesarean section rates (guidelines + mandatory second opinion) (Khunpradit 2011) • Obstetrics - non-clinical interventions to reduce unnecessary cesarean section rates (nurse training/insurance reform/legislative changes/audit and feedback/external peer review) (Khunpradit 2011) • Obstetrics - traditional birth attendants (TBA) (trained TBAs versus untrained TBA) (Sibley 2012) • Obstetrics - traditional birth attendants (TBA) (additional TBAs training versus no additional TBA training) (Sibley 2012) • Obstetrics (skilled births attendance versus usual care) (Yakoob 2011) • Training traditional healers about STD and HIV medicine (Sorsdahl 2009)
Strategies targeted at healthcare recipients • Providing information/education (multimedia for promoting HIV testing) (Vidanapathirana 2005) • Providing information (written medicine information) (Nicolson 2009) • Single interventions to improve health literacy (presenting essential information first, presenting information so that the higher numbers indicate better quality) (Berkman 2011 • Adherence - medication (interventions to improve adherence to short-term treatments) (Haynes 2008) • Adherence - medication (interventions to improve adherence to long-term treatments - more than 6 months) (Haynes 2008) • Adherence - TB (immediate versus deferred incentives) (Lutge 2015) • Adherence - TB (cash versus non-cash incentive) (Lutge 2015) • Adherence - TB (different levels of cash incentives) (Lutge 2015) • Adherence - TB (incentives vs other interventions) (Lutge 2015) • Adherence - malarial medication (blister packed tablets and capsules compared to tablets and capsules in paper envelopes) (Orton 2005) • Adherence - malaria medication (tablets in sectioned polythene bags compared to bottled syrup (Orton 2005) • Adherence - malaria medication (tablets in sectioned polythene bags compared to unsectioned polythene bags (Orton 2005) • Immunisation coverage (healthcare providers training) (Oyo-Ita 2016) • Immunisation coverage (home visits) (Oyo-Ita 2016) • Immunisation coverage (monetary incentives - withdrawing of monetary vouchers) (Oyo-Ita 2016) • Immunisation coverage (multifaceted interventions - monetary incentives + quality assurance + provision of equipment, drugs and materials) (Oyo-Ita 2016) • Malaria: education about appropriate use of insecticide-treated bednets (Augustincic Polec 2015) • Risk factor assessment to improve the uptake of cervical cancer screening (Everett 2011)

Table 9. Priorities for primary research

Implementation strategy	Systematic review	Applicability limitations	
		Findings	**Interpretation**
Strategies targeted at healthcare workers by type of intervention			
Educational materials	Giguère 2012	The studies reviewed were mostly from high-income countries. Only one study out of the 45 included was from a middle-income country	In low-income countries (LICs) where health systems may be weaker, it may be difficult to ensure that up-to-date printed

Table 9. Priorities for primary research (*Continued*)

			educational materials reach the appropriate providers promptly. It is therefore unclear whether similar effects would be expected in LICs
Interprofessional education (IPE)	Reeves 2013	Included studies were done primarily in the USA and UK in varied settings (hospital emergency departments, health maintenance organisations, community mental health provider organisations, primary care practices)	The impact of IPE interventions in low-income settings is uncertain (differences in the health system contexts, gender relationships and comparable social status of different health professions may influence the effectiveness of IPE in different settings)
Teaching critical appraisal skills in healthcare settings	Horsley 2011	None of the included studies took place in a low-income country. Interventions assessed included journal club supported by a half-day workshop, critical appraisal materials, listserv discussions and articles and a half-day Critical Appraisal Skills Programme (CASP) workshop	The impact of critical appraisal educational interventions (workshops, materials) in low-income countries is uncertain
Educational outreach	Baskerville 2012	The review did not include any studies conducted in low-income countries that evaluated the use of practice facilitation to promote adoption of evidence-based guidelines	Practice facilitation might be difficult to implement in low-resource settings, particularly the audit and feedback component, and it might be more difficult to make necessary organisational changes
Local opinion leaders	Flodgren 2011	The included trials were from primary care in the USA (6 studies) and Canada (1 study)	Rigorous studies from low-income countries are needed to fully assess applicability of the findings to all healthcare settings
Patient-mediated interventions (i.e. new clinical information collected directly from patients and given	No updated review identified	-	-

Table 9. Priorities for primary research (*Continued*)

to the provider)			
Reminders	No updated review identified	-	-
Tailored interventions	Baker 2015	The studies were undertaken in the USA, the UK, Belgium , Canada, Indonesia , Norway, the Netherlands and Portugal	The impact of tailored interventions in low-income countries is uncertain
Interventions encouraging use of systematic reviews in clinical decision-making	Perrier 2011	All studies included in the review took place in middle and high income countries	The applicability of these findings to low-income countries is uncertain. Important issues in adopting of such interventions include acceptance by the end user and integration into the healthcare system
Strategies targeted at healthcare workers by type of problem			
Communication with patients - Training healthcare providers to be more 'patient-centred' in clinical consultations	Dwamena 2012	This review did not find any study conducted in low- and-middle-income countries, all 43 studies included were from high-income countries	Although patient-centredness may be an objective of care in many settings, it is not possible to be confident about the applicability of the reported interventions to low-income countries (LICs) and to settings other than primary care, as almost all studies took place in the USA and Europe Human resource constrains in some health systems and low motivation to deliver patient-centred care may limit the feasibility and potential of this approach for improving professional practice and health outcomes
Obstetrics - Non-clinical interventions for reducing unnecessary caesarean section	Khunpradit 2011	The included studies took place in high-income and middle-income countries	The evidence for the effectiveness of these interventions in low-income

Table 9. Priorities for primary research (*Continued*)

			settings is limited; observed effects may be different in low-income settings given differences in contextual factors (e.g. socioeconomic factors)-
Strategies targeted at healthcare recipients			
Providing information/education - Mass media interventions for promoting HIV testing	Vidanapathirana 2005	All the studies took place in high-income countries	The degree of diffusion and importance of multimedia (television, radio, etc.) in low-income countries should be considered in order to reach more population with the messages
Providing information/education - Written information about individual medicines for consumers	Nicolson 2009	All the trials - except one conducted in Turkey - were carried out in high-income countries	Implementation of written medicine information (WMI) depends on the health systems' regulatory context. For instance in high-income countries there are specific laws that already governed the use of WMI. Hence its implementation and impact in low-income countries could be different to the findings from this review The effects of WMI are mediated by the ability to read the information presented. Hence low literacy levels in a country could make these findings less applicable
Providing information/education - Health literacy interventions and outcomes	Berkman 2011	Most studies took place in high-income countries.	There is insufficient evidence of the effectiveness of these interventions in low-income countries. The effects observed in these studies were limited to clinical environments and a narrow geographical area which may be different in low-income settings given that they have different literacy levels and other contextual factors (e.g. sociodemographic factors)
Adherence - medication	Haynes 2008	Most studies took place in high-income countries.	Almost all the interventions that were effective were complex and included combinations of interventions. Even the most effective interventions did not lead to large improvements in treatment outcomes The findings indicate that interventions to improve medication adherence should be used with caution given that there is a high degree of uncertainty about both their effects and costs
Adherence - ART for HIV/AIDS	Simoni 2006	All studies took place in high-income countries. The update of the review includes 3 studies in Brazil, China	Some studies use combinations of interventions, so it is difficult to know which component is leading to the observed effects There are countless aspects where interventions to improve adherence in HIC and LMIC may differ

Table 9. Priorities for primary research (*Continued*)

		and Mozambique, with mixed results. We are very uncertain if there is a different effect in those settings	
Adherence - TB - Material incentives and enablers in the management of tuberculosis	Lutge 2015	Most studies took place in the USA; most studies were conducted in population subgroups	The findings need to be applied with caution in low- and middle-income countries considering the structural and qualitative differences in health systems, healthcare provision, resources and healthcare-seeking behaviour The included studies focus on specific subgroups of patients, such as injection drug users. The findings may therefore not be applicable in the general population
Access to healthcare services - Interventions targeted at women to encourage the uptake of cervical screening	Everett 2011	All except one of the studies included in the systematic review took place in high-income countries. One study took place in a middle-income country	When assessing the transferability of these findings to low-income countries the following factors should be considered • Literacy levels (e.g. for printed materials) • Population migration, and access to remote areas • Availability of resources for the intervention or devices, such as mobile phones, to disseminate messages • Acceptability and costs of the interventions

We only have included priorities for research on the effects of implementation strategies based on the findings of the included systematic reviews.

Table 10. Priorities for systematic reviews

Implementation strategy	What we found
Strategies targeted at healthcare organisations	
Continuous quality improvement	Review in progress (Brennan 2009)
Strategies targeted at healthcare workers by type of intervention	
Patient-mediated interventions	Review in progress (Fønhus 2016)
Reminders	Review in progress (Pantoja 2014b)
Strategies targeted at healthcare workers by type of problem	
Healthcare-associated infections	No up-to-date review identified

Table 10. Priorities for systematic reviews (*Continued*)

Strategies targeted at healthcare recipients	
Facility-based deliveries	Review in progress (Dudley 2009)

CONTRIBUTIONS OF AUTHORS

All of the authors contributed to drafting and revising the overview. All of the authors contributed important intellectual input to the overview.

DECLARATIONS OF INTEREST

Tomas Pantoja, Newton Opiyo, Simon Lewin, Elizabeth Paulsen, Cristian A Herrera, Gabriel Rada, and Andrew D Oxman are editors of the Cochrane Effective Practice and Organisation of Care (EPOC) Group. Newton Opiyo, Simon Lewin, Andrew D Oxman, and Charles S Wiysonge are authors on some of the included reviews. Agustín Ciapponi, Blanca Peñaloza, Lilian Dudley, Marie-Pierre Gagnon, and Sebastian Garcia Marti have no relevant conflicts to declare.

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Internal sources

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INDEX TERMS

Medical Subject Headings (MeSH)

*Developing Countries; *Patient Education as Topic; Evidence-Based Practice; Health Personnel [*education]; Health Plan Implementation [*methods; organization & administration]; National Health Programs [*organization & administration]; Needs Assessment; Organizational Culture; Patient Compliance; Review Literature as Topic; Unnecessary Procedures

MeSH check words

Humans