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## Contracting out to improve the use of clinical health services and health outcomes in low- and middle-income countries (Review)

Odendaal WA, Ward K, Uneke J, Uro-Chukwu H, Chitama D, Balakrishna Y, Kredo T

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**Contracting out to improve the use of clinical health services and health outcomes in low- and middle-income countries (Review)**

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[Intervention Review]

# Contracting out to improve the use of clinical health services and health outcomes in low- and middle-income countries

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## ABSTRACT

### Background

Contracting out of governmental health services is a financing strategy that governs the way in which public sector funds are used to have services delivered by non-governmental health service providers (NGPs). It represents a contract between the government and an NGP, detailing the mechanisms and conditions by which the latter should provide health care on behalf of the government. Contracting out is intended to improve the delivery and use of healthcare services. This Review updates a Cochrane Review first published in 2009.

### Objectives

To assess effects of contracting out governmental clinical health services to non-governmental service provider/s, on (i) utilisation of clinical health services; (ii) improvement in population health outcomes; (iii) improvement in equity of utilisation of these services; (iv) costs and cost-effectiveness of delivering the services; and (v) improvement in health systems performance.

### Search methods

We searched CENTRAL, MEDLINE, Embase, NHS Economic Evaluation Database, EconLit, ProQuest, and Global Health on 07 April 2017, along with two trials registers - ClinicalTrials.gov and the International Clinical Trials Registry Platform - on 17 November 2017.

### Selection criteria

Individually randomised and cluster-randomised trials, controlled before-after studies, interrupted time series, and repeated measures studies, comparing government-delivered clinical health services versus those contracted out to NGPs, or comparing different models of non-governmental-delivered clinical health services.

### Data collection and analysis

Two authors independently screened all records, extracted data from the included studies and assessed the risk of bias. We calculated the net effect for all outcomes. A positive value favours the intervention whilst a negative value favours the control. Effect estimates are presented with 95% confidence intervals. We used the Grading of Recommendations Assessment, Development and Evaluation (GRADE) approach to assess the certainty of the evidence and we prepared a Summary of Findings table.

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## Main results

We included two studies, a cluster-randomised trial conducted in Cambodia, and a controlled before-after study conducted in Guatemala. Both studies reported that contracting out over 12 months probably makes little or no difference in (i) immunisation uptake of children 12 to 24 months old (moderate-certainty evidence), (ii) the number of women who had more than two antenatal care visits (moderate-certainty evidence), and (iii) female use of contraceptives (moderate-certainty evidence).

The Cambodia trial reported that contracting out may make little or no difference in the mortality over 12 months of children younger than one year of age (net effect = -4.3%, intervention effect  $P = 0.36$ , clustered standard error (SE) = 3.0%; low-certainty evidence), nor to the incidence of childhood diarrhoea (net effect = -16.2%, intervention effect  $P = 0.07$ , clustered SE = 19.0%; low-certainty evidence). The Cambodia study found that contracting out probably reduces individual out-of-pocket spending over 12 months on curative care (net effect = \$ -19.25 (2003 USD), intervention effect  $P = 0.01$ , clustered SE = \$ 5.12; moderate-certainty evidence). The included studies did not report equity in the use of clinical health services and in adverse effects.

## Authors' conclusions

This update confirms the findings of the original review. Contracting out probably reduces individual out-of-pocket spending on curative care (moderate-certainty evidence), but probably makes little or no difference in other health utilisation or service delivery outcomes (moderate- to low-certainty evidence). Therefore, contracting out programmes may be no better or worse than government-provided services, although additional rigorously designed studies may change this result. The literature provides many examples of contracting out programmes, which implies that this is a feasible response when governments fail to provide good clinical health care. Future contracting out programmes should be framed within a rigorous study design to allow valid and reliable measures of their effects. Such studies should include qualitative research that assesses the views of programme implementers and beneficiaries, and records implementation mechanisms. This approach may reveal enablers for, and barriers to, successful implementation of such programmes.

## PLAIN LANGUAGE SUMMARY

### Contracting out to improve the use of clinical health services and health outcomes in low- and middle-income countries

#### What is the aim of this Review?

This Cochrane Review aims to assess the effects of contracting out healthcare services. Cochrane researchers searched for all relevant studies to answer this question. Two studies met their criteria for inclusion in the Review.

#### Key messages

Contracting out healthcare services may make little or no difference in people's use of healthcare services or to children's health, although it probably decreases the amount of money people spend on health care. We need more studies to measure the effects of contracting out on people's health, on people's use of healthcare services, and on how well health systems perform. We also need to know more about the potential (negative) effects of contracting out, such as fraud and corruption, and to determine whether it provides advantages or disadvantages for specific groups in the population.

#### What was studied in the Review?

When governments contract out healthcare services, they give contracts to non-governmental organisations to deliver these services.

Contracting out healthcare services is common in many middle-income countries and is becoming more common in low-income countries. In many of these countries, government-run services are understaffed or are not easily accessible. Private healthcare organisations, on the other hand, often are more widespread and sometimes are well funded by international donors. By contracting out healthcare services to these organisations, governments can make healthcare services accessible to more people, for example, those in rural and remote areas.

However, contracting out might be a more expensive way of providing healthcare services when compared with services provided by governments themselves. Some governments may find it difficult to manage non-governmental organisations and to ensure that contractors deliver high-quality, standardised care. The process of giving and managing contracts may create opportunities for fraud and corruption.

#### What are the main results of the Review?

The review authors found two studies that met the criteria for inclusion in this Review. One study was from Cambodia. This study compared districts that contracted out healthcare services versus districts that provided healthcare services that were run by the government. The second study was from Guatemala. This study assessed what happened before and after preventive, promotional, and basic curative services were contracted out. These studies showed that contracting out:

- probably makes little or no difference in children's immunisation uptake, women's use of antenatal care visits, or women's use of contraceptives (moderate-certainty evidence);

- may make little or no difference in the number of children who die before they are one year old, or who suffer from diarrhoea (low-certainty evidence); and
- probably reduces the amount of money people spend on their own health care (moderate-certainty evidence).

Included studies did not report the effect of contracting out on fairness (equity) in the use of healthcare services nor on side effects such as fraud and corruption.

**How up-to-date is this Review?**

The review authors searched for studies that had been published up to April 2017.

## SUMMARY OF FINDINGS

### Summary of findings for the main comparison.

#### Contracting out compared with not contracting out for providing clinical healthcare services

**Population:** people who use governmental clinical health services that are contracted out to non-governmental providers

**Intervention:** provision of any clinical health service on behalf of the government by for-profit and/or not-for-profit, non-governmental providers

**Comparison:** contracting out vs no contracting out

Outcomes	Net effect <sup>a</sup>	No. of studies	Certainty of the evidence (GRADE) <sup>b</sup>	Results in words	Comments
<b>Utilisation of health services</b>					
<b>Immunisation of children 12 to 24 months old</b>  (over a 12 month period)	<b>Fully immunised</b>  Net effect = -39.4%, intervention effect P = 0.46, clustered SE = 9.0%; see <a href="#">Table 1</a> for the CI	2c,d	⊕⊕⊕⊕  Moderate <sup>e</sup>	Contracting out probably makes little or no difference in immunisation uptake of children 12 to 24 months old over the previous 12 months.	
	<b>Measles</b>  Net effect = 46.5%, SE = 28.5%, 95% CI -9.4% to 102.4%				
	<b>DPT</b>  Net effect = -1.4%, SE = 22.9%, 95% CI -46.3% to 43.5%				
	<b>Polio</b>  Net effect = -7.6%, SE = 24.1%, 95% CI -54.8% to 39.6%				
<b>Antenatal visits</b>  (over the previous 12 months)	<b>&gt; 2 antenatal care visits</b>  Net effect = -12.2%, intervention effect P = 0.35, clustered SE = 10.0%; see <a href="#">Table 1</a> for the CI	2c,d	⊕⊕⊕⊕  Moderate <sup>e</sup>	Contracting out probably makes little or no difference in the number of women who had > 2 antenatal care visits over the previous 12 months.	
	<b>≥ 3 antenatal care visits</b>				

	Net effect = 27.4%, SE = 22.2%, 95% CI -16.1% to 70.9%			
<b>Female use of contraceptives</b> (over a 12 month period)	Net effect = -11.5%, intervention effect P = 0.78, clustered SE = 3.0%; see <a href="#">Table 1</a> for the CI  Net effect = 1.9%, SE = 6.9%, 95% CI -11.6% to 15.4%	2 <sup>c,d</sup>	⊕⊕⊕⊕ Moderate <sup>e</sup>	Contracting out probably makes little or no difference in female use of contraceptives over the previous 12 months.
<b>Health outcomes</b>				
<b>Mortality in the past year of children younger than 1 year</b> (over a 12 month period)	Net effect = -4.3%, intervention effect P = 0.36, clustered SE = 3.0%; see <a href="#">Table 1</a> for the CI	1 <sup>c</sup>	⊕⊕⊕⊕ Low <sup>e,f</sup>	Contracting out may make little or no difference in the mortality of children younger than 1 year over a 12 month period. Trial authors conclude that the sample size was too small to detect typical mortality.
<b>Incidence of diarrhoea in children younger than 5 years</b> (over a 12 month period)	Net effect = -16.2%, intervention effect P = 0.07, clustered SE = 19.0%; see <a href="#">Table 1</a> for the CI	1 <sup>c</sup>	⊕⊕⊕⊕ Low <sup>e,f</sup>	Contracting out may make little or no difference in the incidence of childhood diarrhoea over a 12 month period.
<b>Equity in utilisation of clinical health services</b>				
Not reported in the included studies				
<b>Economic outcomes</b>				
<b>Individual health-care expenditures</b> (over a 12 month period)	Net effect = \$ -19.25 (2003 USD), intervention effect P = 0.01, clustered SE = \$ 5.21; see <a href="#">Table 1</a> for the CI	1 <sup>c</sup>	⊕⊕⊕⊕ Moderate <sup>e</sup>	Contracting out probably reduces individual out-of-pocket spending on curative care over a 12 month period. The reduction in individuals' health-care expenditure is in line with the reported decrease in people visiting private healthcare providers.
<b>Adverse effects</b>				
Not reported in the included studies.				

<sup>a</sup> Calculated as the difference between the change in the intervention group and the change in the control group:  $\text{Net effect} = (\text{INT}_{\text{post}} - \text{INT}_{\text{pre}}) - (\text{CONT}_{\text{post}} - \text{CONT}_{\text{pre}})$ .

**b GRADE Working Group grades of evidence:**

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

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

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

⊕⊖⊖⊖ **Very low certainty:** This research does not provide a reliable indication of the likely effect. The likelihood that the effect will be substantially different\* is very high.

\* Substantially different = a large enough difference that it might affect a decision.

<sup>c</sup> Bloom 2006 (cluster-randomised trial).

<sup>d</sup> Cristia 2015 (CBA).

<sup>e</sup> Downgraded by 1 for serious risk of bias. Study 1 (Bloom 2006) is at high risk of bias as baseline participant characteristics are not reported, and Study 2 (Cristia 2015) is at high risk of other bias because estimates of effects correspond with a strengthened model of the intervention compared with the initial model.

<sup>f</sup> Downgraded by one for serious imprecision. The study reported treatment of the treated (ToT) estimates. Actual numbers for numerator and denominator were not provided.

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DPT: diphtheria-pertussis-tetanus



## BACKGROUND

The origin of contracting public (i.e. governmental) services out to non-governmental service providers can be traced back to the rise of the new public management doctrine in the 1980s, with its emphasis on results-oriented management and improved productivity in the public service sector (Hood 1991). Around the same time, it became increasingly common for governmental services, including healthcare services, to be contracted out to non-governmental (i.e. private) service providers (Greve 2001; Palmer 2006). Many elements of this new public management doctrine, such as linking rewards with performance and promoting competition between service providers, became part of the way in which governments engage with non-governmental providers (NGPs), whether for-profit or not-for-profit enterprises.

Contracting out of public health services is a financing strategy that governs the way in which public sector funds are used to deliver these services (Lagarde 2009). This strategy is operationalised in many different ways (see [How the intervention might work](#) below) but at its core is a contract between the government and the NGP that details the mechanisms and conditions by which the NGP is to provide healthcare services on behalf of the government (Lagarde 2009; Levin 2011).

Contracting with NGPs is a viable option for meeting human resource shortages in rural and remote areas (Randive 2012). Advantages include that it offers a more focussed service provision because measurable outcomes are specified in the contract (Marek 1999; Palmer 2006); it circumvents governmental bureaucracy; it decentralises decision-making to those who provide the services (Loevinsohn 2004); it allows governments to focus on roles they are uniquely placed to play, such as planning and standard setting (Loevinsohn 2004); and it may improve equity in the utilisation of clinical health services (Bhushan 2002). Key to the success of contracting out is close monitoring and evaluation of how the NGP meets contract deliverables (Greve 2001; Liu 2007). One consequence of contracting out that is ambiguous in terms of being positive or negative is fragmentation of health services: Palmer 2006 cited examples from England and New Zealand in which fragmentation, or decentralising, of services, was beneficial, whilst it had the opposite effect in Afghanistan (Arur 2010). In the latter case, the detrimental effect of lacking standardised practises was made worse by further decentralisation of services to different NGPs.

Many confounders can impact the effects of contracting out. These include, amongst other issues, (i) opportunities for fraud and corruption may occur during the tender and contract management processes (Greve 2001; Heard 2011); (ii) contracting out may be more expensive than provision of the same service by the government because of high transaction costs between the government and the NGP (Bel 2007); (iii) mistrust may develop in the contractual relationship for the NGP, government, or both (Batley 2006; Girth 2014; Van Slyke 2007); and (iv) governments may be unable to sustain contracts (England 2004). It is argued that when contracting out occurs in response to ineffective government service delivery, these same governments often lack the capacity to effectively manage the contract, thereby countering the aim of improved service delivery by an NGP (Bustreo 2003; Mills 1998a).

Evidence on the outcomes of contracting out is as varied as its benefits and challenges. One review found mixed results when non-

clinical services were contracted out (Mills 1998a); another review highlighted the paucity of high-certainty evidence (England 2004); and the Loevinsohn 2004 and Liu 2007 reviews reported positive evidence for some outcomes, such as a decline in child malnutrition and improved utilisation of services, respectively. This is the first update of the Cochrane Review published in 2009 (Lagarde 2009).

### Description of the condition

Although contracting out of public healthcare services initially occurred mainly in middle-income countries, it is increasingly found in low-income countries (Arur 2010). Palmer 2006 surmises that this is due to the fact that contracting out is presented as a solution to address inadequate provision of health care by governments (Mills 1998; Tanzil 2014), and that it is used when the private sector is well funded by international donors (Vian 2007). Contracting out is therefore seen as a useful strategy for improving and scaling up healthcare service delivery in fragile states (Bloom 2006).

### Description of the intervention

The intervention - contracting out - is defined as the provision of any clinical health service on behalf of the government (purchaser) by non-governmental providers (NGPs), regardless of whether they are for-profit or not-for-profit providers (Heard 2011; Palmer 2006), whereby NGPs (contractors) are compensated for the services they provide (Levin 2011). For this review, we have defined clinical health services as any preventative and/or curative medical services that are provided by professional (e.g. doctors, pharmacists, psychologists, occupational therapists, nurses) or para-professional healthcare workers (e.g. formally trained nurse aides, physician assistants, emergency service paramedical workers) at primary, secondary, and tertiary healthcare facilities. These two cadres of health workers received formal tertiary education for their respective professions (Lewin 2005). We excluded from this review healthcare services contracted out to lay health workers (i.e. workers with no professional or paraprofessional tertiary education) (Lewin 2005).

### How the intervention might work

The most fundamental element of the intervention is a contract between a government and an NGP that details (i) the healthcare services the NGP will provide on behalf of the government (Lagarde 2009), and (ii) the compensation offered by the government in return for these services (Liu 2007). However, as alluded to in the flowchart below, the government can source NGPs and adjudicate contracts in more than one way (Waters 2000). Governments may choose to select the NGP rather than inviting interested agencies to apply. They can contract with one NGP to provide an agreed service, or they can reduce the risk of selecting a contractor who may not honour the contract by contracting with several NGPs for each to provide a proportion of an agreed service (Heard 2011). Commonly, the NGP is an organisation, yet a government can also contract with individuals, as was the case with private specialists who were contracted by the government to provide emergency obstetrical care in rural India (Randive 2012).

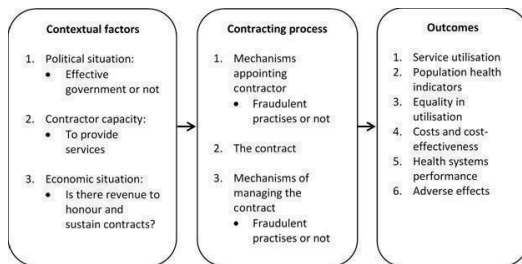
If sourcing NGPs is accomplished through a tendering process, the contract amount could be specified in the tender documentation made available beforehand, or the tendering brief may invite applicants to state a cost for services that they wish to provide (Zaidi 2012). In a similar way to sourcing NGPs, government can manage

the NGP’s performance in different ways - an issue that is becoming increasingly more challenging as contractual relationships become more complex and ambiguous (Girth 2014). A third party can be appointed for this role, or it can be performed in-house by the government (Heard 2011), and payment penalties, also referred to as “sanctions”, and/or bonus payments may be used to ensure that the NGP honours the contract (Girth 2014, p. 318).

As pointed out by Agyepong and Adjei, any health reform, including contracting out, is as much a political matter (i.e. shaped by those in power who determine health policies and oversee their

implementation) as it is a technical matter (i.e. its content and implementation requires technical expertise from all involved in the contracting out process) (Agyepong 2008). Contextual issues and processes such as those listed in Figure 1 were planned to be treated as effect modifiers and included in the analysis, as their importance in shaping the contracting out process and ultimately the outcomes cannot be ignored (Bel 2007; Greve 2001; Lagarde 2009; Liu 2007; Mills 1998a). When the included studies did not present these modifiers as numerical data, it was decided that they should be narratively reported in the same way as in the original review (Lagarde 2009).

**Figure 1. How the intervention might work.**



**Why it is important to do this review**

In an attempt to ensure that high-quality public health services are equitable and accessible in low- and middle-income countries (LMIC), it often happens that governments will contract these services to non-governmental providers. A case in point is the National Department of Health in South Africa, which in 2011/12 adopted a ‘National Health Insurance’ policy with the aim of increasing participation of the private sector in the delivery of public health services. Private general practitioners and community pharmacies are among the providers earmarked by the National Department of Health to be contracted with to provide clinical health services on behalf of the government. Similarly, in Nigeria, the federal government, through the National Health Insurance Scheme (NHIS), has involved a non-governmental organisation in the accreditation of private and public hospitals to implement NHIS (see NHIS 2011).

Lagarde 2009, the original EPOC review on this topic, was published in 2009, with the main searches completed in 2006 and updated in May 2009. This review indicated that contracting out has become more common practise in many low- and middle-income

countries, and it can be assumed that evidence on its effects continue to accumulate. This update also expanded the outcomes by including health system performance as a measure of its effects. This inclusion reflects concern expressed in Liu 2007 that past evaluations reported primarily on how contracting out impacted access to, and utilisation of, services, with little reference to its impact on the healthcare system.

**OBJECTIVES**

To assess effects of contracting out governmental clinical health services to non-governmental service provider/s on (i) utilisation of clinical health services; (ii) improvement in population health outcomes; (iii) improvement in equity of utilisation of these services; (iv) costs and cost-effectiveness of delivering the services; and (v) improvement in health systems performance.

## METHODS

### Criteria for considering studies for this review

#### Types of studies

We considered the following study designs for inclusion (EPOC 2017a).

- Individual randomised trials.
- Cluster-randomised trials and non-randomised studies with at least two intervention sites and two control sites, or two intervention groups for each type of intervention.
- Controlled before-after (CBA) studies with at least two intervention sites and two control sites at which data collection was contemporaneous and identical methods were used.
- Interrupted time series studies with at least three data points before and three after the intervention.
- Repeated measures studies wherein measurements were made for the same individuals at least three data points before and three after the intervention.

#### Types of participants

The unit of analysis was the populations that access and use governmental clinical health services that are contracted out to non-governmental providers, whether for-profit and/or not-for-profit providers. Participants included users and non-users of these services, as well as health facilities at all levels where these contracted services are provided. Given that the intervention is directly linked to, and impacted by, the economic status and political conditions of a country, we assumed that the outcomes would not be transferable between LMIC and high-income countries. We therefore limited the review to LMIC as defined by the World Bank (World Bank 2016), using its classification of countries into low-income, lower-middle-income, and upper-middle-income economies.

#### Types of interventions

We defined the intervention - contracting out - as the provision of any clinical health service on behalf of the government by for-profit and/or not-for-profit, non-governmental providers. The intervention had to meet the following two criteria.

- A formal contractual relationship between the government and a non-governmental provider must be described.
- The object of the contract must be that the non-governmental provider will provide, on behalf of the government, clinical health services for a specific (i) geographical area, (ii) patient population, and (iii) period of time. Non-clinical services, such as catering, will not be included.

We measured the intervention effect by comparing:

- contracting out versus no contracting out. Outcomes (listed under [Types of outcome measures](#) below) for routine governmental clinical health services that are not contracted out were to be compared with the same set of outcomes for governmental clinical health services that are contracted out to NGP/s; and
- one model of contracting out versus another model. In this instance, the compared models had to be different from

each other based on well-described contracting features, for example:

- *tender process*: competitive bidding versus fixed bidding for the contract;
- *contract duration*: annual renewal versus multi-year contracts; or
- *governmental stewardship*: different incentive structures offered by the government and/or whether the government does the monitoring and evaluation of contract deliverables in-house versus an externally appointed agency.

#### Types of outcome measures

##### Primary outcomes

##### Utilisation of health services

- Utilisation of clinical health services that are contracted out, with the unit of analysis being an individual's initial contact with a professional health worker during a given time period and/or the number of services an individual received from a healthcare professional in a given time period for those services contracted out (Andersen 2005; Bhandari 2006)

##### Health outcomes

- Measured as patient level mortality and morbidity

##### Secondary outcomes

##### Equity in utilisation of clinical health services

- Measured as the level of disparity in healthcare utilisation by individuals of different socio-economic status (Braveman 2003; Waters 2000); use of healthcare services was to be treated as a dependant variable, and independent variables were to include issues such as personal income, employment status, private health insurance or not, and the degree of ill health

##### Economic outcomes

- Cost-effectiveness of delivering contracted out clinical health services measured in terms of incremental cost per quality-adjusted life-years (QALYs) gained or incremental cost per disability-adjusted life-years (DALYs) averted
- Costs and savings to government, contracted agencies, and patients
- Economic measure of health benefit such as QALYs and DALYs

##### Health system performance

- Measured in terms of health service delivery, health workforce, health information, availability of essential medicines, and health financing indicators (as listed below) (World Health Organization 2010a)

##### Health service delivery

- Number and distribution of inpatient beds per 10,000 population
- Number of outpatient department visits per 10,000 population per year (service utilisation)
- General and specific service readiness scores for health facilities
- Proportion of health facilities offering specific services
- Number and distribution of health facilities offering specific services per 10,000 population

- Quality of services (i.e. structural indicators that assess NGP attributes such as availability of specified services, as well as compliance with clinical guidelines) (Liu 2007)

#### Health workforce

- Number of healthcare workers per 10,000 population
- Distribution of healthcare workers by specialisation, region, place of work, and gender

#### Health information

- Health information system performance index, which is a composite of scores showing the overall availability of national databases for various health statistics. Although this particular indicator may not be used in the included studies, they may include outcomes measured with respect to availability and/or quality of clinical data for monitoring and evaluation

#### Availability of selected essential medicines

- Average availability of selected essential medicines in public and private facilities
- Median consumer price ratio of selected essential medicines in public and private facilities

#### Health financing

- Ratio of household out-of-pocket payments for health to total expenditure on health, noting that this will be differently interpreted in a very low-income setting than in a low-income setting (World Health Organization 2010b)

#### Adverse effects

- Fraudulent practices in contracting non-governmental providers
- Job insecurity for governmental-provider employees
- Compared with standard care, the intervention does not improve but worsens the primary and secondary outcomes listed above

It should be noted that we did not include the economic and health system performance outcomes in the previous version of this review (Lagarde 2009). We added these to provide additional insight into the effects of contracting out.

#### Search methods for identification of studies

We searched the *Cochrane Database of Systematic Reviews* (CDSR) and the Database of Abstracts of Reviews of Effects (DARE) for primary studies included in related systematic reviews.

#### Electronic searches

We searched the following databases for related reviews.

- Cochrane Central Register of Controlled Trials (CENTRAL; 2017, Issue 3) in the Cochrane Library ([www.cochranelibrary.com](http://www.cochranelibrary.com)) (searched 06 April 2017).

We searched the following databases for primary studies.

- MEDLINE In-Process & Other Non-Indexed Citations, MEDLINE Daily, and MEDLINE 1946 to Present, Ovid (searched 06 April 2017).

- National Health Service (NHS) Economic Evaluation Database (NHS EED; 2015, Issue 2) in the Cochrane Library ([www.cochranelibrary.com](http://www.cochranelibrary.com)) (searched 06 April 2017).
- MEDLINE Epub Ahead of Print, In-Process & Other Non-Indexed Citations, MEDLINE Daily and MEDLINE 1946 to Present, Ovid (searched 06 April 2017).
- Embase 1974 to 2017 April 05, Ovid (searched 06 April 2017).
- EconLit 1969 to present, ProQuest (searched 19 April 2016).
- Global Health 1973 to 2016 Week 14, Ovid (searched 19 April 2016).
- Latin American Caribbean Health Sciences Literature Virtual Health Library (LILACS VHL) (<http://lilacs.bvsalud.org/en/>) (searched 06 April 2017).

The EPOC Information Specialist in consultation with the review authors developed the search strategies. Search strategies comprised keywords and controlled vocabulary terms. We applied no language or time limits. We searched all databases from database start date to date of search.

#### Searching other resources

We conducted a grey literature search to identify studies not indexed in the databases listed above.

#### Grey literature

- Eldis: <http://www.eldis.org/> (searched 09 October 2014)
- Google Scholar: <http://scholar.google.com/> (searched 06 October 2017)
- Grey Literature Report: <http://www.nyam.org/library/> (searched 06 October 2017)
- Organisation for Economic Cooperation and Development (OECD) Library: <http://www.oecd-ilibrary.org/search/advanced> (searched 26 January 2018)
- OpenGrey: <http://www.opengrey.eu> (searched 06/10/2017)
- World Bank: <http://documents.worldbank.org/curated/en/docadvancesearch> (searched 26 January 2018)

#### Trial registries

- ClinicalTrials.gov, US National Institutes of Health (NIH): [clinicaltrials.gov](http://clinicaltrials.gov) (searched 10 October 2017)
- International Clinical Trials Registry Platform (ICTRP), World Health Organization (WHO): <http://www.who.int/ictrp/en/> (searched 10 October 2017)

We also:

- screened individual journals and conference proceedings (e.g. handsearch);
- reviewed reference lists of all included studies and relevant systematic reviews/primary studies;
- contacted authors of relevant studies/reviews to clarify reported published information and to seek unpublished results/data;
- contacted researchers with expertise relevant to the review topic/EPOC interventions; and
- conducted a cited reference search for all included studies in Web of Science.

We have provided in [Appendix 1](#) all strategies used, including a list of sources screened and relevant reviews/primary studies reviewed.

## Data collection and analysis

### Selection of studies

Two review authors screened abstracts and titles and the full texts retrieved for studies that potentially met the inclusion criteria (see the screening tool in [Appendix 2](#)). We resolved disagreements during the abstract/title and full text screening by conducting internal discussions and consulting with the EPOC contact editor.

### Data extraction and management

We used a standardised data extraction form to record the following information from included studies.

- Type of study.
- Duration of study.
- Study setting (country, key features of the healthcare system, external support, other health financing options in place, other ongoing economic/political/social reforms).
- Characteristics of participants (e.g. catchment area size, characteristics of the population, existing health service provision).
- Characteristics of interventions (nature of the contractor, scope and characteristics of the contract).
- Main outcome measures and results.

### Assessment of risk of bias in included studies

Two review authors independently assessed risk of bias using the EPOC prespecified domains ([EPOC 2017b](#)). We resolved disagreements by discussion or, when no consensus was reached, by involving a third review author. These risk of bias domains include random sequence generation, allocation concealment, blinding of participants and personnel, blinding of outcome assessment, missing outcome data, selective reporting, and other biases identified by review authors.

We have judged each potential source of bias as high, low, or unclear and have provided a justification for our judgement in the 'Risk of bias' table. We summarised 'Risk of bias' judgements across different studies for each of the domains listed.

We also assessed included studies for risks specifically associated with cluster-randomised trials ([Higgins 2011](#)). We assessed the study on recruitment bias (when individuals were recruited to the trial after clusters were randomised), imbalance between clusters at baseline, loss of clusters during the trial, incorrect analysis methods, and comparability of the study with other randomised trials.

In assessing the overall risk, we considered the likely direction and magnitude of the risks and whether they resulted in biased findings. An overall high risk of bias, being a plausible bias that seriously weakens the level of certainty of results, implied a 'high risk' score in one or more of the domains. An overall unclear risk of bias, being a plausible bias that raises some doubt about certainty of the results, meant an 'unclear risk' score in one or more of the domains. An overall low risk of bias, being a plausible bias unlikely

to seriously change the results, implied a 'low risk' score in all domains.

### Measures of treatment effect

We measured effects by mean percentages before and after the intervention. We calculated the intervention effect as the percentage difference between pre-intervention and post-intervention (i.e.  $INT_{effect} = INT_{post} - INT_{pre}$ ). Similarly, we calculated the control effect as  $CONT_{effect} = CONT_{post} - CONT_{pre}$ . We then calculated the net effect as the difference between intervention and control effects:  $Net\ effect = INT_{effect} - CONT_{effect}$ . This net effect, which uses the scale of percentage points, is comparable with difference-in-difference estimates, as it is calculated in the same way and on the same scale. The net effect is thus the intervention effect after adjustments for the control effect. The percentage point is the arithmetical difference between two percentages, and as such, it can be a positive or negative value, indicating the direction of the net effect. Positive percentage differences favour the intervention, whilst negative percentage differences favour the control. The magnitude of the difference suggests the extent of the favour. We have presented effect estimates with 95% confidence intervals (CIs). We calculated the net effect for [Bloom 2006](#) to allow for comparison with [Cristia 2015](#), which reported difference-in-difference estimates. The CIs presented for [Bloom 2006](#) represent CIs for the intervention effect and can be found in [Table 1](#). We could not calculate CIs for the net effect in [Bloom 2006](#), as standard errors for the comparison were not provided in the text. The CIs presented for [Cristia 2015](#) represent the CIs for the net effect.

In future updates, we plan to meta-analyse intervention outcomes by converting estimates of effect from the primary analysis into risk ratios, with reported adjusted analyses for dichotomous or continuous outcomes. Should odd ratios be reported for dichotomous outcomes, we will convert these into risk ratios before doing the meta-analysis, using RevMan 5.3 (2014). If we find any interrupted time series studies in future, we plan to record changes in level and slope. If these results are not properly analysed and reported, we will attempt to re-analyse the data using methods described in [Ramsay 2003](#). If this review is to be updated, we suggest that studies reporting multiple measures of the same outcome should be analysed in accordance with steps proposed by [Brennan 2009](#). These include choosing the trial authors' primary outcome/s that relate closest to the review's primary outcomes; should we identify no such primary outcome/s, selecting the outcome used in calculating the sample size; when no sample size calculations are found, ranking the effect estimates and using the outcome with the median effect estimate. We also propose for the next update of this review that economic outcome data should be extracted in keeping with guidelines described in the UK National Health Services' Economic Evaluation Database (NHS EED) ([Craig 2007](#)).

### Unit of analysis issues

For future updates we will re-analyse the cluster-randomised trials that do not account for clustering, provided that the following information is available.

- Number of clusters that were randomised to each intervention group, or the mean size of each cluster.

- Estimate of the intracluster correlation coefficient (if this is not reported, this coefficient will be extracted from similar CRTs).
- Outcome data for the total number of individuals in the study, thus not taking clusters into account.

When it is not possible to adjust the analysis, we will present the results separately and will not combine them in a meta-analysis.

### Dealing with missing data

For this update, we identified no missing data. Should data be missing, we would contact trial authors to request the data. We will report data not obtained as missing data in the risk of bias table.

### Assessment of heterogeneity

We assessed whether studies were similar with respect to participants, settings, interventions, and outcome measures. When meta-analysis was possible, we would have assessed heterogeneity by visual inspection of the meta-analyses' forest plots (i.e. by looking at the direction of the intervention effect and its size). We would have used a  $\chi^2$  test to determine whether observed differences in outcomes between studies are due to chance only. If differences were bigger than expected by chance only, we will assume that statistical and/or clinical heterogeneity is present across studies. We will use the  $I^2$  statistic to indicate the degree of statistical heterogeneity. The threshold for substantial heterogeneity will be an  $I^2$  value between 50% and 100%, and we will further analyse such cases in subgroup analyses as described below.

### Assessment of reporting biases

We planned to use funnel plots to examine asymmetry and to assess the potential that any asymmetry may be due to publication bias. However, we identified too few studies of similar comparisons to allow a meaningful assessment of asymmetry.

### Data synthesis

As the two included studies used different study designs (cluster trial and before-after study), we did not synthesise the data. We graded our confidence in available estimates of effects using GRADE, as described in [Cochrane 2011](#). This approach classifies the certainty of evidence into four categories: high, moderate, low, and very low.

For future updates, we will use RevMan software to conduct meta-analyses of pooled outcome data. We will present an estimate of treatment effect for different studies with similar interventions; these studies must be comparable with respect to methods, settings, participants, and outcomes. We will not combine randomised and non-randomised trials. We will calculate pooled estimates for non-randomised trials using different designs. We will perform random-effects meta-analysis to combine data, as heterogeneity across studies is assumed, given differences in settings and intervention mechanisms. For studies with results adjusted for confounding variables, we will use the inverse variance available in RevMan (version 5.3) for the meta-analysis. We will analyse repeated measures studies and interrupted time series studies using a regression analysis with time trends before and after the intervention. We will express outcomes for such studies as changes in:

- level (i.e. the immediate effect of the intervention, measured as the difference between the fitted value for the first post-intervention data point minus the predicted outcome measured at the first post-intervention data point); and
- slope (i.e. the change in trend from before to after the intervention). We will present long-term effects in a similar way as immediate effects. We will report effects at six months as the difference between the fitted value for month six as the post-intervention data point minus the predicted outcome six months post intervention based on the pre-intervention slope. We will apply the same method to measure effects after 12 and 24 months.

### 'Summary of findings'

We prepared a 'Summary of findings' table for the main intervention comparison and included the seven most important outcomes, based on the review team's judgement of outcomes most likely to influence (i) policy makers' decision to implement contracting out, and (ii) use of these contracted out services by patients and the general public. The seven outcomes are immunisation of children, antenatal visits, female use of contraceptives, mortality of children younger than one year, diarrhoea in children under five years old, equity in the use of clinical health services, and individual healthcare expenditures ([Summary of findings for the main comparison](#)). Two review authors independently assessed the overall certainty of the evidence (high, moderate, low, and very low), using the five GRADE considerations (risk of bias, consistency of effect, imprecision, indirectness, and publication bias) to downgrade the certainty and three factors to upgrade the certainty (large effect size, confounder, dose response) ([Guyatt 2008](#)). We used methods and recommendations as described in Chapter 11 of the *Cochrane Handbook for Systematic Reviews of Interventions* ([Schünemann 2011](#)), along with the EPOC worksheets ([EPOC 2017c](#)). We provided justification for decisions to downgrade or upgrade the ratings using footnotes in the table and made comments to aid readers' understanding of the review when necessary. We used plain language statements to report these findings in the review ([EPOC 2017d](#)). For outcomes presented in [Summary of findings for the main comparison](#), we have presented the evidence profile in [Appendix 3](#), and for all other outcomes, in [Appendix 4](#).

### Subgroup analysis and investigation of heterogeneity

Owing to the way participant groups were presented in the included studies, we conducted no subgroup analyses. For the next update, we will use the latest version of RevMan to conduct analyses between two or more subgroups to investigate the variance in intervention effect for different interventions and settings due to confounding variables (see Contextual factors and Contracting mechanisms, in [Figure 1](#)) that could impact the intervention effect. The analysis will detect true differences between subgroups, not sampling error. Subgroup samples must be exclusive to a group, enough trials must be reported before an important comparison is possible. If we identify 10 times or more studies than the number of independent variables, we will perform a meta-regression analysis to simultaneously explore the intervention effect on estimates of effects and the effects of different settings and interventions. We will use non-overlapping confidence intervals for random-effects meta-analyses to detect an important difference between subgroups in relation to the treatment effect. When meta-analysis is not appropriate, we will report subgroup results narratively.

### Sensitivity analysis

We did not conduct a sensitivity analysis, as we included only two studies in this review. For future updates, we will conduct a sensitivity analysis by removing studies with an overall high risk of bias from the meta-analyses described above. Should cluster-randomised trials be combined, analysis will involve varying the intracluster correlation coefficient. For non-randomised trials that present results adjusted and not adjusted for confounding variables, we will conduct a sensitivity analysis of results that were not adjusted.

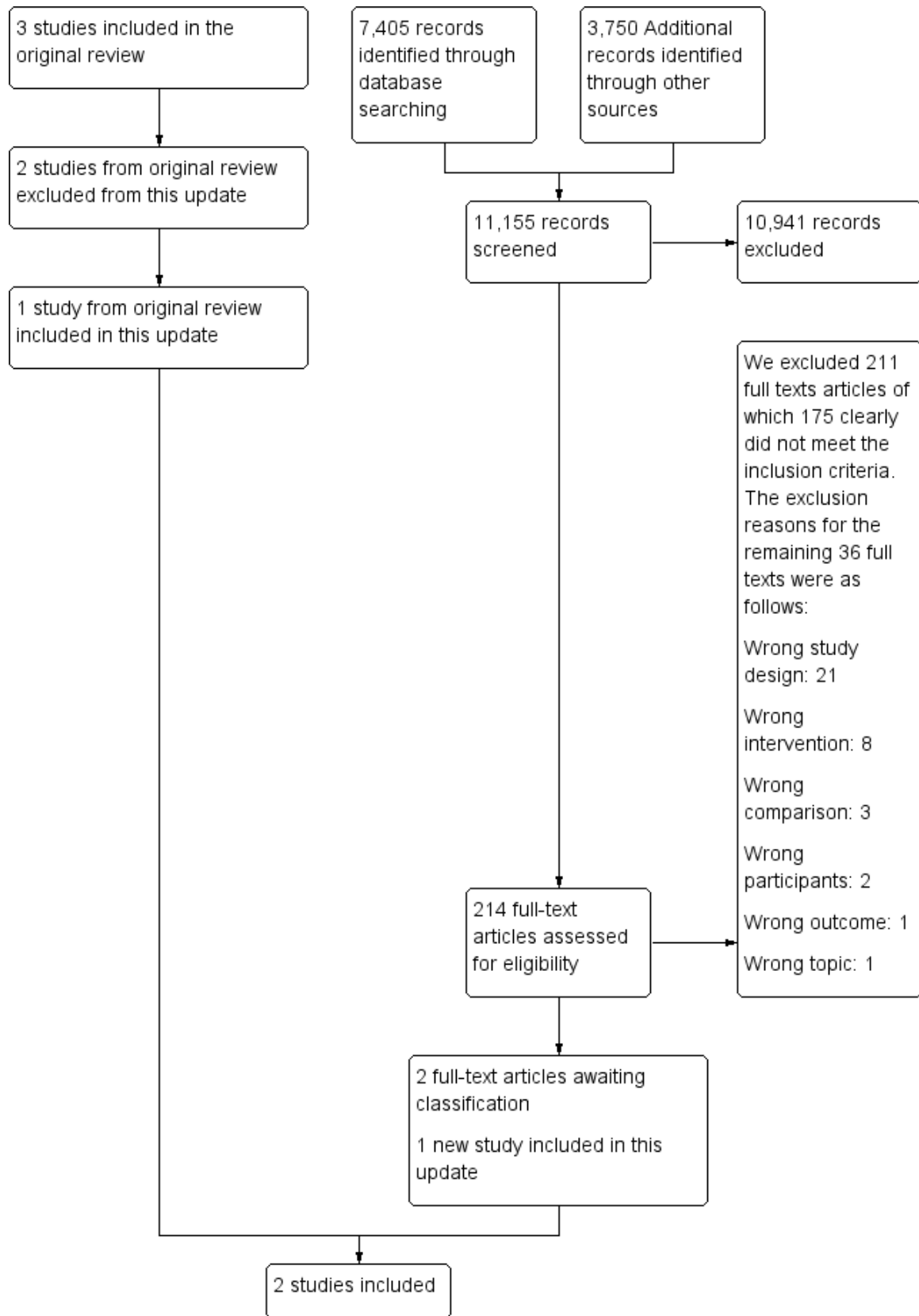
## RESULTS

### Description of studies

#### Results of the search

We screened 11,155 references retrieved from databases and other sources, and we excluded 10,941 records after a review of titles and abstracts. We retrieved the full texts of 214 articles for detailed assessment. Of these, we excluded 211 articles because they did not meet the review inclusion criteria. We included one new study in this update and one study from the previous version of the review. Two studies are awaiting classification. We have presented additional detail in the study flow diagram in [Figure 2](#).

**Figure 2. Study flow diagram.**





## Included studies

Two studies met the inclusion criteria of this review: a cluster-randomised trial conducted in Cambodia ([Bloom 2006](#)), and a controlled before-after study implemented in Guatemala ([Cristia 2015](#)). [Bloom 2006](#) was included in the previous version of the Cochrane Review ([Lagarde 2009](#)).

As the manner in which the intervention was implemented differed substantially between studies, the table below summarises (i) contexts, content, and outcomes of respective contracting out programmes, and (ii) process variables listed in [Figure 1](#), which we consider drivers of the intervention that are as important as the intervention itself. We have presented additional details in [Characteristics of included studies](#).

Descriptor	Bloom 2006	Cristia 2015
<b>Context</b>	(1) Cambodia, currently a lower-middle-income country. The intervention, implemented over 4 years (1999 to 2003), targeted the health needs of rural, under-resourced communities and reached approximately 1.26 million people - 11% of the country's population. (2) The intervention aimed to redress a dysfunctional health system. (3) 12 districts were randomised to control and intervention arms. (4) The intervention arm also included a model of contracting for public health services. We excluded this model, as NGPs had to operate within government structures, and this did not meet our intervention inclusion criteria.	(1) Guatemala, currently a lower-middle-income country. The intervention, implemented over 10 years (1997 to 2007), targeted the health needs of rural, under-resourced communities and reached about 4.2 million people - a third of the country's population. (2) The intervention was provided when a three-decade-long civil war ended and aimed to redress a dysfunctional health system. (3) Communities receiving the intervention were selected in an ad hoc manner.
<b>Appointing non-governmental service providers (NGPs)</b>	(1) NGPs were not required to be licensed before they could bid for the contract. (2) A competitive bidding process was followed and contracts awarded to NGPs with the highest score on technical abilities and costs. (3) All contracted NGPs were international non-governmental organisations.	(1) NGPs in Guatemala had to be licensed, based on issues such as staff, infrastructure, and relevant experience, before they could bid for the contract. (2) A competitive bidding process resulted in contracts awarded only on technical abilities because the budget within which NGPs had to provide health care was predetermined. (3) Most contracted NGPs were local non-governmental organisations.
<b>Contract and intervention</b>	(1) NGPs were contracted to provide all preventive, promotional, and basic curative healthcare services mandated for a district by the Ministry of Health; they had "pretty much full authority for and responsibility over their districts" ( <a href="#">Bloom 2006</a> , p. 7) and could decide how they would provide services, manage staff and salaries, and procure drugs, supplies, and equipment. (2) This was a facility-based intervention that focussed on improving services at public facilities. (3) NGPs were contracted to deliver specific services and achieve corresponding targets. (4) The government did not involve local leaders to promote the use of contracted healthcare services.	(1) NGPs were contracted to establish mobile medical teams who provided a basic set of preventative care services for mothers and children up to two years old. The teams comprised a physician or a nurse and a health assistant, who conducted monthly visits to targeted communities. These visits included checkups, immunisations, and education sessions. (2) This was a community-based intervention in which NGPs did not manage the public health facilities. (3) Contracts detailed specific services and corresponding targets that the NGP had to deliver and achieve. (4) The government involved local leaders and community volunteers to promote the use of contracted out healthcare services.
<b>Outcomes</b>	Maternal and child health outcomes plus other outcomes such as facility performance and healthcare expenditures over 12 months	Maternal and child health outcomes over 12 months
<b>Monitoring mechanisms</b>	(1) The government established monitoring teams that conducted quarterly visits to the districts. These visits comprised unannounced visits to health facilities, community surveys, and patient visits to establish whether patients received health care at the respective facilities. (2) Failing to meet agreed targets	(1) Monitoring mechanisms are not described, but contracts became more detailed and contract renewal criteria stricter over time. (2) Failure on contract deliverables resulted in cancellation of contracts by the government. (3) No fraudulent practices were reported.

resulted in withholding of payment until the problem was resolved. (3) No fraudulent practises were reported.

<b>Governmental commitment</b>	The government provided political commitment and financial support for successful contracting out of health services.	Trial authors reported that the programme suffered substantial budget cuts between 2000 and 2004. However, a new president, elected in 2004, prioritised the programme, which resulted in huge revenue and support investments. This strengthened the programme considerably.
<b>Funding sources</b>	No mention of how the study was funded	No mention of how the study was funded

**Note:** No changes to the programme in Cambodia were reported (Bloom 2006), but several changes took place in Guatemala (Cristia 2015). The first two years (1997 to 1999) saw rapid programme expansion but poor government management and monitoring practises; between 2000 and 2004, drastic budget cuts were made; and a government change in 2004 resulted in a second expansion (2004 to 2005) with renewed government commitment and larger financial investments to make the programme work. Outcome data reported by Cristia 2015 are based on expansion of the programme (2004 to 2005), and "the estimated effects correspond to the strengthened version of the programme that was prevailing at the post-treatment period (2006)" (Cristia 2015, p. 250).

Bloom 2006 reported 'intention-to-treat' (ITT) and 'treatment-on-the-treated' (TOT) analyses, respectively, for the results presented below. ITT analysis provides treatment effect estimates for all four randomised contracting out districts, including the two not included in the final report owing to unsuccessful bids. Bloom 2006 used 'province X year fixed effects' to increase the precision of intervention effect estimates, and to account for random natural events that could affect delivery of the intervention. An example of natural events would be substantial rainfall in a province. TOT analysis provides the treatment effect as measured only in the two successfully contracted out districts. TOT provides estimates for settings in which successful bidding can reasonably be expected. Given that ITT and TOT impact the certainty we place on evidence of the intervention effect (see [Summary of findings for the main comparison](#)), we indicated for each outcome reported by Bloom 2006 whether an ITT or TOT analysis was performed. When researchers reported both ITT and TOT estimates, we chose to report ITT estimates, as this is a more conservative approach to estimating an intervention effect (Armijo-Olivo 2009). For some outcomes, Bloom 2006 reported only TOT estimates, and in these cases, this is what we have reported.

Outcomes reported in Cristia 2015 resulted from a routine survey conducted during the time of the intervention, but unrelated to the intervention implementation. Aspects of the survey covered maternal (women aged between 15 and 49 who gave birth in the past five years) and child (children aged between 0 and 5) health indicators relevant to the intervention. The survey conducted in the year 2000 served as the source of pre-intervention data, and the 2006 survey as the source of post-intervention

data. Cristia 2015 used four models of analysis to report effects of the intervention. We reported this group's Model 4, which controlled for use of the same counties in pre-intervention and post-intervention assessments, as this model meets eligibility for a controlled before-after study design in which data collection should be contemporaneous at study and control sites during pre-intervention and post-intervention periods of the study, and for which identical methods of measurement should be used. It should be noted that data show a marked difference in numbers of sites and observations compared with other models; for example, for antenatal care outcomes, 33 communities and 280 observations are reported in Model 4 compared with 112 communities and 504 observations reported in other analysis models. This trend is similar across all outcomes. Given that the roll-out of the intervention was done in a haphazard way, sampling involved unequal probabilities of receiving the intervention. All outcomes have been weighted for representativeness of the population.

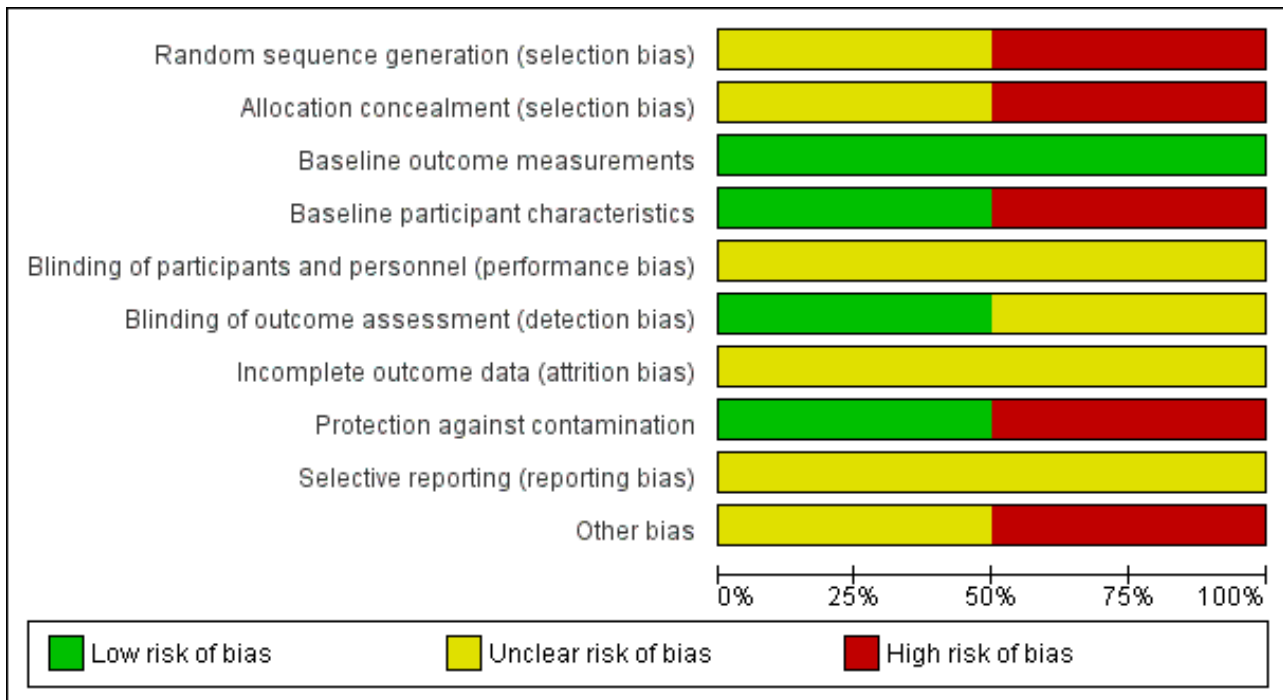
#### Excluded studies

We excluded a total of 211 full-text articles. Of these, 175 clearly did not meet inclusion criteria for the review. For the remaining 36 full texts, we have provided reasons for exclusion in the [Characteristics of excluded studies](#) table. Reasons for exclusion include ineligible study designs (n = 21), interventions (n = 8), comparisons (n = 3), participants (n = 2), outcomes (n = 1) and topics (n = 1).

#### Risk of bias in included studies

We have presented our summary of risk of bias assessments in [Figure 3](#) and [Figure 4](#).

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



**Figure 4. Risk of bias summary: review authors' judgements about each risk of bias item for each included study.**

	Random sequence generation (selection bias)	Allocation concealment (selection bias)	Baseline outcome measurements	Baseline participant characteristics	Blinding of participants and personnel (performance bias)	Blinding of outcome assessment (detection bias)	Incomplete outcome data (attrition bias)	Protection against contamination	Selective reporting (reporting bias)	Other bias
Bloom 2006	?	?	+	-	?	?	?	+	?	?
Cristia 2015	-	-	+	+	?	+	?	-	?	-

**Random sequence generation (selection bias)**

Bloom 2006 is a cluster-randomised trial, but the explanation of sequence generation provided is unclear and therefore may introduce bias. Cristia 2015 is at high risk of selection bias because investigators selected intervention communities in a non-random manner.

**Allocation concealment (selection bias)**

Bloom 2006 provides a poor description of allocation concealment and therefore has unclear risk of selection bias. Cristia 2015 describes ad hoc selection and allocation of the intervention communities and therefore can be assumed to have high risk of selection bias due to lack of allocation concealment.

**Baseline outcome measurements**

We rated both studies as having low risk of bias, as baseline outcome measures appear to be similar across intervention and control arms; however study authors report no test for statistical differences.

**Baseline participant characteristics**

Bloom 2006 is at high risk of selection bias owing to absent or poor reporting of baseline participant characteristics. Cristia 2015 reports baseline characteristics and differences between intervention and control arms that are well balanced, except for a statistical difference in age among children aged 2 to 24 months. We rated this study as having low risk of potential bias.

**Blinding of participants and personnel**

Bloom 2006 and Cristia 2015 provide no description of blinding, and it is unlikely that this was done. It is unclear whether this would affect the performance of participants or study personnel.

**Blinding of outcome assessment (detection bias)**

Neither of the included studies reported on blinding of outcome assessment. However, we assessed Bloom 2006 as having unclear risk, as it is unclear whether those who conducted baseline and post-intervention surveys were not blinded to whether participants belonged to intervention or control arms. In Cristia 2015, risk for bias in this domain is low because the data used to assess

intervention effects were extracted from routine surveys that were independent of the intervention itself.

### Incomplete outcome data (attrition bias)

The included studies did not report attrition; therefore we assessed them as having unclear risk of attrition bias.

### Protection against contamination

[Bloom 2006](#) is at low risk for contamination between intervention and control arms because allocation to the respective arms was done at district level, and it is unlikely that the control group received the intervention. We judged the risk in [Cristia 2015](#) as high because the intervention was delivered at a village level, and we cannot exclude the potential that people may have received the intervention when visiting neighbouring villages.

### Selective reporting (reporting bias)

It is unclear whether included studies are at risk for bias due to selective reporting because we could not access the respective study protocols.

### Other bias

We did not identify potential bias in [Bloom 2006](#); however, we rated [Cristia 2015](#) as having high potential risk of bias due to changes in the context in which the intervention was delivered from the start of evaluation to completion. At the time of the post-intervention survey, the intervention had been implemented for about eight years, and trial authors reported that estimates of the effects correspond with a "strengthened version" of the intervention ([Cristia 2015](#), p. 250).

### Effects of interventions

See: [Summary of findings for the main comparison](#)

The net effect that we report below is the intervention effect after adjustments for the control effect. The percentage (%) is the arithmetical difference between two percentages, and as such, it can be a positive or negative value, indicating the direction of the net effect. Positive percentage values favour the intervention, whilst negative percentage values favour the control. The magnitude of the percentage suggests the extent of favour. The CIs presented for the intervention effect for [Bloom 2006](#) can be found in [Table 1](#). The grading of evidence certainty for the outcomes reported in the [Summary of findings for the main comparison](#) is presented in [Appendix 3](#), and for the remaining outcomes in [Appendix 4](#).

We have reported below the effects of contracting out compared with not contracting out.

### Primary outcomes

#### Utilisation of health services

##### Immunisation of children 12 to 24 months old

Contracting out probably makes little or no difference in immunisation uptake of children 12 to 24 months old over 12 months, whether 'immunisation' refers to being fully immunised or being immunised respectively for measles, diphtheria-pertussis-tetanus (DPT), and polio (fully immunised net effect = -39.4%, intervention effect P = 0.46, clustered standard error (SE) = 9.0%;

moderate-certainty evidence; [Bloom 2006](#); ITT); (measles net effect = 46.5%, SE = 28.5%, 95% confidence interval (CI) -9.4% to 102.4%; moderate-certainty evidence; [Cristia 2015](#)); (DPT net effect = -1.4%, SE = 22.9%, 95% CI -46.3% to 43.5%; moderate-certainty evidence; [Cristia 2015](#)); and (polio net effect = -7.6%, SE = 24.1%, 95% CI -54.8% to 39.6%; moderate-certainty evidence; [Cristia 2015](#)).

##### High-dose vitamin A to children 6 to 59 months old

[Bloom 2006](#) found that contracting out probably slightly improves the number of children 6 to 59 months old who receive high-dose vitamin A twice in the past 12 months (net effect = 2.3%, intervention effect P = 0.02, clustered SE = 7.0%; moderate-certainty evidence; ITT).

##### Antenatal visits

Contracting out probably makes little or no difference in the number of women who had more than two antenatal care visits in the previous 12 months: (> 2 antenatal care visits net effect = -12.2%, intervention effect P = 0.35, clustered SE = 10.0%; moderate-certainty evidence, [Bloom 2006](#); ITT); (≥ 3 antenatal visits to a health professional net effect = 27.4%, SE = 22.2%, 95% CI -16.1% to 70.9%; moderate-certainty evidence; [Cristia 2015](#)).

##### Birth deliveries by trained professionals

[Bloom 2006](#) reported that contracting out probably makes little or no difference in the number of babies deliveries by professionals over 12 months (net effect = -15.5%, intervention effect P = 0.33, clustered SE = 3.0%; moderate-certainty evidence; ITT).

##### Female use of contraceptives

Contracting out probably makes little or no difference in female use of contraceptives over a 12 month period (net effect = -11.5%, intervention effect P = 0.78, clustered SE = 3.0%; moderate-certainty evidence; [Bloom 2006](#); ITT); (net effect = 1.9%, SE = 6.9%, 95% CI -11.6% to 15.4%; moderate-certainty evidence; [Cristia 2015](#)).

##### Use of district public healthcare facilities when sick

[Bloom 2006](#) reported that contracting out probably slightly increases the use of governmental hospitals and primary healthcare facilities over a 12 month period when sick (net effect = 7.6%, intervention effect P = 0.02, clustered SE = 5.0%; moderate-certainty evidence; ITT).

### Health outcomes

##### Mortality in the past year among children younger than one year

[Bloom 2006](#) found that contracting out may make little or no difference in the mortality of children younger than one year over a 12 month period (net effect = -4.3%, intervention effect P = 0.36, clustered SE = 3.0%; low-certainty evidence; TOT).

##### Incidence of diarrhoea among children younger than five years

[Bloom 2006](#) reported that contracting out may make little or no difference in the incidence of childhood diarrhoea over a 12 month period (net effect = -16.2%, intervention effect P = 0.07, clustered SE = 19.0%; low-certainty evidence; TOT).

## Secondary outcomes

### *Equity in utilisation of clinical health services*

The included studies did not report the effect of contracting out on equity in use of services.

### *Economic outcomes*

#### **Government healthcare expenditures**

Contracting out increased the government's per capita expenditure by \$2.94 (2003 USD) compared with a \$1.59 (2003 USD) increase in the control arm over a 12 month period. Researchers performed no statistical comparisons.

#### **Individual healthcare expenditures**

[Bloom 2006](#) found that contracting out probably reduces individual out-of-pocket spending over 12 months on curative care (net effect = \$ -19.25 (2003 USD), intervention effect  $P = 0.01$ , clustered SE = \$ 5.12; moderate -certainty evidence; ITT).

### *Health system performance*

#### **Health service delivery**

The included studies did not report the effect of contracting out on health service delivery.

#### **Health workforce**

The included studies did not report the effect of contracting out on the health workforce.

#### **Health information: accuracy of facility registers**

[Bloom 2006](#) found that contracting out may make little or no difference in the accuracy of facility registers (net effect = -54.3%, intervention effect  $P = 0.72$ , clustered SE = 36.0%; low-certainty evidence; TOT).

#### **Availability of selected essential medicines: availability of child vaccines at facilities**

[Bloom 2006](#) found that contracting out may make little or no difference in the availability of child vaccines at facilities in the last three months (net effect = -21.4%, intervention effect  $P = 0.84$ , clustered SE = 18.0%; low-certainty evidence; TOT).

#### **Health financing**

The included studies did not report the effect of contracting out on health financing.

#### **Adverse effects**

The included studies did not report adverse effects resulting from implementing contracting out.

## DISCUSSION

### **Summary of main results**

This review, which updates the 2009 review ([Lagarde 2009](#)), aimed to update the evidence on effects of contracting governmental clinical health services out to non-governmental service providers. Of the three studies included in [Lagarde 2009](#), we excluded two, applying the revised EPOC study type criteria ([EPOC 2017a](#)). We included one new study ([Cristia 2015](#)). We found that contracting out may be no better or worse than usual delivery

of government services. Specifically, this review confirms the findings from [Lagarde 2009](#) that contracting out probably makes little or no difference in (i) immunisation uptake of children 12 to 24 months old (moderate-certainty evidence), (ii) antenatal care visits (moderate-certainty evidence), (iii) female use of contraceptives (moderate-certainty evidence), (iv) the mortality of children younger than one year (low-certainty evidence), and (v) childhood diarrhoea (low-certainty evidence). It was also reported that contracting out probably reduces individual out-of-pocket spending on curative care (moderate-certainty evidence). Neither study reported on any adverse effects that resulted from implementing contracting out, and neither reported on equity in the use of clinical health services. A narrative summary of these studies is provided in [Table 2](#).

### **Overall completeness and applicability of evidence**

[Bloom 2006](#) reported 48 outcomes on effects of contracting out on various dimensions of the use and delivery of healthcare services. [Cristia 2015](#) reported three outcomes, all of which are also reported in [Bloom 2006](#); these studies reported similar findings. Contracting out is a strategy provided by governments to improve poor healthcare services ([Mills 1998](#); [Palmer 2006](#); [Tanzil 2014](#)), in particular in the context of political instability ([Alonge 2014](#)). Evidence from [Bloom 2006](#) and [Cristia 2015](#) is highly relevant to these contexts, given that contracting out was implemented after a period of civil war and political instability in the respective study countries. However, we acknowledge the limitation of having only two studies on which to base a decision to implement contracting out. Our review was limited to low- and middle-income countries. As contracting out is impacted by the political conditions and economic status of a country ([Bel 2007](#)), it is not advisable to generalise review findings to settings that differ in terms of income status and study contexts.

### **Certainty of evidence**

We presented six outcomes from [Bloom 2006](#). For two of these, we assessed the certainty of evidence as low, given the absence of baseline participant characteristics and the less robust 'treatment of the treated' analysis, which did not provide actual numbers for numerators and denominators. We assessed one outcome as having moderate certainty and graded this down because of the absence of baseline participant characteristics. [Cristia 2015](#) reported the three remaining outcomes; as assessed these as providing moderate-certainty evidence, given the absence of baseline participant characteristics in [Bloom 2006](#), and given that estimates of effects in [Cristia 2015](#) corresponded with a strengthened model of the intervention compared with the initial model.

### **Potential biases in the review process**

We recognise that we may not have found all studies that were eligible for inclusion in this review; however, we conducted a comprehensive search without restriction on language or date, and we undertook duplicate screening to identify eligible studies. Limiting our inclusion criteria to experimental studies is another potential source of bias. Our review may also have been biased in the light of our narrow definition of contracting out (i.e. that a formal contract between government and non-governmental health service providers (NGPs) must detail the mechanisms and conditions on which the latter should provide health care on behalf of the government). We therefore excluded public-

private partnerships (PPPs), which are collaborations between governments and NGPs with no contractual arrangements, other than a joint decision to optimise services by working together (Kane 2010; Khatun 2011; Naqvi 2012; Shet 2011; Sinanovic 2006).

### Agreements and disagreements with other studies or reviews

We did not find other systematic reviews against which to compare the results of our review. We have described in Table 2 case studies that we identified during our search to provide additional information about examples in which contracting out has been implemented. This information may provide details relevant for understanding the feasibility of implementing this approach in different settings. The case studies reported that contracting out may improve aspects of the delivery and use of healthcare services - similar to the findings of our review. Examples from the case studies are studies in which contracting out was linked to an increase in the use of curative services (Alonge 2014; Ameli 2008; Arur 2010), as well as in the number of services provided by health facilities (Heard 2013), and studies linked with fewer treatment failures at health facilities (Shet 2011). This evidence should be considered in the context in which it is reported, with the understanding that case studies have inherent bias due to lack of controls or structured methods for design or implementation of the contracting out intervention.

## AUTHORS' CONCLUSIONS

### Implications for practice

Contracting out probably reduces individual out-of-pocket spending on curative care (moderate-certainty evidence) but probably makes little or no difference in other important health system utilisation or health outcomes (moderate- to low-certainty evidence). Further research may change our understanding of these outcomes. This implies that contracting out is probably no better or worse than usual provision of government services. Contracting out is situation driven and context specific, and the findings of our review suggest that contracting out may be considered when the government needs additional support for service delivery. Those developing and managing contracting out programmes should pay attention to the level of competition in awarding contracts, governments' capacity to monitor contractors' performance, and sustainable funding, as these are key drivers of successful contracting out initiatives (Mills 1998; Siddiqi 2006). It is also advisable to allow NGPs more, rather than less, autonomy in managing the services for which they contracted (Van de Poel 2016). In addition, programme developers implementing any new programme should build in specific measures for detailing their settings, contracting out mechanisms, salient implementation processes, and changes over time, in addition to outcome measures of health importance.

### Implications for research

Additional high-quality, rigorously designed studies are needed to explore the effects of contracting out. However, it is likely that the urgency to restore dysfunctional healthcare services may be more important than the need to implement contracting out programmes as rigorously designed research. As was the

case in Guatemala (Cristia 2015), use of routine data to assess programme effectiveness is a way to address this situation, provided that robust statistical procedures are used to estimate intervention effects. Those interested in measuring the effects of contracting out should be mindful that these programmes may mature over time (Cristia 2015a), and they should factor this in when planning and reporting, their research. Equally important to knowing how effective contracting out is, is the need for qualitative research to examine the drivers of and barriers to successful contracting out programmes. Future contracting out programmes should be framed within an appropriate study design to allow valid and reliable measures of its effects. Such studies should include qualitative research that assesses the views of programme implementers and beneficiaries and records implementation mechanisms.

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## CHARACTERISTICS OF STUDIES

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

#### Bloom 2006

Methods	Cluster-randomised trial; 4 districts each were randomised to intervention and control arms
Participants	The study was conducted in rural districts in Cambodia, and served a population of about 1.26 million people - adults and children (11% of Cambodia's population).
Interventions	NGPs were contracted to provide all preventive, promotional, and basic curative healthcare services mandated for a district by the Ministry of Health. These NGPs were contracted to deliver specific services and corresponding targets at health facilities. The programme was implemented over 4 years - between 1999 and 2003.
Outcomes	<p>We reported the following outcomes (all measured over a 12 month period): immunisation of children 12 to 24 months old, high-dose vitamin A to children 6 to 59 months old, antenatal visits, birth deliveries by trained professionals, female use of contraceptives, use of district public healthcare facilities when sick, mortality in the past year of children younger than 1 year, incidence of diarrhoea in children younger than 5 years, government healthcare expenditures</p> <p>Health information: accuracy of facility registers</p> <p>Availability of selected essential medicines: availability of child vaccines at facilities over the previous 3 months</p> <p>Health financing: individual healthcare expenditures (ITT; important benefit) (measured over a 12 month period)</p>
Notes	<p><b>Contextual factors</b></p> <ul style="list-style-type: none"> <li>The intervention followed a period of political instability with a health system that was dysfunctional, mainly because of poor training, and had widespread corruption, seen as government-employed health workers being absent during work and doctors running private practices on the side and diverting patients to their private practices.</li> <li>Contracts were based on competitive bidding, and only international non-governmental organisations were successful.</li> </ul>

#### Risk of bias

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	Unclear risk	This is not described in the paper.

**Bloom 2006** (Continued)

Allocation concealment (selection bias)	Unclear risk	This is not described in the paper.
Baseline outcome measurements	Low risk	The numbers reported in baseline measures appear to be similar across intervention and control arms; however no details of statistical differences are provided.
Baseline participant characteristics	High risk	Characteristics are not reported in text or tables.
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	Blinding is not described, and it is unlikely that it was done. It is unclear whether this would affect the performance of participants or personnel.
Blinding of outcome assessment (detection bias) All outcomes	Unclear risk	It is unclear whether the assessors - those who conducted baseline and post-intervention surveys - were blinded to whether participants belonged to intervention or control arms.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	This is not described in the paper.
Protection against contamination	Low risk	Allocation to intervention and control arms was done at the district level, and it unlikely that the control group received the intervention.
Selective reporting (reporting bias)	Unclear risk	The study protocol could not be accessed.
Other bias	Unclear risk	Review authors did not identify other risks of bias.

**Cristia 2015**

Methods	Controlled before-after study
Participants	The study was conducted in rural districts in Guatemala, and served a population of about 4.2 million people - a third of the country's population.
Interventions	NGPs were contracted to provide all preventive, promotional, and basic curative healthcare services mandated for a district by the Ministry of Health. Services were provided by mobile medical teams comprising a physician or a nurse and a health assistant. These teams conducted visits to communities at least monthly. NGPs were contracted to deliver specific services and corresponding targets at health facilities. The intervention was implemented over ten years, from 1997 to 2007.
Outcomes	We reported the following outcomes: immunisation of children 12 to 24 months old, antenatal visits, and female use of contraceptives over a 12 month period.
Notes	<p><b>Contextual factors</b></p> <ul style="list-style-type: none"> <li>The intervention was provided after a three-decade-long civil war ended and aimed to redress a dysfunctional health system.</li> <li>Assessment of how effective contracting out is, is based on comparison of a strengthened model of the intervention vs the initial model.</li> </ul>

**Risk of bias**

**Cristia 2015** (Continued)

Bias	Authors' judgement	Support for judgement
Random sequence generation (selection bias)	High risk	Risk of selection bias was high because the intervention communities were selected in a non-random manner.
Allocation concealment (selection bias)	High risk	Selection and allocation of the intervention communities were performed ad-hoc; therefore this study can be assumed to have high risk of selection bias due to lack of allocation concealment.
Baseline outcome measurements	Low risk	The numbers reported in baseline measures appear to be similar across intervention and control arms; however no details of statistical differences are provided.
Baseline participant characteristics	Low risk	Baseline characteristics and differences between intervention and control arms are well balanced except for a statistical difference in age among children aged 2 to 24 months. We rated this study as having low risk of potential bias.
Blinding of participants and personnel (performance bias) All outcomes	Unclear risk	It is unlikely that this was done. It is unclear whether this would affect the performance of participants or personnel.
Blinding of outcome assessment (detection bias) All outcomes	Low risk	Data used to assess intervention effects were extracted from routine surveys that were independent of the intervention itself.
Incomplete outcome data (attrition bias) All outcomes	Unclear risk	Attrition is not reported; therefore we assessed this to show unclear risk of attrition bias.
Protection against contamination	High risk	The intervention was delivered at village level, and we cannot exclude the potential that people may have received the intervention when visiting neighbouring villages.
Selective reporting (reporting bias)	Unclear risk	The study protocol could not be accessed.
Other bias	High risk	Data show changes in the context in which the intervention was delivered from the start of evaluation to completion. At the time of the post-intervention survey, the intervention had been implemented for about 8 years, and trial authors reported that estimates of effects correspond with an improved version of the intervention.

ITT, intention-to-treat.

NGP, non-governmental health service provider.

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

Study	Reason for exclusion
<a href="#">Ali 2006</a>	Ineligible study design: ITS study without pre-intervention assessment data
<a href="#">Ameli 2008</a>	Ineligible study design: no control group or assessments at points before and after the intervention
<a href="#">Arora 2004</a>	Ineligible study design: ITS study without pre-intervention assessment data

Study	Reason for exclusion
Arur 2010	Ineligible study design: a description of different contracting out models without reported assessment of intervention effects
Babar 2009	Ineligible study design: a description of a contracting out model without a design to assess intervention effects
Bjornsson 1998	Ineligible study design: a description of contracting out models without a design to assess intervention effects
Bunting 1987	Ineligible intervention: supply services - not clinical health services - were contracted out.
Bush 2011	Ineligible study design: a report on best practices for contracting out without reported assessment of intervention effects
Cockcroft 2011	Ineligible study outcomes: patient satisfaction with contracted out services reported
De Costa 2014	Ineligible study design: a retrospective longitudinal study design that is purely descriptive and provides no evidence of a cause (contracting out intervention) and effect (improved outcomes) relationship
Frangakis 2009	Ineligible topic: about privatisation - not contracting out
Haque 2011	Ineligible intervention: about deploying skilled birth attendants - not contracting out health services
Heard 2013	Ineligible comparison: comparison of a contracting out model vs a model in which the central government contracted the local government
Kane 2010	Ineligible study design: a description of a contracting out model without a design for assessment of intervention effects
Katyal 2015	Ineligible comparison: both groups given the same intervention
Khatun 2011	Ineligible comparison: comparison of the contracting out model vs a model in which the central government contracted the local government
Korejo 2012	Ineligible study design: a retrospective study design that is purely descriptive and provides no evidence of a cause and effect relationship
Kritzer 2011	Ineligible study design
Kula 2014	Ineligible study design: a literature review
Lavadenz 2001	Ineligible study design: a CBA study with only 1 intervention site in the initial design
Lopez-Moreno 2011	Ineligible study design: a description of a contracting out model without a design for assessment of intervention effects
Marek 1999	Ineligible study design: a description of a contracting out model without a design for assessment of intervention effects
McPake 2011	Ineligible study design: a case study, involving only 1 site
Mennemeyer 1989	Ineligible participants: not an LMIC
Miguel-Cruz 2014	Ineligible intervention: about medical equipment maintenance - not clinical healthcare services

Study	Reason for exclusion
Mills 1998	Ineligible study design: an evaluation study to identify which aspects of the contracting process and the context in which it takes place are important in influencing whether contracting with the private sector is a desirable means of service provision
Naqvi 2012	Ineligible study design: a description of a contracting out model without a design for assessment of intervention effects
Quy 2003	Ineligible intervention: no formal contract between the government and the non-governmental service provider
Sehgal 2007	Ineligible study design: a description of contracting out models without a design for assessment of intervention effects
Sekhri 2011	Ineligible study design: a description of contracting out models without a design for assessment of intervention effects
Shet 2011	Ineligible intervention: clinical health services managed in part by a non-governmental service provider
Siddiqi 2006	Ineligible study design: a description of contracting out models without a design for assessment of intervention effects
Sinanovic 2006	Ineligible intervention: clinical health services managed in part by non-governmental service provider
Tanzil 2014	A case study of outsourced primary healthcare services in Sindh, Pakistan: Is this real reform?
Tuominen 2012	Ineligible participants: not an LMIC
Vieira 2014	Ineligible study design: CBA study with only 1 intervention site
Widdus 2001	Ineligible study design: a description of contracting out models without a design for assessment of intervention effects
Zafar 2012	Ineligible intervention: National TB programme partnered with NGOs and private medical practitioners, but services were not contracted out.

CBA: controlled before-after.

ITS: interrupted time series.

LMIC: low- and middle-income country.

NGO: non-governmental organisation.

TB: tuberculosis.

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

#### Greve 2017

Methods	Controlled before-after study
Participants	Municipalities in Sao Paulo, Brazil
Interventions	Municipalities implemented the Family Health Program, a community-based programme to deliver primary healthcare services, and contracted out these services to precertified non-profit, non-governmental organisations.



**Greve 2017** (Continued)

Outcomes Infant and child mortality, hospitalisation for preventable diseases

Notes

**Malik 2017**

Methods Controlled before-after study.

Participants Rural communities in Pakistan.

Interventions A MOU was signed between the government and the Punjab Rural Support programme (PRSP) which gave the PRSP administrative and financial control over the management of all BHUs in the Rahim Yar Khan district. The MOU provided the PRSP with the autonomy to implement organizational and management changes regarding the BHU infrastructure, staff, budget and procurement of medicines.

Outcomes Seeking care for unknown general illness and childhood diarrhoea.

Notes

BHU: basic health unit.

MOU: memorandum of understanding.

PRSP: Punjab Rural Support Programme.

**ADDITIONAL TABLES**
**Table 1. Bloom results: intervention effects and confidence intervals reported as percentages**

Outcome	Intervention effect (CI)
Immunisation of children 12 to 24 months old over a 12 month period	7.6% (-10.0% to 25.2%)
High-dose vitamin A to children 6 to 59 months old over a 12 month period	20.3% (6.6% to 34.0%)
Antenatal visits in the previous 12 months	13.8% (-5.8% to 33.4%)
Birth deliveries by trained professionals over a 12 month period	-5.5% (-11.4% to 0.4%)
Female use of contraceptives in the previous 12 months	-1.5% (-7.4% to 4.4%)
Use of district public healthcare facilities when sick in the previous 12 months	16.6% (6.8% to 26.4%)
Mortality in the past year of children younger than 1 year over a 12 month period	-4.3% (-10.2% to 1.6%)
Incidence of diarrhoea in children younger than 5 years over a 12 month period	-25.2% (-62.4% to 12.0%)
Individual healthcare expenditures over a 12 month period	\$ -25.89 (2003 USD) (\$ -35.93 to \$ -15.855)
Health information: accuracy of facility registers	12.7% (-57.9% to 83.3%)

**Table 1. Bloom results: intervention effects and confidence intervals reported as percentages** (Continued)

Availability of selected essential medicines: availability of child vaccines at facilities in the previous 3 months 14.6% (-20.7% to 49.9%)

**Table 2. Summary of contracting out programmes reported since 2009**

Publication	Setting	Contracting model	Key messages	Study design
<a href="#">Alonge 2014</a> <a href="#">Ameli 2008</a> <a href="#">Arur 2010</a>	Afghanistan, 2003-2006/7 (post-Taliban conflict)	Three models:  1. Province-wide lump sum contracts; performance bonuses; an independent group monitored performance; a high degree of NGP autonomy; limited capacity building of NGP;  government managed contracts  2. Monthly reimbursements made; monitoring through an international non-profit organisation; no performance bonuses  3. 80% of Year 1 budget paid in advance; donor-monitored NGP performance; no performance bonuses	1. Contracting out has been associated with substantial increases in use of curative care, in particular that of poor and female patients.  2. No conclusive evidence shows that any 1 model is more effective than another.  3. Linking equity goals to performance bonuses may reduce the inequity of service utilisation between the poor and the non-poor.  4. Using service characteristics and geographical distances as planning parameters does not guarantee better resource allocation.  5. The impact of contracting out on the quality of services needs to be re-searched.	Contracting out was implemented as routine care.
<a href="#">De Costa 2014</a> <a href="#">Mohanani 2014</a>	India, 2000-2010	1. The government contracted private obstetricians who own hospitals to enable poor women in rural areas to deliver at these facilities.  2. Hospitals had to meet criteria related to size and emergency services.  3. Obstetricians received a fixed reimbursement per 100 deliveries.  4. The reimbursement amount had a build-in disincentive for caesarean deliveries.	1. Institutional deliveries increased by 50%.  2. Quality of care and provider attrition need to be researched.  <u>Mohanani 2014</u>  3. Investigators contested the success of the programme: Studies claiming programme success did not (i) address the impact of self-selection of institutional delivery, or (ii) address inaccurate reporting from hospitals.  4. Investigators found no important changes in the probability of institutional delivery.	Contracting out was implemented as routine care.
<a href="#">Heard 2013</a>	Bangladesh, 1999-2004	1. The government contracted with an NGP or with local government to deliver basic PHC.  2. Competitive bidding for NGP contracts	1. Improvement in PHC was seen in both models, but the overall quality of care was better in the NGP facilities.  2. NGP facilities provided more PHC services per capita spending.	Contracting out was implemented as routine care.

**Table 2. Summary of contracting out programmes reported since 2009** *(Continued)*

		<p>3. NGPs, but not the local government, were allowed to recruit staff and set salaries and working conditions.</p> <p>4. NGPs, but not the local government, procured products directly from suppliers.</p> <p>5. Both NGPs and the local government were reimbursed for documented expenditures.</p>	<p>3. Investing in PHC facilities and contracting with NGPs may improve urban health services.</p>	
Kane 2010	India, 1-year project, 2007-2008	<p>1. The government partnered with NGPs to improve TB case finding through including it in routine HIV prevention services.</p> <p>2. 48% of NGPs had formal contracts.</p> <p>3. The model was translated into national policy through a public sector-funded TB-HIV partnership scheme with NGPs.</p> <p>4. No other details were reported.</p>	<p>1. TB services can be effectively integrated into HIV prevention services and can be delivered through public-private partnerships (PPPs).</p>	The PPP was implemented as routine care.
Mairembam 2012	India, 2008-2012	<p>1. PPP to attract and retain skilled health workers</p> <p>2. Management functions in facilities were contracted to NGPs through a memorandum of understanding.</p> <p>3. No other details were reported.</p>	<p>1. Improved service delivery, building maintenance, and staff availability</p> <p>2. NGPs' flexible approach in staff recruitment and creating a supportive working environment reduced staff attrition.</p> <p>3. Being isolated from government-supported functions limited access to training programmes.</p> <p>4. Contracting out must happen in the context of broader government support to address isolation from government support.</p>	The PPP was implemented as routine care.
Shet 2011	India, 2004-2007	<p>1. At the public-private facility, the government provided free treatment and the private hospital provided the premises, infrastructure, and human resources.</p> <p>2. No other details were reported.</p>	<p>1. The fully public and PPP facilities had notably better health outcomes compared with the fully private facility.</p> <p>2. The fully public facility reported fewer treatment failures compared with PPP and private facilities.</p> <p>3. Larger studies are required.</p>	The PPP was implemented as routine care.
Tanzil 2014	Pakistan, 2005-2011	<p>1. The government outsourced administration of PHC to a</p>	<p>1. Healthcare services were better managed in contracted out facilities than in fully governmental facilities.</p>	Contracting out was implement-

**Table 2. Summary of contracting out programmes reported since 2009** *(Continued)*

		semi-autonomous government entity.	2. Contracting may be effective in rebuilding PHC in low- and middle-income countries.	ed as routine care.
		2. No other details were reported.		
<a href="#">Vieira 2014</a>	Guinea Bissau, 2012-2013	1. The government entered a PPP with an NGP to manage a national TB reference centre.  2. Government provided the drugs and electricity, and paid staff.  3. The NGP topped up salaries and provided services.	1. Since the contracting period, mortality and treatment failure were notably lower compared with during the pre-contracting period.  2. Direct costs to patients were reduced.  3. PPP may, in the short term, increase adherence to the hospitalisation phase of intensive treatment.	The PPP was implemented as routine care.
<a href="#">Zaidi 2012</a>	Pakistan, 2003-2008	1. HIV prevention services were contracted out to NGPs through competitive bidding.  2. These were performance-based contracts according to predefined targets.  3. Contracts were managed by the government.	1. Contracting out is inherently a political process affected by the wider policy context.  2. Rapid roll-out in unprepared contexts can be confounded by governments' capacity to manage it.  3. Governments should be careful that contracting out does not distance NGPs from their historical attributes.  4. Governments' political willingness and technical capacity are key components of successful programmes.	Contracting out was implemented as routine care.

HIV: human immunodeficiency virus.

NGP: non-governmental provider.

PHC: primary health care.

PPP: public-private partnership

TB: tuberculosis

## APPENDICES

### Appendix 1. Search strategies

#### SUMMARY

Database	Total records
The Cochrane Central Register of Controlled Trials (CENTRAL) 2016, Issue 3, part of <i>The Cochrane Library</i> . <a href="http://www.thecochranelibrary.com">www.thecochranelibrary.com</a>	51
The Cochrane Central Register of Controlled Trials (CENTRAL) 2017, Issue 3, part of <i>The Cochrane Library</i> . <a href="http://www.cochranelibrary.com">www.cochranelibrary.com</a>	129

(Continued)

NHS Economic Evaluation Database (NHSEED) 2015, Issue 2, part of <i>The Cochrane Library</i> . <a href="http://www.cochranelibrary.com">www.cochranelibrary.com</a>	42
MEDLINE In-Process & Other Non-Indexed Citations, MEDLINE Daily and MEDLINE 1946 to Present, Ovid	1,609
MEDLINE Epub Ahead of Print, In-Process & Other Non-Indexed Citations, MEDLINE Daily and MEDLINE 1946 to Present, Ovid	1,821
Embase 1974 to 2016 Week 15, Ovid	1,527
Embase 1974 to 2017 April 05, Ovid	707
EconLit 1969 – present, ProQuest	239
Global Health 1973 to 2016 Week 14, Ovid	640
LILACS, VHL	298
LILACS, VHL: <a href="http://lilacs.bvsalud.org/en/">http://lilacs.bvsalud.org/en/</a>	342
<b>Sub total</b>	<b>7,405</b>
ClinicalTrials.gov	251
International Clinical Trials Registry Platform (ICTRP)	297
Eldis	1,292
Google Scholar	1,153
Grey Literature Report	437
OECD Library	37
Open Grey	258
World Bank	25
<b>Sub total</b>	<b>3,750</b>
<b>TOTAL</b>	<b>11,155</b>

## STRATEGY DETAILS

### CENTRAL, Cochrane Library

ID	Search	Hits
#1	("contract out" or "contracting out" or "contracted out" or "contract in" or "contracting in" or "contracted in"):ti,ab,kw	26
#2	(contracting or outsourcing or "out sourcing"):ti	58

(Continued)

#3	MeSH descriptor: [Contracts] this term only	13
#4	MeSH descriptor: [Contract Services] this term only	14
#5	MeSH descriptor: [Outsourced Services] this term only	3
#6	MeSH descriptor: [Public-Private Sector Partnerships] this term only	11
#7	MeSH descriptor: [Competitive Bidding] this term only	2
#8	#3 or #4 or #5 or #6 or #7	43
#9	MeSH descriptor: [Public Sector] this term only	58
#10	MeSH descriptor: [Government] 2 tree(s) exploded	946
#11	MeSH descriptor: [Financing, Government] this term only	69
#12	MeSH descriptor: [State Medicine] this term only	544
#13	MeSH descriptor: [National Health Programs] this term only	388
#14	MeSH descriptor: [Health Care Reform] this term only	34
#15	MeSH descriptor: [Health Policy] this term only	380
#16	MeSH descriptor: [Public Policy] this term only	59
#17	#9 or #10 or #11 or #12 or #13 or #14 or #15 or #16	2402
#18	MeSH descriptor: [Private Sector] this term only	53
#19	MeSH descriptor: [Privatization] this term only	3
#20	#18 or #19	55
#21	MeSH descriptor: [Health Services] explode all trees	89135
#22	MeSH descriptor: [Delivery of Health Care] this term only	915
#23	MeSH descriptor: [Cooperative Behavior] this term only	923
#24	#21 or #22 or #23	90054
#25	#17 and #20 and #24	12
#26	(contracts or contract next service*):ti,ab,kw	171
#27	contract* next (management or strateg* or model* or scheme* or approach* or tool or tools or arrangement* or policy or policies or service*):ti,ab,kw	47
#28	(contract* near/1 health*):ti,ab,kw	12
#29	((outsourc* or out next sourc* or privatiz* or privatis*) near/3 (service* or care or healthcare)):ti,ab,kw	8

(Continued)

#30	((public*) and (privat*) and (partner* or collaborat* or cooperat* or co next operat* or relation*) and (service* or care or healthcare)):ti,ab,kw	98
#31	"public private mix":ti,ab,kw	3
#32	((privat* next sector* or informal next sector* or privat* next provi* or informal next provi* or nongovernment* or non next government*) and (public* next sector* or public* next provi* or government*) and (healthcare next service* or health next care next service* or health next service* or clinical next service*)):ti,ab,kw	40
#33	(privat* and (public* or government*) and (contract or contracts)):ti,ab,kw	6
#34	#26 or #27 or #28 or #29 or #30 or #31 or #32 or #33	344
#35	#8 or #25 or #34	352
#36	(Africa or Asia or Caribbean or "West Indies" or "South America" or "Latin America" or "Central America"):ti,ab,kw	7573
#37	(Afghanistan or Albania or Algeria or Angola or Antigua or Barbuda or Argentina or Armenia or Armenian or Aruba or Azerbaijan or Bahrain or Bangladesh or Barbados or Benin or Byelarus or Byelorussian or Belarus or Belorussian or Belorussia or Belize or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brasil or Brazil or Bulgaria or "Burkina Faso" or "Burkina Faso" or "Upper Volta" or Burundi or Urundi or Cambodia or "Khmer Republic" or Kampuchea or Cameroon or Cameroons or Cameron or Camerons or "Cape Verde" or "Central African Republic" or Chad or Chile or China or Colombia or Comoros or "Comoro Islands" or Comores or Mayotte or Congo or Zaire or "Costa Rica" or "Cote d'Ivoire" or "Ivory Coast" or Croatia or Cuba or Cyprus or Czechoslovakia or "Czech Republic" or Slovakia or "Slovak Republic"):ti,ab,kw	16402
#38	(Djibouti or "French Somaliland" or Dominica or "Dominican Republic" or "East Timor" or "East Timur" or "Timor Leste" or Ecuador or Egypt or "United Arab Republic" or "El Salvador" or Eritrea or Estonia or Ethiopia or Fiji or Gabon or "Gabonese Republic" or Gambia or Gaza or Georgia or Georgian or Ghana or "Gold Coast" or Greece or Grenada or Guatemala or Guinea or Guam or Guiana or Guyana or Haiti or Honduras or Hungary or India or Maldives or Indonesia or Iran or Iraq or "Isle of Man" or Jamaica or Jordan or Kazakhstan or Kazakh or Kenya or Kiribati or Korea or Kosovo or Kyrgyzstan or Kirghizia or "Kyrgyz Republic" or Kirghiz or Kirgizstan or "Lao PDR" or Laos or Latvia or Lebanon or Lesotho or Basutoland or Liberia or Libya or Lithuania):ti,ab,kw	17746
#39	(Macedonia or Madagascar or "Malagasy Republic" or Malaysia or Malaya or Malay or Sabah or Sarawak or Malawi or Nyasaland or Mali or Malta or "Marshall Islands" or Mauritania or Mauritius or "Agalega Islands" or Mexico or Micronesia or "Middle East" or Moldova or Moldovia or Moldovian or Mongolia or Montenegro or Morocco or Ifni or Mozambique or Myanmar or Myanma or Burma or Namibia or Nepal or "Netherlands Antilles" or "New Caledonia" or Nicaragua or Niger or Nigeria or "Northern Mariana Islands" or Oman or Muscat or Pakistan or Palau or Palestine or Panama or Paraguay or Peru or Philippines or Philipines or Phillipines or Phillippines or Poland or Portugal or "Puerto Rico"):ti,ab,kw	8603
#40	(Romania or Rumania or Roumania or Russia or Russian or Rwanda or Runda or "Saint Kitts" or "St Kitts" or Nevis or "Saint Lucia" or "St Lucia" or "Saint Vincent" or "St Vincent" or Grenadines or Samoa or "Samoa Islands" or "Navigator Island" or "Navigator Islands" or "Sao Tome" or "Saudi Arabia" or Senegal or Serbia or Montenegro or Seychelles or "Sierra Leone" or Slovenia or "Sri	10573

(Continued)

	Lanka" or Ceylon or "Solomon Islands" or Somalia or Sudan or Suriname or Surinam or Swaziland or Syria or Tajikistan or Tadjikistan or Tadjikistan or Tadjik or Tanzania or Thailand or Togo or "Togolese Republic" or Tonga or Trinidad or Tobago or Tunisia or Turkey or Turkmenistan or Turkmen or Uganda or Ukraine or Uruguay or USSR or "Soviet Union" or "Union of Soviet Socialist Republics" or Uzbekistan or Uzbek or Vanuatu or "New Hebrides" or Venezuela or Vietnam or "Viet Nam" or "West Bank" or Yemen or Yugoslavia or Zambia or Zimbabwe or Rhodesia):ti,ab,kw	
#41	(developing or less* next developed or "under developed" or underdeveloped or "middle income" or low* next income or underserved or "under served" or deprived or poor*) next (countr* or nation* or population* or world):ti,ab,kw	4453
#42	(developing or less* next developed or "under developed" or underdeveloped or "middle income" or low* next income) next (economy or economies):ti,ab,kw	23
#43	low* next (gdp or gnp or "gross domestic" or "gross national"):ti,ab,kw	39
#44	(low near/3 middle near/3 countr*):ti,ab,kw	569
#45	("transitional country" or "transitional countries"):ti,ab,kw	3
#46	#36 or #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 or #45	55354
#47	#35 and #46	100
#48	#1 or #2 or #47 in Trials	129

### NHSEED, Cochrane Library

ID	Search	Hits
#1	("contract out" or "contracting out" or "contracted out" or "contract in" or "contracting in" or "contracted in")	50
#2	(contracting or outsourcing or "out sourcing"):ti	58
#3	MeSH descriptor: [Contracts] this term only	13
#4	MeSH descriptor: [Contract Services] this term only	14
#5	MeSH descriptor: [Outsourced Services] this term only	3
#6	MeSH descriptor: [Public-Private Sector Partnerships] this term only	11
#7	MeSH descriptor: [Competitive Bidding] this term only	2
#8	#3 or #4 or #5 or #6 or #7	43
#9	MeSH descriptor: [Public Sector] this term only	58
#10	MeSH descriptor: [Government] 2 tree(s) exploded	946



(Continued)

#11	MeSH descriptor: [Financing, Government] this term only	69
#12	MeSH descriptor: [State Medicine] this term only	544
#13	MeSH descriptor: [National Health Programs] this term only	388
#14	MeSH descriptor: [Health Care Reform] this term only	34
#15	MeSH descriptor: [Health Policy] this term only	380
#16	MeSH descriptor: [Public Policy] this term only	59
#17	#9 or #10 or #11 or #12 or #13 or #14 or #15 or #16	2402
#18	MeSH descriptor: [Private Sector] this term only	53
#19	MeSH descriptor: [Privatization] this term only	3
#20	#18 or #19	55
#21	MeSH descriptor: [Health Services] explode all trees	89135
#22	MeSH descriptor: [Delivery of Health Care] this term only	915
#23	MeSH descriptor: [Cooperative Behavior] this term only	923
#24	#21 or #22 or #23	90054
#25	#17 and #20 and #24	12
#26	(contracts or contract next service*)	335
#27	contract* next (management or strateg* or model* or scheme* or approach* or tool or tools or arrangement* or policy or policies or service*)	62
#28	(contract* near/1 health*)	23
#29	((outsourc* or out next sourc* or privatiz* or privatis*) near/3 (service* or care or healthcare))	13
#30	((public*) and (privat*) and (partner* or collaborat* or cooperat* or co next operat* or relation*) and (service* or care or healthcare))	1069
#31	"public private mix"	5
#32	((privat* next sector* or informal next sector* or privat* next provi* or informal next provi* or nongovernment* or non next government*) and (public* next sector* or public* next provi* or government*) and (healthcare next service* or health next care next service* or health next service* or clinical next service*))	181
#33	(privat* and (public* or government*) and (contract or contracts))	163
#34	#26 or #27 or #28 or #29 or #30 or #31 or #32 or #33	1507
#35	#8 or #25 or #34	1515

(Continued)

#36	(Africa or Asia or Caribbean or "West Indies" or "South America" or "Latin America" or "Central America")	13750
#37	(Afghanistan or Albania or Algeria or Angola or Antigua or Barbuda or Argentina or Armenia or Armenian or Aruba or Azerbaijan or Bahrain or Bangladesh or Barbados or Benin or Byelarus or Byelorussian or Belarus or Belorussian or Belorussia or Belize or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brasil or Brazil or Bulgaria or "Burkina Faso" or "Burkina Fasso" or "Upper Volta" or Burundi or Urundi or Cambodia or "Khmer Republic" or Kampuchea or Cameroon or Cameroons or Cameron or Camerons or "Cape Verde" or "Central African Republic" or Chad or Chile or China or Colombia or Comoros or "Comoro Islands" or Comores or Mayotte or Congo or Zaire or "Costa Rica" or "Cote d'Ivoire" or "Ivory Coast" or Croatia or Cuba or Cyprus or Czechoslovakia or "Czech Republic" or Slovakia or "Slovak Republic")	59935
#38	(Djibouti or "French Somaliland" or Dominica or "Dominican Republic" or "East Timor" or "East Timur" or "Timor Leste" or Ecuador or Egypt or "United Arab Republic" or "El Salvador" or Eritrea or Estonia or Ethiopia or Fiji or Gabon or "Gabonese Republic" or Gambia or Gaza or Georgia or Georgian or Ghana or "Gold Coast" or Greece or Grenada or Guatemala or Guinea or Guam or Guiana or Guyana or Haiti or Honduras or Hungary or India or Maldives or Indonesia or Iran or Iraq or "Isle of Man" or Jamaica or Jordan or Kazakhstan or Kazakh or Kenya or Kiribati or Korea or Kosovo or Kyrgyzstan or Kirghizia or "Kyrgyz Republic" or Kirghiz or Kirgizstan or "Lao PDR" or Laos or Latvia or Lebanon or Lesotho or Basutoland or Liberia or Libya or Lithuania)	58958
#39	(Macedonia or Madagascar or "Malagasy Republic" or Malaysia or Malaya or Malay or Sabah or Sarawak or Malawi or Nyasaland or Mali or Malta or "Marshall Islands" or Mauritania or Mauritius or "Agalega Islands" or Mexico or Micronesia or "Middle East" or Moldova or Moldovia or Moldovian or Mongolia or Montenegro or Morocco or Ifni or Mozambique or Myanmar or Myanma or Burma or Namibia or Nepal or "Netherlands Antilles" or "New Caledonia" or Nicaragua or Niger or Nigeria or "Northern Mariana Islands" or Oman or Muscat or Pakistan or Palau or Palestine or Panama or Paraguay or Peru or Philippines or Philipines or Phillipines or Phillippines or Poland or Portugal or "Puerto Rico")	24555
#40	(Romania or Rumania or Roumania or Russia or Russian or Rwanda or Ruan-da or "Saint Kitts" or "St Kitts" or Nevis or "Saint Lucia" or "St Lucia" or "Saint Vincent" or "St Vincent" or Grenadines or Samoa or "Samoan Islands" or "Navigator Island" or "Navigator Islands" or "Sao Tome" or "Saudi Arabia" or Senegal or Serbia or Montenegro or Seychelles or "Sierra Leone" or Slovenia or "Sri Lanka" or Ceylon or "Solomon Islands" or Somalia or Sudan or Suriname or Surinam or Swaziland or Syria or Tajikistan or Tadjhikistan or Tadjikistan or Tadzhi-k or Tanzania or Thailand or Togo or "Togolese Republic" or Tonga or Trinidad or Tobago or Tunisia or Turkey or Turkmenistan or Turkmen or Ugan-da or Ukraine or Uruguay or USSR or "Soviet Union" or "Union of Soviet So-cialist Republics" or Uzbekistan or Uzbek or Vanuatu or "New Hebrides" or Venezuela or Vietnam or "Viet Nam" or "West Bank" or Yemen or Yugoslavia or Zambia or Zimbabwe or Rhodesia)	31859
#41	(developing or less* next developed or "under developed" or underdeveloped or "middle income" or low* next income or underserved or "under served" or deprived or poor*) next (countr* or nation* or population* or world)	6017
#42	(developing or less* next developed or "under developed" or underdeveloped or "middle income" or low* next income) next (economy or economies)	39
#43	low* next (gdp or gnp or "gross domestic" or "gross national")	42

(Continued)

#44	(low near/3 middle near/3 countr*)	1138
#45	("transitional country" or "transitional countries")	19
#46	#36 or #37 or #38 or #39 or #40 or #41 or #42 or #43 or #44 or #45	168005
#47	#35 and #46	981
#48	#1 or #2 or #47 in Economic Evaluations	42

**MEDLINE, Ovid and Embase, Ovid**

#	Searches	Results
1	(contract out or contracting out or contracted out).ti,ab,kf.	444
2	Contracts/	8629
3	Contract Services/	120825
4	Outsourced Services/	114261
5	Public-Private Sector Partnership/	6432
6	Competitive Bidding/	113960
7	or/2-6	139191
8	Public Sector/	360523
9	exp Government/	284649
10	Financing, Government/	126603
11	State Medicine/	115900
12	Health Care Reform/	190203
13	National Health Programs/	189781
14	Health Policy/	198954
15	Public Policy/	149877
16	or/8-15	1236228
17	Private Sector/	376069
18	Informal Sector/	44
19	Privatization/	393155

(Continued)

20	or/17-19	401660
21	exp Health Services/	6679690
22	"Delivery of Health Care"/	198682
23	Cooperative Behavior/	76998
24	or/21-23	6772317
25	16 and 20 and 24	197008
26	(contract* adj (management or strateg* or model? or scheme? or approach* or tool? or arrangement? or policy or policies or service?)).ti,ab,kf.	2454
27	(contract in or contracting in or contracted in).ti,ab,kf.	3843
28	contract* for health*.ti,ab,kf.	1204
29	((outsourc* or out sourc* or privatiz* or privatis*) adj3 (service? or care or healthcare)).ti,ab,kf.	1180
30	(public* and privat* and (partner* or collaborat* or cooperat* or co operat* or relation*) and (healthcare or health care or health service? or clinical service? or clinical care or medical service? or medical care)).ti,ab,kf.	4968
31	public private mix.ti,ab,kf.	363
32	((privat* sector? or informal sector? or privat* provi* or informal provi* or non-government* or non government*) and (public* sector? or public* provi* or government*) and (healthcare or health care or health service? or clinical service? or clinical care or medical service? or medical care)).ti,ab,kf.	5906
33	(privat* and (public* or government*) and (contract or contracts)).ti,ab,kf.	1035
34	or/26-33	19458
35	7 or 25 or 34	339536
36	Developing Countries.sh,kf.	81133
37	(Africa or Asia or Caribbean or West Indies or South America or Latin America or Central America).hw,kf,ti,ab,cp.	520485
38	(Afghanistan or Albania or Algeria or Angola or Antigua or Barbuda or Argentina or Armenia or Armenian or Aruba or Azerbaijan or Bahrain or Bangladesh or Barbados or Benin or Byelarus or Byelorussian or Belarus or Belorussian or Belorussia or Belize or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brasil or Brazil or Bulgaria or Burkina Faso or Burkina Fasso or Upper Volta or Burundi or Urundi or Cambodia or Khmer Republic or Kampuchea or Cameroon or Cameroons or Cameron or Camerons or Cape Verde or Central African Republic or Chad or Chile or China or Colombia or Comoros or Comoro Islands or Comores or Mayotte or Congo or Zaire or Costa Rica or Cote d'Ivoire or Ivory Coast or Croatia or Cuba or Cyprus or Czechoslovakia or Czech Republic or Slovakia or Slovak Republic or Djibouti or French Somaliland or Dominica or Dominican Republic or East Timor or East Timur or Timor Leste or Ecuador or Egypt or United Arab Republic or El Salvador or Eritrea or Estonia or Ethiopia or Fiji or Gabon or Gabonese Republic or Gambia	6789916

(Continued)

or Gaza or Georgia Republic or Georgian Republic or Ghana or Gold Coast or Greece or Grenada or Guatemala or Guinea or Guam or Guiana or Guyana or Haiti or Honduras or Hungary or India or Maldives or Indonesia or Iran or Iraq or Isle of Man or Jamaica or Jordan or Kazakhstan or Kazakh or Kenya or Kiribati or Korea or Kosovo or Kyrgyzstan or Kirghizia or Kyrgyz Republic or Kirghiz or Kirgizstan or Lao PDR or Laos or Latvia or Lebanon or Lesotho or Basutoland or Liberia or Libya or Lithuania or Macedonia or Madagascar or Malagasy Republic or Malaysia or Malaya or Malay or Sabah or Sarawak or Malawi or Nyasaland or Mali or Malta or Marshall Islands or Mauritania or Mauritius or Agalega Islands or Mexico or Micronesia or Middle East or Moldova or Moldavia or Moldovan or Mongolia or Montenegro or Morocco or Ifni or Mozambique or Myanmar or Myanma or Burma or Namibia or Nepal or Netherlands Antilles or New Caledonia or Nicaragua or Niger or Nigeria or Northern Mariana Islands or Oman or Muscat or Pakistan or Palau or Palestine or Panama or Paraguay or Peru or Philippines or Philipines or Phillipines or Phillippines or Poland or Portugal or Puerto Rico or Romania or Rumania or Roumania or Russia or Russian or Rwanda or Ruanda or Saint Kitts or St Kitts or Nevis or Saint Lucia or St Lucia or Saint Vincent or St Vincent or Grenadines or Samoa or Samoan Islands or Navigator Island or Navigator Islands or Sao Tome or Saudi Arabia or Senegal or Serbia or Montenegro or Seychelles or Sierra Leone or Slovenia or Sri Lanka or Ceylon or Solomon Islands or Somalia or South Africa or Sudan or Suriname or Surinam or Swaziland or Syria or Tajikistan or Tadjhikistan or Tadjikistan or Tadjhik or Tanzania or Thailand or Togo or Togolese Republic or Tonga or Trinidad or Tobago or Tunisia or Turkey or Turkmenistan or Turkmen or Uganda or Ukraine or Uruguay or USSR or Soviet Union or Union of Soviet Socialist Republics or Uzbekistan or Uzbek or Vanuatu or New Hebrides or Venezuela or Vietnam or Viet Nam or West Bank or Yemen or Yugoslavia or Zambia or Zimbabwe or Rhodesia).hw,kf,ti,ab,cp.

39	((developing or less* developed or under developed or underdeveloped or middle income or low* income or underserved or under served or deprived or poor*) adj (countr* or nation? or population? or world)).ti,ab.	171554
40	((developing or less* developed or under developed or underdeveloped or middle income or low* income) adj (economy or economies)).ti,ab.	918
41	(low* adj (gdp or gnp or gross domestic or gross national)).ti,ab.	489
42	(low adj3 middle adj3 countr*).ti,ab.	17387
43	(lmic or lmics or third world or lami countr*).ti,ab.	10496
44	transitional countr*.ti,ab.	319
45	or/36-44	7089552
46	randomized controlled trial.pt.	459411
47	controlled clinical trial.pt.	93909
48	pragmatic clinical trial.pt.	552
49	multicenter study.pt.	225113
50	non-randomized controlled trials as topic/	11498
51	interrupted time series analysis/	250152

(Continued)

52	controlled before-after studies/	266121
53	(randomis* or randomiz* or randomly).ti,ab.	1721121
54	groups.ab.	3970874
55	(trial or multicenter or multi center or multicentre or multi centre).ti.	482707
56	(intervention? or effect? or impact? or controlled or control group? or (before adj5 after) or (pre adj5 post) or ((pretest or pre test) and (posttest or post test)) or quasiexperiment* or quasi experiment* or evaluat* or time series or time point? or repeated measur* or generalized estimating equation? or generalised estimating equation?).ti,ab,kw.	18206391
57	(pretest-posttest study or pretesting or pre-post tests or quasi experimental design or quasi experimental study or quasi experimental study design or repeated measurement or repeated measurements or repeated measures or time series).kw.	4085
58	or/46-57	20371721
59	exp Animals/	44445703
60	Humans/	28267839
61	59 not (59 and 60)	16180039
62	review.pt.	4547496
63	meta analysis.pt.	78720
64	news.pt.	182765
65	comment.pt.	687802
66	editorial.pt.	974770
67	cochrane database of systematic reviews.jn.	19072
68	comment on.cm.	687801
69	(systematic review or literature review).ti.	205930
70	or/61-69	21383393
71	58 not 70	11390028
72	1 or (35 and 45 and 71)	8165
73	(contract out or contracting out or contracted out).ti,ab,kw.	451
74	(contract* adj (management or strateg* or model? or scheme? or approach* or tool? or arrangement? or policy or policies or service?)).ti,ab,kw.	2496
75	(contract in or contracting in or contracted in).ti,ab,kw.	3844

(Continued)

76	contract* for health*.ti,ab,kw.	1204
77	((outsourc* or out sourc* or privatiz* or privatis*) adj3 (service? or care or healthcare)).ti,ab,kw.	1189
78	(public* and privat* and (partner* or collaborat* or cooperat* or co operat* or relation*) and (healthcare or health care or health service? or clinical service? or clinical care or medical service? or medical care)).ti,ab,kw.	4938
79	public private mix.ti,ab,kw.	382
80	((privat* sector? or informal sector? or privat* provi* or informal provi* or non-government* or non government*) and (public* sector? or public* provi* or government*) and (healthcare or health care or health service? or clinical service? or clinical care or medical service? or medical care)).ti,ab,kw.	5902
81	(privat* and (public* or government*) and (contract or contracts)).ti,ab,kw.	1044
82	or/73-81	19800
83	Developing Country.sh.	100734
84	(Africa or Asia or Caribbean or West Indies or South America or Latin America or Central America).hw,ti,ab,cp.	509047
85	(Afghanistan or Albania or Algeria or Angola or Antigua or Barbuda or Argentina or Armenia or Armenian or Aruba or Azerbaijan or Bahrain or Bangladesh or Barbados or Benin or Byelarus or Byelorussian or Belarus or Belorussian or Belorussia or Belize or Bhutan or Bolivia or Bosnia or Herzegovina or Hercegovina or Botswana or Brasil or Brazil or Bulgaria or Burkina Faso or Burkina Fasso or Upper Volta or Burundi or Urundi or Cambodia or Khmer Republic or Kampuchea or Cameroon or Cameroons or Cameron or Camerons or Cape Verde or Central African Republic or Chad or Chile or China or Colombia or Comoros or Comoro Islands or Comores or Mayotte or Congo or Zaire or Costa Rica or Cote d'Ivoire or Ivory Coast or Croatia or Cuba or Cyprus or Czechoslovakia or Czech Republic or Slovakia or Slovak Republic or Djibouti or French Somaliland or Dominica or Dominican Republic or East Timor or East Timur or Timor Leste or Ecuador or Egypt or United Arab Republic or El Salvador or Eritrea or Estonia or Ethiopia or Fiji or Gabon or Gabonese Republic or Gambia or Gaza or Georgia Republic or Georgian Republic or Ghana or Gold Coast or Greece or Grenada or Guatemala or Guinea or Guam or Guiana or Guyana or Haiti or Honduras or Hungary or India or Maldives or Indonesia or Iran or Iraq or Isle of Man or Jamaica or Jordan or Kazakhstan or Kazakh or Kenya or Kiribati or Korea or Kosovo or Kyrgyzstan or Kirghizia or Kyrgyz Republic or Kirghiz or Kirgizstan or Lao PDR or Laos or Latvia or Lebanon or Lesotho or Basutoland or Liberia or Libya or Lithuania or Macedonia or Madagascar or Malagasy Republic or Malaysia or Malaya or Malay or Sabah or Sarawak or Malawi or Nyasaland or Mali or Malta or Marshall Islands or Mauritania or Mauritius or Agalega Islands or Mexico or Micronesia or Middle East or Moldova or Moldovia or Moldovian or Mongolia or Montenegro or Morocco or Ifni or Mozambique or Myanmar or Myanma or Burma or Namibia or Nepal or Netherlands Antilles or New Caledonia or Nicaragua or Niger or Nigeria or Northern Mariana Islands or Oman or Muscat or Pakistan or Palau or Palestine or Panama or Paraguay or Peru or Philippines or Philipines or Phillipines or Phillippines or Poland or Portugal or Puerto Rico or Romania or Rumania or Roumania or Russia or Russian or Rwanda or Ruanda or Saint Kitts or St Kitts or Nevis or Saint Lucia or St Lucia or Saint Vincent or St Vincent or Grenadines or Samoa or Samoan Islands or Navigator Island or Navigator Islands or Sao Tome or Saudi Arabia or Senegal or Serbia or Montenegro or Seychelles or Sierra Leone or Slovenia or Sri Lanka	6786904

(Continued)

or Ceylon or Solomon Islands or Somalia or South Africa or Sudan or Suriname or Surinam or Swaziland or Syria or Tajikistan or Tadjhikistan or Tadjikistan or Tadjhik or Tanzania or Thailand or Togo or Togolese Republic or Tonga or Trinidad or Tobago or Tunisia or Turkey or Turkmenistan or Turkmen or Uganda or Ukraine or Uruguay or USSR or Soviet Union or Union of Soviet Socialist Republics or Uzbekistan or Uzbek or Vanuatu or New Hebrides or Venezuela or Vietnam or Viet Nam or West Bank or Yemen or Yugoslavia or Zambia or Zimbabwe or Rhodesia).hw,ti,ab,cp.

86	((developing or less* developed or under developed or underdeveloped or middle income or low* income or underserved or under served or deprived or poor*) adj (countr* or nation? or population? or world)).ti,ab.	171554
87	((developing or less* developed or under developed or underdeveloped or middle income or low* income) adj (economy or economies)).ti,ab.	918
88	(low* adj (gdp or gnp or gross domestic or gross national)).ti,ab.	489
89	(low adj3 middle adj3 countr*).ti,ab.	17387
90	(lmic or lmics or third world or lami countr*).ti,ab.	10496
91	transitional countr*.ti,ab.	319
92	or/83-91	7087990
93	Randomized Controlled Trial/	949165
94	Controlled Clinical Trial/	581412
95	Quasi Experimental Study/	4715
96	Pretest Posttest Control Group Design/	360
97	Pretest Posttest Design/	2540
98	Time Series Analysis/	24801
99	Experimental Design/	121820
100	Multicenter Study/	394350
101	(randomis* or randomiz* or randomly).ti,ab.	1721121
102	groups.ab.	3970874
103	(trial or multicentre or multicenter or multi centre or multi center).ti.	482707
104	(intervention? or effect? or impact? or controlled or control group? or (before adj5 after) or (pre adj5 post) or ((pretest or pre test) and (posttest or post test)) or quasiexperiment* or quasi experiment* or evaluat* or time series or time point? or repeated measur* or generalized estimating equation? or generalised estimating equation?).ti,ab,kw.	18206391
105	or/93-104	20372051



(Continued)

106	exp animals/ or exp invertebrate/ or animal experiment/ or animal model/ or animal tissue/ or animal cell/ or nonhuman/	45901200
107	human/ or normal human/ or human cell/	35578224
108	106 and 107	35531384
109	106 not 108	10369816
110	(systematic review or literature review).ti.	205930
111	"cochrane database of systematic reviews".jn.	19072
112	or/109-111	10593400
113	105 not 112	15793529
114	82 and 92 and 113	3242
115	limit 114 to embase [Limit not valid in Ovid MEDLINE(R),Ovid MEDLINE(R) Daily Update,Ovid MEDLINE(R) In-Process,Ovid MEDLINE(R) Publisher; records were retained]	2251
116	limit 114 to embase status [Limit not valid in Ovid MEDLINE(R),Ovid MEDLINE(R) Daily Update,Ovid MEDLINE(R) In-Process,Ovid MEDLINE(R) Publisher; records were retained]	1678
117	limit 114 to article in press status [Limit not valid in Ovid MEDLINE(R),Ovid MEDLINE(R) Daily Update,Ovid MEDLINE(R) In-Process,Ovid MEDLINE(R) Publisher; records were retained]	1562
118	limit 114 to inprocess status [Limit not valid in Ovid MEDLINE(R),Ovid MEDLINE(R) Daily Update,Ovid MEDLINE(R) In-Process,Ovid MEDLINE(R) Publisher; records were retained]	1551
119	limit 114 to conference abstract status [Limit not valid in Ovid MEDLINE(R),Ovid MEDLINE(R) Daily Update,Ovid MEDLINE(R) In-Process,Ovid MEDLINE(R) Publisher; records were retained]	1609
120	or/115-119	2282
121	72 use ppez	2009
122	120 use oemez	735
123	121 or 122	2744
124	remove duplicates from 123	2528

#### LILACS, VHL (IAHx)

("Contract Services" or "Outsourced Services" or "Public-Private Partnership" or "Public-Private Sector Partnerships" or Privatization or "Servicios Contratados" or "Servicios Externos" or "Participación Público-Privada" or "Asociación entre el Sector Público-Privado" or Privatización or "Serviços Contratados" or "Serviços Terceirizados" or "Parceria Público-Privada" or "Parcerias Público-Privadas" or Privatização or "contracting out" or "contracting in" or "contract service" or "contract services" or "outsourced service" or "outsourced service" or "outsourced services" or "outsourced services" or "out sourced services" or "public private partnership" or "public private partnerships" or

"private public partnership" or "private public partnerships" or "public private sector partnership" or "public private sector partnerships" or "private public sector partnership" or "private public sector partnerships" or privatization or privatización or contratación or subcontratación or "servicio contratado" or "servicios contratados" or "servicio externalizado" or "servicio externo" or "servicios externalizados" or "servicios externos" or outsourcing or "participacion publica privada" or "participación publica privada" or "participaciones publico privadas" or "participacion privado publica" or "participación privado publica" or "participaciones privado publicas" or "asociacion entre el sector publico privado" or "asociación entre el sector publico privado" or "asociaciones entre el sector publico privado" or "asociacion entre el sector privado publico" or "asociación entre el sector privado publico" or "asociaciones entre el sector privado publico" or privatization or privatización or contratacao or subcontratacao or "serviços subcontratados" or "subcontratação de serviços" or outsourcing or privatizações) AND (randomised or randomized or randomly or "controlled trial" or "control group" or "control groups" or compare or compared or effect\* or evaluat\* or intervention\* or impact\* or "multicenter study" or "multi center study" or "multicentre study" or "multi centre study" or (pretest and posttest) or quasiexperiment\* or (quasi and experiment\*) or "time series" or "time point" or "time points" or "repeated measure" or "repeated measures" or "repeated measurement" or "repeated measurements" or "ensayo clinico controlado aleatorio" or "ensayo clinico controlado" or "ensaio clinico controlado aleatorio" or "ensaio clinico controlado" or aleatorios or azar or acaso or efecto or efectos or efeito or efeitos or evaluar or evaluacion or avaliacao or intervencion\* or intervencao\* or impacto or impactos or (estudio\* and multicentrico\*) or (estudo\* and multicentrico\*) or (ensaio\* and multicentrico\*) or (preteste and posteste) or ("pre teste" and "pos teste") or cuasiexperiment\* or (cuasi and experiment\*) or quaseexperiment\* or (quase and experiment\*) or "serie temporal" or "series temporal" or "serie temporales" or "series temporales" or "series temporais" or "puntos de tiempo" or "puntos temporales" or "pontos temporais" or "medida repetida" or "medida repetidas" or "medidas repetida" or "medidas repetidas" or "medicion repetida" or "medicion repetidas" or "mediciones repetida" or "mediciones repetidas")

**Global Health 1973 to 2016 Week 14, Ovid**

#	Searches	Results
1	contracting.ti.	126
2	(contracting in or contract in or contracted in).af.	367
3	(contracting out or contract out or contracted out).af.	59
4	(contract adj (strateg* or model? or scheme? or approach* or tool? or arrangement? or policy or policies or service?)).af.	21
5	(contracting adj (strateg* or model? or scheme? or approach* or tool? or arrangement? or policy or policies or service?)).af.	19
6	(contractual adj (strateg* or model? or scheme? or approach* or tool? or arrangement? or policy or policies or service?)).af.	40
7	((contracting or contracted) adj3 private provider?).af.	5
8	contracting for health*.af.	28
9	((outsourc* or out sourc* or privatiz* or privatis*) adj3 (service? or care or healthcare)).af.	132
10	or/2-8	507
11	(public* or government).af.	457298
12	(privat* or non government* or nongovernment*).af.	30217
13	(contract or contracts or contracting or contracted or contractual or contractor or contractors or partnership*).af.	14706
14	11 and 12 and 13	1427

(Continued)

15	delivery of health*.af.	1646
16	(health* adj2 (reform or program* or system?)).af.	52694
17	or/15-16	53667
18	(contract or contracts).af.	2079
19	17 and 18	222
20	10 or 14 or 19	2014
21	(randomis* or randomiz* or control* or intervention* or evaluat* or (before adj5 after) or (pre adj5 post) or ((pretest or pre test) and (posttest or post test)) or quasiexperiment* or quasi experiment* or time series or time point? or repeated measur* or generalized estimating equation? or generalised estimating equation?).af.	1147562
22	(trial or effect* or impact*).ti.	291472
23	or/21-22	1268425
24	20 and 23	986
25	1 or 24	1090
26	EE118.cc.	34964
27	EE120.cc.	23831
28	EE130.cc.	6824
29	EE165.cc.	429
30	EE800.cc.	1672
31	UU300.cc.	6526
32	UU350.cc.	152296
33	or/26-32	185231
34	25 and 33	640

### EconLit 1969 - present, ProQuest

((SU.EXACT("Comparison of Public and Private Enterprises and Nonprofit Institutions; Privatization; Contracting Out (L33)") OR SU.EXACT("Contracting Out; Joint Ventures; Technology Licensing (L24)") OR (TI("contracting out" OR "contract out" OR "contracting in" OR "contract in" OR "contract services" OR "outsourced services" OR "out sourced services") OR AB("contracting out" OR "contract out" OR "contracting in" OR "contract in" OR "contract services" OR "outsourced services" OR "out sourced services")))) AND ALL("medic\* OR health\* OR clinical OR hospital\* OR pharmac\* OR physician\* OR doctor\* OR nurse)) AND ALL("randomised" OR "randomized" OR "randomly allocated" OR "random allocation" OR "controlled trial" OR "control group" OR "control groups" OR "quasiexperiment" OR "quasiexperiments" OR "quasiexperimental" OR "quasi experiment" OR "quasi experiments" OR "quasi experimental" OR "evaluate" OR "evaluating" OR "evaluation" OR "time series" OR "time point" OR "time points" OR "repeated measure" OR "repeated measures" OR "repeated measurement" OR "repeated measurements" OR "before AND after" OR "pre AND post" OR ("pretest" OR "pre test") AND ("posttest" OR "post test")) OR "trial" OR "effect" OR "effects" OR "impact" OR "impacts" OR "intervention" OR "interventions" OR

"multicenter" OR "multi center" OR "multicentre" OR "multi centre" OR "generalized estimating equation" OR "generalised estimating equation" OR "generalized estimating equations" OR "generalised estimating equations")

## STRATEGIES FOR GREY LITERATURE & TRIAL REGISTRIES

### GREY LITERATURE

**Google Scholar:** <https://scholar.google.com/> (Advanced search - 2 separate strategies)

1. With all of the words: *health* + at least one of the words: "contracting out" "contract out" "contracting in" "contract in" "contract management" "contracting for health" outsourcing "out sourcing" "outsourced services" (in the title of the article)

2. With all of the words: *private public partnership health* (in the title of the article)

**The Grey Literature Report:** <http://www.greylit.org/> (4 separate strategies)

1. *Contract* - Search Within Title

2. *Contract* - with Additional Keywords: *health*

3. *Contract* - with Additional Keywords: *service*

4. *Contract* - with Additional Keywords: *management*

**OpenGrey:** <http://www.opengrey.eu/> (2 separate strategies)

1. (health OR healthcare OR clinical OR medical) AND ("contracting out" OR "contract out" OR "contracting in" OR "contract in" OR "contract management" OR "contracting for health" OR outsourcing OR "out sourcing" OR "outsourced services")

**World Bank:** <http://documents.worldbank.org/curated/en/docadvancesearch> (Advanced search)

1. *contracting out* + *health service management* + *health policy and management* + *government procurement*

2. *contracting out* + *health service management*

**OECD Library:** <http://www.oecd-ilibrary.org/search/advanced> (Advanced Search)

1. *contracting* OR *contract* OR *contracts* OR *outsourcing* AND *health* OR *healthcare* OR *clinical* OR *medical* in Title and Abstract

### TRIAL REGISTRIES

**ClinicalTrials.gov:** <https://clinicaltrials.gov/> (Advanced Search)

1. *contracting* OR "contract out" OR "contract in" OR "contract management" OR *outsourcing* OR "out sourcing" OR *outsourced* OR "outsourced"

2. *contracting* OR "contract out" OR "contract in" OR "contract management" OR *outsourcing* OR "out sourcing" OR *outsourced* OR "outsourced" AND *service* OR *services* OR *care*

**ICTRP:** <http://apps.who.int/trialsearch/> (Advanced search)

1. *contracting* OR *contract out* OR *contract in* OR *contract management* OR *outsourcing* OR *out sourcing* OR *outsourced* OR *out sourced*

2. *contracting* OR *contract out* OR *contract in* OR *contract management* OR *outsourcing* OR *out sourcing* OR *outsourced* OR *out sourced* [in Intervention + Recruitment status

## Appendix 2. Abstract and title screening tool

### Stage 1: Screening of abstracts/titles

a. There are three possible outcomes of the reviewer's assessment of an abstract or title:

1. Include
2. Exclude
3. Unsure

b. Definitions of outcomes:

### Include

The study potentially meets the inclusion criteria.

Action: Retrieve full text to assess eligibility.

### Exclude

The abstract/title does not meet all the inclusion criteria.

There might be more than one reason for exclusion but select only the first one that became apparent as you read the abstract/title. The reasons for exclusions are:

- 1 - *Wrong topic*: The title/abstract points to a study that is not relevant to this review.
- 2 - *Wrong intervention*: This abstract/title/full text does not meet the intervention criteria.
- 3 - *Wrong study type*: This abstract/title/full text does not meet the study type criteria.
- 4 - *Wrong comparison*: This abstract/title/full text does not meet the comparison criteria.
- 5 - *Wrong outcomes*: This abstract/title/full text does not meet the outcome criteria.
- 6 - *Wrong participants*: This abstract/title/full text does not meet the participant criteria.
- 7 - *Book*.
- 8 - *Duplicate record*.

Action: Don't retrieve the full text.

### Unsure

The information provided in the abstract/title is insufficient and/or unclear to make an inclusion/exclusion decision.

Action: Retrieve full text for assess eligibility.

c. Labels: This is used for when the decision outcome is Exclude but the reviewer thinks that retrieving the full text will have value for any of the following two reasons:

#### 1. *Narrative label*

The full text may provide useful background information and/or qualitative data that can be used later on.

#### 1. *Accountability label*

The abstract/title might be relevant to the *Accountability* review and the citation should be forwarded to them.

## Stage 2: Assessing the eligibility of full texts retrieved

The study must meet all the criteria to be considered for inclusion in this review.

### 1. *Study type*

Was **one** of the following study types been used?

If YES, indicate which design by deleting those which don't apply and continue with the rest of the assessment.

If NO, exclude the study.

#### Randomised trial (RCT) YES NO

An experimental study in which people are allocated to intervention and control groups or to different interventions using methods that are random.

#### Cluster randomised trials (CRT) YES NO

An experimental study in which clusters are allocated to intervention and control arms or to different interventions using methods that are random.

If YES:

Does the study have at least two intervention and two control sites? YES NO

If YES, continue with the rest of the assessment.

If NO, exclude the study.

Non-randomised trial (NRCT) YES NO

An experimental study in which people are allocated to intervention and control arms or to different interventions using methods that are not random.

If YES:

Does the study have at least two intervention and two control sites?

YES NO

If YES, continue with the rest of the assessment.

If NO, exclude the study.

Controlled before-after design (CBA) YES NO

A study in which observations are made before and after the implementation of an intervention, both in a group that receives the intervention and in a control group that does not.

If YES:

Does the study have at least two intervention and two control sites?

YES NO

If YES, continue with the rest of the assessment.

If NO, exclude the study.

Interrupted time series (ITS) YES NO

A study that uses observations at multiple time points before and after an intervention (the 'interruption'). The design attempts to detect whether the intervention has had an effect notably greater than any underlying trend over time.

If YES:

Does the study have a clearly defined point in time when the intervention occurred and at least three data points before and three after the intervention?

YES NO

If YES, continue with the rest of the assessment.

If NO, exclude the study.

Repeated measurement design (RM) YES NO

The collection of many individual patients' data over multiple time points. It must include control groups too, i.e. many control patients from whom multiple measures are collected.

If YES:

Does the study have a clearly defined point in time when the intervention occurred and at least three data points before and three after the intervention?

YES NO

If YES, continue with the rest of the assessment.

If NO, exclude the study.

## 2. *Intervention*

Does the study meet **all** of the intervention criteria?

If YES, include for data extraction and continue with the rest of the assessment.

If NO, exclude the study.

The provision of any preventative and/or curative clinical health service on behalf of the government by for-profit and/or not-for-profit, non-state providers.

YES NO

The clinic health services are provided by a professional and/ or paraprofessional health worker

YES NO

Be a formal contractual relationship between the government and a non-state provider that is described.

YES NO

The aim of the contract must be for the non-state provider to provide, on behalf of the government, clinical health services for a specific:

(i) geographic area: YES NO

(ii) patient population: YES NO

(iii) period of time: YES NO

## 3. *Comparison*

Does the study meet **one** of the following comparison criteria?

If YES, continue with the rest of the assessment.

If NO, exclude the study.

Contracting out vs no contracting out. YES NO

One model of contracting out to another model. YES NO

## 4. *Outcome measures*

Does the study meet **one** of the following outcome criteria?

If YES, continue with the rest of the assessment.

If NO, exclude the study.

### Primary outcomes

1. The utilisation of clinical health services. YES NO

2. Population health outcomes: YES NO

### Secondary outcomes

1. Improving equity in utilisation of clinical health services (equal treatment for equal needs) YES NO

2. Costs and cost-effectiveness. YES NO

3. Health system performance as measured in its building blocks such as financing, human resources management and governance. YES NO

4. Adverse effects. YES NO

## 5. *Participants*

Does the study meet **all** of the following participant criteria?

If YES, continue with the rest of the assessment.

If NO, exclude the study.

1. Users and non-users of contracted out services and health facilities at all levels where the contracted services are provided YES NO
2. Low -and middle-income countries YES NO

### Examples

*Comparison criterion: One model of contracting out to another model*

In this instance, the compared models must be different to each other based on well described contracting features, for ex.:

*Tender process*; i.e. competitive bidding vs fixed bidding for the contract;

*Contract duration*; i.e. annual renewal vs multi-year contracts;

*Governmental stewardship*, i.e. payment penalties for not meeting set targets vs bonus payment for performance.

*Outcome criterion: Economic outcomes* such as:

The cost-effectiveness of delivering the contracted out clinical health services

Costs and savings to government, contracted agencies, and patients.

*Outcome criterion: Adverse effects* such as:

Fraudulent practices in contracting non-state providers

Job insecurity for state-provider employees

Fragmentation of the health system



**Appendix 3. Certainty assessment of evidence for outcomes reported in the SoF table**

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	Certainty (overall score)
<b>Outcome 1: Mortality of children ≤ 1 year in past year</b>							
1	Cluster RCT	<b>Serious (-1)</b>  Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics</i> are not reported.	<b>No serious risk</b>	<b>No serious risk</b>	<b>Serious (-1)</b>  Downgraded by 1 for serious imprecision. The study reported Treatment of the Treated (ToT) estimates. Actual numbers for numerator and denominator not provided.	<b>No serious risk</b>	<b>Low<sup>a, b</sup></b>  Downgraded by 2 because of serious RoB and Imprecision
<b>Outcome 2: Child diarrhoea</b>							
1	Cluster RCT	<b>Serious (-1)</b>  Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics</i> are not reported.	<b>No serious risk</b>	<b>No serious risk</b>	<b>Serious (-1)</b>  Downgraded by 1 for serious imprecision. The study reported Treatment of the Treated (ToT) estimates. Actual numbers for numerator and denominator not provided.	<b>No serious risk</b>	<b>Low<sup>a, b</sup></b>  Downgraded by 2 because of serious RoB and Imprecision
<b>Outcome 3: Child immunisation</b>							
2	Cluster RCT  Controlled Before-After	<b>Bloom 2006: Serious (-1)</b>  Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics</i> are not reported.  <b>Cristia 2015: Serious (-1)</b>  Downgraded by 1 for serious risk of bias. The study is at a high risk of <i>Other bias</i> because the estimates of the effects correspond with a strengthened model of the	<b>No serious risk</b>	<b>No serious risk</b>	<b>Bloom 2006: No serious risk</b>  (95% CI -10.0%; 25.2%) calculating width: 10.0%+25.2% = the width = 35.2% = not imprecise  <b>Cristia 2015: No serious risk</b>  <u>Measles</u>  (95% CI -9.4%; 102.4% ) calculating width: 9.4%+102.4%= the width = 111.8% = not imprecise  <u>DPT</u>	<b>No serious risk</b>	<b>Moderate<sup>c</sup></b>  Downgraded by 1 because of serious RoB

(Continued)

intervention compared to the initial model.

(95% CI -46.3%; 43.5%) calculating width: 46.3%+43.5% = the width = 89.8% = not imprecise

Polio

(95% CI -54.8% to 39.6%) calculating width: 54.8%+39.6% = the width = 94.4% = not imprecise

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	Certainty (overall score)
<b>Outcome 4: Antenatal visits</b>							
2	Cluster RCT Controlled Before-After	<b>Bloom 2006: Serious (-1)</b> Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics</i> are not reported.  <b>Cristia 2015: Serious (-1)</b> Downgraded by 1 for serious risk of bias. The study is at a high risk of <i>Other bias</i> because the estimates of the effects correspond with a strengthened model of the intervention compared to the initial model.	<b>No serious risk</b>	<b>No serious risk</b>	<b>Bloom 2006: No serious risk</b> (95% CI -5.8% to 33.4%) calculating width: 5.8%+33.4% = the width = 39.2% = not imprecise  <b>Cristia 2015: No serious risk</b> <u>number of women with visit</u> (95% CI -53%; 43.8%) calculating width: 53.0%+43.8% = the width = 96.8% = not imprecise  <u>visit professional</u> (95% CI -22.5%;56.7%) calculating width: 22.5%+56.7% = the width = 79.2% = not imprecise  <u>≥ 3 visits</u> (95% CI -16.1%; 70.9%) calculating width: 16.1%+70.9% = the width = 87.0% = not imprecise	<b>No serious risk</b>	<b>Moderate<sup>c</sup></b> Downgraded by 1 because of serious RoB

(Continued)

**Outcome 5: Female use of contraceptives**

2	Cluster RCT  Controlled Before-After	<p><b>Bloom 2006: Serious (-1)</b></p> <p>Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics</i> are not reported.</p> <p><b>Cristia 2015: Serious (-1)</b></p> <p>Downgraded by 1 for serious risk of bias. The study is at a high risk of <i>Other bias</i> because the estimates of the effects correspond with a strengthened model of the intervention compared to the initial model.</p>	<b>No serious risk</b>	<b>No serious risk</b>	<p><b>Bloom 2006: No serious risk</b></p> <p>(95% CI -7.4%; 4.4%) calculating width: 7.4%+4.4% = the width = 11.8% = not imprecise</p> <p><b>Cristia 2015: No serious risk</b></p> <p>(95% CI -11.6% to 15.4%) calculating width: 11.6%+15.4% = the width = 27.0% = not imprecise</p>	<b>No serious risk</b>	<b>Moderate<sup>c</sup></b>
							Downgraded by 1 because of serious RoB

**Outcome 6: Individual healthcare expenditures**

1	Cluster RCT	<p><b>Serious (-1)</b></p> <p>Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics</i> are not reported.</p>	<b>No serious risk</b>	<b>No serious risk</b>	<b>No serious risk</b>	<b>No serious risks</b>	<b>Moderate<sup>d</sup></b>
					(95% CI \$ -35.93 to \$ -15.855); calculating width: \$ 35.93-\$ 15.855 = the width = \$ 20.075 = is not imprecise as it refers to \$.		Downgraded by 1 because of serious RoB

**Outcome 7: Equity in the use of public healthcare services**

1	Cluster RCT	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed	Not assessed
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**Foot notes**

<sup>a</sup> Downgraded by 1 for serious risk of bias. Study 1 ([Bloom 2006](#)) is at a high risk of bias as the *baseline participant characteristics* are not reported.

<sup>b</sup> Downgraded by 1 for serious imprecision. The study reported Treatment of the Treated (ToT) estimates. Actual numbers for numerator and denominator

not provide.

<sup>c</sup> Downgraded by 1 for serious risk of bias. Study 1 ([Bloom 2006](#)) is at a high risk of bias as the *baseline participant characteristics* are not reported.

Study 2 ([Cristia 2015](#)) is at a high risk of *other bias* because the estimates of the effects correspond with a strengthened model of the intervention

compared to the initial model.

<sup>d</sup> Downgraded by 1 for serious risk of bias as the *baseline participant characteristics* are not reported.

**Appendix 4. Certainty assessment of evidence for outcomes not reported in the SoF table**

No of studies	Design	Risk of bias	Inconsistency	Indirectness	Imprecision	Other	Certainty* (overall score)
<i>Outcome: High-dose Vitamin A to children 6-59 months old</i>							
1	Cluster RCT	<b>Serious (-1)</b> Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics are not reported.</i>	<b>No serious risk</b>	<b>No serious risk</b>	<b>No serious risk</b>	<b>No serious risk</b>	<b>Moderate<sup>a</sup></b> Downgraded by 1 because of serious RoB
<i>Outcome: Birth deliveries by trained professionals</i>							
1	Cluster RCT	<b>Serious (-1)</b> Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics are not reported.</i>	<b>No serious risk</b>	<b>No serious risk</b>	<b>No serious risk</b>	<b>No serious risk</b>	<b>Moderate<sup>a</sup></b> Downgraded by 1 because of serious RoB
<i>Outcome: Use of district public health care facilities when sick</i>							
1	Cluster RCT	<b>Serious (-1)</b> Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics are not reported.</i>	<b>No serious risk</b>	<b>No serious risk</b>	<b>No serious risk</b>	<b>No serious risk</b>	<b>Moderate<sup>a</sup></b> Downgraded by 1 because of serious RoB
<i>Outcome: Government healthcare expenditures</i>							
1	Cluster RCT	<b>Serious (-1)</b> Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics are not reported.</i>	<b>No serious risk</b>	<b>No serious risk</b>	<b>Serious (-1)</b> Downgraded by 1 for serious imprecision.	<b>No serious risk</b>	<b>Low<sup>a, b</sup></b> Downgraded by 2 because of serious RoB and Imprecision
<i>Outcome: Accuracy of facility registers</i>							
1	Cluster RCT	<b>Serious (-1)</b> Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics are not reported.</i>	<b>No serious risk</b>	<b>No serious risk</b>	<b>Serious (-1)</b> Downgraded by 1 for serious imprecision.	<b>No serious risk</b>	<b>Low<sup>a, b</sup></b> Downgraded by 2 because of serious RoB and Imprecision

(Continued)

Outcome: Availability of child vaccines at facilities

1	Cluster RCT	<b>Serious (-1)</b>  Downgraded by 1 for serious risk of bias. <i>Baseline participant characteristics are not reported.</i>	<b>No serious risk</b>	<b>No serious risk</b>	<b>Serious (-1)</b>  Downgraded by 1 for serious imprecision.	<b>No serious risk</b>	<b>Low<sup>a, b</sup></b>  Downgraded by 2 because of serious RoB and Imprecision
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\*GRADE Working Group grades of evidence

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

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

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

⊕⊖⊖⊖ **Very low certainty:** This research does not provide a reliable indication of the likely effect. The likelihood that the effect will be substantially different\*\* is very high.

\*\* Substantially different = a large enough difference that it might affect a decision.

## Footnotes

<sup>a</sup> Downgraded by 1 for serious risk of bias. [Bloom 2006](#) is at a high risk of bias as the *baseline participant characteristics* are not reported.

<sup>b</sup> Downgraded by 1 for serious imprecision. [Bloom 2006](#) reported Treatment of the Treated (ToT) estimates. Actual numbers for numerator and denominator not provided.

## WHAT'S NEW

Date	Event	Description
26 January 2018	New citation required but conclusions have not changed	<p><b>Included studies</b></p> <p>Given EPOC's revised study design criteria (<a href="#">EPOC 2017a</a>), we excluded from this update 2 of the studies included in the previous version of this review. We included 1 new study, bringing the total number of included studies in this review to 2.</p> <p><b>New review author team</b></p> <p>Willem A Odendaal, Kim Ward, Jesse Uneke, Henry Uro-Chukwu, Dereck Chitama, Yusencha Balakrishna, Tamara Kredo</p>
26 January 2018	New search has been performed	<p>This is the first update of a Cochrane Review published in 2009. We conducted a new search and updated other content. We made the following 3 changes to the original Review.</p> <p><b>Outcomes</b></p> <p><i>Secondary outcomes</i></p> <p>We added the following 2 outcomes.</p> <ul style="list-style-type: none"> <li>Economic outcomes <ul style="list-style-type: none"> <li>cost-effectiveness of delivering contracted out clinical health services</li> <li>costs and savings to government, contracted agencies, and patients</li> <li>economic measures of health benefit</li> </ul> </li> <li>Health system performance as measured in terms of health service delivery, health workforce, health information, availability of essential medicines, and health financing</li> </ul> <p><b>Search strategy</b></p> <ul style="list-style-type: none"> <li>Given the added secondary outcomes, we changed the search strategy</li> </ul> <p><b>Study design criteria</b></p> <p><i>Controlled before-after (CBA) studies</i></p> <ul style="list-style-type: none"> <li>To fulfil the EPOC inclusion criteria for a CBA, the study must have at least 2 intervention sites and 2 control sites</li> <li>Criteria reported in the 2009 review were as follows: "For this review, the control group for both RCTs and CBAs had to be areas or health facilities where the provision of health services was undertaken by the public using a traditional type of management, i.e. without the possibility for healthcare managers at the lower levels to define the remuneration levels of their staff" (<a href="#">Lagarde 2009</a>, p. 5)</li> </ul>

## CONTRIBUTIONS OF AUTHORS

WO, KW, CJU, HC, and DC drafted the protocol and screened abstracts, titles, and full texts for eligibility. YB analysed the data. WO and TK drafted the manuscript, and KW, JU, HU, and DC commented on various drafts of the manuscript. All review authors approved the final version of the manuscript.

## DECLARATIONS OF INTEREST

Willem A Odendaal: none known.

Kim Ward: none known.

Jesse Uneke: none known.

Henry Uro-Chukwu: none known.

Dereck Chitama: none known.

Yusentha Balakrishna: none known.

Tamara Kredo: none known.

## SOURCES OF SUPPORT

### Internal sources

- The respective employment organisations of the review authors supported their involvement in the review, Other.

### External sources

- Alliance for Health Policy and Systems Research, Other.

## DIFFERENCES BETWEEN PROTOCOL AND REVIEW

We made the following two changes: First, based on our reading of the literature and advice from the contact editor, we amended the measures of effects and study design criteria for this update as follows.

- **Measures of effects change:** We expanded the outcome measures to include measures of cost-effectiveness, health system performance, and health service delivery.
- **Study design change:** We added studies with a repeated measurement design (RM). We amended one criterion for CBA studies based on revised EPOC study design criteria ([EPOC 2017a](#)), which specify that such studies have to include two sites in the control and intervention arms, respectively.

Second, a new review author team was established for the update of the previous version of this review ([Lagarde 2009](#)). The new review author team consists of Willem A Odendaal, Kim Ward, Jesse Uneke, Henry Uro-Chukwu, Dereck Chitama, Yusentha Balakrishna, and Tamara Kredo.

## INDEX TERMS

### Medical Subject Headings (MeSH)

\*Developing Countries; \*Health Services Accessibility [economics] [statistics & numerical data]; \*Health Services Needs and Demand [economics] [statistics & numerical data]; \*Outsourced Services [economics] [statistics & numerical data]; \*Process Assessment, Health Care; Cambodia; Contraceptive Agents, Female [administration & dosage]; Controlled Before-After Studies; Diarrhea [epidemiology]; Guatemala; Health Expenditures; Immunization [economics]; Infant Mortality; Prenatal Care [statistics & numerical data]; Randomized Controlled Trials as Topic

### MeSH check words

Humans; Infant