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

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[Overview of Reviews]

Delivery arrangements for health systems in low-income countries: an overview of systematic reviews

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ABSTRACT

Background

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 quality and safety systems. How services are delivered can have impacts on the effectiveness, efficiency and equity of health systems. This broad overview of the findings of systematic reviews can help policymakers and other stakeholders identify strategies for addressing problems and improve the delivery of services.

Objectives

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

Methods

We searched Health Systems Evidence in November 2010 and PDQ-Evidence up to 17 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 delivery arrangements on 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) and that were published after April 2005. We excluded reviews with limitations important enough to compromise the reliability of the 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 51 of them in this overview. We judged 6 of the 51 reviews to have important methodological limitations and the other 45 to have only minor limitations. We grouped delivery arrangements into eight categories. Some reviews provided more than one comparison and were in more than one category. Across these categories, the following intervention were effective; that is, they have desirable effects on at least one outcome with moderate- or high-certainty evidence and no moderate- or high-certainty evidence of undesirable effects.

Who receives care and when: queuing strategies and antenatal care to groups of mothers.

Who provides care: lay health workers for caring for people with hypertension, lay health workers to deliver care for mothers and children or infectious diseases, lay health workers to deliver community-based neonatal care packages, midlevel health professionals for abortion care, social support to pregnant women at risk, midwife-led care for childbearing women, non-specialist providers in mental health and neurology, and physician-nurse substitution.

Coordination of care: hospital clinical pathways, case management for people living with HIV and AIDS, interactive communication between primary care doctors and specialists, hospital discharge planning, adding a service to an existing service and integrating delivery models, referral from primary to secondary care, physician-led versus nurse-led triage in emergency departments, and team midwifery.

Where care is provided: high-volume institutions, home-based care (with or without multidisciplinary team) for people living with HIV and AIDS, home-based management of malaria, home care for children with acute physical conditions, community-based interventions for childhood diarrhoea and pneumonia, out-of-facility HIV and reproductive health services for youth, and decentralised HIV care.

Information and communication technology: mobile phone messaging for patients with long-term illnesses, mobile phone messaging reminders for attendance at healthcare appointments, mobile phone messaging to promote adherence to antiretroviral therapy, women carrying their own case notes in pregnancy, interventions to improve childhood vaccination.

Quality and safety systems: decision support with clinical information systems for people living with HIV/AIDS.

Complex interventions (cutting across delivery categories and other health system arrangements): emergency obstetric referral interventions.

Authors' conclusions

A wide range of strategies have been evaluated for improving delivery arrangements in low-income countries, using sound systematic review methods in both Cochrane and non-Cochrane reviews. These reviews have assessed a range of outcomes. Most of the available evidence focuses on who provides care, where care is provided and coordination of care. For all the main categories of delivery arrangements, we identified gaps in primary research related to uncertainty about the applicability of the evidence to low-income countries, low- or very low-certainty evidence or a lack of studies.

PLAIN LANGUAGE SUMMARY

Effects of delivery arrangements 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 delivery arrangements for health systems in low-income countries.

This overview is based on 51 systematic reviews. These systematic reviews searched for studies that evaluated different types of delivery arrangements. The reviews included a total of 850 studies.

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

What was studied in the overview?

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 health care providers, where care is provided, the use of information and communication technology to deliver care, and quality and safety systems. How services are delivered can have impacts on the effectiveness, efficiency and equity of health systems. This overview can help policymakers and other stakeholders to identify evidence-informed strategies to improve the delivery of services.

What are the main results of the overview?

When focusing only on evidence assessed as high to moderate certainty, the overview points to a number of delivery arrangements that had at least one desirable outcome and no evidence of any undesirable outcomes. These include the following:

Who receives care and when

- Queuing strategies

- Group antenatal care

Who provides care - role expansion or task shifting

- Lay or community health workers supporting the care of people with hypertension

- Community-based neonatal packages that include additional training of outreach workers

- Lay health workers to deliver care for mothers and children or for infectious diseases

- Mid-level, non-physician providers for abortion care

- Health workers providing social support during at-risk pregnancies

- Midwife-led care for childbearing women and their infants

- Non-specialist health workers or other professionals with health roles to help people with mental, neurological and substance-abuse disorders

- Nurses substituting for physicians in providing care

Coordination of care

- Structured multidisciplinary care plans (care pathways) used by health care providers in hospitals to detail essential steps in the care of people with a specific clinical problem

- Interactive communication between collaborating primary care physicians and specialist physicians in outpatient care

- Planning to facilitate patients' discharge from hospital to home

- Adding a new health service to an existing service and integrating services in health care delivery

- Integrating vaccination with other healthcare services

- Using physicians rather than nurses to lead triage in emergency departments

- Groups or teams of midwives providing care for a group of women during pregnancy and childbirth and after childbirth

Where care is provided - site of service delivery

- Clinics or hospitals that manage a high volume of people living with HIV and AIDS rather than smaller volumes

- Intensive home-based care for people living with HIV and AIDS

- Home-based management of malaria in children

- Providing care closer to home for children with long-term health conditions

- Community-based interventions using lay health workers for childhood diarrhoea and pneumonia

- Youth HIV and reproductive health services provided outside of health facilities

- Decentralising care for initiation and maintenance of HIV and AIDS medicine treatment to peripheral health centres or lower levels of healthcare

Information and communication technology

- Mobile phone messaging for people with long-term illnesses

- Mobile phone messaging reminders for attendance at healthcare appointments

- Mobile phone messaging to promote adherence to antiretroviral therapy

- Women carrying their own case notes in pregnancy

- Information and communication interventions to improve childhood vaccination coverage

Quality and safety systems

- Establishing clinical information systems to organize patient data for people living with HIV and AIDS

Packages that include multiple interventions

- Interventions to improve referral for emergency care during pregnancy and childbirth

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 (Herrera 2014; Pantoja 2014; Wiysonge 2014). The aim is to provide broad overviews of the evidence about the effects of health system arrangements, including delivery, financial and governance arrangements, and implementation strategies. This overview addresses delivery arrangements.

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 quality and safety systems.

2. Financial arrangements include changes in how funds are collected, insurance schemes, how services are purchased, 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 (Pantoja 2014).

How services are delivered can have impacts on the effectiveness, efficiency and equity of health systems. Outcomes that can potentially be affected by changes in delivery arrangements include patient outcomes (health and health behaviours), the quality or utilisation of healthcare services, resource use, healthcare provider outcomes (e.g. overall well-being, fatigue, drug/alcohol use, stress, physical/mental health complaints, job satisfaction), 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 delivery arrangements 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 deliver 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 delivery services that are already widely available or not needed in high-income countries. Our focus in this overview is specifically on delivery arrangements in low-income countries. By low-income countries, we mean countries that are classified as low- or lower-middle-income by 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 delivery arrangements include options related to who receives care, who provides care, coordination of care amongst different providers, where care is provided, the use of information and communication (or eHealth) technologies to deliver care, quality and safety systems, and the working conditions of those who provide care.

The types of interventions that we included in this overview are listed in Table 1 using a framework derived from the taxonomy for health system arrangements developed by Lavis 2015.

How the intervention might work

Changes in delivery arrangements can affect health and related goals in multiple ways and can have both desirable and undesirable effects. Examples of how changes in different types of delivery arrangements might lead to improvements in health systems and thereby better health outcomes are listed in Table 2.

Why it is important to do this overview

Our aim is to provide a broad overview of the evidence from systematic reviews about the effects of alternative delivery arrangements for health systems in low-income countries. Such a broad overview can help policymakers, their support staff and other stakeholders to identify strategies for addressing problems and for improving their health systems. This overview will also help to identify where new primary and secondary research is needed and how this research should be carried out. Furthermore, it will help to refine the framework outlined in Table 1 for considering delivery arrangements.

Additionally, 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 such as those about the applicability of the findings of systematic reviews in a specific context, are still needed. Nevertheless, this overview can help people making decisions about delivery arrangements by summarising the findings of available systematic reviews, including estimates of the effects of changes in delivery arrangements and the certainty of those estimates, by identifying important uncertainties identified by those systematic reviews and by identifying where new or updated systematic reviews are needed. The overview can also 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 delivery arrangements for health systems in low-income countries. Secondary objectives include identifying needs and priorities for future evaluations and systematic reviews on delivery arrangements and informing refinements of the framework for delivery arrangements outlined in the review (Table 1).

METHODS

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

Criteria for considering reviews for inclusion

We included systematic reviews that:

- had a Methods section with explicit inclusion criteria;
- assessed the effects of delivery arrangements (as defined in Background);
- 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);
- were published after April 2005.

Judging relevance to low-income countries is sometimes difficult, and we are aware that evidence from high-income countries is not directly generalisable to low-income countries. We based our judgments on an assessment of the likelihood that the health systems arrangements 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 arrangements requiring 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 overview authors whenever there was uncertainty. We excluded reviews that only 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 with 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 also excluded reviews with methodological limitations important enough to compromise the reliability of the findings (Appendix 1).

Search methods for identification of reviews

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

- Health system topics = delivery arrangements.
- Type of synthesis = systematic review or Cochrane Review.
- Type of question = effectiveness.
- 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 last search.

PDQ-Evidence is a database of evidence for decisions about health systems, which is derived from the Epistomonikos database of systematic reviews (Rada 2013). It includes systematic reviews, overviews of reviews (including evidence-based policy briefs) and studies included in systematic reviews. The following databases are included in Epistomonikos and PDQ-Evidence searches, 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.

We describe the detailed search strategies for Pubmed, Embase, LILACS, CINAHL and PsycINFO in Appendix 2. 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 Collaboration's 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 independently screened the titles and abstracts found in PDQ-Evidence to identify reviews that appeared to meet the inclusion criteria (AC, GB, SF, MPG, SGM, CG, CH, CIO, NO, TP, EP, BP, GR, FS or CW). 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 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 (interventions, participants, settings and outcomes), the key findings; and considerations of applicability, equity, economic considerations, 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 has been peer-reviewed and published on an open access website (www.supportsummaries.org).

Each completed SUPPORT Summary underwent peer review and was 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. The rationale for the criteria that we used for these assessments is described 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 our 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 are important enough that it would be worthwhile to search for another systematic review and to interpret the results of this review cautiously, if no better review is available;
- limitations that are important enough to compromise the reliability of the findings of the review and prompt the exclusion of the review.

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, we prepared '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. The SUPPORT Summaries were reviewed 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 were copy edited. The editor determined whether the comments had been adequately addressed and the summary was ready for publication on the SUPPORT Summary website.

We organised the review using a modification of the taxonomy that Health Systems Evidence uses for health systems arrangements (Lavis 2015). We adjusted this framework iteratively to ensure that we appropriately categorised all of the included reviews and included and logically organised all relevant health system delivery arrangements. We prepared a table listing the included reviews as well as the types of delivery arrangements 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). This included 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 were considered not to be transferable to low-income countries, and reviews with limitations that were important enough that the findings of the review were not reliable.

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

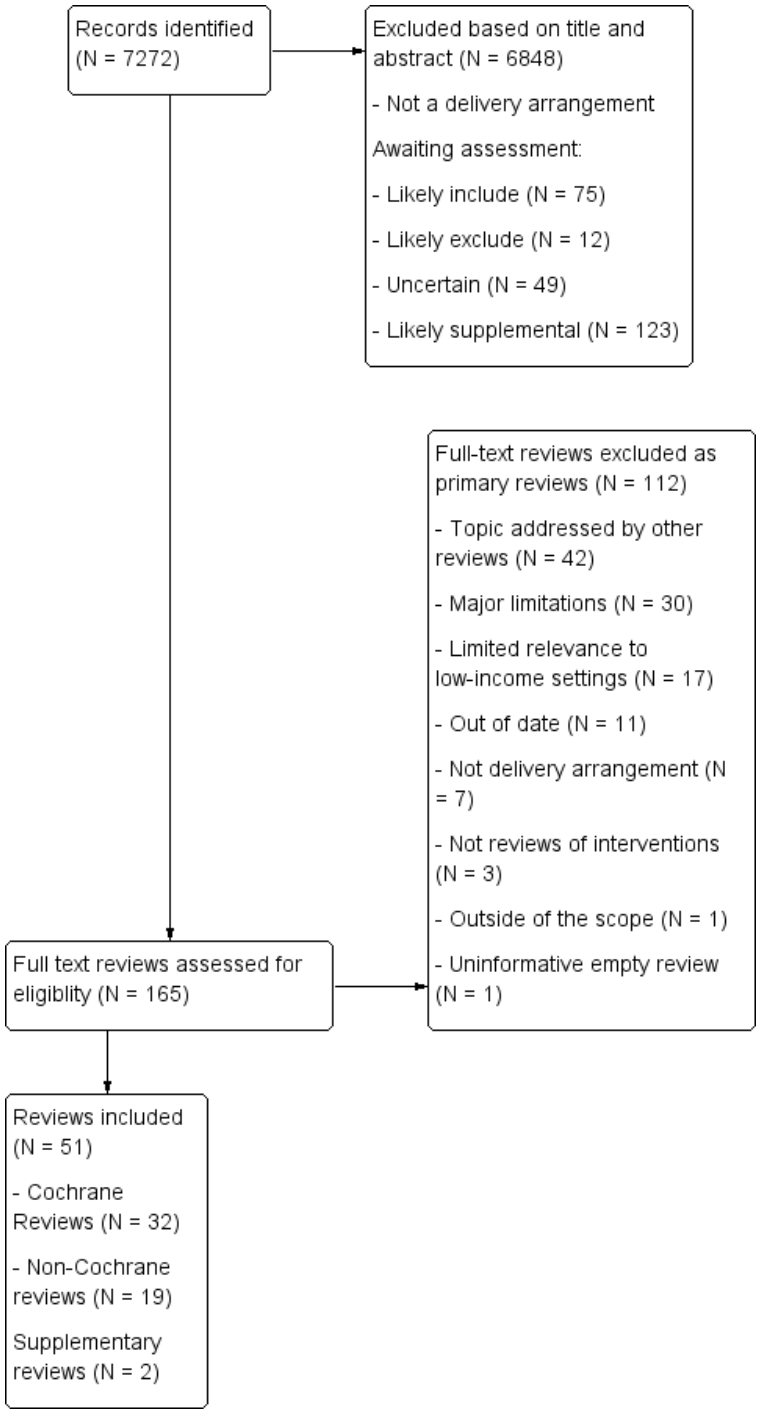
Our structured synthesis of the findings of our overview was based on two tables. We summarised the main findings of each review in a table that included the key messages from each SUPPORT Summary (Table 6). In a second table (Table 7), we reported the direction of the results and the certainty of the evidence for each of the following types 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 outcomes (that did not fit into any of the preceding types of outcomes) (EPOC 2016). The direction of results were categorised 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 was considered by the review authors), 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 all other relevant considerations besides the findings of the included reviews when drawing conclusions about implications for practice (EPOC 2016). Our conclusions about implications for systematic reviews were based on types of delivery arrangements for which we were unable to find a reliable, up-to-date review along with limitations identified in the included reviews. These limitations include considerations related to the applicability of the findings and likely impacts on equity. Our conclusions about implications for future evaluations were based on the findings of the included reviews (EPOC 2016).

RESULTS

We identified 7272 systematic reviews of health system arrangements and implementation strategies and excluded 6848 reviews from this overview following a review of titles and abstracts. We retrieved the full texts of 165 reviews for further detailed assessment (Figure 1). This overview includes a total of 51 primary systematic reviews (Table 3, Appendix 3 and Appendix 4), plus two supplementary reviews (Appendix 5). We excluded 112 systematic reviews of delivery arrangements: 42 focused on an area already covered by one of the included reviews, 30 had major methodological limitations and 17 were of limited relevance to low-income countries. Eleven of the excluded reviews were out-of-date, three were not systematic reviews of interventions, one was outside the scope and one was uninformative (Table 4). Seven reviews were covered in another overview. We focus here on the results of the 51 primary reviews. Following the screening of titles and abstracts of the subsequent searches of PDQ-Evidence, we identified additional systematic reviews of delivery arrangements that are awaiting assessment (Appendix 6).

Figure 1. Flowchart



Description of included reviews

Out of the 51 included systematic reviews, 32 were Cochrane Reviews and 19 were non-Cochrane reviews. Twenty-four reviews were published in the last five years (2013 to 2017) (see Appendix 4). A structured summary of each included review can be found in the SUPPORT Summaries database. Each summary includes key messages, background information, including what the review authors searched for and what they found, GRADE 'Summary of findings' tables, and an assessment of the relevance of the findings for low-income countries. The assessments of relevance include what the review authors found and our interpretation of the applicability of the evidence to low-income countries, impacts on equity, economic considerations, and the need for monitoring and evaluation.

The reviews reported results from 850 included studies. The reviews included the following study designs: randomised trials (54%), non-randomised trials (5%), and interrupted time series studies (9%). They also included 65 cross-sectional or non-comparative studies, which we have not included in this overview. The number of studies included in each review ranged from zero in Van Lonkhuijzen 2012 to 89 in Davey 2013. Dates of the most recent searches in the reviews ranged from February 2004 to February 2013.

Out of the 51 primary reviews covered by this overview, 11 included studies took place exclusively or mostly in low-income countries, 7 in exclusively or mostly middle-income countries and 29 in exclusively or mostly high-income countries. Two reviews included all three categories, but studies mostly took place in low- and middle-income countries, and one review included no studies but provided additional information for a review that included mostly studies from low-income countries. Most studies in the reviews were from the USA (257 studies), the UK (68 studies), Australia (37 studies) and Canada (29 studies) (Appendix 3 and Appendix 4).

Study settings varied and included 13 family, work, home or community settings; 10 primary care settings; 16 hospital or health centre settings, and 11 a mix of settings (Appendix 3 and Appendix 4).The health professionals who participated in studies included in the reviews were physicians, nurses, pharmacists, psychologists, social workers, lay health workers, midlevel health professionals, non-physician healthcare providers, allied health professionals (paramedics, physiotherapists, occupational therapists, language therapists and radiographers), clinical officers, pharmacists, skilled birth attendants, and dental therapists. The patients who participated in studies included in the reviews were children, adults and pregnant women (Appendix 3). Outcomes examined included patient outcomes, access to care, coverage, utilisation of health services, quality of care, resource use, social outcomes (social isolation), impacts on equity, healthcare provider performance and adverse effects.

Four reviews included two comparisons each (Dudley 2011; Hansen 2011; Pasricha 2012; Young 2010), and another three reviews, three comparisons each (Butler 2011; Handford 2006; Theodoratou 2010), so the total number of comparisons evaluated in the 51 included reviews was 60 (Appendix 3 provides details of interventions and comparisons).

We grouped the delivery arrangements in eight categories, seven pre-specified in the protocol and an additional one for complex interventions that cut across categories of delivery arrangements and included components that were not delivery arrangements (i.e. financial arrangements, governance arrangements and implementation strategies). Three reviews were in more than one category (Butler 2011; Handford 2006; Young 2010). The number of reviews and comparisons by category were:

- who receives care and when (2 reviews, 2 comparisons);
- who provides care (15 reviews, 16 comparisons);
- coordination of care (14 reviews, 18 comparisons);
- where care is provided (12 reviews, 13 comparisons);
- information and communication technology (6 reviews, 5 comparisons);
- quality and safety systems (3 reviews, 4 comparisons);
- working conditions of health workers (1 review, 1 comparison);
- complex interventions (cutting across delivery categories and across the other overviews) (1 review, 1 comparison).

Methodological quality of included reviews

We report our assessment of the methodological quality (reliability) of the included reviews in Table 5. We judged 6 out of the 51 included reviews to have important methodological limitations (that are important enough that it would be worthwhile to search for another systematic review and to interpret the review results cautiously, if a better review cannot be found). We judged the other 45 reviews to have only minor limitations.

Overall, we found few problems with respect to the identification, selection and critical appraisal of studies in the included reviews. One review had important limitations and 17 reviews only partially met the criterion for comprehensiveness of the search. We also found few problems overall with respect to the analysis of the findings. Three reviews had important limitations in their analysis, 12 reviews had limitations in examining factors that might explain differences in the results of included studies and 10 reviews in reporting characteristics and results of the included studies.

Effect of interventions

We summarise the key messages from the included reviews in Table 6. The key findings are summarised in Table 7, which provides an overview of the reported effects and the certainty of the evidence for each intervention on each of the following categories of outcomes: patient outcomes; access, coverage or utilisation; quality of care; resource use; social outcomes; impacts on equity; healthcare provider outcomes; and adverse effects.

Some systematic reviews included both interventions outside and within the scope of this overview. For example, one review included both implementation strategies and delivery arrangements to improve referrals from primary to secondary care (Akbari 2008). In this overview, we have only included comparisons of delivery arrangements from those reviews.

We divided the review findings into four categories.

1. **Effective**: 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.
2. **Ineffective**: 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.
3. **Undesirable**: interventions found to have at least one outcome with an undesirable effect with moderate- or high-certainty evidence, and no moderate- or high-certainty evidence of desirable effects.
4. **Uncertain**: interventions for which the certainty of the evidence was low or very low (or no studies were found) for all outcomes examined.

Where findings from a review were mixed in terms of whether the interventions were effective, ineffective etc., we listed each finding in the relevant category rather than trying to assign all of the findings to one category.

Effective delivery arrangements

We found moderate- or high-certainty evidence of desirable effects on at least one outcome and no moderate- or high-certainty evidence of undesirable effects for the delivery arrangements described below.

Who receives care and when

Queuing strategies

A review of the effects of interventions to reduce waiting times for elective procedures included eight studies (Ballini 2015). Direct/open access and direct booking systems probably slightly decrease median waiting times in hospital settings (moderate-certainty evidence). The effects of direct/open access and direct booking systems on mean waiting times in outpatient settings, and on the proportion of patients waiting less than a recommended time, are uncertain. The effects of other interventions to reduce waiting times, including increasing the supply of services, are uncertain.

Group antenatal care

A review of the effects of providing antenatal care to groups of mothers, compared to providing usual care to individual mothers (Catling 2015), included four studies. Group antenatal care was provided by midwives or obstetricians to groups of 8 to 12 women. The review found that group antenatal care probably reduces preterm births compared to individual antenatal care (moderate-certainty evidence). Also, group antenatal care probably has little or no effect on the number of newborns with low birthweight and who are small for gestational age, compared to individual antenatal care (moderate-certainty evidence), and it may have little or no effect on perinatal mortality (low-certainty evidence) (Catling 2015).

Who provides care

Role expansion or task shifting

Lay health workers: hypertension

A review of the effects of community or lay health workers in supporting the care of people with hypertension included 14 studies from high-income settings. In people with hypertension, lay or community health workers probably improve behavioural changes (such as appointment keeping and adherence to medication), blood pressure control, and the 5-year mortality rate (moderate-certainty evidence), and they may slightly improve healthcare utilisation and health systems outcomes, such as the number of hospital admissions (low-certainty evidence) (Brownstein 2007).

Community-based neonatal packages that include additional training of outreach workers

A review of the effects of community-based neonatal intervention packages, compared to usual maternal and newborn care services, included 26 studies (Lassi 2015). The packages had a range of components including additional training for lay health workers and other outreach workers, building community support, community mobilisation, antenatal and intrapartum home visits, and home-based care and treatment. The review found that community mobilisation and antenatal and postnatal home visits decrease neonatal mortality (high-certainty evidence) and may reduce maternal mortality (low-certainty evidence). Community mobilisation and home-based neonatal treatment probably reduce neonatal mortality (moderate-certainty evidence) and may reduce maternal

mortality (low-certainty evidence). Community support groups or women's groups probably reduce neonatal mortality (moderate-certainty evidence) and may reduce maternal mortality (low-certainty evidence). Training traditional birth attendants who make antenatal and intrapartum home visits may reduce neonatal mortality and maternal mortality (low-certainty evidence). Other community-based intervention packages that may reduce neonatal mortality include home-based neonatal care and treatment and education of mothers and antenatal and postnatal visits (low-certainty evidence).

Lay health workers: maternal and child health and infectious diseases

A review of the effects of using lay health workers to deliver care for mothers and children or for infectious diseases included 82 studies (Lewin 2010). Lay health workers provided varied services, including visiting parents at home; giving parents information about the importance of routine childhood immunisations and encouraging them to visit clinics for child immunisation; providing counselling to promote exclusive breastfeeding, health education, management of common childhood illness; and supporting adherence in people with tuberculosis. The review found that using lay health workers probably leads to an increase in the number of women who breastfeed and the number of children with up-to-date immunisation schedules (moderate-certainty evidence). The use of lay health workers in tuberculosis programmes probably leads to an increase in the number of people with tuberculosis who are cured (moderate-certainty evidence). The use of lay health workers in maternal and child health programmes may lead to fewer deaths among children under five years and fewer children who suffer from fever, diarrhoea and pneumonia and may increase the number of parents who seek help for their sick child (low-certainty evidence).

Midlevel health professionals for abortion care

A review of the effects of using non-physician providers for abortion care included five studies (Ngo 2013). The review compared the performance of trained midlevel providers (midwives, nurses, and other non-physician providers) with trained physicians (gynaecologists and obstetricians) when conducting surgical aspiration abortions and managing medical abortions. The review found that surgical aspiration procedures administered by midlevel providers rather than doctors probably lead to little or no difference in incomplete and failed abortions (moderate-certainty evidence). Medical abortion procedures administered by midlevel providers probably lead to slightly fewer incomplete and failed abortions compared to doctors (moderate-certainty evidence). However, surgical aspiration abortion procedures administered by midlevel providers probably lead to slightly more complications compared to doctors (moderate-certainty evidence).

Social support to pregnant women at risk

A review of the effects of health workers providing social support during at-risk pregnancies,compared to usual care, included 17 trials (Hodnett 2010). Additional social support may include advice and counselling (e.g. about nutrition, rest, stress management, or the use of alcohol), tangible assistance (e.g. transportation to clinic appointments or household help) and emotional support (e.g. reassurance, or sympathetic listening). Midwives or nurses, social workers, a multi-disciplinary team of nurses, psychologists, midwives, or trained lay health workers provided the support. Additional social support during at-risk pregnancy probably leads to fewer caesarean sections compared to usual care (moderate-certainty evidence) and may lead to fewer antenatal hospital admissions (low-certainty evidence). Compared to usual care, providing additional social support during an at-risk pregnancy probably has little or no effect on the incidence of low birthweight, preterm births, or perinatal deaths (moderate-certainty evidence) (Hodnett 2010).

Midwife-led care for childbearing women

A review compared midwife-led care with other models of care for childbearing women and their infants, and included 15 studies (Sandall 2013). In midwife-led care, midwives are the lead professionals in the planning, organisation and delivery of care given to women from the initial booking to the postnatal period. Non-midwife models of care include obstetrician-provided; family physician-provided; and shared models of care, in which different health professionals share responsibility for the organisation and delivery of care. The review found that midwife-led care compared to other models of care reduces: preterm births (before 37 weeks) and overall fetal loss and neonatal death before 24 weeks (high-certainty evidence); the use of regional analgesia (epidural/spinal) during labour (high-certainty evidence); and instrumental vaginal births (high-certainty evidence). It also increases spontaneous vaginal births (high-certainty evidence) and probably reduces caesarean births and increases the number of women with an intact perineum (moderate-certainty evidence).

Non-specialist providers versus specialists for mental health

A review of the effects of non-specialist providers (like doctors, nurses or lay health workers) compared with specialist providers in mental health or neurology for caring for adults with depression, anxiety or both included 38 studies (Van Ginneken 2013). It found that using non-specialist health workers in the care of adults

with dementia probably slightly improves behavioural symptoms in people with dementia and probably improves the mental well-being, burden and distress in caregivers of people with dementia (moderate-certainty evidence).

Physician-nurse substitution

A review assessed the impact on clinical outcomes of physician-nurse substitution in primary care, and included 11 randomised trials (Martínez-González 2014). Most studies were conducted in high-income countries. In all studies, nurses provided care for complex conditions including HIV, hypertension, heart failure, cerebrovascular diseases, diabetes, asthma, Parkinson's disease and incontinence. This review found that nurse-led care probably leads to lower systolic blood pressure as well as to lower CD4 cell counts in people with HIV and AIDS compared to physician-led care (moderate-certainty evidence). However, nurse-led care probably leads to little or no difference in other clinical outcomes, such as diastolic blood pressure, total cholesterol level, and glycosylated haemoglobin concentrations (moderate-certainty evidence).

Coordination of care

Care pathways: hospital clinical pathways

A review of the effects of hospital clinical pathways, compared to usual care, included 27 studies (Rotter 2010). Clinical pathways are structured multidisciplinary care plans used by healthcare providers to detail essential steps in the care of patients with a specific clinical problem. The review found that clinical pathways in hospitals probably decrease the length of stay (moderate-certainty evidence).

Interactive communication between primary care doctors and specialists

A review of the effects of interactive communication between collaborating primary care physicians and key specialists for patients receiving ambulatory care included 23 studies (Foy 2010). Interactive communication included face-to-face meetings, letters written on paper, telephone discussions, videoconferencing, electronic records or letters, and combined methods of communication. The review found that interactive communication between primary care doctors and specialists probably leads to substantial improvements in patient outcomes, compared to usual care (moderate-certainty evidence).

Hospital discharge planning

A review of the effects of discharge planning from hospital to home, compared to usual care, included 30 studies (Gonçalves-Bradley 2016). Discharge planning should ensure that patients are discharged from hospital at an appropriate point in their care and that, with adequate notice, the provision of other services is adequately organised. The review found that discharge planning probably reduces unscheduled readmission rates at three months in patients admitted with a medical condition and probably reduces the length of hospital stays (moderate-certainty evidence). All the included studies were conducted in high income countries.

Integration

Adding a service to an existing service and integrating delivery models

A review compared integration to usual care and included nine studies (Dudley 2011). Integration brings together the inputs, delivery, management and organisation of particular service functions in order to improve care at the point of delivery. The review identified two types of interventions: adding a service to an existing vertical programme and fully integrating services in routine healthcare delivery. The review found, firstly, that adding family planning to other services compared to those services alone probably increases the use of family planning services (moderate-certainty evidence) but probably results in little or no difference in the number of new pregnancies (moderate-certainty evidence). Secondly, adding provider-initiated HIV counselling and testing to tuberculosis and sexually transmitted infection services probably increases the number of people receiving HIV testing (moderate-certainty evidence). Thirdly, integrated community and facility provision of HIV prevention and control improves the proportion of STIs treated effectively in men (high-certainty evidence).

Referral systems

Referral from primary to secondary care

A review assessed the effects of interventions to change primary care outpatient referral rates or improve outpatient referral appropriateness, and included 17 studies (Akbari 2008). The review found that professional education that includes guidelines, checklists, video materials and educational outreach by specialists probably improves the quantity and quality of referrals (moderate-certainty evidence), and that joint primary care practitioner and consultant sessions probably result in improved patient outcomes (moderate-certainty evidence).

Physician-led versus nurse-led triage in emergency departments

A review of the effects of physician-led triage in emergency departments, compared to nurse-led triage, included 28 studies (Rowe 2011). Triage systems are used to decide who needs urgent care and who can wait, with the aim of prioritising or assigning patients to treatment categories in order to assist in their management. The review found that physician-led triage compared to nurse-led triage probably reduces emergency department length of stay, physicians' initial assessment time, and the proportion of patients leaving without being seen (moderate-certainty evidence). However, physician-led triage may lead to little or no difference in the proportion of patients leaving the emergency department against medical advice (low-certainty evidence). None of the included studies was conducted in low-income country.

Teams: midwifery

A review of the effect of hospital nurse staffing models included 15 studies (Butler 2011). One comparison examined team midwifery in relation to standard care. A midwifery team includes a group of midwives providing care and taking shared responsibility for antenatal, intrapartum and postnatal care for a group of women. The review found that team midwifery shortens length of stay in special care nurseries for infants and slightly shortens the length of stay in hospital for women giving birth (high-certainty evidence) while probably leading to little or no difference in perinatal deaths (moderate-certainty evidence). None of the included studies was conducted in low-income country.

Where care is provided

Site of service delivery

High-volume institutions

A review of the effects of the setting and organisation of care for people living with HIV and AIDS included 28 studies (Handford 2006). Interventions included dedicated hospital units for the treatment of people living with HIV and AIDS; clinics, hospitals or hospital wards that managed larger numbers of people living with HIV and AIDS; and the incorporation of trainees in care delivery. The review found that units that manage larger numbers of people living with HIV and AIDS probably reduce the number of emergency department visits and the length of hospital stays among people living with this health issue (moderate-certainty evidence).

Home-based care for people living with HIV/AIDS

The effects of home-based care for people living with HIV and AIDS was compared to other delivery options in a review that included 11 studies (Young 2010). Home-based care included medical management; counselling and teaching; and physical, psychosocial, palliative and social support. Intensive home-based care delivered by nurses to people living with HIV/AIDS probably improves their knowledge about HIV and HIV medications (moderate-certainty evidence). It may also improve adherence to medication and physical functioning among people living with HIV and AIDS (low-certainty evidence). However, intensive home-based care probably leads to little or no difference in CD4 counts and viral loads in this group (moderate-certainty evidence). The review also found that home-based safe water systems probably reduce the frequency and severity of diarrhoea among people living with HIV and AIDS (moderate-certainty evidence).

Home-based management of malaria

A review of the effects of home-based management of malaria (presumptive treatment of children with symptoms) compared to usual care included 10 studies (Okwundu 2013). Home- or community-based programmes for treating malaria probably increase the number of children who are treated promptly with an effective antimalaria medicine and probably reduce all-cause mortality (moderate-certainty evidence). However these programmes may have little or no effect on the prevalence of anaemia (low-certainty evidence). The review also examined the use of rapid diagnostic tests in home- or community-based programmes for treating malaria, compared to clinical diagnosis. Such home-based testing probably reduces the number of children treated with antimalarials (moderate-certainty evidence) but may have little or no effect on all-cause mortality and hospitalisations (low-certainty evidence).

Home versus facility care for children with long-term conditions

Evidence on the effectiveness and costs of care closer to home for children with long-term conditions was examined in one review. Home care for children with acute physical conditions probably increases costs for the health system but decreases the costs incurred by families (moderate-certainty evidence) (Parker 2013).

Community-based interventions for childhood diarrhoea and pneumonia

Community-based interventions for childhood diarrhoea and pneumonia, compared to routine care, were examined in one review that included 24 studies (Das 2013). Community-based interventions probably increase care seeking for diarrhoea and pneu-

monia in children, increase use of oral rehydration solution and antibiotics for diarrhoea and pneumonia respectively, and reduce mortality due to diarrhoea and acute pneumonia among children aged up to 4 years (moderate-certainty evidence).

Out-of-facility HIV and reproductive health services for youth

A review of the effects of out-of-facility HIV and reproductive health services for youth, compared to facility-based services, included 20 studies (Denno 2012). Out-of-facility interventions include promoting HIV or reproductive health services (including for sexually transmitted infections (STIs), HIV, or pregnancy testing) and making commodities available (including condoms, contraceptives or emergency contraception; clean needles and syringes or exchanges). The review found that improved access to self-test kits probably leads to more youth being screened for chlamydia, compared to clinic-based testing (moderate-certainty evidence).

Decentralised HIV care

Decentralised HIV care for initiation and maintenance of antiretroviral therapy, compared to centralised care, was assessed in a review that included 16 studies (Kredo 2013). Decentralisation of care broadly means relocating services from centralised sites (i.e. hospitals) to peripheral health centres or lower levels of healthcare, generally geographically closer to patients' homes. The review found that partial decentralisation of HIV treatment (starting care at hospital and then moving to health centre care) probably reduces the combined number of people who die or are lost to care at one year (moderate-certainty evidence) and may reduce the costs of travel for patients (low-certainty evidence). Full decentralisation of HIV treatment (starting and continuing care at a health centre) probably reduces the number of people lost to care (moderate-certainty evidence), but it is uncertain if it reduces deaths at one year (very low-certainty evidence). The review also found that decentralisation of HIV treatment from facility to community probably leads to little or no difference in the number of people who die or are lost to care at one year (moderate-certainty evidence) and may reduce total costs to people living with HIV and AIDS and to the health services (low-certainty evidence).

Information and communication technology

E-health

Mobile phone messaging for patients with long-term illnesses

Mobile phone messaging for patients with long-term illnesses, such as diabetes, hypertension and asthma, was compared to usual care in a review that included four studies (De Jongh 2012). Mobile phone messaging tools include medication reminders, supportive care messages, or communicating information with healthcare providers and receiving feedback from them. The review found that mobile phone messaging support probably improves medication adherence in people with hypertension (moderate-certainty evidence).

Mobile phone messaging reminders for attendance at healthcare appointments

A review compared the effects of mobile phone messaging for attendance at healthcare appointments to various other interventions, and included four studies (Gurol-Urganci 2013). It found that mobile phone text message reminders probably increase attendance at healthcare appointments compared to no reminders (moderate-certainty evidence).

Mobile phone messaging to promote adherence to antiretroviral therapy

A review of the effects of mobile phone messaging to promote adherence to antiretroviral therapy (ART) compared these interventions to usual care and included three trials (Mbuagbaw 2013). The review found, firstly, that mobile phone text messages compared to standard care improves adherence to ART for up to 12 months (high-certainty evidence) and may lead to little or no difference in mortality or loss to follow-up to 12 months (low-certainty evidence). Secondly, 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). All of the studies were conducted in low-income countries in Africa.

Health information systems for managing the care of people living with HIV/AIDS

A review examined the effects of the setting of care and the organisation of care on medical, immunological/virological, psychosocial and economic outcomes for people living with HIV/AIDS (Handford 2006). The review included twenty-eight studies, all conducted in high-income countries. In relation to organisation of care, the review found that computer prompts for primary care providers probably hasten initiation of recommended treatments for patients with HIV/AIDS (moderate-certainty evidence) . Other effects of computer prompts and information systems are uncertain.

Women carrying their own case notes in pregnancy

A review evaluated the effects of women carrying their own case notes during pregnancy, and included three trials conducted in high-income countries (Brown 2011). The findings suggest that women carrying their own case notes probably feel more in control and involved in decision making about their care, and that they want to carry their notes again in subsequent pregnancies (moderate-certainty evidence). The evidence for all other outcomes was uncertain (see below).

Interventions to improve childhood vaccination

A review of the effects of interventions to improve childhood vaccination coverage included 14 studies (Oyo-Ita 2016). Interventions included health education, monetary incentives, parent reminders, provider-oriented interventions, home visits, integration of immunisation services with intermittent preventive treatment of malaria in infants, regular immunisation outreach sessions and a combination of provider training and quality assurance. The review found that community-based health education probably improves DTP3 coverage (moderate-certainty evidence). Another review of the effects of reminders for routine childhood vaccination compared to usual care included 43 studies (Jacobson Vann 2005). The studies used a variety of methods to remind parents about their child's routine vaccinations including a letter alone or in combination with other interventions such as postcards, telephone calls and home visits. The review found that reminders and recall strategies probably increase routine childhood vaccinations (moderate-certainty evidence).

Quality and safety systems

Decision support and clinical information system for people living with HIV/AIDS

A review of the effects of decision support and clinical information systems on healthcare processes and health outcomes for people with HIV included a total of 16 trials (Pasricha 2012). Clinical information-system interventions were defined as information systems to organise patient data in order to improve the delivery of care, for example by developing schedules for patients with certain conditions, audit and feedback, change in medical records systems or reminders. The review found that clinical information systems probably improve the proportion of patients with a suppressed HIV load (moderate-certainty evidence) and may increase adherence to recommended practice by health professionals and adherence to treatment by patients (low-certainty evidence). It is uncertain whether they improve healthcare utilisation (very low-certainty evidence). For all other interventions, the outcomes were uncertain (see below).

Package of multiple interventions

Emergency obstetric referral interventions

A review of the effects of emergency obstetric referral interventions, compared to no intervention, included 19 studies from low- and middle-income countries (Hussein 2012). The emergency obstetric referral interventions examined included financial arrangements, implementation strategies and delivery arrangements such as information and communication technologies, changes in where care is provided, integration of services, and the use of ambulances. The review found that emergency obstetric referral interventions probably lead to a reduction in neonatal mortality (moderate-certainty evidence).

Ineffective delivery arrangements

We found moderate- or high-certainty evidence of little or no effect and no moderate- or high-certainty evidence of desirable or undesirable effects for the following delivery arrangements.

Who receives care and when

Role expansion or task shifting

Lay health workers: maternal and child health and infectious diseases

Using lay health workers in tuberculosis programmes probably makes little or no difference to the number of people who complete preventive treatment for tuberculosis (moderate-certainty evidence) (Lewin 2010).

Care pathways: hospital clinical pathways

Multifaceted interventions that include clinical pathways probably lead to little or no difference in hospital mortality (moderate-certainty evidence) and may lead to little or no difference in length of stay or hospital costs (low-certainty evidence) (Rotter 2010).

Integration: adding a service to an existing service and integrated delivery models

A review of the effects of integration compared to usual care found that integrated community and facility provision of HIV prevention and control leads to little or no difference in the proportion of STIs treated effectively in women (high-certainty evidence) and results in little or no difference in STI or HIV incidence in the population (high-certainty evidence) (Dudley 2011).

Referral systems: from primary to secondary care

Interventions to change primary care outpatient referrals were examined in one review which found that professional education that only includes the passive dissemination of referral guidelines probably leads to little or no difference in both the quantity and quality of referrals (moderate-certainty evidence) (Akbari 2008).

Site of service delivery

Strategies for increasing ownership and use of insecticide-treated bednets

A review examined the effects of distributing insecticide-treated bednets for free compared to making them available for purchase and included 10 studies (Augustincic 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 (moderate-certainty evidence) but probably leads to little or no difference in their appropriate use (moderate-certainty evidence).

Information and communication technology

E-health

Mobile phone messaging for long-term illnesses

A review that compared mobile phone messaging for patients with long-term illnesses with usual care found that such messaging probably leads to little or no difference in people's knowledge about their diabetes, in adherence to diabetes medication in young people with diabetes, or in care plan adherence in people with asthma (moderate-certainty evidence). Mobile phone messaging support for people living with diabetes probably leads to little or no difference in glycaemic control (moderate-certainty evidence) and may lead to little or no difference in diabetes complications (low-certainty evidence) (De Jongh 2012).

Mobile phone messaging reminders for attendance at healthcare appointments

The effects of mobile phone messaging for attendance at healthcare appointments, compared to various other interventions, was assessed in one review (Gurol-Urganci 2013). This found that mobile phone text message reminders probably lead to little or no difference in attendance at healthcare appointments compared to phone call reminders. However, the cost per text message and per attendance may be lower compared to the cost of mobile phone call reminders.

Delivery arrangements with undesirable effects

We did not find any delivery arrangements for which there was moderate- or high-certainty evidence of at least one outcome with an **undesirable effect** and no moderate- or high-certainty evidence of desirable effects. However, only five reviews reported adverse effects (Dudley 2011; Martínez-González 2014; Ngo 2013; Parker 2013; Wilson 2011), and one review did not find any studies reporting adverse effects (Van Lonkhuijzen 2012). Wilson 2011 reported undesirable effects on patient outcomes, and Dudley 2011 on access, coverage or utilisation, both with low- or very low-certainty evidence. Dudley 2011 also found that integrating STI services into routine primary healthcare may decrease women's utilisation of these services and their attendance following referral (low certainty of the evidence). Ngo 2013 reported that using midlevel health professionals rather than doctors for abortion care with surgical aspiration probably leads to slightly more complications when compared to doctors (moderate-certainty evidence).

Delivery arrangements with uncertain effects

For the following delivery arrangements, the certainty of the evidence was low or very low (or no studies were found) for all outcomes examined.

Who provides care

Pre-licensure education to increase health worker supply

A review assessed the effect of changes in the pre-licensure education of health professionals on health-worker supply, and included two studies focusing on academic advising programmes for minority groups (Pariyo 2009). The review found that minority academic advising programmes may increase the number of minority students enrolled in health sciences, may slightly increase retention through to graduation, and may decrease differences between minority and non-minority students in retention levels through to graduation (low-certainty evidence). More broadly, there is little evidence of the effects of interventions to increase the capacity of health professional training institutions, reduce student dropout rates or increase the number of students recruited from other countries. Furthermore, no studies were found on other pre-licensure measures to increase health worker supply.

Recruitment and retention strategies

The effectiveness of interventions to increase the proportion of healthcare professionals working in rural and other underserved areas was examined in one review (Grobler 2015). The review identified one study conducted in Taiwan, a high-income country. This study assessed the impacts of introducing a mandatory national health insurance scheme and found that it is uncertain

whether such schemes, including a single-payer system and comprehensive benefits for different types of care, improves the equality of geographic distribution of physicians, doctors of Chinese medicine and dentists (very low-certainty evidence). No evidence was found on other types of interventions to increase the proportion of health professionals practising in underserved communities.

A supplementary review found low to very low-certainty evidence that the following delivery arrangements may lead to retention of health workers in rural areas in low-income countries (WHO 2010).

- Educational interventions, including: admission of students with rural backgrounds, locating training institutions in rural areas, provision of rotations in rural areas during pre-service education, and revising curricula to include rural health topics.
- Regulatory interventions, including: introducing different types of health workers with appropriate training and regulation for rural practice and imposing compulsory service in exchange for licensing.
- Professional and personal support, including: improving living conditions, provision of good and safe working environments, specialist outreach, caregiver development programmes, professional support networks, and public recognition measures for health workers in rural areas.

Role expansion or task shifting

Clinical officers versus physician for caesarean section

Whether the key outcomes of caesarean section differ between non-physician clinicians and medical doctors was explored in one review that included six studies conducted in low-income countries. The review found that non-physician clinicians performing caesarean sections may lead to slightly more wound infections and occurrences of wound dehiscence than doctors (low-certainty evidence). It is uncertain whether there are any differences in maternal or perinatal mortality between caesarean sections performed by non-physician clinicians and by doctors (very low-certainty evidence) (Wilson 2011).

Non-specialist providers versus specialists for mental health

A review compared the effects of non-specialist providers (such as doctors, nurses or lay health workers), compared with specialist providers in mental health or neurology, in caring for adults with depression, anxiety or both (Van Ginneken 2013). The review found, firstly, that using non-specialist health workers in caring for adults with depression, anxiety or both may increase the number of adults who recover two to six months after treatment and may reduce symptoms for mothers with depression (low-certainty evidence). Secondly, the use of non-specialist health workers may also decrease the quantity of alcohol consumed in problem drinkers and may reduce symptoms in adults with post-traumatic stress disorder (low-certainty evidence). Thirdly, it is uncertain whether lay health workers or teachers reduce post-traumatic stress disorder symptoms among children (very low-certainty evidence) (Van Ginneken 2013).

Specialist nursing post or dietary assistants added to hospital nurse staffing

A review of the effect of hospital nurse staffing models found that the addition of a specialist nursing post to staffing may decrease patients' length of stay (low-certainty evidence). However, it may lead to little or no difference in in-hospital mortality, readmissions, emergency department attendance within 30 days, and postdischarge adverse events (low-certainty evidence). Adding support staff (dietary assistants) to nurse staffing may decrease mortality in trauma units, in hospital, and at four months after discharge (low-certainty evidence) (Butler 2011).

Pharmacists delivering non-dispensing services to patients

Whether additional services provided by pharmacists reduce healthcare costs or the demand for healthcare in low- and middle-income countries was examined in one review that included twelve randomised trials (Pande 2013). The evidence indicates that 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; and improvements in some clinical outcomes (low-certainty evidence). The provision of additional services by pharmacists targeted at healthcare professionals, such as educational outreach visits, may improve patient outcomes (low-certainty evidence).

Skilled birth attendants

A review explored the effect of provision of skilled birth attendance, as well as basic and emergency obstetric care, on stillbirths and included 21 studies. The review found that skilled birth attendance may reduce stillbirths and perinatal mortality (low-certainty evidence). However, it is uncertain what the effects of alternative ways of providing emergency obstetric care are on stillbirths or perinatal mortality (very low-certainty evidence) (Yakoob 2011).

Dental care by dental therapists

A review examined whether midlevel dental providers improve oral health, compared to no care or care by dentists. It is uncertain

whether midlevel providers decrease the incidence, prevalence, or severity of dental caries or increase treatment of caries (very low-certainty evidence) (Wright 2013).

Coordination of care

Care pathways

Improved pre-hospital trauma systems

The effectiveness of pre-hospital trauma systems in low- and middle-income countries was examined in one review which found that these systems may reduce mortality and the response time from injury to first medical contact in the field (low-certainty evidence) (Henry 2012).

Rapid response systems in hospitals

A review assessed the effects of rapid response systems on hospital mortality and cardiopulmonary arrests outside the intensive care unit (Maharaj 2015). The evidence indicates that, firstly, rapid-response systems for hospitalised adults may slightly reduce hospital mortality and cardiopulmonary arrests outside of intensive care units, but may lead to little or no difference in admissions to intensive care units (low-certainty evidence). Secondly, rapid-response systems for hospitalised children may slightly reduce cardiopulmonary arrests outside of intensive care units (low-certainty evidence); the effects on hospital mortality and admissions to intensive care units are uncertain (very low-certainty evidence).

Hospital clinical pathways

Clinical pathways compared to usual care in hospitals may decrease complications and hospital admissions (low-certainty evidence). However, it is uncertain whether clinical pathways reduce in-hospital mortality or hospital costs (very low-certainty evidence). It is also uncertain whether multifaceted interventions that include a clinical pathway decrease hospital complication or readmissions (very low-certainty evidence) (Rotter 2010).

Case management

Community-based case management with antibiotics

The effectiveness of community case management of pneumonia in children was examined in one review, which identified fourteen studies of this intervention. The review found that community case management with antibiotics for children with pneumonia may reduce all-cause mortality as well as mortality due to acute lower respiratory infection (low-certainty evidence) (Theodoratou 2010).

Case management for people living with HIV/AIDS

A review of the effects of the setting and organisation of care for people living with HIV and AIDS examined a range of interventions and included 28 studies (Handford 2006). The review found that case management may reduce mortality and the number of emergency department visits among people living with HIV/AIDS (low-certainty evidence). Other effects of case management are uncertain. The review also reported that the effects of multidisciplinary or multifaceted interventions are uncertain (very low-certainty evidence).

Pre-/postdischarge interventions and transition interventions to reduce rehospitalisation

The impacts of interventions to reduce rehospitalisation within thirty days of discharge were examined in one review that included 43 studies examining a range of strategies (Hansen 2011). The review found, firstly, that it is uncertain whether interactions between patients and nurses before and after discharge to support patient self-care reduce rehospitalisation (very low-certainty evidence). Secondly, inpatient-outpatient provider continuity may slightly reduce rehospitalisation (low-certainty evidence). Thirdly, postdischarge interventions may lead to little or no difference in rehospitalisation. Finally, it is uncertain whether pre-discharge interventions or patient-centred discharge instructions reduce rehospitalisation (very low-certainty evidence).

Hospital discharge planning

Discharge planning may lead to increased satisfaction for patients and healthcare professionals (low-certainty evidence). However, the effect of discharge planning on unscheduled readmissions for patients admitted to hospital following a fall, and the costs or savings of discharge planning, are uncertain (very low-certainty evidence). All of the included studies were conducted in high income countries and the effects of discharge planning in low-income countries are therefore uncertain (Gonçalves-Bradley 2016).

Integration

Adding a service to an existing service and integrating delivery models

A review of the effects of integration compared to usual care found that integrating STI services for female sexual partners of truck drivers into routine primary care may reduce women's utilisation of these services and their attendance following referral (low-certainty evidence) (Dudley 2011).

Integrating vaccination with other healthcare services

The effects of interventions to improve childhood vaccination coverage were considered in one review which found that integrating vaccination with other healthcare services may increase diphtheria-tetanus-pertussis (DTP3) and measles vaccine coverage but may have little or no effect on Bacillus Calmette Guérin (BCG) coverage (low-certainty evidence) (Oyo-Ita 2016).

Referral systems: from primary to secondary care

Interventions to change primary care outpatient referral rates or improve outpatient referral appropriateness were studied in one review. The review found that organisational interventions that may improve referral rates and referral appropriateness include: the provision of physiotherapy services in primary care; obtaining a second, in-house assessment of referrals; and dedicated appointment slots at secondary levels for each primary care practice (low-certainty evidence). The review also found that the effects of financial incentives on referral rates are uncertain (very low-certainty evidence) (Akbari 2008).

Site of service delivery

HIV voluntary counselling and testing at optional locations instead of at clinics

Offering people a choice of settings in which to receive voluntary counselling and testing, including at home, may increase acceptance of HIV pre-test counselling and HIV testing,acceptance of HIV post-test counselling, and receipt of HIV test results (low-certainty evidence) (Bateganya 2010).

Units dedicated to care for people living with HIV/AIDS and institutions managing a high volume of people living with HIV/AIDS

The impacts of the setting and organisation of care for people living with HIV and AIDS was examined in one review (Handford 2006). This found that units dedicated to AIDS care and institutions that managed high numbers of people living with HIV and AIDS may reduce mortality within this group (low-certainty evidence). The effects of other interventions related to the setting of care, such as outreach or interventions to reduce travel time to providers, are uncertain (very low-certainty evidence).

Teams

Practice-based interventions to promote collaboration

A review assessed the impact of practice-based interventions to improve collaboration between professionals, and included nine randomised trials (Reeves 2017). The review found, firstly, that the use of externally facilitated interprofessional activities or interprofessional meetings may slightly improve adherence to recommended practices and prescription of medicines (low-certainty evidence). However, it is uncertain if externally facilitated interprofessional activities improve collaborative working, team communication, co-ordination, patient-assessed quality of care or continuity of care (very low-certainty evidence). Secondly, interprofessional checklists, interprofessional rounds and externally facilitated interprofessional activities may slightly improve overall use of resources and slightly decrease length of hospital stay and costs (low-certainty evidence).

Where care is provided

Site of service delivery

Early discharge from hospital for mothers and infants born at term

The safety, impact and effectiveness of a policy of early discharge for healthy mothers and term infants was assessed in one review that included ten randomised trials (Brown 2007). Compared to standard discharge, early discharge may lead to little or no difference in the number of infant or maternal readmissions or breastfeeding rates at two months (low-certainty evidence). In addition, the effect of early discharge on the cost of care is uncertain (very low-certainty evidence). The review found that although the costs of hospitalisation are probably lower in the early discharge group, the postnatal costs associated with early postnatal discharge from hospital and total costs are uncertain.

Out-of-facility HIV and reproductive health services for youth

The effects of out-of-facility HIV and reproductive health services for youth, compared to facility-based services, was explored in one review (Denno 2012). The review found, firstly, that access to emergency contraception through pharmacies without a doctor's prescription (over-the-counter access) may increase non-prescription emergency contraception use but may have mixed effects on overall use of emergency contraception, with increases in some settings but not others (low-certainty evidence). Secondly,

the distribution of condoms and health education messages by street outreach workers may increase condom use (low-certainty evidence). Finally, it is uncertain whether street and youth centre-based outreach improves follow-through on HIV referral for homeless or street-based youth; whether the use of community youth programme promoters and integrated youth centres increase the use of contraceptives; and whether members of the poorest households are more likely to use home-based counselling and testing for HIV, compared to those living in wealthier households (very low-certainty evidence).

Home-based care with multidisciplinary teams for people living with HIV/AIDS

The effects of home-based care for people living with HIV and AIDS was compared to other delivery options in one review (Young 2010). The review found that multiprofessional team care in the home, including medical management, counselling and teaching, and physical, psychosocial, palliative and social support, may lead to little or no difference in quality of life, time in care or survival of people living with HIV/AIDS, compared with usual care by primary care nurses (low-certainty evidence). It was also found that the provision of information, communication and decision support via a computer in the homes of people living with AIDS may lead to little or no difference in the health status, decision-making skills or confidence of patients, but may slightly reduce social isolation and improve their quality of life (low-certainty evidence). Evidence from this review indicates that it is uncertain whether exercise at home improves the physical functioning, well-being, body composition measures or biochemical measures of people living with HIV/AIDS (very low-certainty evidence).

Home-based management of malaria

Home-based management of malaria (presumptive treatment of children with symptoms) was compared to usual care in one review (Okwundu 2013).This found that the effects of home- or community-based programmes for treating malaria on hospitalisations, severe malaria, the prevalence of parasitaemia, and adverse effects are uncertain (very low-certainty evidence). In addition, the effects of using rapid diagnostic tests in home- or community-based programmes for treating malaria on treatment failures, severe malaria, the prevalence of parasitaemia, anaemia, and adverse effects are uncertain (very low-certainty evidence).

Strategies for increasing ownership and use of insecticide treated bednets

A review compared the effects of distributing insecticide-treated bednets for free compared to making them available for purchase, and included 10 studies (Augustincic 2015). Education about appropriate use of insecticide-treated bednets may increase the number of adults and children under five sleeping under bednets. However, providing incentives to encourage the use of insecticide-treated bednets may lead to little or no difference in use (low-certainty evidence).

Home versus facility care for children with long-term conditions

Evidence on the effectiveness and costs of care closer to home for children with long-term conditions was examined in one review (Parker 2013). Compared with hospital care, home care may lead to little or no difference in re-admissions or the time spent by families caring for children with acute physical conditions (low-certainty evidence). The review also found that for children with traumatic brain injury, home rehabilitation compared with clinic-based rehabilitation may slightly improve mental functioning (low-certainty evidence). However, the effects on adverse events, family and carers, and costs were not reported. In addition, for children with acute lymphoblastic leukaemia, home chemotherapy compared with hospital chemotherapy may slightly improve their quality of life and may lead to little or no difference in adverse events or family costs (low-certainty evidence). The impact on family and carers is uncertain.

Workplace programmes for HIV

Workplace programmes for the diagnosis or treatment of HIV or tuberculosis (TB) were examined in one review (Yassi 2013). The evidence indicates that, firstly, workplace programmes for health workers may increase the uptake of HIV testing and awareness of postexposure prophylaxis to prevent HIV infection (low-certainty evidence). Secondly, onsite compared with offsite rapid HIV testing may increase the uptake of voluntary counselling and testing among workers in sectors other than health (low-certainty evidence). Finally, workplace programmes offering free antiretroviral therapy may improve markers of effective antiretroviral therapy among workers living with HIV and AIDS in sectors other than health (low-certainty evidence).

Maternity waiting homes

The effects of maternity waiting homes on perinatal and maternal mortality and morbidity in low-resource settings are uncertain, since the review found no studies that met the inclusion criteria (Van Lonkhuijzen 2012).

Information and communication technology

E-health

Mobile phone messaging for long-term illnesses

One review compared mobile phone messaging for patients with long-term illnesses to usual care (De Jongh 2012). Ther review found, firstly, that mobile phone messaging support may improve people's self-efficacy in relation to their diabetes (low-certainty evidence). Secondly, mobile phone messaging support for people living with asthma or hypertension may lead to little or no difference in control of these conditions. Finally, it is uncertain whether mobile phone messaging support changes health service utilisation by people living with diabetes and asthma.

Mobile phone messaging reminders for attendance at healthcare appointments

A review compared the effects of mobile phone messaging for attendance at healthcare appointments to various other interventions (Gurol-Urganci 2013). Mobile phone text message reminders plus postal reminders may lead to improved attendance at healthcare appointments, compared to postal reminders alone (low-certainty evidence).

Health information systems

Women carrying their own case notes in pregnancy

The effects of women carrying their own case notes during pregnancy was examined in one review (Brown 2011). This showed that women carrying their own case notes may lead to an increase in assisted deliveries and a slight increase in epidural analgesia (low-certainty evidence). Carrying case notes may also lead to little or no difference in miscarriages, stillbirths or neonatal deaths, breastfeeding initiation, smoking cessation, or in availability of complete antenatal records at the time of delivery or the loss of case notes (low-certainty evidence). In addition, women carrying their own case notes may be slightly more satisfied with antenatal care (low-certainty evidence).

Interventions to improve childhood vaccination

A review of interventions to improve childhood vaccination found that the effects of facility-based health education on coverage of DTP3 may vary from little or no impact to potentially important benefits (low-certainty evidence). The review also found that health education combined with reminders may increase DTP3 coverage (low-certainty evidence) and home visits may improve OPV3 and measles coverage (low-certainty evidence). In contrast, household monetary incentives may have little or no effect on achieving full vaccination coverage (Oyo-Ita 2016).

Quality and safety systems

Medication review for hospitalised adult patients

Whether medication review improves the health outcomes of hospitalised adult patients was examined in one review. The evidence indicates that medication review may reduce hospital emergency department contacts and may lead to little or no difference in mortality or hospital readmissions (low-certainty evidence) (Christensen 2016).

Interventions to improve antibiotic prescribing to hospital inpatients

One review assessed whether professional interventions are effective in antibiotic stewardship for hospital inpatients (Davey 2013). The review found, firstly, that restrictive interventions (for example, compulsory order form and expert approval) may improve antibiotic prescribing at one month but may lead to little or no difference in antibiotic prescribing at longer follow-up, compared with persuasive interventions, such as the dissemination of educational materials or audit and feedback (low-certainty evidence). Secondly, interventions intended to decrease unnecessary antibiotic prescribing probably lead to little or no difference in all-cause mortality (moderate-certainty evidence), and it is uncertain whether they affect the length of stay or readmissions (very low-certainty evidence). Thirdly, interventions intended to increase effective antibiotic prescribing for pneumonia may decrease mortality from this condition (low-certainty evidence). Finally, interventions intended to decrease unnecessary antibiotic prescribing probably lead to little or no difference in all-cause mortality (moderate-certainty evidence).

Decision support with or without clinical information systems for people living with HIV/AIDS

A review examined the effects of decision support systems, with or without clinical information systems, on healthcare processes and health outcomes, compared to usual care or non-chronic models of care (Pasricha 2012). Decision support (with or without clinical information systems) may improve health professionals' adherence to recommended practice and patients' adherence to treatment (low-certainty evidence). It is uncertain whether decision support

systems (with or without clinical information systems) improve health outcomes, healthcare utilisation or at-risk behaviours (very low-certainty evidence).

Working conditions of health workers

Staff support

Managerial supervision to improve quality of primary health care

A review assessed the effects of supervision on heath sector performance, and included nine studies from low- and middle-income countries (Bosch-Capblanch 2011). The findings were as follows: managerial supervision may improve provider practices and knowledge compared with no supervision. However, low-intensity managerial supervision (e.g. fewer visits) may lead to little or no difference in indicators such as the number of new family planning client visits or the number of clients that re-visit (low-certainty evidence). It is uncertain whether managerial supervision improves medicine stock management and whether enhanced managerial supervision (e.g. increased supervision or the use of tools such as checklists) improves the performance of lay or community health workers or midwives, or improves patient and health worker satisfaction (very low-certainty evidence).

Training vaccination managers to provide supportive supervision for healthcare providers

A review of the effects of interventions to improve childhood vaccination coverage found that training vaccination managers to provide supportive supervision for healthcare providers may have little or no effect on coverage of DTP3 vaccine, oral polio vaccine (OPV) and hepatitis B virus (HBV) vaccine (low-certainty evidence) (Oyo-Ita 2016).

Complex interventions cutting across delivery categories and across other reviews

Package of multiple interventions

Emergency obstetric referral interventions

The effects of emergency obstetric referral interventions, compared to no intervention, were explored in one review. This found that emergency referral interventions may lead to a reduction in maternal mortality (low-certainty evidence) but that the effect of these interventions on stillbirths is uncertain (very low-certainty evidence). None of the included studies reported cost outcomes, and the cost implications of emergency referral interventions are therefore uncertain (Hussein 2012).

DISCUSSION

Summary of main results

This overview included 51 systematic reviews that evaluated different types of delivery arrangements. In these reviews, only two categories of outcomes were reported in more than half of the included reviews: firstly, patient outcomes and, secondly, outcomes related to access to care, coverage or utilisation of health services. Quality of care was the next most commonly reported outcome. The included reviews generally did not consider other types of outcomes, such as resource use, social outcomes, equity and adverse effects (Table 7).The overview shows wide variability in the magnitude of effect sizes and the certainty of the estimates for the different delivery arrangements. However, when focusing only on evidence assessed as high to moderate certainty, the overview points to a substantial number of delivery arrangements that were 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.

Overall completeness and applicability of evidence

The overview identified extensive evidence on the effects of delivery arrangements, including on who provides care (14 reviews, 16 comparisons), coordination of care (11 reviews, 18 comparisons), where care is provided (10 reviews, 123 comparisons) and information and communication technology (5 reviews, 5 comparisons). However, there is uncertainty about the applicability of some of this evidence to low-income countries (Table 8).

Twenty-three (47%) of the reviews focused on out-of-hospital settings, including primary and community care, the workplace, families and homes. Fifteen reviews (31%) focused on hospitals or health centres, while 11 (22%) included a mix of settings.

Table 7 summarises the outcomes examined in the individual reviews and comparisons. Thirteen reviews found at least one study reporting costs and cost-effectiveness of interventions (Akbari 2008; Bosch-Capblanch 2011; Brown 2007; Butler 2011; Gonçalves-Bradley 2016; Gurol-Urganci 2013; Kredo 2013; Oyo-Ita 2016; Pande 2013; Parker 2013; Reeves 2017; Rotter 2010; Young 2010), and an additional six reviews searched for but did not find such outcomes (Catling 2015; De Jongh 2012; Hussein

2012; Lewin 2010; Pasricha 2012; Wright 2013). Only one review explicitly examined effects of the intervention/s on equity (differential effects of interventions for disadvantaged populations, such as pregnant women, under-five children, rural poor) (Pariyo 2009).

We incorporated our judgments about the applicability of summarised evidence (particularly, indirectness in relation to settings, populations and outcomes) into the GRADE assessments of its certainty, and we reported these applicability judgments in each of the SUPPORT Summaries. Most of the studies included in the reviews were undertaken in high-income countries. In general, it is difficult to make generalisable conclusions regarding the applicability of the findings to low-income countries, given marked differences in the settings (including local health systems arrangements), interventions, target behaviours and populations studied. Whether the effects of these interventions are likely to be similar in low-income countries is therefore often uncertain. This is particularly true for interventions that require substantial resources or advanced technology for their delivery, such as information and communication technology, communication between providers, or quality and safety systems. There were some exceptions to this: for example, mobile phone messaging was mostly evaluated in low- and middle-income countries (Gurol-Urganci 2013; Mbuagbaw 2013).

Certainty of the evidence

Although some of the included reviews had methodological limitations, they were, for the most part, relatively well conducted (Table 5). The certainty of the evidence for the effect estimates for the different interventions was highly variable, ranging from very low to high (Table 7).

Potential biases in the overview process

We could have missed a number of relevant reviews since our searches were restricted to reviews included in PDQ-Evidence and published within the past 10 years. We are unaware of any evidence of biased publication of systematic reviews, but the overview may be incomplete.

There was some overlap in the primary studies included in the contributing reviews (32 studies were included in at least two reviews). However, we excluded overlapping reviews from the synthesis of results or included them as supplementary reviews (Table 1), which provided additional information used in the interpretation of the findings of the included reviews. Therefore, it is unlikely that this biased the effect estimates that we reported in the SUPPORT Summaries (www.supportsummaries.org).

It is possible that we misclassified reviews, given the lack of standardised terminology or a standard classification scheme for health system arrangements. In particular, the distinction between delivery arrangements and implementation strategies, which are addressed in a related overview (Pantoja 2014), was not always clear. While this might generate some confusion, it is unlikely to have biased the overviews.

Agreements and disagreements with other studies or reviews

We identified 10 related overviews of reviews published in the last 10 years (Althabe 2008; Black 2011; Chopra 2008; Davoli 2006; Franx 2008; Lewin 2008; Momsen 2012; Oxman 2008; Wensing 2006; Wilson 2013). These overviews addressed a range of delivery arrangements, barriers and facilitators of change, disease conditions, and behaviours in diverse settings and populations.

Althabe 2008 included reviews of strategies for improving the quality of health care in maternal and child health in low- and middle-income countries. It found inconsistent effects for formal integration of services, while improving office systems appeared to increase use of health services, and the results for changes in medical record systems were inconclusive.

Black 2011 included systematic reviews assessing the effectiveness and consequences of various e-health technologies on the quality and safety of care. The authors found that despite support from policymakers, there was relatively little empirical evidence to substantiate many of the claims made in relation to technologies about storing, managing and transmitting data; supporting clinical decisions; and facilitating care from a distance. It was unclear whether the success of those relatively few solutions identified to improve quality and safety could be replicated beyond the contexts in which they were originally developed. Overview authors also found a lack of robust research on the risks of implementing these technologies and their cost-effectiveness.

Chopra 2008 aimed to identify all available policy options to address human resources for health in low- and middle-income countries and to assess the effectiveness of these policy options. It identified a need for more systematic reviews of the effects of policy options to improve human resources for health and for assessments of any interventions that policymakers introduce to manage human resources for health.

Damery 2016 summarised the evidence of 50 reviews regarding the effectiveness of integrated care interventions in reducing hospital activity. Interventions must have delivered care crossing the boundary between at least two health and/or social care settings. The authors found that 11/21 reviews reported significantly reduced emergency admissions (15% to 50%); 11/24 showed significant reductions in all-cause (10% to 30%) or condition-specific (15% to 50%) readmissions; 9/16 reported length of stay reductions, and 4/9 showed significantly lower accident and emergency use (30% to 40%). Ten out of 25 reviews reported significant cost reductions but provided little robust evidence. Effective interventions included discharge management with postdischarge support, multidisciplinary team care with teams that include condition-

specific expertise, specialist nurses and/or pharmacists and self-management as an adjunct to broader interventions. Interventions were most effective when targeting single conditions such as heart failure and when patients received care in their homes.

Davoli 2006 aimed to identify areas, clinical conditions or interventions for which an association between volume and outcome has been investigated. They found that in some areas the evidence seems strong enough to guide healthcare organisational choices, although it is not possible to identify well-defined volume thresholds. In other areas, particularly for non-surgical conditions, there was insufficient evidence.

Franx 2008 included reviews of organisational change to transfer knowledge and improve quality and outcomes of care for people with severe mental illness. It found that multidisciplinary teams and integrated care services can improve the quality of care and should be promoted in severe mental healthcare settings. On the other hand, systematic reviews had not studied popular and costly organisational changes used in daily practice, such as quality management or routine outcome measurement and the introduction of computer systems.

Hisashige 2012 evaluated the evidence on effectiveness and efficiency of disease management approaches. The authors included 28 meta-analyses and systematic reviews and found that the improvement with a reasonable amount of evidence was the highest for process indicators (69%), followed by outcomes in health services (63%), quality of life (57%), health (51%), satisfaction (50%) and costs (38%). The review found statistically significant mortality reductions only for coronary heart disease.

Lewin 2008 reviewed the effects of health system arrangements for primary health care in low- and middle-income countries. It found that although evidence was scant, there were several promising health systems arrangements that could strengthen primary health care. These included distribution of health workers, specialist outreach clinics, lay health workers, and training of traditional birth attendants to reduce inequalities; lay health workers and training of traditional birth attendants to increase participation in health by consumers; contracting out of health services, integrating primary healthcare services, reminders and recall for immunisation; working with for-profit providers to increase the effectiveness of care; subcontracting the delivery of health services, integrating primary healthcare services, addressing the distribution of health workers, specialist outreach clinics, substitution of doctors by nurses, lay health workers, and training of traditional birth attendants to increase coverage or access; and outpatient referrals to improve the coordination of care. The overview concluded that the evidence base needs to be strengthened.

Luna 2013 aimed to identify systematic reviews on the domain of health informatics in developing countries and included 11 systematic reviews based mainly on poor quality primary research. In spite of challenges facing the developing world such as lack of human expertise and financial resources, unreliable electric power and erratic Internet connectivity, most studies have shown some positive effects and reported on the feasibility of designing and implementing health information systems into this environment.

Martinez-Gonzalez 2014 reviewed the effects of integrated care programmes in chronically ill patients. Most included systematic reviews covered comprehensive services across the care continuum or standardisation of care through interprofessional teams, but they rarely assessed organisational culture, governance structure or financial management. Most reviews found beneficial effects of integration, including reduced hospital admissions and re-admissions, improved adherence to treatment guidelines or quality of life. Few reviews showed reductions in costs.

Momsen 2012 investigated the current scientific evidence about the effectiveness of multidisciplinary team rehabilitation for different health problems. They found that multidisciplinary team care effectively improves rehabilitation interventions but concluded that further research in this area was needed.

Oxman 2008 included a broad range of reviews to inform deliberations among policymakers and stakeholders regarding how best to reform the Norwegian healthcare system to improve the coordination or integration of health care for people with chronic conditions. It found that components of broad frameworks or service delivery models that have been shown to be effective generally have modest effects, including patient education and motivational counselling, provider education, feedback, reminders, multidisciplinary team work, some interventions targeted at patients discharged from hospital or the emergency department to home, complex interventions to improve physical function and maintain independent living in elderly people, rehabilitation services targeted towards stroke patients living at home, computerised central recall, with prompting for patients and their family doctors, community mental health teams, collaborative care for depressed patients in primary care, and intensive case management for patients with severe mental illness. The effectiveness of many other components was very uncertain, including evidence-based care pathways, case management, shared care, home visiting programmes for older people with poor health, and most information and communication technologies.

Wensing 2006 included reviews of organisational interventions to implement improvements in patient care. It found that none of the strategies produced consistent effects. Professional performance generally improved with revision of professional roles and computer systems for knowledge management. Patient outcomes generally improved with multidisciplinary teams, integrated care services, and computer systems, and the benefits of quality management remained uncertain.

Wilson 2013 investigated counselling, case management and health promotion for people living with HIV/AIDS. Key findings from high-quality systematic reviews supported centralising care in high-concentration or high-volume settings, in addition to using cognitive behavioural interventions for reducing symptoms of depression, stress and anxiety; interventions to promote adherence; and the use of aerobic and progressive resistance exercise.

AUTHORS' CONCLUSIONS

Implications for practice

The following delivery arrangements were found to be **effective** (moderate- or high-certainty evidence of desirable effects on at least one outcome and no moderate- or high-certainty evidence of undesirable effects).

Who receives care and when

- Queuing strategies (Ballini 2015)
- Group versus individual antenatal care (Catling 2015)

Who provides care

- Lay or community health workers supporting the care of people with hypertension (Brownstein 2007)
- Community-based neonatal packages that include additional training of outreach workers (Lassi 2015)
- Lay health workers to deliver care for mothers and children or for infectious diseases (Lewin 2010)
- Mid-level, non-physician providers for abortion care (Ngo 2013)
- Health workers providing social support during at-risk pregnancies (Hodnett 2010)
- Midwife-led care for childbearing women and their infants (Sandall 2013)
- Non-specialist health workers or other professionals with health roles to help people with mental, neurological and substance-abuse disorders (Van Ginneken 2013)
- Nurses substituting for physicians in providing care (Martínez-González 2014)

Coordination of care

- Structured multidisciplinary care plans (care pathways) used by health care providers in hospitals to detail essential steps in the care of people with a specific clinical problem (Rotter 2010)
- Interactive communication between collaborating primary care physicians and specialist physicians in outpatient care (Foy 2010)
- Planning to facilitate patients' discharge from hospital to home (Gonçalves-Bradley 2016)
- Adding a new health service to an existing service and integrating services in health care delivery (Dudley 2011)
- Integrating vaccination with other healthcare services (Oyo-Ita 2016)
- Referral from primary to secondary care (Akbari 2008)
- Using physicians rather than nurses to lead triage in emergency departments (Rowe 2011)
- Groups or teams of midwives providing care for a group of women during pregnancy and childbirth and after childbirth (Butler 2011)

Where care is provided

- Clinics or hospitals that manage larger numbers of people living with HIV and AIDS (Handford 2006)
- Intensive home-based care for people living with HIV and AIDS (Young 2010)
- Home-based management of malaria in children (Okwundu 2013)
- Providing care closer to home for children with long-term health conditions (Parker 2013)
- Community-based interventions using lay health workers for childhood diarrhoea and pneumonia (Das 2013)
- Youth HIV and reproductive health services provided outside of health facilities (Denno 2012)
- Decentralising care for initiation and maintenance of HIV and AIDS medicine treatment to peripheral health centres or lower levels of healthcare (Kredo 2013)

Information and communication technology

- Mobile phone messaging for people with long-term illnesses (De Jongh 2012)
- Mobile phone messaging reminders for attendance at healthcare appointments (Gurol-Urganci 2013)
- Mobile phone messaging to promote adherence to antiretroviral therapy (Mbuagbaw 2013)
- Women carrying their own case notes in pregnancy (Brown 2011)
- Information and communication interventions to improve childhood vaccination coverage (Jacobson Vann 2005; Oyo-Ita 2016)

Quality and safety systems

- Decision support systems with clinical information systems to improve the healthcare process and health outcomes for people living with HIV/AIDS (Pasricha 2012)

Package of multiple interventions

- Interventions to improve referral for emergency care during pregnancy and childbirth (Hussein 2012)

The following delivery arrangements were found to be **ineffective** (moderate- or high-certainty evidence of little or no effect and no moderate- or high-certainty evidence of desirable or undesirable effects).

Role expansion or task shifting

- Lay health workers to support preventive treatment for tuberculosis (Lewin 2010)

Care pathways: hospital clinical pathways

- Multifaceted interventions that include clinical pathways (Rotter 2010).

Integration: integrated delivery models

- Integrated community and facility provision of HIV prevention and control - STI impacts (Dudley 2011).

Referral systems: from primary to secondary care

- Professional education that only includes the passive dissemination of referral guidelines (Akbari 2008).

Site of service delivery

- Providing free insecticide-treated bednets, compared to providing subsidised or full market price bednets - impacts on appropriate use (Augustincic 2015)

Information and communication technology; E-health

- Mobile phone messaging support for people living with diabetes (De Jongh 2012)
- Mobile phone message reminders for attendance at healthcare appointments, compared to phone call reminders (Gurol-Urganci 2013)

We did not find evidence that any interventions were **harmful** (moderate- or high-certainty evidence of at least one outcome with an undesirable effect and no moderate- or high-certainty evidence of desirable effects).
There is low- or very low-certainty evidence of the effects of other delivery arrangements.

Implications for research

Based on the included reviews, we identified gaps in primary research due to uncertainty about the applicability of the evidence to low-income countries, mainly due to the lack of evidence from low-income countries (Table 8) and due to low-certainty evidence or a lack of studies (Table 9). The included reviews rarely evaluated social outcomes, impacts on equity, healthcare provider outcomes and adverse effects for delivery arrangements in almost any category (Table 1, Table 2 and Table 7). All of the included reviews found that primary research is needed for at least one of these categories of outcomes: patient outcomes; access, coverage or utilisation; quality of care; or resource use (Table 9).

We also have identified gaps in the availability of reliable up-to-date systematic reviews in a number of categories of delivery arrangements in low-income countries (Table 10).

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* *Indicates the major publication for the study*

ADDITIONAL TABLES

Table 1. Types of delivery arrangements

Delivery arrangement	Definition
Who receives care and when	
Queuing strategies	Different ways of managing waiting lists
Group vs individual care	Providing care to groups vs individual patients
Who provides care	
Pre-licensure education	How health professionals are educated
Recruitment and retention strategies	Strategies for recruiting to and retaining health workers in specific areas or types of work
Movement of health workers between public and private care	Strategies for managing the movement of health workers between public and private organisations
Role expansion or task shifting	Expanding tasks undertaken by a cadre of health workers or shifting tasks from one cadre to another
Self-management	Shifting the provision of care to patients or their families
Co-ordination of care	
Integration	Integration of the delivery of different type of services
Packages of care	Integrated packages of care such as the Integrated Management of Childhood Illness (IMCI)
Case management	Use of individuals, often specially trained nurses, to coordinate care for patients with multiple or complex needs
Disease management	Programmes designed to manage or prevent a chronic condition using a systematic approach to care and potentially employing multiple ways of influencing patients, providers or the process of care

Table 1. Types of delivery arrangements (*Continued*)

Care pathways	Strategies to link evidence to practice for specific health conditions. These strategies detail the local structure, systems and time frames to address recommendations
Teams	Care provided by teams or interdisciplinary collaboration
Communication between providers	Systems[1] or strategies for communication between healthcare providers
Referral systems	Systems[1] for managing referrals of patients between healthcare providers
Discharge planning	Systems[1] for planning the discharge of patients from facilities
Where care is provided	
Site of service delivery	Changes in where care is provided including home vs facility, inpatient vs outpatient, specialised vs non-specialised facility
Intermediate care	Services designed to facilitate the transition from hospital to home
Specialist outreach	Regular visits by specialist providers to primary care or rural hospital settings
Generalist outreach	Regular visits by generalist doctors to primary care or rural hospital settings
Transportation services	Arrangements for transporting patients from one site to another
Mobile units	Mobile facilities that visit and deliver services on a regular basis
Facilities and equipment	Changes in healthcare facilities or equipment
Size of organisations	Consequences of differences in the size of health service provider organisations
Procurement and distribution of supplies	Systems[1] for procuring and distributing medicines or other supplies
Information and communication technology	
Health information systems	Health record and health management systems
Patient reminder and recall systems	Systems[1] for recalling patients for follow-up or prevention
E-Health	The combined use of electronic communication and information technology in the health sector. This includes the use of digital data - transmitted, stored and retrieved electronically - for clinical, edu-

Table 1. Types of delivery arrangements (*Continued*)

	cational and administrative purposes
Quality and safety systems	
Quality monitoring and improvement systems	Systems[1] for monitoring and improving the quality of health care
Safety monitoring and improvement systems	Systems[1] for monitoring and improving the safety of health care
Working conditions of health workers	
Workload	Changes in the workload of health workers
Work environment	Changes in the working environment of health workers
Staff support	Provision of staff support to health workers
Health and safety systems	Systems* for protecting or promoting the health and safety of health workers

[1]Systems include structures or organisational arrangements.

Table 2. Examples of how changes in delivery arrangements might work

Delivery arrangement	How this might work
Who receives care and when	
Queuing strategies	Strategies such as increasing capacity or productivity might reduce waiting times by increasing the supply of services. Strategies such as co-payments, explicit referral criteria or clinical priority scores might decrease waiting times by reducing or managing demand
Group vs individual care	Group care might expand coverage by increasing the numbers of patients health workers can see and might improve effectiveness through peer support
Who provides care	
Pre-licensure education	Strategies that help to ensure that students complete their education might improve access to care by increasing the supply of health professionals
Recruitment and retention strategies	Strategies that help to recruit health professionals to underserved areas or keep them there might improve access to care and equity
Movement of health workers between public and private care	Strategies that attract or keep health workers in the public sector might improve access to care, equity and sustainability

Table 2. Examples of how changes in delivery arrangements might work (*Continued*)

Role expansion or task shifting	Role expansion or task shifting form more to less specialised health workers might improve access, coverage and equity
Self-management	Shifting responsibility for care from health workers to patients might improve access for other patients, empower patients and reduce resource use
Coordination of care	
Integration	Bringing together several service functions might increase service coherence and reduce fragmentation, thereby improving access, utilisation and efficiency. On the other hand, vertical (non-integrated programmes) might improve the delivery of effective interventions, thereby improving health outcomes
Packages of care	Packages of care, such as the Integrated Management of Childhood Illnesses, might improve coverage, delivery quality and utilisation of effective interventions and thereby improve health outcomes
Case management	Case management might improve quality of care and patient compliance and efficiency by ensuring that patients are followed up and reducing fragmentation
Disease management	Disease management might improve the quality of care and efficiency by reducing fragmentation
Care pathways	An evidence-based plan of care that aims to promote organised and efficient multidisciplinary patient care might improve the quality of care and efficiency
Teams	Multidisciplinary teams of health professionals might improve the quality of care, reduce delays and fragmentation and thereby improve health outcomes
Communication between providers	Improved communication between providers might improve the quality of care and efficiency
Referral systems	Effective referral systems might improve the quality of care by helping ensure that patients who need specialised care receive it and improve efficiency by reducing inappropriate referrals
Discharge planning	Strategies that help to ensure that patients are discharged as soon as they are ready might improve efficiency by reducing unnecessary hospital utilisation. Strategies that help to ensure that patients are managed appropriately following discharge might improve the quality of care and efficiency by reducing re-hospitalisation
Where care is provided	

Table 2. Examples of how changes in delivery arrangements might work (*Continued*)

Site of service delivery	Providing services closer to patients (e.g. in rural areas) might improve access and utilisation
Intermediate care	Facilities that offer a transition between hospital care and home care might improve efficiency by reducing the length of hospital stays and might improve the quality of care following discharge from the hospital
Specialist outreach	Providing specialist services closer to patients (e.g. in rural areas) might improve access
Generalist outreach	Providing generalist services closer to patients (e.g. in rural areas) might improve access
Transportation services	Strategies that make it easier for patients to travel to and from health facilities might improve access and utilisation
Mobile units	Mobile units might improve utilisation by making it easier for patients to access services
Facilities and equipment	Strategies that improve the availability of facilities and equipment might improve access and utilisation
Size of organisations	Larger organisations might improve efficiency because of economies of scale. They might also improve the quality of care for procedures where there are better outcomes with a high volume. On the other hand changing the size of organisations (e.g. mergers) might reduce efficiency and quality of care during a transition period because of the need to integrate different systems. Also, very large organisations may be difficult to manage, increase administrative costs and have communication problems that might reduce efficiency and quality of care
Procurement and distribution of supplies	Strategies that improve the procurement and distribution of supplies might reduce resource use and improve the quality of care by ensuring that necessary supplies are available
Information and communication technology	
Health information systems	Health information systems might improve the quality of care and efficiency by improving communication, coordination and decision-making
Patient reminder and recall systems	Patient reminder and recall systems might increase utilisation and the quality of care by helping to ensure that patients receive effective interventions

Table 2. Examples of how changes in delivery arrangements might work (*Continued*)

E-Health	Electronic communication of health information might improve access to care by making it easier for patients and generalists to consult with specialists and for information to be shared between patients, providers and the health system
Quality and safety systems	
Quality monitoring and improvement systems	Monitoring systems might help to ensure that problems with the quality of care are identified and addressed. Routine, structured processes to address problems might help to improve the quality of care
Safety monitoring and improvement systems	Monitoring systems might help to ensure that problems with safety are identified and addressed. Routine, structured processes to address problems might help to improve safety
Working conditions of health workers	
Workload	Strategies to manage workloads might improve efficiency by helping to ensure health workers have an optimal amount of work. They might improve access to care by reducing burnout, absenteeism and loss of health workers
Work environment	Improvements to the work environment might improve the quality of care and efficiency by improving working conditions. They might improve access to care by helping to attract and retain health workers
Staff support	Staff support might reduce burnout, absenteeism and loss of health workers and thereby improve access to care
Health and safety systems	Health and safety systems might reduce injuries and illness among health workers and thereby improve access to care and reduce resource use needed to care for injured or ill health workers

Table 3. Included reviews

Delivery arrangement	Included reviews
Who receives care and when	
Queuing strategies	Interventions to reduce waiting times for elective procedures (Ballini 2015)
Care received by groups vs individual care	Group versus conventional antenatal care for women (Catling 2015)
Who provides care	

Table 3. Included reviews (*Continued*)

Pre-licensure education	Effects of changes in the pre-licensure education of health workers on health-worker supply (Pariyo 2009)
Recruitment and retention strategies	Interventions for increasing the proportion of health professionals practising in rural and other underserved areas (Grobler 2015)
Movement of health workers between public and private care	No relevant systematic review found
Role expansion or task shifting - Lay health workers: hypertension	Effectiveness of community health workers in the care of people with hypertension (Brownstein 2007)
Role expansion or task shifting - Lay health workers: delivery of community-based neonatal care packages	Community-based intervention packages for reducing maternal and neonatal morbidity and mortality and improving neonatal outcomes (Lassi 2015)
Role expansion or task shifting - Lay health workers: maternal and child health and infectious diseases	Lay health workers in primary and community health care for maternal and child health and the management of infectious diseases (Lewin 2010)
Role expansion or task shifting - Midlevel health professionals: non-doctor providers for abortion care	Safety and effectiveness of termination services performed by doctors versus midlevel providers: a systematic review and analysis (Ngo 2013)
Role expansion or task shifting - Healthcare providers giving additional social support to pregnant women vs usual care	Support during pregnancy for women at increased risk of low birthweight babies (Hodnett 2010)
Role expansion or task shifting - Midlevel health professionals: midwife-led care in pregnancy	Midwife-led continuity models versus other models of care for childbearing women (Sandall 2013)
Role expansion or task shifting - Allied health professionals (paramedics, physiotherapists, occupational therapists, language therapists, radiographers)	No relevant systematic review found
Role expansion or task shifting - Clinical officers/non-physician clinicians/associate clinicians vs physician for caesarean section	A comparison of clinical officers with medical doctors on outcomes of caesarean section in the developing world: meta-analysis of controlled studies (Wilson 2011)
Role expansion or task shifting - General practice	No relevant systematic review found
Role expansion or task shifting - Non-specialist vs specialist providers for mental health	Non-specialist health worker interventions for the care of mental, neurological and substance-abuse disorders in low- and middle-income countries (Van Ginneken 2013)
Role expansion or task shifting - Specialist nursing post added to hospital nurse staffing/dietary assistants added to hospital nurse staffing	Hospital nurse staffing models and patient- and staff-related outcomes (Butler 2011)

Table 3. Included reviews (*Continued*)

Role expansion or task shifting - Physician-nurse substitution	Effects of physician-nurse substitution on clinical parameters: a systematic review and meta-analysis (Martínez-González 2014)
Role expansion or task shifting - Professional groups vs physician anaesthesiologists administering anaesthesia	No relevant systematic review found
Role expansion or task shifting - Pharmacists delivering non-dispensing services to patients	The effect of pharmacist-provided non-dispensing services on patient outcomes, health service utilisation and costs in low- and middle-income countries (Pande 2013)
Role expansion or task shifting - Skilled birth attendants	The effect of providing skilled birth attendance and emergency obstetric care in preventing stillbirths (Yakoob 2011)
Role expansion or task shifting - Dental health promotion	No relevant systematic review found
Role expansion or task shifting - Dental care by dental therapists	A systematic review of oral health outcomes produced by dental teams incorporating midlevel providers (Wright 2013)
Self-management	No relevant systematic review found
Coordination of care	
Care pathways - Improved pre-hospital trauma systems vs no systems	Prehospital trauma systems reduce mortality in developing countries: a systematic review and meta-analysis (Henry 2012)
Care pathways - Rapid response systems in hospitals vs no systems	() Rapid response systems: a systematic review and meta-analysis (Maharaj 2015)
Care pathways - Hospital clinical pathways vs usual care	Clinical pathways: effects on professional practice, patient outcomes, length of stay and hospital costs (Rotter 2010)
Case management - Children with pneumonia/community-based with antibiotics/hospital-based with oxygen or vitamins	The effect of case management on childhood pneumonia mortality in developing countries (Theodoratou 2010)
Case management - People living with HIV/AIDS	Setting and organisation of care for persons living with HIV/AIDS (Handford 2006)
Communication between providers - Interactive communication between primary care doctors and specialists vs usual care	Meta-analysis: effect of interactive communication between collaborating primary care physicians and specialists (Foy 2010)
Coordination of care to reduce rehospitalisation - Pre-/post discharge interventions vs usual care/transition interventions vs usual care	Interventions to reduce 30-day rehospitalisation: a systematic review (Hansen 2011)

Table 3. Included reviews (*Continued*)

Discharge planning - Hospital discharge planning vs usual care	Discharge planning from hospital (Gonçalves-Bradley 2016)
Disease management	No relevant systematic review found
Integration - Adding a service to an existing service vs services with no addition/integrated vs vertical delivery models	Strategies for integrating primary health services in middle- and low-income countries at the point of delivery (Dudley 2011)
Packages of care	No relevant systematic review found
Referral systems - Healthcare delivery of organisational interventions vs no intervention for referral from primary to secondary care	Interventions to improve outpatient referrals from primary care to secondary care (Akbari 2008)
Referral systems - Nurse vs physician triage systems in emergency departments	The role of triage liaison physicians on mitigating overcrowding in emergency departments: a systematic review (Rowe 2011)
Teams - Team midwifery vs standard care	Hospital nurse staffing models and patient- and staff-related outcomes (Butler 2011)
Teams - Multidisciplinary team care for people living with HIV/AIDS vs no team	Home-based care for reducing morbidity and mortality in people infected with HIV/AIDS (Young 2010)
Teams - Practice based interventions to promote collaboration vs no intervention	Interprofessional collaboration to improve professional practice and healthcare outcomes (Reeves 2017)
Where care is provided	
Facilities and equipment	No relevant systematic review found
Generalist outreach	No relevant systematic review found
Intermediate care	No relevant systematic review found
Mobile units	No relevant systematic review found
Site of service delivery - HIV voluntary counselling and testing (VCT) at an optional location vs VCT at clinic	Home-based HIV voluntary counselling and testing (VCT) for improving uptake of HIV testing (Bateganya 2010)
Site of service delivery - Units dedicated to care for people living with HIV/AIDS/institutions managing a high volume of people living with HIV/AIDS	Setting and organisation of care for persons living with HIV/AIDS (Handford 2006)

Table 3. Included reviews (*Continued*)

Site of service delivery - Home-base care for people living with HIV/AIDS - Home-based care with multidisciplinary team care for people living with HIV/AIDS vs other delivery options	Home-based care for reducing morbidity and mortality in people infected with HIV/AIDS (Young 2010)
Site of service delivery Facility vs home	No relevant systematic review found
Site of service delivery - Home-based management of malaria (presumptive treatment of children with symptoms) vs usual care	Home- or community-based programmes for treating malaria (Okwundu 2013)
Site of service delivery - Strategies for increasing ownership and use of insecticide-treated bednets	Strategies to increase the ownership and use of insecticide-treated bednets to prevent malaria (Augustincic 2015)
Site of service delivery - Home care (different models) vs facility	Systematic review of international evidence on the effectiveness and costs of paediatric home care for children and young people who are ill (Parker 2013)
Site of service delivery - Maternity waiting home vs no waiting homes	Maternity waiting facilities for improving maternal and neonatal outcome in low-resource countries (Van Lonkhuijzen 2012)
Site of service delivery - Generalist outreach	No relevant systematic review found
Site of service delivery - Community-based interventions for childhood diarrhoea and pneumonia versus routine care	Effect of community based interventions on childhood diarrhoea and pneumonia: uptake of treatment modalities and impact on mortality (Das 2013)
Site of service delivery - Early discharge from hospital for mothers and infants born at term versus standard discharge	Early postnatal discharge from hospital for healthy mothers and term infants (Brown 2007)
Site of service delivery - Out-of-facility vs facility-based HIV and reproductive health services for young people	Reaching youth with out-of-facility HIV and reproductive health services: a systematic review (Denno 2012)
Site of service delivery - Decentralised vs centralised HIV care for initiating and maintaining anti-retroviral therapy	Decentralising HIV treatment in lower- and middle-income countries (Kredo 2013)
Site of service delivery - Workplace programmes for HIV and tuberculosis vs no programme	Workplace programmes for HIV and tuberculosis: a systematic review to support development of international guidelines for the health workforce (Yassi 2013)
Size of organisations	No relevant systematic review found

Table 3. Included reviews (*Continued*)

Specialist outreach	No relevant systematic review found
Information and communication technology	
E-Health - Mobile phone messaging for long-term illnesses vs usual care	Mobile phone messaging for facilitating self-management of long-term illnesses (De Jongh 2012)
E-Health - Mobile phone messaging reminders for attendance at healthcare appointments vs various other interventions	Mobile phone messaging reminders for attendance at healthcare appointments (Gurol-Urganci 2013)
E-Health - Mobile phone messaging to promote adherence to antiretroviral therapy vs usual care	Mobile phone text messages for improving adherence to antiretroviral therapy (ART): an individual patient data meta-analysis of randomised trials (Mbuagbaw 2013)
E-Health - Telemedicine vs face-to-face patient care	No relevant systematic review found
Health information systems - Women carrying their own case notes in pregnancy vs less detailed health cards	Giving women their own case notes to carry during pregnancy (Brown 2011)
Patient reminder and recall systems - Reminders for routine childhood vaccination vs usual care	Interventions for improving coverage of child immunisation in low-income and middle-income countries (Oyo-Ita 2016) Patient reminder and recall systems to improve immunisation rates (Jacobson Vann 2005)
Quality and safety systems	
Quality/safety monitoring and improvement systems - Medication review for hospitalised adult patients vs standard care	Medication review in hospitalised patients to reduce morbidity and mortality (Christensen 2016)
Quality monitoring and improvement systems - Interventions to improve antibiotic prescribing to hospital inpatients	Interventions to improve antibiotic prescribing practices for hospital inpatients (Davey 2013)
Quality monitoring and improvement systems - Decision support to improve healthcare process and health outcomes for people living with HIV/AIDS - Decision support with clinical information system to improve healthcare process and health outcomes for people living with HIV/AIDS	Chronic care model decision support and clinical information systems interventions for people living with HIV: a systematic review (Pasricha 2012)
Working conditions of health workers	
Workload	No relevant systematic review found

Table 3. Included reviews (*Continued*)

Staff support - Managerial supervision to improve quality of primary health care	Managerial supervision to improve primary health care in low- and middle-income countries (Bosch-Capblanch 2011)
Staff support - Staff-support interventions for health workers	No relevant systematic review found
Work environment - Improvements to nursing work environment vs no intervention	No relevant systematic review found
Health and safety systems	No relevant systematic review found
Complex interventions cutting across delivery categories and across the other overviews	
Package of multiple interventions - Emergency obstetric referral interventions	The effectiveness of emergency obstetric referral interventions in developing country settings: a systematic review (Hussein 2012.)

Table 4. Excluded reviews

Review ID	Excluded reviews	Reasons for exclusion
Arnold 2005	Interventions to improve antibiotic prescribing practices in ambulatory care	Search out of date
Black 2011	The impact of ehealth on the quality and safety of health care: a systematic overview	Addressed by De Jongh 2012, and Pasricha 2012
Blalock 2013	Effect of community pharmacy-based interventions on patient health outcomes: a systematic review	Addressed by Pande 2013
Cabana 2004	Does continuity of care improve patient outcomes?	Major limitations
Callaghan 2010	A systematic review of task-shifting for HIV treatment and care in Africa	Addressed by Kredo 2013
Carroli 2001	WHO systematic review of randomized controlled trials of routine antenatal care	Search out of date
Darmstadt 2009	60 Million non-facility births: who can deliver in community settings to reduce intrapartum-related deaths?	Major limitations
Deglise 2012	SMS for disease control in developing countries: a systematic review of mobile health applications	Major limitations
Dolea 2010	Evaluated strategies to increase attraction and retention of health workers in remote and rural areas	Addressed by Grobler 2015

Table 4. Excluded reviews (*Continued*)

Dowswell 2009	Antenatal day care units versus hospital admission for women with complicated pregnancy	Limited relevance to low-income countries
Dowswell 2010	Alternative versus standard packages of antenatal care for low-risk pregnancy	Addressed by Lassi 2015
Engstrom 2001	Is general practice effective? A systematic literature review	Search out of date
Faulkner 2003	A systematic review of the effect of primary care-based service innovations on quality and patterns of referral to specialist secondary care	Search out of date
Fearon 2012	Services for reducing duration of hospital care for acute stroke patients	Limited relevance to low-income countries
Fernandez 2012	Models of care in nursing: a systematic review	Addressed by Butler 2011
Ford 2012	Safety of task-shifting for male medical circumcision: a systematic review and meta-analysis	Major limitations
Fraser 2005	Implementing electronic medical record systems in developing countries	Limited relevance to low-income countries
Fraser 2007	Information systems for patient follow-up and chronic management of HIV and tuberculosis: a life-saving technology in resource-poor areas	Major limitations
Garg 2005	Effects of computerized clinical decision support systems on practitioner performance and patient outcomes: a systematic review	Limited relevance to low-income countries
Griffiths 2007	Effectiveness of intermediate care in nursing-led in-patient units	Limited relevance to low-income countries
Gruen 2004	Specialist outreach clinics in primary care and rural hospital settings	Search out of date
Gurol-Urganci 2012	Mobile phone messaging for communicating results of medical investigations	Limited relevance to low-income countries
Harding 2011	Do triage systems in healthcare improve patient flow? A systematic review of the literature	Addressed by Rowe 2011
Hatem 2008	Midwife-led versus other models of care for childbearing women	Addressed by Sandall 2013

Table 4. Excluded reviews (*Continued*)

Haws 2007	Impact of packaged interventions on neonatal health: a review of the evidence	Addressed by Lassi 2015
Heintze 2007	What do community-based dengue control programmes achieve? A systematic review of published evaluations	Govenance arrangement
Hesselink 2012	Improving patient handovers from hospital to primary care: a systematic review	Limited relevance to low-income countries
Hickam 2013	Outpatient Case Management for Adults With Medical Illness and Complex Care Needs	Limited relevance to low-income countries
Hopkins 2007	Impact of home-based management of malaria on health outcomes in Africa: a systematic review of the evidence	Addressed by Okwundu 2013
Horrocks 2002	Systematic review of whether nurse practitioners working in primary care can provide equivalent care to doctors	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
Hundley 2012	Are birth kits a good idea? A systematic review of the evidence	Implementation strategies
Hussein 2011	What kinds of policy and programme interventions contribute to reductions in maternal mortality? The effectiveness of primary level referral systems for emergency maternity care in developing countries	Addressed by Hussein 2012
Ioannidis 2001	Evidence on interventions to reduce medical errors: an overview and recommendations for future research	Search out of date
Jamal 2009	The impact of health information technology on the quality of medical and health care: a systematic review	Major limitations
Joshi 2006	Tuberculosis among health-care workers in low- and middle-income countries: a systematic review	Major limitations
Kaboli 2006	Clinical pharmacists and inpatient medical care: a systematic review	Limited relevance to low-income countries
Kennedy 2010	Linking sexual and reproductive health and HIV interventions: a systematic review	Addressed by Dudley 2011

Table 4. Excluded reviews (*Continued*)

Kidney 2009	Systematic review of effect of community-level interventions to reduce maternal mortality	Addressed by Lewin 2010
Ko 2010	Patient-held medical records for patients with chronic disease: a systematic review	Major limitations
Koshman 2008	Pharmacist care of patients with heart failure: a systematic review of randomized trials	Addressed by Pande 2013
Krause 2005	Economic effectiveness of disease management programs: a meta-analysis	Major limitations
Krishna 2009	Healthcare via cell phones: a systematic review	Addressed by De Jongh 2012
Kuethe 2013	Nurse versus physician-led care for the management of asthma	Addressed by Martinez-Gonzalez 2014
Kuhlmann 2010	The integration of family planning with other health services: a literature review	Addressed by Dudley 2011
Lee 2009	Linking families and facilities for care at birth: what works to avert intrapartum-related deaths?	Major limitations
Legido-Quigley 2013	Integrating tuberculosis and HIV services in low- and middle-income countries: a systematic review	Limited relevance to low-income countries
Liang 2011	Effect of mobile phone intervention for diabetes on glycaemic control: a meta-analysis	Addressed by De Jongh 2012
Lim 2009	A systematic review of the literature comparing the practices of dispensing and non-dispensing doctors	Major limitations
Lindegren 2012	Integration of HIV/AIDS services with maternal, neonatal and child health, nutrition, and family planning services	Addressed by Dudley 2011, but it addresses a subset of types of integration that is highly relevant
Macinko 2009	The impact of primary healthcare on population health in low- and middle-income countries	Major limitations
Malarcher 2011	Provision of DMPA by community health workers: what the evidence shows	Addressed by Lewin 2010
Marcos 2012	Community strategies that improve care and retention along the prevention of mother-to-child transmission of HIV cascade: a review	Major limitations
Marine 2006	Preventing occupational stress in healthcare workers	Outside of the scope of the overviews - focus on occupational health

Table 4. Excluded reviews (*Continued*)

Mattke 2007	Evidence for the effect of disease management: is $1 billion a year a good investment?	Major limitations
McGaughey 2007	Outreach and Early Warning Systems (EWS) for the prevention of intensive care admission and death of critically ill adult patients on general hospital wards	Addressed by Maharaj 2015.
McNeill 2013	Do either early warning systems or emergency response teams improve hospital patient survival? A systematic review	Addressed by Maharaj 2015.
McPherson 2006	A systematic review of evidence about extended roles for allied health professionals	Search out of date
Mdege 2013	The effectiveness and cost implications of task-shifting in the delivery of antiretroviral therapy to HIV-infected patients: a systematic review	Addressed by Kredo 2013
Millard 2013	Self-management education programs for people living with HIV/AIDS: a systematic review	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
Mitchell 2008	Multidisciplinary care planning and teamwork in primary care	Not a systematic review of interventions
Mohanan 2009	Family support for reducing morbidity and mortality in people with HIV/AIDS	Uninformative empty review
Montgomery 2010	Can paraprofessionals deliver cognitive-behavioral therapy to treat anxiety and depressive symptoms?	Addressed by Van Ginneken 2013
Muthu 2004	Free-standing midwife-led maternity units: a safe and effective alternative to hospital delivery for low-risk women?	Addressed by Sandall 2013
Norris 2006	Effectiveness of community health workers in the care of persons with diabetes	Major limitations
Nyamtema 2011	Maternal health interventions in resource limited countries: a systematic review of packages, impacts and factors for change	Major limitations
Orton 2005	Unit-dose packaged medicines for treating malaria	Implementation strategies

Table 4. Excluded reviews (*Continued*)

Ostini 2009	Systematic review of interventions to improve prescribing	Major limitations
Painuly 2008	Effectiveness of training of non-mental health care providers in mental health in low- and middle-income countries: a systematic review	Addressed by Van Ginneken 2013
Pappas 2012	Email for clinical communication between healthcare professionals	Implementation strategies
Parker 2011	Evaluating models of care closer to home for children and young people who are ill: a systematic review	Addressed by Parker 2013
Parmelli 2012	Interventions to increase clinical incident reporting in health care	Major limitations
Post 2009	Do specialized centers and specialists produce better outcomes for patients with chronic diseases than primary care generalists? A systematic review	Limited relevance to low-income countries
Pyone 2012	Childbirth attendance strategies and their impact on maternal mortality and morbidity in low-income settings: a systematic review	Addressed by Yakoob 2011
Ranji 2007	Effects of rapid response systems on clinical outcomes: systematic review and meta-analysis	Addressed by Maharaj 2015
Ranji 2008	Interventions to reduce unnecessary antibiotic prescribing: a systematic review and quantitative analysis	Implementation strategies
Reeves 2013	Interprofessional education: effects on professional practice and healthcare outcomes	Implementation strategies
Renner 2013	Who can provide effective and safe termination of pregnancy care? A systematic review	Addressed by Ngo 2013
Rueda 2006	Patient support and education for promoting adherence to highly active antiretroviral therapy for HIV/AIDS	Major limitations
Saberi 2012	The impact of HIV clinical pharmacists on HIV treatment outcomes: a systematic review	Addressed by Pande 2013
Sazawal 2003	Effect of pneumonia case management on mortality in neonates, infants, and preschool children: a meta-analysis of community-based trials	Not a systematic review of interventions

Table 4. Excluded reviews (*Continued*)

Schadewaldt 2011	Nurse-led clinics as an effective service for cardiac patients: results from a systematic review	Major limitations.
Schalk 2010	Interventions aimed at improving the nursing work environment: a systematic review	Search out of date
Shojania 2009	The effects of on-screen, point of care computer reminders on processes and outcomes of care	Implementation strategies. Limited relevance to low-income countries
Sibbald 2007	Shifting care from hospitals to the community: a review of the evidence on quality and efficiency	Major limitations
Smith 2004	Comparative effectiveness and safety of physician and nurse anaesthetists: a narrative systematic review	Search out of date
Smith 2009	Private local pharmacies in low- and middle-income countries: a review of interventions to enhance their role in public health	Major limitations
Spaulding 2009	Linking family planning with HIV/AIDS interventions: a systematic review of the evidence	Major limitations
Tomasi 2004	Health information technology in primary health care in developing countries: a literature review	Major limitations
Tsai 2005	A meta-analysis of interventions to improve care for chronic illnesses	Major limitations
Tudor Car 2011	Integrating prevention of mother-to-child HIV transmission (PMTCT) programmes with other health services for preventing HIV infection and improving HIV outcomes in developing countries	Addressed by Dudley 2011
Tudor Car 2013	Telephone communication of HIV testing results for improving knowledge of HIV infection status	Addressed by De Jongh 2012; Gurol-Urganci 2013; Mbuagbaw 2013
Tura 2013	The effect of health facility delivery on neonatal mortality: systematic review and meta-analysis	Major limitations
Uyei 2011	Integrated delivery of HIV and tuberculosis services in sub-Saharan Africa: a systematic review	Major limitations
Van Citters 2004	A systematic review of the effectiveness of community-based mental health outreach services for older adults	Limited relevance to low-income countries
Van Velthoven 2013	Scope and effectiveness of mobile phone messaging for HIV/AIDS care: a systematic review	Addressed by Mbuagbaw 2013

Table 4. Excluded reviews (*Continued*)

Van Walraven 2010	The association between continuity of care and outcomes: a systematic and critical review	Limited relevance to low-income countries
Van Wyk 2010	Preventive staff-support interventions for health workers	Outside of the scope of the overviews - focuses largely on occupational health
Villar 2001	Patterns of routine antenatal care for low-risk pregnancy	Search out of date
Walsh 2004	Outcomes of free-standing, midwife-led birth centers: a structured review	Addressed by Sandall 2013
Webster 2007	Delivery systems for insecticide treated and untreated mosquito nets in Africa: categorization and outcomes achieved	Major limitations
Wiley-Exley 2007	Evaluations of community mental health care in low- and middle-income countries: a 10-year review of the literature	Addressed by Van Ginneken 2013
Willey 2012	Strategies for delivering insecticide-treated nets at scale for malaria control: a systematic review	Addressed by Augustincic 2015
Wilson 2009	A critical review of interventions to redress the inequitable distribution of healthcare professionals to rural and remote areas	Addressed by Grobler 2015
Winters 2007	Rapid response systems: a systematic review	Addressed by Maharaj 2015
Woltmann 2012	Comparative effectiveness of collaborative chronic care models for mental health conditions across primary, specialty, and behavioral health care settings: systematic review and meta-analysis	Limited relevance to low-income countries
Wouters 2012	Impact of community-based support services on antiretroviral treatment programme delivery and outcomes in resource-limited countries: a synthetic review	Major limitations
Wu 2012	Effects of clinical communication interventions in hospitals: a systematic review of information and communication technology adoptions for improved communication between clinicians	Limited relevance to low-income countries
Yang 2011	Reducing needle stick injuries in healthcare occupations: an integrative review of the literature	Not a systematic review of interventions

Table 4. Excluded reviews (*Continued*)

Zuurmond 2012	The effectiveness of youth centers in increasing use of sexual and reproductive health services: a systematic review	Addressed by Denno 2012
Zwar 2006	A systematic review of chronic disease management	Major limitations

Table 5. Reliability of included reviews

Review	A. Identification, selection and critical appraisal of studies[1]						B. Analysis[2]						C. Overall[3]	
	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. Explorato factors	6. Overall	1. Other considerations	2. Reliability of the review
Akbari 2008	+	+	+	+	+	+	+	+	NA	+	+	+	+	+
Augustincic 2015	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Ballini 2015	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Bateganya 2010	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Bosch-Capblanch 2011	+	+	+	+	+	+	?	+	+	+	?	+	+	+
Brown 2007	+	+	+	+	?	+	+	+	+	+	+	+	+	+
Brown 2011	+	?	+	+	+	+	?	+	+	+	+	+	+	+

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

Brown-stein 2007	+	?	+	?	?	+	?	+	+	?	?	+	+	+
Butler 2011	+	+	+	+	+	+	?	+	?	+	+	+	+	+
Catling 2015	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Chris-tensen 2016	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Das 2013	+	+	+	+	?	+	+	+	+	+	+	+	+	+
Davey 2013	+	+	+	+	+	+	+	+	+	+	?	+	?	+
De Jongh 2012	+	+	+	+	+	+	+	+	?	?	+	—	+	—
Denno 2012	+	+	+	+	?	+	+	+	?	+	?	+	+	+
Dud-ley 2011	+	+	+	+	+	+	+	+	+	+	?	+	+	+
Foy 2010	+	?	+	?	+	+	+	+	+	+	+	+	+	+
Gonçalv Bradley 2016	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Grob-ler 2015	+	+	+	+	+	+	?	+	NA	+	NA	+	+	+
Gurol- Ur-ganci	+	+	+	+	+	+	+	+	+	+	NA	+	+	+

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

2013													
Handford 2006	+	?	?	+	?	?	?	+	+	?	—	?	+	—
Hansen 2011	+	?	+	?	+	+	+	+	+	+	?	+	+	+
Henry 2012	+	?	+	?	+	+	?	+	+	+	+	+	+	+
Hodnett 2010	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Hussein 2012	+	+	?	?	+	+	+	+	?	+	+	+	+	+
Jacobson Vann 2005	+	?	+	?	+	—	+	+	+	+	+	+	+	—
Kredo 2013	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Lassi 2015	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Lewin 2010	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Maharaj 2015	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Martíne Gonzále 2014	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Mbuagbaw 2013	+	—	?	+	+	?	+	+	+	+	+	+	+	+

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

Ngo 2013	+	?	+	?	?	−	+	+	+	+	+	NA	−	−
Okwundu 2013	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Oyo-Ita 2016	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Pande 2013	+	?	+	+	+	+	+	+	+	?	?	+	+	+
Pariyo 2009	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Parker 2013	+	?	+	?	−	+	?	+	+	+	?	−	?	−
Pasricha 2012	+	+	+	+	+	+	+	+	+	+	?	+	+	+
Reeves 2017	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Rotter 2010	+	+	?	+	+	+	+	+	+	+	+	+	+	+
Rowe 2011	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Sandall 2013	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Theodoatou 2010	+	?	+	+	+	+	?	+	+	+	+	+	+	+
Van Ginneken 2013	+	+	+	+	+	+	+	+	+	+	?	+	+	+
Van	+	+	+	+	+	+	NA	NA	NA	NA	NA	NA	+	+

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

Lonkhujzen 2012														
Wilson 2011	+	?	+	?	?	−	?	+	+	+	?	−	+	−
Wright 2013	+	+	+	+	+	+	+	+	+	?	?	+	+	+
Yakoob 2011	+	?	+	+	+	+	+	+	+	+	+	+	+	+
Yassi 2013	+	+	+	+	+	+	+	+	?	+	+	+	+	+
Young 2010	+	+	+	+	+	+	+	+	+	+	+	+	+	+
Total +	**51**	**32**	**47**	**42**	**43**	**46**	**40**	**50**	**43**	**45**	**35**	**45**	**47**	**45**
Total −	**0**	**1**	**0**	**0**	**1**	**3**	**0**	**0**	**0**	**0**	**1**	**3**	**1**	**6**
Total NA	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**3**	**1**	**3**	**2**	**0**	**0**
Total ?	**0**	**18**	**4**	**9**	**7**	**2**	**10**	**0**	**5**	**5**	**12**	**1**	**3**	**0**

[1]**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)

[2]**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; e.g. 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; e.g. no studies or data)

3. **Heterogeneity**: did the review describe the extent of heterogeneity? (+ yes; ? can't tell/partially; − no, NA not applicable; e.g. 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; e.g. 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; e.g. 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)

[3]**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)

Table 6. Key messages of included reviews

Delivery arrangement	Key messages
Who receives care and when	
Queuing strategies Ballini 2015	➡ Direct/open access and direct booking systems probably slightly decrease median waiting times and may decrease mean waiting times in hospital settings • The effects of direct/open access and direct booking systems on mean waiting times in outpatient settings, and on the proportion of patients waiting less than a recommended time are uncertain. ➡ The effects of other interventions to reduce waiting times, including increasing the supply of services, are uncertain ➡ The included studies were from high-income countries.
Group vs individual care Catling 2015	➡ In high-income countries, group compared to individual antenatal care probably reduces the number of preterm births, while having little or no effect on the number of low birthweight and small for gestational age newborns; and it may have little or no effect on perinatal mortality ➡ The applicability of the findings of this review to low-income countries is uncertain ➡ The effects, costs and cost-effectiveness of group antenatal care should be evaluated in large randomised trials in low-income countries
Who provides care	
Pre-licensure education Pariyo 2009	➡ There is little evidence of the effects of interventions to increase the capacity of health professional training institutions, reduce student dropout rates or increase the number of students recruited from other countries into health professional training institutions ➡ Academic advising programmes for minority groups may: • increase the number of minority students enrolled in health sciences; • slightly increase retention through to graduation;

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

	• decrease differences in retention levels through to graduation between minority and non-minority students in the health sciences. ➡ No studies were found of the effects of other pre-licensure measures to increase health worker supply
Recruitment and retention strategies Grobler 2015	➡ It is uncertain whether any of the following types of interventions to recruit or retain health professionals increase the number of health professionals practising in underserved areas • Educational interventions (e.g. student selection criteria, undergraduate and postgraduate teaching curricula, exposure to rural and urban underserved areas). • Financial interventions (e.g. undergraduate and postgraduate bursaries or scholarships linked to future practice location, rural allowances, increased public sector salaries). • Regulatory strategies (e.g. compulsory community service, relaxing work regulations imposed on foreign medical graduates who are willing to work in rural or urban underserved areas). • Personal and professional support strategies (e.g. providing adequate professional support and attending to the needs of the practitioner's family).
Role expansion or task shifting - Lay health workers: hypertension Brownstein 2007	**In people with hypertension**: ➡ Community health workers (CHWs) probably improve behavioural changes (such as appointment keeping and adherence to medication), blood pressure control, and the 5-year mortality rate ➡ CHWs may slightly improve healthcare utilisation and health systems outcomes (such as reduced hospital admissions) ➡ All the included studies took place in a high-income country but mainly in poor communities
Role expansion or task shifting - Lay health workers: delivery of community-based neonatal care packages Lassi 2015	➡ Community mobilisation and antenatal and postnatal home visitation decreases neonatal mortality ➡ The following community-based intervention packages probably reduce neonatal mortality • Community-support groups or women's groups. • Community mobilisation and home-based neonatal treatment. ➡ The following community-based intervention packages may reduce neonatal mortality • Training traditional birth attendants who make antenatal and intrapartum home visits. • Home-based neonatal care and treatment. • Education of mothers and antenatal and postnatal visitation. ➡ The following community-based intervention packages may reduce maternal mortality • Community mobilisation and antenatal and postnatal

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

	home visitation. • Community-support groups or women's groups. • Community mobilisation and home-based neonatal treatment. • Training traditional birth attendants who make antenatal and intrapartum home visits.
Role expansion or task shifting - Lay health workers: maternal and child health and infectious diseases Lewin 2010	➡ The use of lay health workers in maternal and child health programmes: • probably leads to an increase in the number of women who breastfeed; • probably leads to an increase in the number of children with up-to-date immunisation schedules; • may lead to fewer deaths among children under five years; • may lead to fewer children who suffer from fever, diarrhoea and pneumonia; • may increase the number of parents who seek help for their sick child. • No studies looked at the impact of lay health workers on maternal mortality. ➡ The use of lay health workers in tuberculosis programmes: • probably leads to an increase in the number of people with tuberculosis who are cured; • probably makes little or no difference to the number of people who complete preventive treatment for tuberculosis. ➡ Little evidence is available regarding the effectiveness of substituting lay health workers for health professionals or the effectiveness of alternative strategies for training, supporting and sustaining lay health workers ➡ Factors that need to be considered when assessing whether intervention effects are likely to be transferable to other settings include: • the availability of routine data on who might benefit from the intervention; • the availability of resources for the lay health worker programme, for clinical and managerial support, and for supplies.
Role expansion or task shifting - Midlevel health professionals: non-doctor providers for abortion care Ngo 2013	➡ Surgical aspiration abortion procedures administered by midlevel providers probably lead to little or no difference in incomplete and failed abortions, compared to doctors ➡ Surgical aspiration abortion procedures administered by midlevel providers probably lead to slightly more complications, compared to doctors ➡ Medical abortion procedures administered by midlevel providers probably lead to slightly less incomplete and failed abortions, compared to doctors ➡ Factors that need to be considered when assessing the transferability of the findings to a low-income setting include the avail-

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

	ability of doctors to perform abortion procedures, the availability and training of midlevel providers to perform surgical and medical abortions and the abortion rates and incidence of unsafe abortion procedures
Role expansion or task shifting - Healthcare providers giving additional social support to pregnant women vs usual care Hodnett 2010	➡ Compared to usual care, providing additional social support during an at-risk pregnancy probably leads to fewer caesarean births and may lead to fewer antenatal hospital admissions ➡ Compared to usual care, providing additional social support during an at-risk pregnancy probably has little or no effect on the incidence of low birth weight, preterm births, or perinatal deaths ➡ The studies included in this review were conducted among socially disadvantaged groups in middle- and high-income countries. Disadvantaged groups in some high- and middle-income countries may share similar characteristics to disadvantaged groups in low-income countries, and the results of these studies may therefore be transferable to low-income country settings
Role expansion or task shifting - Midlevel health professionals: midwife-led care in pregnancy Sandall 2013	➡ In high-income countries, midwife-led care compared to other models of care for childbearing women and their infants: • reduces preterm births (less than 37 weeks); • reduces overall foetal loss and neonatal deaths; • increases spontaneous vaginal births; • reduces instrumental vaginal births (use of forceps or vacuum); • decreases the use of regional analgesia (epidural/spinal). ➡ In addition, midwife-led care compared to other models of care probably reduces caesarean births and increases the number of women with an intact perineum ➡ None of the included studies took place in a low-income country, and the transferability of this evidence is uncertain
Role expansion or task shifting - Clinical officers vs physician for caesarean section Wilson 2011	➡ It is uncertain whether there are any differences in maternal or perinatal mortality between caesarean sections performed by non-physician clinicians and by doctors ➡ Non-physician clinicians performing caesarean sections may lead to slightly more wound infections and occurrences of wound dehiscence than doctors ➡ All six studies included in this systematic review were from low-income countries
Role expansion or task shifting - Non specialists vs specialists providers for mental health Van Ginneken 2013	➡ The use of non-specialist health workers in the care of adults with depression, anxiety or both: • may increase the number of adults who recover two to six months after treatment; • may reduce symptoms for mothers with depression. ➡ The use of non-specialist health workers in the care of adults with dementia: • probably slightly improves the symptoms of people with

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

	dementia; • probably improves the mental well-being, burden and distress of caregivers to people with dementia. ➡ The use of non-specialist health workers may decrease the quantity of alcohol consumed in problem drinkers ➡ The use of non-specialist health workers or teachers may reduce the symptoms in adults with post-traumatic stress disorder ➡ It is uncertain whether lay health workers or teachers reduce post-traumatic stress disorder symptoms among children ➡ Most of the included studies took place in low-resource settings
Role expansion or task shifting - Specialist nursing post added to hospital nurse staffing - Dietary assistants added to hospital nurse staffing Butler 2011	➡ The addition of a specialist nursing post to staffing may decrease patient length of stay; and may lead to little or no difference in in-hospital mortality, readmissions, attendance at emergency departments within 30 days, or postdischarge adverse events ➡ Adding support staff (dietary assistants) to nurse staffing may decrease mortality in trauma units, in hospital, and at 4 months after discharge ➡ Team midwifery shortens the length of stay in special care nurseries for infants, slightly shortens the length of stay in hospital for women giving birth, and probably leads to little or no difference in perinatal deaths ➡ None of the included studies took place in a low-income country
Role expansion or task shifting - Physician-nurse substitution Martínez-González 2014	➡ Nurse-led care probably leads to a lower systolic blood pressure and lower CD4 cell counts in HIV/AIDs patients compared to physician-led care ➡ Nurse-led care compared to physician-led care probably leads to little or no difference in other clinical parameters, such as diastolic blood pressure, total cholesterol level, and glycosylated haemoglobin concentrations ➡ Most of the studies took place in high-income countries. • The applicability of the findings may be affected by cultural and economic differences, patient populations, services provided in primary care settings, and the availability and level of nurses' skills.
Role expansion or task shifting - Pharmacists delivering non-dispensing services to patients 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' atti-

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

	tudes to pharmacists, pharmacists' training, and laws governing pharmaceutical practice
Role expansion or task shifting - Skilled birth attendants 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
Role expansion or task shifting - Dental care by dental therapists Wright 2013	➡ It is uncertain whether midlevel providers decrease the incidence, prevalence or severity of dental caries, or increase treatment of caries ➡ None of the included studies took place in a low-income country
Coordination of care	
Care pathways - Improved pre-hospital trauma systems vs no systems Henry 2012	➡ Pre-hospital trauma systems may reduce mortality. ➡ Pre-hospital trauma systems may reduce the response time from injury to first medical contact in the field ➡ Most of the included studies took place in middle-income countries
Care pathways - Rapid response systems in hospitals vs no systems Maharaj 2015	➡ Rapid-response systems for hospitalised adults may slightly reduce hospital mortality and cardiopulmonary arrests outside of intensive care units; and may lead to little or no difference in admissions to intensive care units ➡ Rapid-response systems for hospitalised children may slightly reduce cardiopulmonary arrests outside of intensive care units, and the effects on hospital mortality and admissions to intensive care units are uncertain ➡ None of the included studies took place in a low-income country
Care pathways - Hospital clinical pathways vs usual care Rotter 2010	➡ Clinical pathways compared to usual care in hospitals probably decrease the length of stay and may decrease complications and hospital readmissions ➡ It is uncertain whether clinical pathways reduce in-hospital mortality or hospital costs ➡ Multifaceted interventions that include a clinical pathway probably lead to little or no difference in hospital mortality and may lead to little or no difference in length of stay or hospital costs ➡ It is uncertain whether multifaceted interventions that include a clinical pathway decrease hospital complication or readmissions ➡ Almost all the evaluations of clinical pathways have been conducted in high-income economies
Case management - Children with pneumonia - Community-based with antibiotics - Hospital-based with oxygen or Vitamin Theodoratou 2010	➡ Community case management of pneumonia may reduce all-cause mortality and mortality due to acute lower respiratory infection ➡ All studies took place in low- and middle-income countries

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

Case management - People living with HIV/AIDS Handford 2006	➡ Case management may reduce mortality and the number of emergency department visits among people living with HIV/AIDS. Other effects of case management are uncertain ➡ Computer prompts probably hasten initiation of recommended treatments for patients with HIV/AIDS. Other effects of computer prompts and information systems are uncertain ➡ The effects of multidisciplinary or multifaceted interventions are uncertain All the studies reviewed took place in high-income countries
Communication between providers - Interactive communication between primary care doctors and specialists vs usual care Foy 2010	➡ Interactive communication between primary care physicians and specialists probably leads to substantial improvements in patient outcomes ➡ Although the population samples in the included studies were patients with diabetes and psychiatric conditions in high-income countries, the consistency of effects suggests the potential of interactive communication to improve the effectiveness of primary care/specialist collaboration across other conditions and settings ➡ When assessing the transferability of these findings to low-income country settings, the availability and accessibility of specialist care in these settings should be considered as well as the technology required for interactive communication
Coordination of care to reduce rehospitalisation - Pre, post discharge interventions vs usual care - Transition interventions vs usual care Hansen 2011	➡ It is uncertain whether pre-discharge interventions reduce rehospitalisation ➡ Postdischarge interventions may lead to little if any difference in rehospitalisation ➡ It is uncertain whether patient-centred discharge instructions reduce rehospitalisation ➡ Inpatient-outpatient provider continuity may slightly reduce rehospitalisation ➡ It is uncertain whether interactions between patients and nurses before and after discharge to support patient self-care reduce rehospitalisation ➡ No studies conducted in low-income countries were identified
Discharge planning - Hospital discharge planning vs usual care Gonçalves-Bradley 2016	➡ In high-income countries: • discharge planning probably reduces unscheduled readmission rates at 3 months for patients admitted with a medical condition and the length of hospital stays. • discharge planning may lead to increased satisfaction for patients and healthcare professionals. • the effect of discharge planning on unscheduled readmissions for patients admitted to hospital following a fall and the costs or savings of discharge planning are uncertain. ➡ The effects of discharge planning in low-income countries are uncertain since no studies took place in these settings • the impacts of discharge planning on the length of hospital stays, unscheduled readmission rates, and health outcomes

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

	might depend on the availability of community care and the capacity of health professionals in the hospital to prepare and implement discharge plans based on individual patient needs.
Integration - Adding a service to an existing service vs services with no addition - Integrated vs vertical delivery models Dudley 2011	➡ Adding family planning to other services probably increases the utilisation of family planning; but probably results in little or no difference in the number of new pregnancies ➡ Adding provider-initiated HIV counselling and testing to sexually transmitted infection services and to TB services probably increases the number of people receiving HIV testing ➡ Integrating sexually transmitted infection services for female sexual partners of truck drivers into routine primary care may reduce women's utilisation of these services and their attendance following referral ➡ Integrated community and facility provision of HIV prevention and control improves the proportion of STIs treated effectively in males but leads to little or no difference in the proportion treated effectively in females ➡ Integrated community and facility provision of HIV prevention and control results in little or no difference in sexually transmitted disease incidence or HIV incidence in the population ➡ 'Integration' is a complex intervention and is understood in different ways in different settings. Evaluations need to clearly describe the interventions being compared, including how services are integrated in practice
Integration Oyo-Ita 2016	➡ Integrating vaccination with other healthcare services may increase DTP3 and measles vaccine coverage and may have little or no effect on BCG coverage
Referral systems - Healthcare delivery of organisational interventions vs no intervention for referral from primary to secondary care Akbari 2008	➡ Professional education that includes guidelines, checklists, video materials and educational outreach by specialists probably improves the quantity and quality of referrals ➡ Joint primary care practitioner and consultant sessions probably result in improved patient outcomes ➡ Organisational interventions that may improve referral rates and referral appropriateness include: • the provision of physiotherapy services in primary care; • obtaining a second, in-house assessment of referrals; • dedicated appointment slots at secondary levels for each primary care practice. ➡ Professional education that only includes the passive dissemination of referral guidelines probably leads to little or no difference in both the quantity and quality of referrals ➡ The effects of financial incentives on referral rates are uncertain
Referral systems - Nurse vs physician triage systems in emergency departments Rowe 2011	➡ Physician-led triage compared to nurse-led triage probably reduces emergency department length of stay, physician's initial assessment time, and the proportion of patients leaving without be-

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

	ing seen ➡ It may lead to little or no difference in the proportion of patients leaving the emergency department against medical advice ➡ None of the included studies took place in a low-income country
Teams - Team midwifery vs standard care Butler 2011	➡ Team midwifery shortens the length of stay in special care nurseries for infants, slightly shortens the length of stay in hospital for women giving birth, and probably leads to little or no difference in perinatal deaths ➡ None of the included studies took place in a low-income country
Teams - Multidisciplinary team care for people living with HIV/AIDS vs no team Young 2010	➡ Intensive home-based care delivered by nurses to people living with HIV and AIDS: • probably improves their knowledge about HIV and about HIV medications and may improve adherence to medication; • probably leads to little or no difference in their CD4 counts and viral loads and may improve their physical functioning. ➡ Multi-professional team care in the home, compared with usual care by primary care nurses, may lead to little or no difference in the quality of life, time in care or survival of people living with HIV and AIDS ➡ Information, communication and decision support via a computer in the homes of people living with AIDS may lead to little or no difference in health status or decision-making skills and confidence but may slightly reduce people's social isolation and improve their quality of life ➡ It is uncertain whether exercise at home improves the physical functioning, well-being, body composition measures or biochemical measures of people living with HIV and AIDS ➡ Home-based safe water systems probably reduce the frequency and severity of diarrhoea among people living with HIV and AIDS
Teams - Practice-based interventions to promote collaboration vs no intervention Reeves 2017	➡ The review identified 4 types of interprofessional collaboration interventions: externally facilitated interprofessional activities, interprofessional meetings, interprofessional checklists and interprofessional rounds ➡ It is uncertain if externally facilitated interprofessional activities improve collaborative working, team communication, co-ordination, patient-assessed quality of care or continuity of care ➡ The use of externally facilitated interprofessional activities or interprofessional meetings may slightly improve adherence to recommended practices and prescription of medicines ➡ None of the included studies assessed outcomes related to patient mortality, morbidity or complication rates ➡ Interprofessional checklists, interprofessional rounds and externally facilitated interprofessional activities may slightly improve overall use of resources and slightly decrease length of hospital stay and costs ➡ The studies included in the review were very varied in terms of

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

	the types of professionals included, the tasks performed, the degree of interaction, and the populations and health issues considered. In addition, all of the studies took place in high-income countries
Where care is provided	
Site of service delivery - HIV voluntary counselling and testing (VCT) at an optional location Bateganya 2010	➡ Offering people a choice of settings in which to receive VCT, including at home, may increase • acceptance of HIV pre-test counselling and HIV testing; and • acceptance of HIV post-test counselling and receipt of HIV test results. ➡ People's preferred location for HIV VCT is uncertain. This outcome was not reported ➡ The review findings come from one setting in a low-income country and may not be relevant to all settings
Site of service delivery - Units dedicated to care for people living with HIV/AIDS - Institutions managing a high volume of people living with HIV/AIDS Handford 2006	➡ Units dedicated to AIDS care and high-volume institutions may reduce mortality among people living with HIV/AIDS ➡ High volume institutions probably reduce the number of emergency department visits and the length of hospital stays among people living with HIV/AIDS ➡ The effects of other interventions related to the setting of care, such as outreach or interventions to reduce travel time to providers, are uncertain
Site of service delivery - Home-based care for people living with HIV/AIDS - Home-based care with multidisciplinary team care for people living with HIV/AIDS vs other delivery options Young 2010	➡ Intensive home-based care delivered by nurses to people living with HIV and AIDS: • probably improves their knowledge about HIV and about HIV medications and may improve adherence to medication; • probably leads to little or no difference in their CD4 counts and viral loads and may improve their physical functioning. ➡ Multi-professional team care in the home, compared with usual care by primary care nurses, may lead to little or no difference in the quality of life, time in care or survival of people living with HIV and AIDS ➡ Information, communication and decision support via a computer in the homes of people living with AIDS may lead to little or no difference in health status or decision-making skills and confidence but may slightly reduce people's social isolation and improve their quality of life ➡ It is uncertain whether exercise at home improves the physical functioning, well-being, body composition measures or biochemical measures of people living with HIV and AIDS ➡ Home-based safe water systems probably reduce the frequency and severity of diarrhoea among people living with HIV and AIDS

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

Site of service delivery - Home-based management of malaria (presumptive treatment of children with symptoms) vs usual care Okwundu 2013	➡ Home- or community-based programmes for treating malaria: • probably increase the number of children who are treated promptly with an effective antimalaria medicine; • probably reduce all-cause mortality; • may have little or no effect on the prevalence of anaemia. ➡ The effects of home- or community-based programmes for treating malaria on hospitalisations, severe malaria, the prevalence of parasitaemia, and adverse effects are uncertain ➡ The use of rapid diagnostic tests in home- or community-based programmes for treating malaria, compared to clinical diagnosis: • probably reduces the number of children treated with antimalarials; • may have little or no effect on all-cause mortality and hospitalisations. ➡ The effects of using rapid diagnostic tests in home- or community-based programmes for treating malaria on treatment failures, severe malaria, the prevalence of parasitaemia, anaemia, and adverse effects are uncertain
Site of service delivery - Strategies for increasing ownership and use of insecticide-treated bednets Augustincic 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 five 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
Site of service delivery - Home care (different models) vs facility Parker 2013	➡ Compared with hospital care, home care may lead to little or no difference in re-admissions or the time spent by families caring for children with acute physical conditions. Home care for children with acute physical conditions probably increases healthcare costs but decreases costs incurred by families in the UK ➡ For children with traumatic brain injury, home rehabilitation compared with clinic-based rehabilitation may slightly improve mental functioning. The effects on adverse events, family and caregivers, and costs were not reported ➡ For children with acute lymphoblastic leukaemia, home chemotherapy compared with hospital chemotherapy may slightly improve their quality of life and may lead to little or no difference in adverse events or family costs. The impact on family and caregivers is uncertain ➡ None of the studies included in the review took place in low-income countries and none reported effects on mortality

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

Site of service delivery - Maternity waiting home vs no waiting homes Van Lonkhuijzen 2012	➡ The effects of maternity waiting homes on perinatal and maternal mortality and morbidity in low-resource settings are uncertain • No studies were found that met the inclusion criteria of this review. • Well-conducted studies are needed to evaluate the effects of maternity waiting homes in low-resource settings. ➡ Related literature suggests that: • maternity waiting homes may be a relevant option for rural populations with limited access to emergency obstetric care; • the planning of maternity waiting homes should address barriers to access, financial costs, lack of transportation, lack of privacy, poor hygiene, a lack of basic necessities such as water and food, and the attitudes of staff.
Site of service delivery - Community-based interventions for childhood diarrhoea and pneumonia vs routine care Das 2013	➡ Community-based interventions probably increase care seeking for diarrhoea in children, increase use of oral rehydration solution, and reduce mortality due to diarrhoea among children age 0-4 years ➡ Community-based interventions probably increase care seeking for pneumonia in children, increase use of antibiotics, and reduce mortality due to acute pneumonia among children age 0-4 years
Site of service delivery - Early discharge from hospital for mothers and infants born at term vs standard discharge Brown 2007	➡ Early discharge may lead to little or no difference in the number of infant or maternal readmissions • Higher levels of postnatal support may influence this outcome. ➡ Early discharge may lead to little or no difference in breastfeeding rates at two months ➡ The effect of early discharge on the cost of care is uncertain • Although the costs of hospitalisation are probably lower in the early discharge group, the postnatal costs associated with early postnatal discharge from hospital and total costs are uncertain. ➡ All the included studies took place in high-income countries • The effects in low-income countries might be different because of differences in the availability of practical support for mothers who are discharged early, the availability of postnatal support in the community, and the quality of care in hospitals or other facilities.
Site of service delivery - Out-of-facility vs facility-based HIV and reproductive health services for youth Denno 2012	➡ Few studies that included data comparing out-of-facility services with facility-based services took place in low- and middle-income countries ➡ Improved access to self-test kits probably leads to more young people being screened for chlamydia compared to clinic-based testing ➡ Access to emergency contraception through pharmacies without a doctor's prescription ('over-the-counter' access) may increase non-prescription emergency contraception use, but may

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

	have mixed effects on overall use of emergency contraception with increases in some settings but not others ➡ The distribution of condoms and health education messages by street outreach workers may increase condom use ➡ It is uncertain whether street and youth centre-based outreach improves follow through on HIV referral for homeless or street-based youth ➡ It is uncertain whether the use of community youth programme promoters and integrated youth centres increase the use of contraceptives ➡ It is uncertain whether members of the poorest households are more likely to use home-based counselling and testing for HIV, compared to those living in wealthier households
Site of service delivery - Decentralised vs centralised HIV care for initiation and maintenance of anti-retroviral therapy Kredo 2013	➡ Partial decentralisation of HIV treatment (starting care at hospital and then moving to health centre care) probably reduces the combined number of people who die or are lost to care at one year and may reduce the costs of travel for patients ➡ Full decentralisation of HIV treatment (starting and continuing care at a health centre) probably reduces the number of people lost to care but it is uncertain if it reduces deaths at one year ➡ Decentralisation of HIV treatment from facility to community probably leads to little or no difference in the number of people who die or are lost to care at one year ➡ Decentralisation of HIV treatment from facility to community may reduce total costs to people living with HIV and AIDS and to the health service ➡ Most of the included studies took place in low-income countries
Site of service delivery - Workplace programmes for HIV and tuberculosis vs no programme Yassi 2013	➡ Workplace programmes for health workers may increase the uptake of HIV testing ➡ Workplace programmes for health workers may increase awareness of post-exposure prophylaxis to prevent HIV infection ➡ Onsite compared with offsite rapid HIV testing may increases the uptake of voluntary counselling and testing among workers in sectors other than health ➡ Workplace programmes offering free antiretroviral therapy may improve markers of effective antiretroviral therapy among workers living with HIV and AIDS in sectors other than health ➡ All studies included in this review took place in low- and middle-income countries
Information and communication technology	
E-Health - Mobile phone messaging for long-term illnesses vs usual care De Jongh 2012	➡ Mobile phone messaging support probably leads to little or no difference in people's knowledge about their diabetes but may improve people's self-efficacy in relation to their diabetes ➡ Mobile phone messaging support probably leads to little or no difference in adherence to diabetes medication in young people

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

	with diabetes or care plan adherence in people with asthma but probably improves medication adherence in people with hypertension ➡ Mobile phone messaging support for people living with diabetes probably leads to little or no difference in glycaemic control and may lead to little or no difference in diabetes complications ➡ Mobile phone messaging support for people living with asthma or hypertension may lead to little or no difference in control of these conditions ➡ It is uncertain whether mobile phone messaging support changes health service utilisation by people living with diabetes and asthma ➡ All of the studies took place in high-income countries and the applicability of the findings to low-income countries is likely to vary, depending on the availability of the technological infrastructure required and factors such as levels of patient literacy and the acceptability of this intervention among different groups
E-Health - Mobile phone messaging reminders for attendance at healthcare appointments vs various other interventions Gurol-Urganci 2013	➡ Mobile phone text message reminders compared with no reminders probably lead to an increase in attendance at healthcare appointments ➡ Mobile phone text message reminders probably lead to little or no difference in attendance at healthcare appointments compared to phone call reminders. However, the cost per text message per attendance may be lower compared to the cost of mobile phone call reminders ➡ Mobile phone text message reminders plus postal reminders may lead to improved attendance at healthcare appointments compared to postal reminders alone
E-Health - Mobile phone messaging to promote adherence to antiretroviral therapy vs usual care 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.
Health information systems - Women carrying their own case notes in pregnancy vs less detailed health cards Brown 2011	➡ Women carrying their own case notes: • may lead to an increase in assisted deliveries; • may lead to a slight increase in epidural analgesia; • may lead to little or no difference in miscarriages, stillbirths or neonatal deaths, breastfeeding initiation, or smoking cessation; • probably feel more in control and involved in decision-making about their care, and want to carry their notes again in subsequent pregnancies; • may be slightly more satisfied with antenatal care; and

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

	• may lead to little or no difference in availability of complete antenatal records at the time of delivery or loss of case notes. ➡ These findings are based on a few small trials in high-income countries. Factors that should be considered in applying the findings of this review to low-income country settings include: • access to and utilisation of antenatal care; • literacy rates of women and care providers.
Patient reminder and recall systems - Interventions to improve childhood vaccination vs usual care Oyo-Ita 2016 Jacobson Vann 2005	➡ Health education combined with reminders may increase DTP3 coverage ➡ Reminders and recall strategies probably increase routine childhood vaccination uptake Related findings: ➡ 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 ➡ Household monetary incentives may have little or no effect on achieving full vaccination coverage ➡ Home visits may improve OPV3 and measles coverage.
Quality and safety systems	
Quality/safety monitoring and improvement system - Medication review for hospitalised adult patients vs standard care Christensen 2016	➡ Medication review may lead to little or no difference in mortality or hospital readmissions ➡ Medication review may reduce hospital emergency department contacts ➡ None of the studies took place in a low- or middle-income country
Quality monitoring and improvement systems - Interventions to improve antibiotic prescribing to hospital inpatients Davey 2013	➡ Restrictive interventions may improve antibiotic prescribing at one month but may lead to little or no difference in antibiotic prescribing at longer follow-up compared with persuasive interventions ➡ Interventions intended to decrease unnecessary antibiotic prescribing probably lead to little or no difference in all-cause mortality ➡ It is uncertain whether interventions intended to decrease unnecessary antibiotic prescribing affect the length of stay or readmissions ➡ Interventions intended to increase effective antibiotic prescribing for pneumonia may decrease mortality ➡ None of the included studies took place in a low-income country
Quality monitoring and improvement systems - Decision support to improve healthcare process and health outcomes for people living with HIV/AIDS - Decision support with clinical information system to improve	➡ Decision support may improve adherence to recommended practice by health professionals and adherence to treatment by patients. It is uncertain if it improves health outcomes or healthcare utilisation

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

healthcare process and health outcomes for people living with HIV/AIDS Pasricha 2012	➡ Clinical information systems probably increase the proportion of patients with a suppressed HIV load, and may increase adherence to recommended practice by health professionals and adherence to treatment by patients. It is uncertain whether they improve healthcare utilisation ➡ Combinations of decision support and clinical information systems may improve adherence to recommended practice by health professionals and adherence to treatment by patients. It is uncertain if they change at-risk behaviours, health outcomes or healthcare utilisation ➡ Few studies took place in low-income countries.
Working conditions of health workers	
Staff support - Managerial supervision to improve quality of primary health care Bosch-Capblanch 2011	➡ Managerial supervision may improve provider practices and knowledge compared with no supervision ➡ It is uncertain whether managerial supervision improves medicine stock management ➡ It is uncertain whether ''enhanced' managerial supervision (e.g. increased supervision, the use of tools such as checklists) improves the performance of lay or community health workers or midwives; the proportion of children receiving adequate care; or patient and health worker satisfaction ➡ ''Less intensive' managerial supervision (e.g. fewer visits) may lead to little or no difference in the number of new family planning client visits or the number of clients that re-visit ➡ The need for additional resources for managerial supervision needs to be addressed when developing policies for and implementing supervision strategies ➡ When implementing managerial supervision, other factors such as whether the healthcare system and organisational culture of healthcare teams are centralised or decentralised should also be considered
Staff support Oyo-Ita 2016	➡ 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
Complex interventions cutting across delivery categories and across the other overviews	
Package of multiple interventions - Emergency obstetric referral interventions Hussein 2012	➡ Emergency referral interventions may lead to a reduction in maternal mortality ➡ Emergency referrals probably lead to a reduction in neonatal mortality ➡ The effect of emergency referral interventions on stillbirths is uncertain ➡ None of the included studies reported cost outcomes; the cost implications of emergency referral interventions are therefore un-

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

	certain ➡ The included studies took place in low- and middle-income countries and are likely applicable to other low-income country settings

Table 7. Intervention-outcome matrix

Delivery arrangement	Patient outcome	Access, coverage, utilisation	Quality of care	Resource use	Social outcomes	Impacts on equity	Health care provider outcomes	Adverse effects	Other
Who receives care and when									
Queuing strategies Ballini 2015	NR	NR	✓⊕⊕⊕○[1] ✓⊕⊕⊖⊖[2] ? ⊕⊖⊖⊖[3]	NR	NR	NR	NR	NR	NR
Group vs individual care Catling 2015	✓⊕⊕⊕○[4] ⊕⊕⊕⊖[5] ⊕⊕⊖⊖[6]	NR	NR	NR	NR	NR	NR	NR	NR
Who provides care									
Pre-licensure education Pariyo 2009	NR	✓⊕⊕⊖⊖[7]	NR	NR	NR	✓⊕⊕⊖⊖[8]	NR	NR	NR
Recruitment and retention strategies Grobler 2015	NR	?⊕⊖⊖⊖[9]	NR	NR	NR	NR	NR	NR	NR
Role expansion or task shifting - Lay health workers: hypertension	✓⊕⊕⊕⊖[10]	✓⊕⊕⊕⊖[10]	✓⊕⊕⊖⊖[11]	✓⊕⊕⊖⊖[11]	NR	NR	NR	NR	NR

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

Brown-stein 2007									
Role expansion or task shifting - Community-based intervention packages that include additional training of outreach workers Lassi 2015	✓⊕⊕⊕⊖[12] ✓⊕⊕◯◯[13] ✓⊕⊕⊕⊕[14] ✓⊕⊕⊖⊖[15]	NR	NS	NR	NR	NR	NR	NR	NR
Role expansion or task shifting - Lay health workers: maternal and child care and infectious diseases Lewin 2010	✓⊕⊕⊖⊖[16] ✓⊕⊕⊖⊖[17] ✓⊕⊕⊕◯[18]	✓⊕⊕⊖⊖[19] ✓⊕⊕⊕⊖[20] ⊕⊕⊕◯[21]	NR	NR	NR	NR	NR	NR	NR
Role expansion or task shifting - Midlevel health professionals: non-doctor providers for abortion care Ngo 2013	×⊕⊕⊕⊖[22] ✓⊕⊕⊕⊖[23]	NR	NR	NR	NR	NR	NR	NR	NR

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

Role expansion or task shifting - Healthcare providers giving additional social support to pregnant women vs usual care Hodnett 2010	✓⊕⊕⊕⊖[24] ⊕⊕⊖⊖[25] ⊕⊕⊕⊖[26]	NR	NR	NR	NR	NR	NR	NR	NR
Role expansion or task shifting - Physician-nurse substitution Martínez-González 2014	✓⊕⊕⊕⊖[27] ⊕⊕⊕⊖[28]	NR	NR	NR	NR	NR	NR	NR	NR
Role expansion or task shifting - Midlevel health professionals: midwife-led care in pregnancy Sandall 2013	✓⊕⊕⊕⊕[29] ✓⊕⊕⊕⊖[30]	✓⊕⊕⊕⊖[31]	NR	NR	NR	NR	NR	NR	NR
Role expansion or task shifting - Clinical officers/ non-physi-	?⊕⊖⊖⊖[32] ×⊕⊕⊖⊖[33]	NR	NR	NR	NR	NR	NR	NR	NR

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

cian clinicians/associate clinicians vs physician for caesarean section Wilson 2011									
Role expansion or task shifting - Non-specialist providers vs specialist providers for mental health Van Ginneken 2013	?⊕⊖⊖⊖ [34] ✓⊕⊕⊖⊖ [35] ✓⊕⊕⊕⊖ [36]	NR	NR	NR	NR	NR	NR	NR	NR
Role expansion or task shifting - Specialist nursing post added to hospital nurse staffing Butler 2011	⊕⊕⊖⊖ [37]	✓⊕⊕⊖⊖ [38] ⊕⊕⊖⊖ [39]	NR	NR	NR	NR	NR	NR	NR
- Dietary assistants added to hospital nurse staffing Butler 2011	⊕⊕⊖⊖ [40] ✓⊕⊕⊖⊖ [41]	NR	NR	NR	NR	NR	NR	NR	NR

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

Role expansion or task shifting - Pharmacists delivering non-dispensing services to patients Pande 2013	✓⊕⊕⊖⊖[42]	✓⊕⊕⊖⊖[43]	NR	✓⊕⊕⊖⊖[44] ?⊕⊖⊖⊖[45]	NR	NR	NR	NR	NR
Role expansion or task shifting- Skilled birth attendant Yakoob 2011	✓⊕⊕⊖⊖ [46] ?⊕⊖⊖⊖[47]	NR	NR	NR	NR	NR	NR	NR	NR
Role expansion or task shifting - Dental care by dental therapists Wright 2013	?⊕⊖⊖⊖[48]	?⊕⊖⊖⊖[49]	NR	NS	NR	NR	NR	NR	NR
Coordination of care									
Care pathways - Improved pre-hospital trauma systems vs no systems Henry 2012	✓⊕⊕⊖⊖[50]	✓⊕⊕⊖⊖[51]	NR	NR	NR	NR	NR	NR	NR
Care pathways - Rapid re-	✓⊕⊕⊖⊖[52] ✓⊕⊕⊖⊖[53] ?⊕⊖⊖⊖[54]	⊕⊕⊖⊖[55] ?⊕⊖⊖⊖[56]	NR	NR	NR	NR	NR	NR	NR

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

sponse systems in hospitals vs no systems Maharaj 2015									
Care pathways - Hospital clinical pathways vs usual care Rotter 2010	?⊕⊖⊖⊖[57] ✓⊕⊕⊖⊖ [58]	✓⊕⊕⊖⊖[59] ✓⊕⊕⊕⊖[60]	NR	?⊕⊖⊖⊖[61]	NR	NR	NR	NR	NR
Case management - Children with pneumonia Theodoratou 2010	✓⊕⊕⊖⊖[62] ✓⊕⊕⊖⊖[63]	NR	NR	NR	NR	NR	NR	NR	NR
Case management - People living with HIV/AIDS Handford 2006	✓⊕⊕⊖⊖ [64]	✓⊕⊕⊖⊖[65] ?⊕⊖⊖⊖[66]		NR	NR	NR	NR	NR	NR
Communication between providers - Interactive communication between primary care doctors and specialists vs usual care Foy 2010	✓⊕⊕⊕⊖[67]	NR	NR	NR	NR	NR	NR	NR	NR

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

Coordination of care to reduce rehospitalisation - Pre-/postdischarge interventions vs usual care Hansen 2011	NR	?⊕⊖⊖⊖[68] ⊕⊕⊖⊖[69]	NR	NR	NR	NR	NR	NR	NR
- Transition interventions vs usual care Hansen 2011	NR	✓⊕⊕⊖⊖[70] ?⊕⊖⊖⊖[71] ?⊕⊖⊖⊖[72]	NR	NR	NR	NR	NR	NR	NR
Discharge planning - Hospital discharge planning vs usual care Gonçalves-Bradley 2016	NR	✓⊕⊕⊕⊖[73] ✓⊕⊕⊕⊖[74]	NR	? ⊕⊖⊖⊖[75]	NR	NR	NR	NR	✓⊕⊕⊖⊖[76]
Integration - Adding a service to an existing service vs services with no addition Dudley 2011	⊕⊕⊕⊖ [77]	✓⊕⊕⊕⊖[78]	NR	NR	NR	NR	NR	NR	✓⊕⊕⊖⊖[79]
- Integrated vs vertical delivery	⊕⊕⊕⊕ [80]	× ⊕⊕⊖⊖[81] ✓⊕⊕⊕⊖[82] ✓⊕⊕⊕⊕ [83]	✓⊕⊕⊕⊕[84] ⊕⊕⊕⊕[85]	NR	NR	NR	NR	NR	NR

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

models Dudley 2011									
Referral systems - Organisational interventions vs no intervention for referral from primary to secondary care Akbari 2008	NR	NR	✓⊕⊕⊖⊖[86] ✓⊕⊕⊖⊖[87]	NR	NR	NR	NR	NR	NR
Referral systems - Nurse vs physician triage systems in emergency departments Rowe 2011	NR	✓⊕⊕⊕⊖[88]	⊕⊕⊖⊖[89] ✓⊕⊕⊕⊖[90] ✓⊕⊕⊕⊖[91]	NR	NR	NR	NR	NR	NR
Teams - Team midwifery vs standard care Butler 2011	⊕⊕⊕⊖[92]	✓⊕⊕⊕⊕[93] ✓⊕⊕⊕⊕[94]	NR	NR	NR	NR	NR	NR	NR
Teams - Practice-based interventions to promote collaboration vs no intervention Reeves	NR	✓⊕⊕⊖⊖[95]	?⊕⊖⊖⊖[96] ?⊕⊖⊖⊖[97]	✓⊕⊕⊖⊖[98]	NR	NR	?⊕⊖⊖⊖[99]	NR	NR

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

2017									
Where care is provided									
Site of service delivery - HIV voluntary counselling and testing (VCT) at an optional location vs VCT at clinic Bateganya 2010	NR	NR	NR	NR	NR	NR	NR	NR	✓⊕⊕⊖⊖[100]
Site of service delivery - Units dedicated to care for people living with HIV/AIDS Handford 2006	✓⊕⊕⊖⊖[101]	NR	NR	NR	NR	NR	NR	NR	NR
- Institutions managing a high volume of people living with HIV/AIDS Handford 2006	✓⊕⊕⊖⊖[102]	✓⊕⊕⊕⊖[103]	NR	NR	NR	NR	NR	NR	NR
Site of service delivery - Inten-	⊕⊕⊕⊖[104] ⊕⊕⊕⊖[105] ✓⊕⊕⊖⊖[106] ✓⊕⊕⊖⊖[107]	NR	NR	NR	NR	NR	NR	NR	✓⊕⊕⊕⊖[109]

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

sive home-based care delivered by nurses for people living with HIV/AIDS vs other delivery options Young 2010	⊕⊕⊖⊖[108]								
Site of service delivery - Multiprofessional team care in the home for people living with HIV/AIDS vs usual care by primary care nurses Young 2010	⊕⊕⊖⊖ [110] ⊕⊕⊖⊖ [111] ⊕⊕⊖⊖ [112]	NR	NR	NR	NR	NR	NR	NR	NR
Site of service delivery - Exercise at home for people living with HIV/AIDS vs no exercise at home Young 2010	?⊕⊖⊖[113]	NR	NR	NR	NR	NR	NR	NR	NR

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

Site of service delivery - Strategies for increasing ownership and use of insecticide-treated bednets Augustincic 2015	NR	NR	NR	NS	NS	NR	NR	NR	✓⊕⊕⊕⊖[114] ⊕⊕⊕⊖[115] ✓⊕⊕⊖⊖[116] ⊕⊕⊖⊖[117]
Site of service delivery - Home- or community-based management of malaria (presumptive treatment of children with symptoms) vs usual care Okwundu 2013	✓⊕⊕⊕⊖[118] ?⊕⊖⊖⊖[119] ⊕⊕⊖⊖ [120]	?⊕⊖⊖⊖[121] ✓⊕⊕⊕⊖[122]	NR	NR	NR	NR	NR	?⊕⊖⊖⊖[123]	NR
Site of service delivery - Use of rapid diagnostic tests in home- or community-based programmes for treating malaria vs clinical diagnosis	⊕⊕⊖⊖ [124] ?⊕⊖⊖⊖[125]	✓⊕⊕⊕⊖[126] ⊕⊕⊖⊖ [127]	NR	NR	NR	NR	NR	?⊕⊖⊖⊖[128]	NR

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

Okwundu 2013									
Site of service delivery - Home (different models) vs facility care for children with acute physical conditions Parker 2013	✓⊕⊕⊖⊖[129] ✓⊕⊕○○[130]	⊕⊕⊖⊖[131]	NR	✓×⊕⊕⊕ ○ 132 ⊕⊕⊖⊖[133]	⊕⊕⊖⊖[134]	NR	NR	⊕⊕⊖⊖[135]	
Site of service delivery - Maternity waiting home vs no waiting homes for pregnant women Van Lonkhuijzen 2012	NS	NS	NS	NS	NS	NS	NS	NS	NS
Site of service delivery - Community-based interventions for childhood diarrhoea and pneumonia vs routine care Das 2013	✓⊕⊕⊕⊖[136] ✓⊕⊕⊕⊖[137]	✓⊕⊕⊕⊖[138] ✓⊕⊕⊕⊖[139]	NR	NR	NR	NR	NR	NR	NR

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

Site of service delivery - Early discharge from hospital for mothers and infants born at term vs standard discharge Brown 2011	⊕⊕⊖⊖[140]	⊕⊕⊖⊖[141]	NR	? ⊕⊖⊖⊖[142]	NR	NR	NR	NR	NR
Site of service delivery - Out-of-facility vs facility-based HIV and reproductive health services for youth Denno 2012	NR	✓⊕⊕⊕⊖[143] ✓⊕⊕⊖⊖ 144 ⊕⊕⊖⊖ 145 ✓⊕⊕⊖⊖ 146 ?⊕⊖⊖⊖ 147	?⊕⊖⊖⊖ 148	NR	NR	?⊕⊖⊖⊖ 149	NR	NR	NR
Site of service delivery - Decentralised vs centralised HIV care for initiation and maintenance of anti-retroviral therapy Kredo 2013	✓⊕⊕⊖⊖ [150] ✓⊕⊕⊕⊖[151] ⊕⊕⊕⊖ [152] ?⊕⊖⊖⊖ [153]	✓⊕⊕⊖⊖[154] ✓⊕⊕⊕⊖[155] ⊕⊕⊖⊖[156]	NR	✓⊕⊕⊖⊖[157] ✓⊕⊕⊖⊖[158]	NR	NR	NR	NR	NR

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

Site of service delivery - Workplace programmes for HIV and tuberculosis diagnosis and treatment vs no programme Yassi 2013	✓⊕⊕⊖⊖[159]	✓⊕⊕⊖⊖[160] ✓⊕⊕⊖⊖[161]	NR	NR	NR	NR	NS	NR	✓⊕⊕⊖⊖[162]
Information and communication technology									
E-Health - Mobile phone messaging for long-term illnesses vs usual care De Jongh 2012	⊕⊕⊕⊖[163] ⊕⊕⊖⊖[164] ⊕⊕⊖⊖[165]	⊕⊕⊕⊖[166] ⊕⊕⊕⊖[167] ✓ ⊕⊕⊕⊖[168] ?⊕⊖⊖⊖ [169]	NR	NR	NR	NR	NR	NR	✓⊕⊕⊖⊖[170] ⊕⊕⊕⊖ [171]
E-Health - Mobile phone messaging reminders for attendance at healthcare appointments vs various other interventions Gurol-Urganci 2013	NR	✓⊕⊕⊕⊖[172] ✓⊕⊕⊖⊖[173] ⊕⊕⊕⊖[174]	NR	✓⊕⊕⊖⊖[175]	NR	NR	NR	NR	NR

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

E-Health - Mobile phone messaging to promote adherence to antiretroviral therapy vs usual care Mbuagbaw 2013	0⊕⊕⊖⊖ [176]	NR	✓⊕⊕⊕⊕ [177] ⊕⊕⊖⊖ [178]	NR	NR	NR	NR	NR	NR
Health information systems - Women carrying their own case notes in pregnancy vs less detailed health cards Brown 2007	⊕⊕⊖⊖ [179]	⊕⊕⊖⊖ [180] ✓⊙⊙⊖⊖ [181] ✓X⊕⊕⊖ ⊖ [182]	NR	NR	NR	NR	NR	NR	⊕⊕⊖⊖ [183] ⊙⊙⊖⊖ [184] ✓⊕⊕⊕⊖ [185] ✓⊕⊕⊖⊖ [186]
Patient reminder and recall systems - Interventions to improve childhood vaccination including reminders for routine childhood vaccination vs usual care Oyo-Ita 2016	NR	✓⊕⊕⊖⊖ [187] ✓X⊕⊕⊖ ⊖ [188] ✓⊕⊕⊖⊖ [189] ⊕⊕⊖⊖ [190] ✓ ⊙⊙⊖⊖ [191] ⊕⊕⊖⊖ [192] ⊕⊕⊖⊖ [193] ✓⊕⊕⊖⊖ [194] ✓⊕⊕⊕⊖ [195]	NR	NR	NR	NR	NR	NR	NR

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

Quality and safety systems									
Quality/ safety monitoring and improvement systems - Medication review for hospitalised adult patients vs standard care Christensen 2016	⨁⨁◯◯ [196]	⨁⨁◯◯ [197] ⨁◯◯◯ [198]	NR	NR	NR	NR	NR	NR	NR
Quality monitoring and improvement systems - Interventions to improve antibiotic prescribing to hospital inpatients Davey 2013	✓⨁⨁◯◯ [199] ⨁⨁⨁◯ [200]	? ⨁◯◯◯ [201]	✓⨁⨁◯◯ [202] ⨁⨁◯◯ [203]	NR	NR	NR	NR	NR	NR
Quality monitoring and improvement systems - Decision support to improve healthcare process and health	? ⨁◯◯◯ [204]	? ⨁◯◯◯ [205] ✓⨁◯◯◯ [206]	✓⨁⨁◯◯ [207]	NR	NR	NR	NR	NR	NR

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

outcomes for people living with HIV/ AIDS Pasricha 2012									
- Decision support with clinical information system to improve healthcare process and health outcomes for people living with HIV/ AIDS Pasricha 2012	? ⊕⊖⊖⊖[208]	? ⊕⊖⊖⊖[209] ✓⊕⊕⊖⊖[210]	✓⊕⊕⊖⊖[211]	NR	NR	NR	NR	NR	?⊕⊖⊖⊖[212]
Clinical information systems to improve healthcare process and health outcomes for people living with HIV/ AIDS Pasricha 2012	✓⊕⊕⊕⊖[213]	✓⊕⊕⊖⊖[214] ? ⊕⊖⊖⊖[215]	✓⊕⊕⊖⊖[216]						
Working conditions of health workers									
Staff support - Managerial supervision to improve	NR	? ⊕⊖⊖⊖[217]	✓⊕⊕⊖⊖[218] ? ⊕⊖⊖⊖[219] ⊕⊕⊖⊖[220]	NR	NR	NR	?⊕⊖⊖⊖[221]	NR	✓⊕⊕⊖⊖[222] ?⊕⊖⊖⊖[223] ?⊕⊖⊖⊖[224]

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

quality of primary health care Bosch-Capblanch 2011									
Complex interventions cutting across delivery categories and across the other overviews									
Package of multiple interventions - Emergency obstetric referral interventions[112] Hussein 2012	⊕⊕⊖⊖ [225] ?⊕⊖⊖⊖ [226] ✓⊕⊕⊕⊖ [227] ?⊕⊖⊖⊖ [228] ✓⊕⊕⊖⊖ [229]	NR	NS	NR	NR	NR	NR	NR	NR

✓: a desirable effect, : little or no effect, ?: an uncertain effect, ×: an undesirable effect, NS: no included studies, NR: not reported

[1] Ballini 2015: median waiting times in hospital settings.
[2] Ballini 2015: mean waiting times in hospital settings.
[3] Ballini 2015: mean waiting times in outpatient settings; proportion of patients waiting less than a recommended time.
[4] Catling 2015: number of preterm births.
[5] Catling 2015: number of low birthweight and small for gestational age newborns.
[6] Catling 2015: perinatal mortality.
[7] Pariyo 2009: the number of minority students enrolled in health sciences; retention through to graduation.
[8] Pariyo 2009: differences in retention levels through to graduation between minority and non-minority students in the health sciences.
[9] Grobler 2015: the number of health professionals practising in underserved areas.
[10] Brownstein 2007: behavioural changes (such as appointment keeping and adherence to medication), blood pressure control, and 5-year mortality
rates.
[11] Brownstein 2007: healthcare utilisation and health systems outcomes (such as reduced hospital admissions).
[12] Lassi 2015: community-support groups or women's groups - neonatal mortality.
[13] Lassi 2015: community-support groups or women's groups - maternal mortality.
[14] Lassi 2015: community mobilisation and antenatal and postnatal home visitation - neonatal mortality.
[15] Lassi 2015: community mobilisation and antenatal and postnatal home visitation - maternal mortality.
[16] Lewin 2010: deaths among children under 5 years.
[17] Lewin 2010: children who suffer from fever, diarrhoea and pneumonia.
[18] Lewin 2010: number of people with tuberculosis who are cured.
[19] Lewin 2010: number of parents who seek help for their sick child.
[20] Lewin 2010: number of women who breastfeed; number of children with up-to-date immunisation schedules.
[21] Lewin 2010: number of people who complete preventive treatment for tuberculosis.
[22] Ngo 2013: incomplete, failed abortions and complications with surgical aspiration abortion.
[23] Ngo 2013: incomplete and failed abortions with medical abortion.
[24] Hodnett 2010: number of caesarean sections.

[25]Hodnett 2010: antenatal hospital admissions.
[26]Hodnett 2010: incidence of low birthweight, preterm births and perinatal deaths.
[27]Martínez-González 2014: systolic blood pressure and CD4 cell counts in people with HIV/AIDS.
[28]Martínez-González 2014: diastolic blood pressure, total cholesterol level and glycosylated haemoglobin concentrations.
[29]Sandall 2013: preterm births, overall foetal loss and neonatal deaths, increase in spontaneous vaginal births and decrease in instrumental vaginal births.
[30]Sandall 2013: decrease in caesarean births, number of women with an intact perineum.
[31]Sandall 2013: use of regional analgesia (epidural/spinal) during labour.
[32]Wilson 2011: maternal mortality and perinatal mortality for caesarean section.
[33]Wilson 2011: wound infections and occurrences of wound dehiscence.
[34]Van Ginneken 2013: use of lay health worker or teachers - post-traumatic stress disorder symptoms among children.
[35]Van Ginneken 2013: For depression/anxiety - number of adults who recover 2-6 months after treatment, symptoms among mothers with depression. Among problem drinkers - quantity of alcohol consumed. Among adults with post-traumatic stress disorder - symptoms.
[36]Van Ginneken 2013: For people with dementia - symptoms. For caregivers of people with dementia - mental well-being, burden and distress.
[37]Butler 2011: in-hospital mortality, postdischarge adverse events.
[38]Butler 2011: patient length of stay in hospital.
[39]Butler 2011: readmission to hospital, attendance at emergency department within 30 days.
[40]Butler 2011: mortality in trauma units, mortality in hospital.
[41]Butler 2011: mortality at 4 months after discharge.
[42]Pande 2013: clinical outcomes for diabetic and hypertensive patients; e.g. reductions in fasting plasma glucose levels or systolic and diastolic blood pressure.
[43]Pande 2013: rates of hospitalisation, general practice visits and emergency room visits.
[44]Pande 2013: for pharmacist services targeted at patients - medication costs of patients with asthma and chronic obstructive pulmonary disease. Other costs were not reported.
[45]Pande 2013: pharmacist services targeted at healthcare professionals - total costs.
[46]Yakoob 2011: skilled birth attendance - stillbirths and perinatal mortality.
[47]Yakoob 2011: alternative ways of providing emergency obstetric care - stillbirths and perinatal mortality.
[48]Wright 2013: incidence, prevalence or severity of dental caries.
[49]Wright 2013: treatment of dental caries.
[50]Henry 2012: mortality.
[51]Henry 2012: response time from injury to first medical contact in the field.
[52]Maharaj 2015: adults - hospital mortality and cardiopulmonary arrests outside of intensive care units.
[53]Maharaj 2015: children - cardiopulmonary arrests outside of intensive care units.
[54]Maharaj 2015: children - hospital mortality.
[55]Maharaj 2015: adults - admissions to intensive care units.
[56]Maharaj 2015: children - admissions to intensive care units.
[57]Rotter 2010: in-hospital mortality.
[58]Rotter 2010: complications.
[59]Rotter 2010: hospital readmissions.
[60]Rotter 2010: length of stay.
[61]Rotter 2010: hospital costs.
[62]Theodoratou 2010: all-cause mortality.
[63]Theodoratou 2010: mortality due to acute lower respiratory infection.
[64]Handford 2006: 30 day mortality.
[65]Handford 2006: receipt of antiretrovirals (ARVs) or indicated prophylaxis.
[66]Handford 2006: healthcare utilisation and hospitalisation.
[67]Foy 2010: patient outcomes, e.g. depression and diabetes control.
[68]Hansen 2011: pre-discharge interventions - re-hospitalisation.
[69]Hansen 2011: post-discharge interventions - re-hospitalisation.
[70]Hansen 2011: inpatient-outpatient provider continuity - rehospitalisation.
[71]Hansen 2011: patient-centred discharge instructions - rehospitalisation; interactions between patients and nurses before and after discharge to

support patient self-care - rehospitalisation.
[72]Hansen 2011: interactions between patients and nurses before and after discharge to support patient self-care - rehospitalisation.
[73]Gonçalves-Bradley 2016: unscheduled re-admission rates at 3 months.
[74]Gonçalves-Bradley 2016: length of hospital stay.
[75]Gonçalves-Bradley 2016: health service costs.
[76]Gonçalves-Bradley 2016: satisfaction among patients and healthcare professionals.
[77]Dudley 2011: adding family planning to other services - number of new pregnancies.
[78]Dudley 2011: adding family planning to other services - utilisation of family planning.
[79]Dudley 2011: adding family planning to other services - number of mothers accepting family planning services.
[80]Dudley 2011: integration of HIV prevention and control - sexually transmitted disease incidence; HIV incidence in the population.
[81]Dudley 2011: integrating sexually transmitted infection services for female sexual partners of truck drivers into routine primary care - women's
utilisation of these services; women's attendance following referral.
[82]Dudley 2011: adding provider initiated counselling and testing to sexually transmitted infections services - number of people receiving HIV
counselling and HIV testing.
[83]Dudley 2011: adding provider initiated counselling and testing to TB services - number of people receiving HIV counselling and HIV testing.
[84]Dudley 2011: integration of HIV prevention and control - proportion of sexually transmitted infections treated effectively in males.
[85]Dudley 2011: integration of HIV prevention and control - proportion of sexually transmitted infections treated effectively in females.
[86]Akbari 2008: provision of physiotherapy services at the primary care level; second opinions in-house; and dedicated appointment slots at secondary
levels for each primary care practice - referral rates and referral appropriateness.
[87]Akbari 2008: practices in which physicians are trained in family medicine compared to practises in which physicians are trained in internal medicine - number of referrals and visits to acute and emergency care.
[88]Rowe 2011: emergency department length of stay.
[89]Rowe 2011: proportion of patients leaving the emergency departments against medical advice.
[90]Rowe 2011: physician initial assessment time.
[91]Rowe 2011: proportion of patients leaving without being seen.
[92]Butler 2011: perinatal deaths.
[93]Butler 2011: length of stay in special care nursery for infants.
[94]Butler 2011: length of stay in hospital for women giving birth.
[95]Reeves 2017: interprofessional checklists, interprofessional rounds and externally facilitated interprofessional activities - length of hospital stay.
[96]Reeves 2017: externally facilitated interprofessional activities - coordination; patient-assessed quality of care; continuity of care.
[97]Reeves 2017: externally facilitated interprofessional activities or interprofessional meetings - adherence to recommended practices; prescription of medicines.
[98]Reeves 2017: interprofessional checklists, interprofessional rounds and externally facilitated interprofessional activities - overall use of resources.
[99]Reeves 2017: externally facilitated interprofessional activities - collaborative working, team communication.
[100]Bateganya 2010: acceptance of HIV pre-test counselling; acceptance of HIV testing; acceptance of HIV post-test counselling; and receipt of HIV
test results.
[101]Handford 2006: mortality among people living with HIV/AIDS.
[102]Handford 2006: mortality among people living with HIV/AIDS.
[103]Handford 2006: emergency department visits; length of hospital stays.
[104]Young 2010: CD4 counts
[105]Young 2010: viral loads
[106]Young 2010: physical functioning
[107]Young 2010: adherence to medication
[108]Young 2010: overall functioning; depressive symptoms; mood; general health
[109]Young 2010: knowledge of HIV and HIV medications.
[110]Young 2010: quality of life

[111] Young 2010: time in care
[112] Young 2010: survival of people living with HIV/AIDS
[113] Young 2010: physical functioning; well-being; body composition measures; biochemical measures of people living with HIV/AIDS
[114] Augustincic 2015: number of pregnant women, adults and children who possess insecticide-treated bednets
[115] Augustincic 2015: appropriate use of bednets
[116] Augustincic 2015: may increase the number of adults and children under five sleeping under bednets
[117] Augustincic 2015: use of insecticide-treated bednets
[118] Okwundu 2013: all cause mortality
[119] Okwundu 2013: severe malaria; the prevalence of parasitaemia
[120] Okwundu 2013: prevalence of anaemia
[121] Okwundu 2013: hospitalisations
[122] Okwundu 2013: number of children treated promptly with an effective antimalaria medicine
[123] Okwundu 2013: adverse effects
[124] Okwundu 2013: all-cause mortality
[125] Okwundu 2013: treatment failure; severe malaria; prevalence of parasitaemia; anaemia
[126] Okwundu 2013: number of children treated with antimalarials
[127] Okwundu 2013: hospitalisations
[128] Okwundu 2013: adverse effects
[129] Parker 2013: for children with traumatic brain injury - mental functioning
[130] Parker 2013: for children with acute lymphoblastic leukeamia - quality of life
[131] Parker 2013: re-admissions for children with acute physical conditions
[132] Parker 2013: for children with acute physical conditions - increases in healthcare costs; decreases in costs incurred by families (in the UK)
[133] Parker 2013: for children with acute lymphoblastic leukeamia - costs incurred by families
[134] Parker 2013: time spent by family caring for children with acute physical conditions
[135] Parker 2013: for children with acute lymphoblastic leukeamia - adverse events
[136] Das 2013: mortality due to diarrhoea among children aged 0-4 years
[137] Das 2013: mortality due to acute pneumonia among children aged 0-4 years
[138] Das 2013: care seeking and use of oral rehydration solution for children aged 0-4 years with diarrhoea
[139] Das 2013: care seeking and use of antibiotics for children aged 0-4 years with acute pneumonia
[140] Brown 2011: breastfeeding rates at two months
[141] Brown 2011: number of infant or maternal readmissions
[142] Brown 2011: costs of care
[143] Denno 2012: self test kits - youth being screened for chlamydia
[144] Denno 2012: access to emergency contraception through pharmacies without a doctor's prescription - non-prescription emergency contraception use
[145] Denno 2012: access to emergency contraception through pharmacies without a doctor's prescription - overall use of emergency contraception
[146] Denno 2012: distribution of condoms and health education messages by street outreach workers - condom use
[147] Denno 2012: community youth promoters and integrated youth centres - use of contraceptives
[148] Denno 2012: street and youth centre-based outreach - HIV referral for homeless or street-based youth
[149] Denno 2012: whether the poorest households are more likely to use home-based counselling and testing for HIV, compared to those in wealthier households
[150] Kredo 2013: partial decentralisation - death at one year
[151] Kredo 2013: partial decentralisation - combined number of people who die or are lost to care at one year
[152] Kredo 2013: decentralisation of HIV treatment from facility to community - deaths at one year; combined number of people who die or are lost to care at one year
[153] Kredo 2013: full decentralisation - deaths at one year; combined number of people who die or are lost to care at one year
[154] Kredo 2013: partial decentralisation - number of people lost to care at one year
[155] Kredo 2013: full decentralisation - number of people lost to care at one year
[156] Kredo 2013: decentralisation of HIV treatment from facility to community - number of people lost to care at one year
[157] Kredo 2013: partial decentralisation - costs of travel for patients

[158]Kredo 2013: decentralisation of HIV treatment from facility to community - total costs to people living with HIV and AIDS and to the health service
[159]Yassi 2013: workplace programmes offering free antiretroviral therapy - markers of effective antiretroviral therapy among workers living with HIV and IADS in sectors other than health
[160]Yassi 2013: workplace programmes for health workers - uptake of HIV testing
[161]Yassi 2013: onsite compared with offsite rapid HIV testing - uptake of voluntary counselling and testing among workers in sectors other than health
[162]Yassi 2013: workplace programmes for health workers - awareness of post-exposure prophylaxis to prevent HIV infection
[163]De Jongh 2012: people living with diabetes - glycaemic control
[164]De Jongh 2012: people living with diabetes - diabetes complications
[165]De Jongh 2012: people living with asthma or hypertension - control of these conditions
[166]De Jongh 2012: people living with diabetes - adherence to diabetes medication in young people
[167]De Jongh 2012: people living with asthma - care plan adherence
[168]De Jongh 2012: people living with hypertension - medication adherence
[169]De Jongh 2012: people living with diabetes and asthma - health service utilisation
[170]De Jongh 2012: people's self-efficacy in relation to their diabetes
[171]De Jongh 2012: people's knowledge about their diabetes
[172]Gurol-Urganci 2013: mobile phone text message reminders compared with no reminders - attendance at healthcare appointments
[173]Gurol-Urganci 2013: mobile phone text message reminders plus postal reminders compared to postal reminders alone - attendance at healthcare appointments
[174]Gurol-Urganci 2013: mobile phone text message reminders compared to phone call reminders - attendance at healthcare appointments
[175]Gurol-Urganci 2013: mobile phone text message reminders compared to phone call reminders - cost per message
[176]Mbuagbaw 2013: mortality up to 12 months
[177]Mbuagbaw 2013: adherence to antiretroviral therapy at 12 months
[178]Mbuagbaw 2013: loss to follow-up at 12 months
[179]Brown 2007: miscarriages, stillbirths and neonatal deaths
[180]Brown 2007: breastfeeding initiation
[181]Brown 2007: epidural anaesthesia
[182]Brown 2007: increase in assisted deliveries
[183]Brown 2007: smoking cessation
[184]Brown 2007: availability of complete antenatal records at the time of delivery; loss of case notes
[185]Brown 2007: women who carry their own clinical case notes probably feel more in control and involved in decision making about their care and probably want to do so again in subsequent pregnancies
[186]Brown 2007: women's satisfaction with antenatal care
[187]Oyo-Ita 2016: community-based health education - coverage of three doses of Diphtheria-Tetanus-Pertussis vaccine (DTP3)
[188]Oyo-Ita 2016: facility-based health education - coverage of three doses of Diphtheria-Tetanus-Pertussis vaccine (DTP3)
[189]Oyo-Ita 2016: health education combined with reminders - DTP3 coverage
[190]Oyo-Ita 2016: training vaccination managers - coverage of DTP3, oral polio vaccine, hepatitis B vaccine
[191]Oyo-Ita 2016: integrating vaccination with other healthcare services - DTP3 coverage; measles vaccine coverage
[192]Oyo-Ita 2016: integrating vaccination with other healthcare services - BCG coverage
[193]Oyo-Ita 2016: household monetary incentives - full vaccination coverage
[194]Oyo-Ita 2016: home visits - oral polio vaccine coverage; measles coverage
[195]Oyo-Ita 2016: reminders and recall strategies - routine childhood vaccination uptake
[196]Christensen 2016: all cause mortality
[197]Christensen 2016: hospital readmissions
[198]Christensen 2016: hospital emergency department contacts
[199]Davey 2013: interventions intended to increase effective antibiotic prescribing for pneumonia - mortality
[200]Davey 2013: interventions intended to decrease unnecessary antibiotic prescribing - mortality.
[201]Davey 2013: interventions intended to decrease unnecessary antibiotic prescribing - the length of stay; readmissions
[202]Davey 2013: restrictive interventions compared with persuasive interventions - antibiotic prescribing at one month
[203]Davey 2013: restrictive interventions compared with persuasive interventions - antibiotic prescribing at longer follow-up
[204]Pasricha 2012: health outcomes

[205] Pasricha 2012: healthcare utilisation
[206] Pasricha 2012: adherence to treatment by patients
[207] Pasricha 2012: adherence to recommended practice by health professionals
[208] Pasricha 2012: health outcomes
[209] Pasricha 2012: health care utilisation
[210] Pasricha 2012: adherence to treatment by patients
[211] Pasricha 2012: adherence to recommended practice by health professionals
[212] Pasricha 2012: at-risk behaviours
[213] Pasricha 2012: suppressed HIV load
[214] Pasricha 2012: adherence to treatment by patients
[215] Pasricha 2012: healthcare utilisation
[216] Pasricha 2012: adherence to recommended practice by health professionals
[217] Bosch-Capblanch 2011: enhanced managerial supervision - proportion of children receiving adequate care
[218] Bosch-Capblanch 2011: managerial supervision - provider practices
[219] Bosch-Capblanch 2011: enhanced managerial supervision - performance of lay health workers; performance of midwives
[220] Bosch-Capblanch 2011: less intensive managerial supervision - number of new family planning visits; number of clients that re-visit
[221] Bosch-Capblanch 2011: enhanced managerial supervision - health worker satisfaction
[222] Bosch-Capblanch 2011: managerial supervision - provider knowledge
[223] Bosch-Capblanch 2011: managerial supervision - medicine stock management
[224] Bosch-Capblanch 2011: enhanced managerial supervision - patient satisfaction
[225] Hussein 2012: organisational interventions to improve emergency obstetric referral - maternal mortality
[226] Hussein 2012: organisational interventions to improve emergency obstetric referral - stillbirths
[227] Hussein 2012: organisational interventions to improve emergency obstetric referral - neonatal mortality
[228] Hussein 2012: structural interventions to improve emergency obstetric referral - maternal mortality; stillbirths
[229] Hussein 2012: structural interventions to improve emergency obstetric referral - neonatal mortality

Table 8. Priorities for primary research[1] based on applicability limitations

Delivery arrangement	Systematic review	Applicability limitations	
		Findings	**Interpretation**
Who receives care and when			
Queuing strategies	Ballini 2015	All included studies took place in high-income countries.	The effect of the interventions included in the review would likely depend on several factors, including: • waiting list length; • resource availability; • healthcare workers availability; • IT development; • health system structure.
Care received by groups vs individual care	Catling 2015	3 out of 4 studies included in the systematic review took place in a high-income country (USA, Sweden)	Local availability of resources and maternal/care providers acceptability should be considered before applying the intervention

Table 8. Priorities for primary research[1] based on applicability limitations (*Continued*)

Who provides care			
Pre-licensure education	Pariyo 2009	All included studies took place in high-income countries.	The challenges faced in health-care worker education in high- and low-income countries are qualitatively and quantitatively different (e.g. the availability of funds, laws regarding equity and awareness of these, job prospects including remuneration, and curricula). Appropriate interventions could be expected to have a comparatively higher impact in low-income countries where alternatives and opportunities are generally more limited than in high-income countries. However, there is no evidence regarding the effects of such interventions
Recruitment and retention strategies	Grobler 2015	No randomised trial was identified. The observational or questionnaire-based studies discussed in the reviews were carried out in various settings, including high-, middle- and low-income countries. The results suggest that some interventions could have positive effects on the recruitment and retention of health workers in underserved areas. However, these findings require further rigorous evaluation	Economic and cultural differences, differences between health system structures, and differences in state and educational institutional capacity to regulate and manage various types of interventions may limit the applicability of findings to low- and middle-income countries
Role expansion or task shifting - Physician-nurse substitution	Martínez-González 2014	Most of the studies took place in high-income countries.	The applicability of the findings may be affected by cultural and economic differences, patient populations, services provided in primary care settings, and the availability and level of nurses' skills
Role expansion or task shifting - Midlevel health professionals: midwife-led care in pregnancy	Sandall 2013	All trials included in the review took place in high-income countries. However, midwives are the primary providers of antenatal and postpartum care in most low- and middle-income countries	When assessing the transferability of these findings, the following factors should be considered: the availability and training of midwives; accessibility to each healthcare model for childbearing women; cost implications of other models of care compared to mid-

Table 8. Priorities for primary research[1] based on applicability limitations (*Continued*)

			wife-led care and local epidemiology of maternal and perinatal mortality
Role expansion or task shifting - Specialist nursing post added to hospital nurse staffing - Dietary assistants added to hospital nurse staffing	Butler 2011	The trials included in the review took place in high-income countries	When assessing the transferability of these findings to low-income countries the following factors should be considered: the availability and training of nurses; the acceptability, feasibility and costs of different nurse staffing models. In particular, nurse and other health professional associations may need to be consulted and the ability of the health system and hospitals to support the implementation of new nurse staffing models
Coordination of care			
Care pathways - Rapid response systems in hospitals	Maharaj 2015	Almost all the studies took place in high-income countries and were before-after studies with no contemporaneous control group	The organisational culture, the resources needed for applying the process should be considered when implementing interventions in middle- or low-income settings
Care pathways - Clinical pathways	Rotter 2010	Almost all the studies took place in high-income countries.	There are many ways in which healthcare teams in high-income and low- or middle- income countries may differ. The organisational culture, the commitment to quality and safety, the resources needed for documenting the process (e.g. electronic health records), are among the issues that need to be considered, particularly when implementing interventions in middle- or low-income settings
Communication between providers - Interactive communication between primary care doctors and specialists	Foy 2010	The studies included in the review took place in high-income countries	When assessing the transferability of these findings to low-income country settings, one needs to consider the organisation of the health system as well as the availability and accessibility of specialist care in such settings

Table 8. Priorities for primary research[1] based on applicability limitations (*Continued*)

Coordination of care to reduce rehospitalisation -Pre-/postdischarge interventions vs usual care -Transition interventions vs usual care	Hansen 2011	All studies took place in high-income countries.	The applicability of the available evidence to low income countries is uncertain because the effects of interventions might depend on the capacity and type of health professionals available in the hospital to apply the interventions, the availability of community care, and the skills of the patient/family to accomplish instructions. Some of the interventions rely on a high level of communication between the hospital and the providers of services outside the hospital. This is not always available or possible in low-income settings
Discharge planning	Gonçalves-Bradley 2016	Almost all the studies took place in high-income countries	The applicability of the available evidence to low-income countries is uncertain because the effects of discharge planning might depend on the availability of community care. It may also depend on the capacity and type of health professionals available in the hospital (for example, doctors, nurses or lay health workers) to prepare and implement discharge plans based on individual patient needs. A high level of communication between the discharge planner and the providers of services outside the hospital is not always available in low-income settings
Referral systems -Healthcare delivery of organisational interventions for referral from primary to secondary care	Akbari 2008	Most of the included studies took place in high-income countries and within particular health systems. These systems included, for example, the publicly funded National Health System in the UK, and Medicaid in the USA	The studies were based in well-resourced environments in which primary care services were provided by an adequate number of practitioners, and relatively easy access was available to specialist services. Such scenarios are not necessarily available or possible in many low-income countries. The study findings therefore need to be interpreted with caution when applied to low-income countries

Table 8. Priorities for primary research[1] based on applicability limitations (*Continued*)

Teams - Team midwifery vs standard care	Butler 2011	The same considerations described in Butler 2011 - role expansion or task shifting	
Teams - Dental care by dental therapists	Wright 2013	Most studies evaluated schoolchildren from urban or rural areas of high-income countries	The provision of oral health care requires a complicated infrastructure besides workforce such as appropriate supervision, dental offices and a financing system. Therefore, the findings may not be directly applicable to low-income countries
Teams - Practice based interventions to promote collaboration	Reeves 2017	All the studies took place in high-income countries.	Healthcare teams are a multidimensional construct, and team structures and processes can vary widely according to membership, scope of work, tasks, and interactions. Some interventions, such as video and audio conferencing that have been used by some teams, may not be available in some settings. Carefully designed and rigorously conducted randomised studies of healthcare teams, measuring Patient/client or healthcare process outcomes are needed before being implemented on a large scale in low income countries
Where care is provided			
Site of service delivery - Units dedicated to care for people living with HIV/AIDS - Institutions managing a high volume of people living with HIV/AIDS	Handford 2006	All the studies took place in high income countries. None of the studies in this review took place in resource-poor settings	It may be difficult for policymakers to replicate the study settings and/or organisation of care in low-income countries
Quality and safety systems			
Quality monitoring and improvement systems - Medication review for hospitalised adult patients vs standard care	Christensen 2016	None of the trials took place in a low- or middle-income country	In addition to considering the uncertainty about the benefits of medication review found in these trials, in low-income countries the availability of resources, including pharmacists with appropriate training, and the cost of the intervention (including training)

Table 8. Priorities for primary research[1] based on applicability limitations (*Continued*)

			should be considered

[1]Priorities for primary research based on applicability limitations to low-income countries of delivery arrangement interventions identified by the included reviews. We did not search for additional primary studies.

Table 9. Priorities for primary research based on insufficient evidence[1] for important outcomes

Delivery arrangement	Included Review	No studies	Certainty of evidence	
			Very low	Low
Who receives care and when				
Queuing strategies	Ballini 2015	Patient outcomes, coverage, utilisation	-	-
Care received by groups vs individual care	Catling 2015	Access, coverage, utilisation	-	-
Who provides care				
Pre-licensure education	Pariyo 2009	-	-	Access, coverage, utilisation
Recruitment and retention strategies	Grobler 2015	-	-	Patient outcomes; access, coverage, utilisation
Role extension or task shifting - Lay health workers: hypertension	Brownstein 2007	-	-	Patient outcomes; access, coverage, utilisation; quality of care; resource use
Role extension or task shifting - Lay health workers: delivery of community-based neonatal care packages	Lassi 2015	-	Patient outcomes	Patient outcomes, access, coverage, utilisation
Role expansion or task shifting - Lay health workers: maternal and child care and infectious diseases	Lewin 2010	-	-	Patient outcomes; access, coverage, utilisation
Role expansion or task shifting - Health-	Hodnett 2010	-	-	Patient outcomes

Table 9. Priorities for primary research based on insufficient evidence[1] for important outcomes (*Continued*)

care providers giving additional social support to pregnant women vs usual care				
Role expansion or task shifting - Physician-nurse substitution	Martínez-González 2014	Access, coverage, utilisation	-	-
Role expansion or task shifting - Midlevel health professionals: midwife-led care in pregnancy	Sandall 2013	-	-	Patient outcomes; access, coverage, utilisation
Role expansion or task shifting - Clinical officers/non-physician clinicians/Associate clinicians vs physician for caesarean section	Wilson 2011	-	Patient outcomes; access, coverage, utilisation	-
Role expansion or task shifting - Non-specialist providers vs. specialist providers for mental health	Van Ginneken 2013	-	Patient outcomes	Patient outcomes
Role expansion or task shifting - Specialist nursing post added to hospital nurse staffing	Butler 2011	-	-	Patient outcomes
- Dietary assistants added to hospital nurse staffing		-	-	Patient outcomes
Role expansion or task shifting - Pharmacists delivering non-dispensing services to patients	Pande 2013	-	Resource use	-
Role expansion or task shifting - Skilled birth attendant	Yakoob 2011	-	-	Patient outcomes

Table 9. Priorities for primary research based on insufficient evidence[1] for important outcomes (*Continued*)

Role expansion or task shifting - Dental care by dental therapists	Wright 2013	Resource use	Patient outcomes	-
Coordination of care				
Care pathways - Improved pre-hospital trauma systems vs no systems	Henry 2012	-	-	Patient outcomes; access, coverage, utilisation
Care pathways - Rapid response systems in hospitals vs no systems	Maharaj 2015	-	Patient outcomes; access, coverage, utilisation	-
Care pathways - Hospital clinical pathways vs usual care	Rotter 2010	-	Patient outcomes; resource use	Patient outcomes; access, coverage, utilisation
Case management - Children with pneumonia - Community-based with antibiotics	Theodoratou 2010	-	-	Patient outcomes
- Hospital-based with oxygen or Vitamin		-	Patient outcomes	-
Case management - People living with HIV/AIDS	Handford 2006	-	-	Patient outcomes; access, coverage, utilisation; quality of care
Coordination of care to reduce rehospitalisation - Pre-/postdischarge interventions vs usual care	Hansen 2011	-	-	Access, coverage, utilisation
- Transition interventions vs usual care		-	-	Access, coverage, utilisation
Discharge planning - Hospital discharge planning vs usual care	Gonçalves-Bradley 2016	Patient outcomes	-	-
Integration - Adding a service to an existing service vs ser-	Dudley 2011	Resource use	Quality of care	-

Table 9. Priorities for primary research based on insufficient evidence[1] for important outcomes (*Continued*)

vices with no addition - Integrated vs vertical delivery models				
		-	-	Access, coverage, utilisation
Referral systems - Healthcare delivery of organisational interventions vs no intervention for referral from primary to secondary care	Akbari 2008	Patient outcomes	-	-
Referral systems - Nurse vs physician triage systems in emergency departments	Rowe 2011	-	-	Quality of care
Teams - Practice-based interventions to promote collaboration vs no intervention	Reeves 2017	-	Patient outcomes; access, coverage, utilisation; resource use	-
Where care is provided				
Site of service delivery - HIV voluntary counselling and testing (VCT) at an optional location vs VCT at clinic	Bateganya 2010	-	-	Access, coverage, utilisation
Site of service delivery - Units dedicated to care for people living with HIV/AIDS - Institutions managing a high volume of people living with HIV/AIDS	Handford 2006	-	-	Patient outcomes; quality of care
		Patient outcomes; quality of care	-	-
Site of service delivery - Home care (different models) vs facility	Parker 2013	Access, coverage, utilisation; quality of care; resource use	Patient outcomes adverse, effects	-
Site of service delivery - Maternity waiting home vs no waiting homes	Van Lonkhuijzen 2012	Patient outcomes; access, coverage, utilisation; quality of care; resource use	-	-

Table 9. Priorities for primary research based on insufficient evidence[1] for important outcomes (*Continued*)

Site of service delivery - Strategies for increasing ownership and use of insecticide treated bednets	Augustincic 2015	Patient outcomes; access, coverage, utilisation; quality of care; resource use	-	-
Site of service delivery - Home-based care for people living with HIV/AIDS - Home-based care by multidisciplinary team care for people living with HIV/AIDS vs no team	Young 2010	-	Patient outcomes	Resource use
		Resource use	-	Patient outcomes
Site of service delivery - Early discharge from hospital for mothers and infants born at term vs standard discharge	Brown 2011	-	Resource use	Patient outcomes; access, coverage, utilisation
Site of service delivery - Out-of-facility vs facility-based HIV and reproductive health services for youth	Denno 2012	-	Quality of care	Quality of care
Site of service delivery - Decentralised vs centralised HIV care for initiation and maintenance of anti-retroviral therapy	Kredo 2013	-	Patient outcomes	Patient outcomes; access, coverage, utilisation
Information and communication technology				
E-Health - Mobile phone messaging for long-term illnesses vs usual care	De Jongh 2012	-	Access, coverage, utilisation	-
E-Health - Mobile phone messaging reminders for attendance at healthcare appointments vs various other interventions	Gurol-Urganci 2013	-	-	Access, coverage, utilisation

Table 9. Priorities for primary research based on insufficient evidence[1] for important outcomes (*Continued*)

E-Health - Decision support to improve healthcare process and health outcomes for people living with HIV/AIDS - Clinical information systems to improve healthcare process and health outcomes for people living with HIV/AIDS	Pasricha 2012	-	Patient outcomes; access, coverage, utilisation	Quality of care
		-	-	Quality of care
Health information systems - Women carrying their own case notes in pregnancy vs less detailed health cards	Brown 2007	Access, coverage, utilisation	Patient outcomes	Patient outcomes; access, coverage, utilisation; quality of care; resource use
E-Health - Mobile phone messaging to promote adherence to antiretroviral therapy vs usual care	Mbuagbaw 2013	-	-	-
Patient reminder and recall systems - Reminders for routine childhood vaccination vs usual care	Oyo-Ita 2016	Patient outcomes	-	-
Quality and safety systems				
Quality monitoring and improvement systems - Medication review for hospitalised adult patients vs standard care	Christensen 2016	-	-	Patient outcomes; access, coverage, utilisation
Quality monitoring and improvement systems - Interventions to improve antibiotic prescribing to hospital inpatients	Davey 2013	-	Access, coverage, utilisation	Patient outcomes; quality of care

Table 9. Priorities for primary research based on insufficient evidence[1] for important outcomes (*Continued*)

Quality monitoring and improvement systems - Decision support to improve healthcare process and health outcomes for people living with HIV/AIDS - Decision support with clinical information systems to improve healthcare process and health outcomes for people living with HIV/AIDS	Pasricha 2012	-	Patient outcomes; Access, coverage, utilisation	Quality of care
		-	-	Quality of care
Working conditions of health workers				
Staff support - Managerial supervision to improve quality of primary health care	Bosch-Capblanch 2011	-	Quality of care	Quality of care
Complex interventions cutting across delivery categories and across the other overviews				
Package of multiple interventions - Emergency obstetric referral interventions	Hussein 2012	Quality of care	Patient outcomes	Patient outcomes

[1]Priorities for primary research based on the absence of evidence or low-certainty of evidence for important outcomes: patient outcomes; access, coverage, utilisation; quality of care; and resource use.

Table 10. Priorities for systematic reviews[1]

Delivery arrangement	Systematic reviews needed*
Who provides care	
· Role expansion or task shifting General practice	Only supplementary review identified (Engstrom 2001)
· Role expansion or task shifting Professional groups than physician anaesthesiologists administering anaesthesia	10 years of most recent search 10 years

Table 10. Priorities for systematic reviews[1] (*Continued*)

· Role expansion or task shifting - Interventions for increasing health promotion practices in dental healthcare settings	Review in progress: Kengne 2014
. Role expansion or task shifting - Allied health professionals (paramedics, physiotherapists, occupational therapists, language therapists, radiographers)	No review identified
. Role expansion or task shifting - Dental health promotion	No review identified
· Self-management - Family support for reducing morbidity and mortality in people with HIV/AIDS	Only supplementary review identified (Mohanan 2009)
- Movement of health workers between public and private care	No review identified
Coordination of care	
· Disease management	No review identified
· Packages of care	Only supplementary reviews (Dowswell 2010; Haws 2007)
Where care is provided	
· Facilities and equipment	No review identified
· Generalist outreach	No review identified
· Intermediate care	No review identified
· Mobile units - mobile clinics for women's and children's health	Review in progress Abdel-Aleem 2012
· Site of service delivery - Facility-based deliveries in reducing maternal and infant morbidity and mortality in low- and middle-income countries	Review in progress: Dudley 2009
· Size of organisations	No review identified
· Specialist outreach	No review identified
· Transportation services	No review identified
Information and communication technology	
· E-Health - telemedicine vs face-to-face patient care: effects on professional practice and healthcare outcomes	Review update in progress: Currell 2000

Table 10. Priorities for systematic reviews[1] (*Continued*)

Quality and safety systems	
· Quality monitoring and improvement systems - Organisational and professional interventions to promote the uptake of evidence in emergency care	Review in progress: Curran 2007
· Quality monitoring and improvement systems - Interventions for reducing medication errors in hospitalised adults	Review in progress: Lopez 2012
· Quality monitoring and improvement systems - Interventions for reducing medication errors in children in hospital	Review in progress: Soe 2013
Working conditions of health workers	
· Workload	No review identified
· Health and safety systems	No review identified
· Staff-support interventions for health workers	No review identified

[1]Priorities for systematic reviews on supporting the delivery arrangement interventions in low-income countries,
* Based on key areas in the taxonomy of delivery arrangements (Table 1) for which we did not find a finished systematic review meeting our inclusion criteria.

CONTRIBUTIONS OF AUTHORS

All of the authors contributed to drafting and revising the overview.

DECLARATIONS OF INTEREST

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

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INDEX TERMS

Medical Subject Headings (MeSH)

*Developing Countries; *Review Literature as Topic; Critical Pathways; Delivery of Health Care [*methods; *organization & administration]; Information Technology; National Health Programs [*organization & administration]; Outcome Assessment (Health Care); Workplace [standards]

MeSH check words

Humans