



February 2017 – SUPPORT Summary of a systematic review

Which interventions can improve antibiotic prescription in ambulatory care settings?

The unnecessary use of antibiotics in ambulatory care settings can produce increased antimicrobial resistance. This has led to the use of more expensive and broad-spectrum antibiotics, contributing to increasing healthcare costs. Numerous strategies to reduce inappropriate use of antibiotics have been implemented, most directed at physicians.

Key messages

- **Strategies such as clinician education and patient education alone or combined with audit and feedback probably reduce antibiotic prescribing in ambulatory care settings.**
- **The effects of the interventions on the proportion of patients treated with appropriate antibiotics and on clinical outcomes were not reported.**
- **Most of the studies were conducted in high-income countries.**



Who is this summary for?

People making decisions about interventions to improve rational use of antibiotics

! 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:

Ranji SR, Steinman M, Shojania K, Gonzalez R. Interventions to reduce unnecessary antibiotic prescribing: a systematic review and quantitative analysis. *Med Care* 2008; 46:847–62.

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

Background references on this topic:
See back page

Background

Antibiotic resistance is a serious problem for individual patients and healthcare systems. The excessive use of antibiotics, particularly in ambulatory practice, has markedly increased antimicrobial resistance among community-acquired bacterial infections.

One approach to reducing the incidence of infections due to antibiotic-resistant organisms is to reduce inappropriate use of antibiotics through changing physician practice. Multiple strategies have been implemented to achieve this, such as educational interventions, alone or combined with audit and feedback, and patient education.

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/

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 evaluate strategies to reduce unnecessary antibiotic prescribing in outpatient practice and to compare the effect of strategies targeting clinicians, patients and/or healthcare systems

Types of	What the review authors searched for	What the review authors found
Study designs & Interventions	Randomised trials, controlled before–after studies, and interrupted time series studies that evaluate interventions to reduce unnecessary prescription of antibiotics for acute nonbacterial illnesses using one of the following interventions: clinician and patient education, audit and feedback, clinician reminders and decision support systems, financial and regulatory incentives and provision of delayed prescriptions	A total of 43 studies were included, reporting 55 trials: Randomised trials (22); quasi-randomised trials (3), controlled before–after studies (19). 24 trials from 23 studies tested an intervention using at least 2 distinct quality improvement (QI) strategies such as clinician education combined with patient education. The remaining trials used a single QI strategy, most commonly clinician education or patient education alone.
Participants	Clinicians, patients, healthcare systems	Patients were adults and children with acute respiratory infection. Clinicians were mostly from primary care settings.
Settings	Outpatient settings	US (17 studies), Canada (2), Europe (12), Australia and New Zealand (4), Israel (1). Six studies were conducted in low- or middle-income countries (Cuba, Indonesia, Mexico, South Africa, Sri Lanka and Zambia).
Outcomes	Proportion of patients' visits at which an antibiotic was prescribed	Most of the studies reported changes in the proportion of visits at which patients were prescribed antibiotics.
Date of most recent search: March 2007		
Limitations: This is a well-conducted systematic review, although there was no detailed report of risk of bias assessment for the included studies and the search was in 2007		

Ranji SR, Steinman M, Shojania K, Gonzalez R. Interventions to reduce unnecessary antibiotic prescribing: a systematic review and quantitative analysis. *Med Care* 2008; 46:847–62.

Summary of findings

This review included 43 studies, of which six were from low- and middle-income countries.

Quality improvement strategies used to reduce inappropriate antibiotic prescribing included: clinician education (such as distribution of educational materials, educational meetings and workshops, and educational outreach with or without guideline distribution) and patient education alone or combined with audit and feedback.

- **Strategies such as clinician education and patient education alone or combined with audit and feedback probably reduce antibiotic prescribing in ambulatory care settings. The certainty of this evidence is moderate.**
- **Effects on the percentage of patients treated with appropriate antibiotics and clinical outcomes were not reported in this review.**

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.

Clinician education with or without patient education or audit and feedback versus no intervention

People	Clinicians and or patients with acute respiratory infections
Settings	Ambulatory clinics in US, Europe, Australasia, Canada, Cuba, Indonesia, Mexico, Sri Lanka, Zambia
Intervention	Educational strategies (outreach visits distribution of materials, workshops) with or without patient education and/or audit and feedback
Comparison	No intervention

Outcomes	Median absolute reduction (Interquartile range)	Certainty of the evidence (GRADE)
Reduction in the number of patient visits at which an antibiotic was prescribed	9.7% (6.6% to 13.7%)	⊕⊕⊕○ Moderate
Clinical (hospitalization admission rate, mortality)	No data reported	
Proportion of patients treated with the adequate antibiotic	No data reported	

GRADE: GRADE Working Group grades of evidence (see above and last page)

Relevance of the review for low-income countries

→ Findings	▷ Interpretation*
APPLICABILITY	
<ul style="list-style-type: none">→ The review covered an extensive range of settings and interventions developed in several countries.→ Only six included studies were conducted in a low- or middle-income country.	<ul style="list-style-type: none">▷ Correct use of antibiotics by ambulatory patients will depend upon several factors in addition to physicians' prescribing, including: country pharmaceutical policies, such as regulation of the sale and dispensing of antibiotics; self-medication habits of patients; access to healthcare; and the importance of unregulated markets for antibiotics.
EQUITY	
<ul style="list-style-type: none">→ Some of the studies that provide evidence about the effects of clinician education alone were conducted in low- or middle-income countries, but they did not provide information about differential effects in disadvantaged populations.	<ul style="list-style-type: none">▷ Strategies that improve rational use of antibiotics could help decrease some health costs and consequently could result in decreased health inequities. This is especially true in countries where medicines are paid for out of pocket.
ECONOMIC CONSIDERATIONS	
<ul style="list-style-type: none">→ This review did not report cost outcomes.	<ul style="list-style-type: none">▷ The cost of different interventions is likely to be highly variable and must be estimated based on specific local conditions.▷ It is necessary to assess the impact on health system costs and cost-effectiveness, including savings from the appropriate use of antibiotics and the costs of the interventions.
MONITORING & EVALUATION	
<ul style="list-style-type: none">→ Results reported in the included studies were for specific health conditions (mainly antibiotics for acute respiratory infections) and included numerous types of interventions.	<ul style="list-style-type: none">▷ Further well-conducted cluster randomised trials are needed to evaluate the effects and cost-effectiveness of interventions to improve rational use of antibiotics in ambulatory care settings and in patients with different types of health problems in low-income countries.

*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

Additional information

Related literature

Roque MD, Herdeiro MT, Soares SI, et al. Educational interventions to improve prescription and dispensing of antibiotics: a systematic review. *BMC Public Health* 2014; 14(1):1276.

Van der Velden AW, Pijpers EJ, Kuyvenhoven MM, et al. Effectiveness of physician-targeted interventions to improve antibiotic use for respiratory tract infections. *J Royal Col Gen Pract* 2012; 62(605):e801-7.

Forsetlund L, Bjørndal A, Rashidian A, et al. Continuing education meetings and workshops: effects on professional practice and health care outcomes. *Cochrane Database Syst Rev* 2009; (2):CD003030.

Holloway K and van Dijk L. The World Medicine Situation 2011. Rational Use of Medicines. World Health Organization 2011. Available from: <http://apps.who.int/medicinedocs/en/d/Js18064en/>

Hawkey, P.M. The growing burden of antimicrobial resistance. *J Antimicrob Chemo* 2008; 62:i1-i9. <http://dx.doi.org/10.1093/jac/dkn241>.

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Conflict of interest

None declared. For details, see: www.supportsummaries.org/coi

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This review should be cited as

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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

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

The Evidence-Informed Policy Network (EVIPONet) is an initiative to promote the use of health research in policymaking in low- and middle-income countries. 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

Norad, the Norwegian Agency for Development Cooperation, supports the Norwegian EPOC satellite and the production of SUPPORT Summaries. 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

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