



May 2017 – SUPPORT Summary of a systematic review

## What are the effects of physician–nurse substitution in primary care?

Physician shortage in many countries and demands of high-quality and affordable care make physician–nurse substitution an appealing workforce strategy. Substitution refers to nurses both performing tasks and taking responsibility for care that formerly would have been performed by physicians.

### Key messages

- Nurse-led care probably leads to a lower systolic blood pressure and lower CD4 cell counts in HIV/AIDs patients compared to physician-led care.
- Nurse-led care compared to physician-led care probably leads to little or no difference in other clinical parameters, such as diastolic blood pressure, total cholesterol level, and glycosylated haemoglobin concentrations.
- Most of the studies were conducted in high-income countries.
  - The applicability of the findings may be affected by cultural and economic differences, patient populations, services provided in primary care settings, and the availability and level of nurses' skills.



### Who is this summary for?

People making decisions concerning the substitution of nurses for physicians in primary care

#### ! This summary includes:

- **Key findings** from research based on a systematic review
- **Considerations about the relevance of this research** for low-income countries

#### X Not included:

- Recommendations
- Additional evidence not included in the systematic review
- Detailed descriptions of interventions or their implementation

### This summary is based on the following systematic review:

Martínez-González NA, Tandjung R, Djalali S, et al. Effects of physician–nurse substitution on clinical parameters: a systematic review and meta-analysis. *PLoS ONE* 2014; 9(2): e89181.

### What is a systematic review?

A summary of studies addressing a clearly formulated question that uses systematic and explicit methods to identify, select, and critically appraise the relevant research, and to collect and analyse data from the included studies

**SUPPORT** was an international project to support the use of policy relevant reviews and trials to inform decisions about maternal and child health in low- and middle-income countries, funded by the European Commission (FP6) and the Canadian Institutes of Health Research.

**Glossary of terms used in this report:**  
[www.supportsummaries.org/glossary-of-terms](http://www.supportsummaries.org/glossary-of-terms)

**Background references on this topic:**  
See back page

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# Background

According to the World Health Organization, the global number of healthcare providers (physicians, nurses and midwives) remains lower than required per 1,000 population. The low number of physicians, changes in working culture, and trends in retirement have contributed greatly to this shortage. There are pressing demands for high-quality affordable care, due to the escalating growth and ageing of the population, patients' expectations, and the costs incurred managing complex conditions. One response to these changes is to substitute nurses for physicians. This is an appealing strategy due to its potential to address workforce shortages, maldistribution of workload, and to reduce costs.

## How this summary was prepared

After searching widely for systematic reviews that can help inform decisions about health systems, we have selected ones that provide information that is relevant to low-income countries. The methods used to assess the reliability of the review and to make judgements about its relevance are described here: [www.supportsummaries.org/how-support-summaries-are-prepared/](http://www.supportsummaries.org/how-support-summaries-are-prepared/)

## Knowing what's not known is important

A reliable review might not find any studies from low-income countries or might not find any well-designed studies. Although that is disappointing, it is important to know what is not known as well as what is known.

A lack of evidence does not mean a lack of effects. It means the effects are uncertain. When there is a lack of evidence, consideration should be given to monitoring and evaluating the effects of the intervention, if it is used.

## About the systematic review underlying this summary

**Review objective:** To assess the impact of physician–nurse substitution in primary care on clinical parameters

Types of	What the review authors searched for	What the review authors found
<b>Study designs &amp; Interventions</b>	Randomised trials that examined physician–nurse substitution	Eleven randomised trials. Nurses had full clinical autonomy to manage patients' disease (1 trial); Nurses made independent decisions for several tasks, but still needed minor support or short communication with the physicians (10 trials). In all trials, the physicians performed standard care.
<b>Participants</b>	Patients of all ages seeking first contact or undergoing care for all conditions including mental health and addiction restricted to primary care	32,247 participants with mean age ranging between 11.2 to 67.1 years. Thirty-five percent (35%) of the population were males (10 trials) and females only (1 trial). Patients showed up with a range of complex conditions including cerebrovascular disease, hypertension, heart failure, diabetes mellitus, asthma, incontinence, Parkinson's disease and HIV
<b>Settings</b>	-General practices, community or ambulatory care settings -No geographical limitation	The studies were conducted in the UK (2), The Netherlands (4), USA (2), South Africa (2) and Russia (1)
<b>Outcomes</b>	-Clinical parameters that detected changes in the clinical status or physiological capability of patients in relation to various forms of disease - Measures of quality of life, satisfaction, mortality, hospital admissions, progression of disease, and process of care were excluded	Changes in blood pressure (5), cholesterol and triglycerides concentration (4), glycosylated haemoglobin level (4), lung and kidney function (1), various parameters of cardiac function (1), frequency of incontinent episodes (1), mobility stand-up test and bone sustaining fracture in patients with Parkinson's disease (1), and CD4 cell counts in HIV/AIDS patients (1)

**Date of most recent search:** August 2012

**Limitations:** This is a well-conducted systematic review with only minor limitations, restricted to English language and published studies.

Martínez-González NA, Tandjung R, Djalali S, et al. Effects of physician–nurse substitution on clinical parameters: a systematic review and meta-analysis. PLoS ONE 2014; 9(2): e89181.

# Summary of findings

This review included 11 randomised trials that assessed the impact of physician–nurse substitution in primary care on clinical parameters. Most studies were conducted in high-income countries. In all studies, nurses provided care for complex conditions including HIV, hypertension, heart failure, cerebrovascular diseases, diabetes, asthma, Parkinson’s disease, and incontinence. The review excluded measures of quality of life, satisfaction, mortality, hospital admissions, progression of disease, and process of care.

## Substitution of physicians by nurses in primary care

- **Nurse-led care probably leads to a lower systolic blood pressure and lower CD4 cell counts in HIV/AIDs patients compared to physician-led care. The certainty of this evidence is moderate.**
- **Nurse-led care probably leads to little or no difference in other clinical parameters such as lowering diastolic blood pressure, lowering total cholesterol level, or glycosylated haemoglobin concentrations compared to physician-led care. The certainty of this evidence is moderate.**

### About the certainty of the evidence (GRADE) \*

⊕⊕⊕⊕

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

⊕⊕⊕○

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

⊕⊕○○

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

⊕○○○

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

\* This is sometimes referred to as ‘quality of evidence’ or ‘confidence in the estimate’.

† Substantially different = a large enough difference that it might affect a decision

See last page for more information.

<b>Substitution of physicians by nurses in primary care</b>			
<b>People</b>	Patients of all ages seeking first contact or undergoing care for all conditions restricted to primary care		
<b>Settings</b>	USA, UK, The Netherlands, Russia, and South Africa		
<b>Intervention</b>	Substitution of physicians by nurses (nurse-led primary care)		
<b>Comparison</b>	Standard care provided by physicians (physician-led primary care)		
<b>Outcomes</b>	<b>Weighted mean difference* (95% CI)</b>	<b>Certainty of the evidence (GRADE)</b>	<b>Comments</b>
<b>Systolic blood pressure (mmHg)</b>	-4.27 (-6.31 to -2.23)	⊕⊕⊕○ Moderate	Nurse-led care led to an average decrease of 4.27 mmHg in systolic blood pressure.
<b>Diastolic blood pressure (mmHg)</b>	-1.48 (-3.05 to 0.09)	⊕⊕⊕○ Moderate	There was little or no difference between between nurse-led care and physician-led care in decreasing diastolic blood pressure.
<b>Total cholesterol (mmol/L)</b>	-0.08 (-0.22 to 0.07)	⊕⊕⊕○ Moderate	There was little or no difference between nurse-led care and physician-led care in decreasing the mean levels of total cholesterol.
<b>Glycosylated heamoglobin (% HbA1c)</b>	0.12 (-0.13 to 0.37)	⊕⊕⊕○ Moderate	There was little or no difference between nurse-led care and physician-led care in reducing glycosylated haemoglobin concentrations (HbA1c).
<b>HIV/AIDs: CD4 count for Anti-Retroviral Therapy initiation.</b>	20 (9.29 to 30.71)	⊕⊕⊕○ Moderate	Patients receiving nurse-led care had lower CD4 cell counts compared to patients who received physician-led care.
GRADE: GRADE Working Group grades of evidence (see above and last page)			
* The weighted mean differences (WMD) of the absolute endpoint measurements for nurses and physicians were calculated			

# Relevance of the review for low-income countries

→ Findings	▷ Interpretation*
APPLICABILITY	
<p>→ All studies except one were conducted in high-income countries.</p> <p>→ The single study conducted in a middle-income country found that nurse-led care probably leads to lower CD4 cell counts in HIV/AIDS patients compared to physician-led care.</p>	<p>▷ While it may be possible to substitute nurses for physicians in some low-income settings, the applicability of the findings may be limited by:</p> <ul style="list-style-type: none"> <li>- cultural and economic differences</li> <li>- patient populations</li> <li>- services provided in primary care settings</li> <li>- availability of nurses in different health systems</li> <li>- nurses' skills and experiences</li> <li>- nurses' roles and levels of clinical autonomy during substitution</li> <li>- definition of boundaries and task allocation in clinical practices</li> </ul> <p>▷ Because nurses are trained to provide care in various settings and for a wide range of complex conditions, in most cases, this requires specialised skills and the use of guidelines for successful disease management when physician-nurse substitution takes place.</p>
EQUITY	
<p>→ The systematic review did not address equity issues.</p>	<p>▷ Substituting nurses for physicians in primary care has the potential to reduce inequities in access to healthcare by increasing access in underserved communities where there is scarcity of physicians.</p>
ECONOMIC CONSIDERATIONS	
<p>→ The systematic review did not address costs, cost-effectiveness, or sustainability of nurse substitution.</p>	<p>▷ The relatively lower salary cost of nurses compared to physicians might translate into economic savings.</p> <p>▷ However, calculation of potential savings should take into consideration the availability and skills of nurses, costs of additional training and provision of supportive supervision, and possible increased referrals, which might offset the anticipated savings.</p>
MONITORING & EVALUATION	
<p>→ Nurse-led care probably leads to similar and in some cases improved clinical parameters in primary care compared to physician-led care.</p> <p>→ This review did not provide evidence on the effectiveness of the intervention on patient-important outcomes, patient satisfaction, or costs.</p>	<p>▷ Given the uncertainties about the impact of intervention on important outcomes and costs, as well as uncertainty about the applicability of the evidence to low-income countries, substituting nurses for physicians in low-income countries should be pilot tested and rigorously monitored and evaluated.</p>

\*Judgements made by the authors of this summary, not necessarily those of the review authors, based on the findings of the review and consultation with researchers and policymakers in low-income countries. For additional details about how these judgements were made see: [www.supportsummaries.org/methods](http://www.supportsummaries.org/methods)

# Additional information

## Related literature

Laurant M, Reeves D, Hermens R, Braspenning J, et al. Substitution of doctors by nurses. *Cochrane Database Syst Rev* 2005; 2:CD001271.

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## Conflict of interest

None declared. For details, see: [www.supportsummaries.org/coi](http://www.supportsummaries.org/coi)

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This summary has been peer reviewed by: Tomas Pantoja, Cristian Mansilla, Nahara Martinez Gonzalez and Thomas Rosemann.

## This review should be cited as

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## The summary should be cited as

Karroum LB, Fadlallah R. What are the effects of physician–nurse substitution in primary care? A SUPPORT Summary of a systematic review. May 2017. [www.supportsummaries.org](http://www.supportsummaries.org)

## About certainty of the evidence (GRADE)

The “certainty of the evidence” is an assessment of how good an indication the research provides of the likely effect; i.e. the likelihood that the effect will be substantially different from what the research found. By “substantially different” we mean a large enough difference that it might affect a decision. These judgements are made using the GRADE system, and are provided for each outcome. The judgements are based on the study design (randomised trials versus observational studies), factors that reduce the certainty (risk of bias, inconsistency, indirectness, imprecision, and publication bias) and factors that increase the certainty (a large effect, a dose response relationship, and plausible confounding). For each outcome, the certainty of the evidence is rated as high, moderate, low or very low using the definitions on page 3.

**For more information about GRADE:**  
[www.supportsummaries.org/grade](http://www.supportsummaries.org/grade)

## SUPPORT collaborators:

**The Cochrane Effective Practice and Organisation of Care Group (EPOC)** is part of the [Cochrane Collaboration](http://www.cochrane.org). The Norwegian EPOC satellite supports the production of Cochrane reviews relevant to health systems in low- and middle-income countries. [www.epocoslo.cochrane.org](http://www.epocoslo.cochrane.org)

**The Evidence-Informed Policy Network (EVIPNet)** is an initiative to promote the use of health research in policymaking in low- and middle-income countries. [www.evipnet.org](http://www.evipnet.org)

**The Alliance for Health Policy and Systems Research (HPSR)** is an international collaboration that promotes the generation and use of health policy and systems research in low- and middle-income countries. [www.who.int/alliance-hpsr](http://www.who.int/alliance-hpsr)

**Norad**, the Norwegian Agency for Development Cooperation, supports the Norwegian EPOC satellite and the production of SUPPORT Summaries. [www.norad.no](http://www.norad.no)

**The Effective Health Care Research Consortium** is an international partnership that prepares Cochrane reviews relevant to low-income countries. [www.evidence4health.org](http://www.evidence4health.org)

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