



August 2016 – SUPPORT Summary of a systematic review

Can in-service health professional training improve the resuscitation of seriously ill newborns and children in low-income countries?

Mortality among seriously ill neonates and children remains high in many low-income countries, even in healthcare facilities with professional staff. Most of these deaths occur within 48 hours of admission. In-service training courses in the emergency care of neonates and children are targeted towards professional healthcare staff. This is seen as a way of reducing mortality through training. However, most courses have been developed in high-income countries and their potential effectiveness in low-income country settings is unclear.

Key messages

- **In-service neonatal emergency care training of health professionals probably**
 - increases the proportion of adequate initial resuscitation steps and
 - decreases inappropriate and potentially harmful practices per resuscitation.
- **In-service neonatal emergency care training of health professionals may reduce mortality in newborns requiring resuscitation.**
- **No studies were found that evaluated the effects of in-service neonatal emergency care training on long-term outcomes or the effects of in-service emergency care training for older children.**



Who is this summary for?

People making decisions concerning in-service training of health professionals to improve care of seriously ill newborns and children in low-income countries

! 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:

Opiyo N, English M. In-service training for health professionals to improve care of seriously ill newborns and children in low-income countries. Cochrane Database of Systematic Reviews 2015, Issue 5. Art. No.: CD007071.

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

Neonatal and child mortality remains high in many low-income countries, particularly among the seriously ill. In healthcare facilities, most deaths among seriously ill neonates and children occur within 48 hours of admission. It has been argued that better emergency care training among professional staff in such settings could reduce mortality. Many courses in emergency care for neonates and children have targeted professional healthcare staff in low-income countries. These are typically designed as in-service training and have mostly been developed in high-income countries. However, their effectiveness in low-income countries in terms of professional practice, mortality, morbidity and healthcare resource use is unclear. The teaching of such courses is associated with considerable financial costs and may potentially disrupt the standard functioning of the relevant services provided.

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 investigate the effectiveness of in-service training of health professionals on their management and care of seriously ill neonates or children in low-income settings

Types of	What the review authors searched for	What the review authors found
Study designs & Interventions	Randomised trials, cluster randomised trials, non-randomised trials, controlled before-after studies, and interrupted time series studies of 1. Neonatal life support courses, 2. Paediatric life support courses, 3. Life support elements within the Integrated Management of Pregnancy and Childbirth, and 4. Other in-service newborn and child health training courses aimed at the recognition and management of seriously ill children	2 randomised trials: a 1-day Newborn Resuscitation Training course and a 4-day Essential Newborn Care Training course
Participants	Qualified healthcare professionals	Qualified healthcare professionals: doctors, nurses, and midwives
Settings	Healthcare delivery sites in low-income countries	Delivery rooms in Kenya and Sri Lanka
Outcomes	<ol style="list-style-type: none">1. Health professional performance outcomes (e.g. clinical assessment/diagnosis, recognition and management/referral of seriously ill newborn/child, prescribing practices)2. Participant outcomes (e.g. mortality, morbidity)3. Health resource utilisation (e.g. drug use, laboratory tests)4. Health services utilisation (e.g. length of hospital stay)5. Other markers of clinical performance (e.g. simulated health worker performance in practice settings)6. Training/implementation costs7. Impact on equity8. Adverse effects	<ol style="list-style-type: none">1. Proportion of adequate initial resuscitation steps2. Inappropriate and potentially harmful practices per resuscitation3. Mortality in all resuscitation episodes4. Preparedness for resuscitation
Date of most recent search: February 2015		
Limitations: This is a well-conducted systematic review with only minor limitations.		

Opiyo N, English M. In-service training for health professionals to improve care of seriously ill newborns and children in low-income countries. Cochrane Database of Systematic Reviews 2015. Issue 5. Art. No.: CD007071.

Summary of findings

Two trials were included in this review. They assessed the effectiveness of the standardised in-service neonatal emergency care training of health professionals in Kenya and Sri Lanka. Both studies were conducted in a delivery room setting and the reported relevant outcomes were manifestations of adherence to treatment guidelines and clinical assessment and diagnosis.

- **In-service neonatal emergency care training of health professionals probably**
 - increases the proportion of adequate initial resuscitation steps (moderate certainty evidence) and
 - decreases inappropriate and potentially harmful practices per resuscitation (moderate certainty evidence).
- **In-service neonatal emergency care training of health professionals may reduce mortality in resuscitation episodes. The certainty of this evidence is low.**
- **It is uncertain what effects in-service neonatal emergency care training has on long-term outcomes. No studies were found that evaluated this.**
- **It is uncertain what effects in-service emergency care training for older children has. No studies were found that evaluated this.**

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.

In-service neonatal emergency care training versus standard care for healthcare professionals				
People	Nurses/midwives (Kenya); doctors, nurses and midwives (Sri Lanka)			
Settings	Delivery rooms in Kenya and Sri Lanka			
Intervention	Kenya: 1-day Newborn Resuscitation Training course; Sri Lanka: 4-day Essential Newborn Care Training course			
Comparison	No training (usual or standard care)			
Outcomes	Absolute effect		Relative effect (95% CI)	Certainty of the evidence (GRADE)
	Without training	With training		
Proportion of adequate initial resuscitation steps	27 per 100	66 per 100	RR 2.45 (1.75 to 3.42)	⊕⊕⊕○ Moderate
	Difference: 39 more per 100 resuscitation practices (Margin of error: 20 to 65 more)			
Inappropriate and potentially harmful practices per resuscitation	Mean: 0.92	Mean: 0.53	-	⊕⊕⊕○ Moderate
	Mean difference: 0.40 fewer per resuscitation (Margin of error: 0.13 to 0.66 fewer)			
Mortality in all resuscitation episodes	36 per 100	28 per 100	RR 0.77 (0.40 to 1.48)	⊕⊕⊕○ Low
	Difference: 8 fewer deaths per 100 resuscitation episodes (Margin of error: 22 fewer to 17 more)			
Margin of error = Confidence interval (95% CI) RR: Risk ratio GRADE: GRADE Working Group grades of evidence (see above and last page)				

Relevance of the review for low-income countries

→ Findings	▷ Interpretation*
APPLICABILITY	
→ The studies included were conducted in low- and middle-income countries.	▷ The strength and performance of health systems vary widely between countries and it is conceivable that the level and rigour of medical training has an influence on the outcomes of training interventions.
EQUITY	
→ The review did not find information on impacts on equity in the included studies.	▷ It is possible that courses are offered predominantly to staff in large, central healthcare facilities. These facilities tend to be relatively better equipped and often benefit the better-off disproportionately. This could therefore negatively increase inequities for the poor who often live in rural areas or are unable to access such healthcare facilities due to prohibitive fees or limited access to transport.
ECONOMIC CONSIDERATIONS	
→ The review did not find information on costs or cost-effectiveness in the included studies.	▷ The review notes that in-service training tends to be expensive and may be disruptive. ▷ Reduced mortality could lead to higher long-term healthcare costs as a result of higher resource usage. Reduced morbidity is likely to have the opposite effect. The overall balance will probably depend on the baseline situation and the cause of morbidity of the seriously ill.
MONITORING & EVALUATION	
→ The certainty of the evidence on the effectiveness of in-service training in neonatal and child emergency care is moderate. → No studies of long-term effects or of in-service training for emergency care of older children were found.	▷ The impact of in-service training on long-term outcomes should be evaluated. ▷ The effects of in-service training for older children should be evaluated. ▷ The costs and cost-effectiveness of in-service training should be evaluated. ▷ The outcomes associated with in-service training in different settings should be evaluated. ▷ The effectiveness of different standard courses should be comparatively evaluated.

*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

Baskett PJ, Nolan JP, Handley A, et al. European Resuscitation Council. European resuscitation council guidelines for resuscitation 2005. Section 9. Principles of training in resuscitation. *Resuscitation* 2005; 67S1:S181-9.

Jabbour M, Osmond MH, Klassen TP. Life support courses: are they effective? *Annals of Emergency Medicine* 1996; 28:690-8.

Rowe AK, Rowe SY, Holloway KA, Ivanovska V, Muhe L, Lambrechts T. Does shortening the training on Integrated Management of Childhood Illness guidelines reduce its effectiveness? A systematic review. *Health Policy Plan.* 2012 May;27(3):179-93.

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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

Opiyo N, English M. In-service training for health professionals to improve care of seriously ill newborns and children in low-income countries. *Cochrane Database of Systematic Reviews* 2015, Issue 5. Art. No.: CD007071.

The summary should be cited as

Steinmann P. Can in-service health professional training improve resuscitation of seriously ill newborns and children in low-income countries? A SUPPORT Summary of a systematic review. August 2016. 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](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 (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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