February 2017 – SUPPORT Summary of a systematic review

Does community case management of pneumonia reduce mortality from childhood pneumonia?

Pneumonia is the leading cause of death in children worldwide and the great majority of these deaths occur in resource-limited settings. Effective case management is an important strategy to reduce pneumonia-related morbidity and mortality in children. Pneumonia case management includes appropriate choice of antibiotic and additional supportive treatments, prompt and appropriate referral for inpatient care, and management of treatment failure.

Key messages

➔ **Community case management of pneumonia may reduce all-cause mortality and mortality due to acute lower respiratory infection.**

➔ **All studies were conducted in low- and middle-income countries.**

Who is this summary for?

People deciding whether to introduce pneumonia case management into practice

This summary includes:

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

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:

Theodoratou E, Al-Jilaihawi S, Woodward F, et al. The effect of case management on childhood pneumonia mortality in developing countries. Int J Epidemiol 2010; 39 Suppl 1:i155-71.

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

Over 2 million children die from pneumonia each year, accounting for almost one in five under-5 deaths worldwide. The World Health Organization developed a case-management strategy in the 1980s aiming to reduce pneumonia-related deaths. As part of the primary care approach, children with pneumonia require access to good-quality basic first-level care that could be provided by lay health workers (community case management). Community case management includes appropriate choice of antibiotic, prompt and appropriate referral for inpatient care, and management of treatment failure.

About 10% of children presenting with pneumonia (severe or very severe) may require referral to a first referral or district hospital for a higher-level of care. Hospital case management includes oxygen, intraveous fluids or antibiotics, zinc and vitamin A supplements.

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 assess the effectiveness of pneumonia case management on mortality and morbidity from childhood pneumonia

Types of	What the review authors searched for	What the review authors found
Study designs & Interventions	Randomised trials, cluster randomised trials, quasi-experimental studies, and observational studies investigating the effect of community and hospital case management (including antibiotics, oxygen, zinc and vitamin A supplements)	Fourteen studies were included for community case management: quasi-experimental (1), before-after study (2), concurrent cohort studies (8), other observational studies (3). Ten studies were included for hospital case management with antibiotics: before-after studies (2), case series (mostly arms of randomised trials) (8). One before-after study of oxygen treatment and 11 randomised trials of supplements.
Participants	Under five-year-old children with pneumonia	Children from rural and urban areas
Settings	Community and hospital	India (8), Pakistan (4), Papua New Guinea (3), Bangladesh (2), Nepal (2), Tanzania (2). One each from: Malaysia, Philippines, South Africa, Mozambique, Yemen, Brazil, Ecuador, Guatemala, Peru, Uruguay and Vietnam. Three multi-country: Colombia; Ghana; India; Mexico; Pakistan; South Africa; Vietnam; Zambia India; Bangladesh; Ecuador; Mexico; Yemen, Fiji and China
Outcomes	Mortality, morbidity and healthcare utilization	All-cause mortality of children with pneumonia; treatment failure rates; length of hospitalization, time to resolution of severe illness, lethargy, inability to eat, low oxygen saturation, chest indrawing and tachypnoea
Date of most recent search: August 2008		
Limitations: This is a well-conducted systematic review with only minor limitations, but the search was done in 2008.		

Theodoratou E, Al-Jilaihawi S, Woodward F, et al. The effect of case management on childhood pneumonia mortality in developing countries. Int J Epidemiol 2010; 39 Suppl 1:i155-71.

Summary of findings

Thirty-six studies were included in the review. Fourteen studies evaluated community case management of pneumonia. Ten of these reported all-cause mortality and 10 reported acute lower respiratory infection mortality.

The other studies included in the review evaluated components of hospital care for children with pneumonia and we do not report on those here.

Community case management of pneumonia

➔ **Community case management of pneumonia may reduce all-cause mortality and acute lower respiratory infection mortality. The certainty of this evidence is low.**

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.

Community case management of childhood pneumonia with antibiotics

People	Children under five years old with pneumonia
Settings	Community
Intervention	Community case management
Comparison	Usual care (No community case management)

Outcomes	**Impact** (95% CI)	Certainty of the evidence (GRADE)
All cause mortality	For 0 to 5 years old: Relative reduction of 35% (18 to 48%) – 0 to 1-month-old: 42% (23 to 54%) – 0 to 1-year-old: 42% (33 to 55%) – 1 to 4 years old: 49% (from an increase of 7% to a reduction of 76%)	⊕⊕◯◯ Low
Acute lower respiratory infection mortality	For 0 to 5 years old: Relative reduction of 21% (12 to 30%) – 0 to 1-month-old: 27% (18 to 35%) – 0 to 1-year-old: 21% (14 to 28%) – 1to 4 years old: 51% (30 to 66%)	⊕⊕◯◯ Low

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

Relevance of the review for low-income countries

➔ Findings	▷ Interpretation*
APPLICABILITY	
➔ **All studies included in the systematic review were conducted in low- and middle-income countries.** ➔ **Most of the studies were from areas in which HIV was not a major public health problem.**	▷ *Considering the settings of the included studies, these findings are likely to be applicable to low-income countries. However, because the review did not report baseline conditions there is uncertainty about the applicability of the findings across different settings.* ▷ *The effect of case management in areas where HIV is a major problem may substantially differ from the estimates in regions where HIV is not such a problem.* ▷ *New vaccines might potentially reduce the absolute benefits of pneumonia case management.* ▷ *Weak infrastructure, shortage of essential supplies and insufficient health staff in low-income countries require consideration of the availability, acceptability and costs of pneumonia case management interventions.*
EQUITY	
➔ **Pneumonia case management may reduce mortality even in rural areas with very limited access to health services and severely limited resources.**	▷ *Resources needed for pneumonia case management may be less available in disadvantaged settings.* ▷ *Pneumonia case management may increase inequity if they are not applied to these populations.*
ECONOMIC CONSIDERATIONS	
➔ **The systematic review did not address economic considerations.**	▷ *Local costing should be considered prior to scaling up pneumonia case management.*
MONITORING & EVALUATION	
➔ **There is low or very low certainty evidence of the effects of pneumonia case management on mortality.**	▷ *More rigorous and larger studies are required to determine the effectiveness and the cost-effectiveness of pneumonia case management.* ▷ *Studies should describe the components of pneumonia case management, such as antibiotic availability, percentage of detected cases, case treatment rates, and treatment compliance.* ▷ *Studies should assess differential effects by risk subgroups.*

*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

Graham SM, English M, Hazir T, et al. Challenges to improving case management of child-hood pneumonia at health facilities in resource-limited settings. Bull World Health Organ 2008; 86(5):349-55.

Zaidi AK, Ganatra HA, Syed S, et al. Effect of case management on neonatal mortality due to sepsis and pneumonia. BMC Public Health 2011; 11 Suppl 3:S13.

Enarson PM, Gie RP, Mwansambo CC, et al. Reducing deaths from severe pneumonia in children in Malawi by improving delivery of pneumonia case management. PLoS One 2014; 9(7):e102955.

Hickam DH, Weiss JW, Guise JM, et al. Outpatient case management for adults with medical illness and complex care needs. Rockville (MD): Agency for Healthcare Research and Quality, 2013.

Sazawal S, Black RE, Pneumonia Case Management Trials Group. Effect of pneumonia case management on mortality in neonates, infants, and preschool children: a meta-analysis of community-based trials. Lancet Infect Dis 2003; 3(9):547-56.

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Conflict of interest

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

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This summary has been peer reviewed by Mike English. We did not receive any comments from the review authors.

This review should be cited as

Theodoratou E, Al-Jilaihawi S, Woodward F, et al. The effect of case management on childhood pneumonia mortality in developing countries. Int J Epidemiol 2010; 39 Suppl 1:i155-71.

The summary should be cited as

Ciapponi A. Does community case management of pneumonia reduce mortality from childhood pneumonia? A SUPPORT Summary of a systematic review. February 2017. 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

SUPPORT collaborators:

The Cochrane Effective Practice and Organisation of Care Group (EPOC) is part of the Cochrane Collaboration. 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 (EVIPNet) 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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