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.
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

<table>
<thead>
<tr>
<th>Types of Study designs &amp; Interventions</th>
<th>What the review authors searched for</th>
<th>What the review authors found</th>
</tr>
</thead>
<tbody>
<tr>
<td>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</td>
<td>2 randomised trials: a 1-day Newborn Resuscitation Training course and a 4-day Essential Newborn Care Training course</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Participants</th>
<th>Qualified healthcare professionals</th>
<th>Qualified healthcare professionals: doctors, nurses, and midwives</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Settings</th>
<th>Healthcare delivery sites in low-income countries</th>
<th>Delivery rooms in Kenya and Sri Lanka</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>1. Proportion of adequate initial resuscitation steps 2. Inappropriate and potentially harmful practices per resuscitation 3. Mortality in all resuscitation episodes 4. Preparedness for resuscitation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>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 costs 7. Impact on equity 8. Adverse effects</td>
</tr>
</tbody>
</table>

**Date of most recent search:** February 2015

**Limitations:** This is a well-conducted systematic review with only minor limitations.

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.

### In-service neonatal emergency care training versus standard care for healthcare professionals

<table>
<thead>
<tr>
<th>Outcomes</th>
<th>Without training</th>
<th>With training</th>
<th>Absolute effect</th>
<th>Relative effect</th>
<th>Certainty of the evidence (GRADE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proportion of adequate initial resuscitation steps</td>
<td>27 per 100</td>
<td>66 per 100</td>
<td>39 more per 100 resuscitation practices (Margin of error: 20 to 65 more)</td>
<td>RR 2.45 (1.75 to 3.42)</td>
<td>Moderate</td>
</tr>
<tr>
<td>Inappropriate and potentially harmful practices per resuscitation</td>
<td></td>
<td></td>
<td>Mean: 0.92</td>
<td>Mean: 0.53</td>
<td>Moderate</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Mean difference: 0.40 fewer per resuscitation (Margin of error: 0.13 to 0.66 fewer)</td>
<td></td>
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</tr>
<tr>
<td>Mortality in all resuscitation episodes</td>
<td>36 per 100</td>
<td>28 per 100</td>
<td>8 fewer deaths per 100 resuscitation episodes (Margin of error: 22 fewer to 17 more)</td>
<td>RR 0.77 (0.40 to 1.48)</td>
<td>Low</td>
</tr>
</tbody>
</table>

* 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.
Relevance of the review for low-income countries

<table>
<thead>
<tr>
<th>Findings</th>
<th>Interpretation*</th>
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</thead>
<tbody>
<tr>
<td><strong>APPLICABILITY</strong></td>
<td></td>
</tr>
<tr>
<td>The studies included were conducted in low- and middle-income countries.</td>
<td>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.</td>
</tr>
<tr>
<td><strong>EQUITY</strong></td>
<td></td>
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<tr>
<td>The review did not find information on impacts on equity in the included studies.</td>
<td>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.</td>
</tr>
<tr>
<td><strong>ECONOMIC CONSIDERATIONS</strong></td>
<td></td>
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<tr>
<td>The review did not find information on costs or cost-effectiveness in the included studies.</td>
<td>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.</td>
</tr>
<tr>
<td><strong>MONITORING &amp; EVALUATION</strong></td>
<td></td>
</tr>
<tr>
<td>The certainty of the evidence on the effectiveness of in-service training in neonatal and child emergency care is moderate.</td>
<td>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.</td>
</tr>
</tbody>
</table>

*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


This summary was prepared by
Peter Steinmann, Swiss Tropical and Public Health Institute, Switzerland.

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

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This summary has been peer reviewed by: Newton Opiyo, Juan Lozano, Simon Goudie, and Hanna Bergman.

This review should be cited as

The summary should be cited as

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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