

Impact case study (REF3b)

<p>Institution: Queen's University Belfast</p>
<p>Unit of Assessment: 3B Allied Health Professions, Dentistry, Nursing and Pharmacy (Nursing and Midwifery)</p>
<p>Title of case study: A systematic review of low cost interventions to improve health outcomes and survival of high risk babies</p>
<p>1. Summary of the impact (indicative maximum 100 words)</p> <p>Every year 15 million babies are born premature and prematurity is the world's single biggest cause of newborn death. Babies born preterm cannot shiver and are dependent on interventions to prevent low body temperature (hypothermia). Implementing evidence-based interventions such as provision of thermal care at high coverage (99%) could increase survival of premature babies by 35-55% worldwide. In light of this, a Cochrane systematic review of evidence on low cost/low tech interventions to prevent low body temperature at birth in preterm and low birthweight babies was conducted. This produced strong evidence to support their routine use in practice, with particular support for use in low and middle-income countries. The findings and recommendations of the review are included in global action agendas of bodies such as the World Health Organization and UNICEF and they have been used as the foundation of numerous clinical practice guidelines worldwide.</p>
<p>2. Underpinning research (indicative maximum 500 words)</p> <p>Hypothermia at delivery is a worldwide problem in every climate although paradoxically it is more of a problem in the developing world where climates are generally warmer. Small babies and those born too early are at particular risk and early intervention in the delivery room is vital to improve health outcomes and survival.</p> <p>This Cochrane Systematic Review <i>Interventions to prevent hypothermia at birth in preterm and/or low birthweight infants</i> was originally funded by the R&D office of the Northern Ireland Department of Health and Personal Social Services in 2002 (£21K). It has since been updated every two years via the ongoing core funding of McCall the research fellow on the Neonatal Intensive Care Outcomes Research and Evaluation (NICORE) group, a joint initiative between Northern Ireland's Public Health Agency and Queen's University Belfast (PHA, £54K per annum). The most recent version was published in February 2010. A further substantive update has been submitted for publication in 2013</p> <p>The review focused on interventions to prevent hypothermia applied immediately at birth in comparison to 'routine care' only. Historically, trials in the field have been small and findings hard to generalise. The studies included in the review fall into two major groups: barriers to prevent heat losses and provision of additional external heat sources. The major strengths of the systematic review and meta-analyses lie in its comprehensive search methodology encompassing both published and unpublished studies and the use of strict inclusion criteria. These criteria ensured the review was focused on interventions applied within the first 10 minutes after birth for preterm and/or low birthweight babies, as opposed to bigger, older babies or longer-term thermal management.</p> <p>Despite variations in the interventions applied, definitions of 'routine care', definitions of hypothermia and groups of infants included across all studies, a similar pattern emerged. This showed that babies in the intervention group were significantly warmer (or showed a non-significant trend in that direction) when compared to babies receiving 'routine care'. Results demonstrated that the use of special plastic wraps or bags, plastic caps, heated mattresses and skin-to-skin contact kept the babies warmer than routine preventative action. There was also an indication from the reviewed studies that the effect is greater in the lightest and most immature babies. Babies of <28 weeks or those weighing 1500g - the babies most likely to suffer from the adverse effects of cold - appeared to derive most benefit from interventions in the delivery suite to prevent hypothermia. The review has been updated approximately every two years (1,2,3) to keep abreast of current evidence.</p>

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3. References to the research (indicative maximum of six references)

First version published online: January 24. 2005

Last assessed as up-to-date: February 8. 2010

Substantive update submitted: July 2013

1. McCall EM, Alderdice FA, Halliday HL, Jenkins JG, Vohra S. Interventions to prevent hypothermia at birth in preterm and/or low birthweight babies. Cochrane Database of Systematic Reviews 2005, Issue 1. Art. No.: CD004210. DOI: 10.1002/14651858.CD004210.pub2 .
2. McCall EM, Alderdice FA, Halliday HL, Jenkins JG, Vohra S. Interventions to prevent hypothermia at birth in preterm and/or low birthweight infants. Cochrane Database of Systematic Reviews 2008, Issue 1. Art. No.: CD004210. DOI: 10.1002/14651858.CD004210.pub3. (citations 105)
3. McCall EM, Alderdice F, Halliday HL, Jenkins JG, Vohra S. Interventions to prevent hypothermia at birth in preterm and/or low birthweight infants. Cochrane Database of Systematic Reviews 2010, Issue 3. Art. No.: CD004210. DOI: 10.1002/14651858.CD004210.pub4 (citations 33)

This review is published under the Cochrane Neonatal Review Group (CNRG) which is one of more than 53 collaborative review groups of the Cochrane Collaboration. The Cochrane Collaboration is an international not-for-profit and independent organisation, dedicated to making up-to-date, accurate information about the effects of healthcare readily available worldwide. It produces and disseminates systematic reviews (incorporating meta-analysis) of healthcare interventions and promotes the search for evidence in the form of clinical trials and other studies of interventions. The 2010 impact factor for Cochrane Database of Systematic Reviews (CDSR) is **6.186**, The impact factor for Neonatal Group is **6.05** (top neonatal journal 1.984).

The review was also selected for full publication, commentary and summary in Evidence-Based Child Health: A Cochrane Review Journal:

4. McCall EM, Alderdice FA, Halliday HL et al. Interventions to prevent hypothermia at birth in preterm and/or low birthweight babies. *Evidence Based Child Health: A Cochrane Review Journal* 2006; 1:287-324.
5. Kosko J and EBCH European editorial base. Summary of ' Interventions to prevent hypothermia at birth in preterm and/or low birthweight babies' *Evidence Based Child Health: A Cochrane Review Journal* 2006, 1: 325-327. Commentary by Tsakiri S, Kennedy K. 328-330.

Supporting Grants

Cochrane Fellowship:HPSS R&DNI office 24/06/2002 £21,108

Annual core funding of NICORE Public Health Agency £ 54,000 per annum plus a further £5,000 to conduct the substantive update in 2013.

4. Details of the impact (indicative maximum 750 words)

The Family Planning and Reproductive Health Indicators Database funded by US Agency for International Development (USAID) has thermal care as one of the five best practices for all newborns. Since the highest period of risk for neonatal deaths is within the first 24 hours, the thermal care strategies detailed in our review are key to improving new born health and survival and can be used effectively at home deliveries, as well as at health care facilities. The results in this review showed that hypothermia could be prevented by the use of special plastic wraps or bags, plastic caps, heated mattresses and skin-to-skin contact in the delivery room just after birth. As many of these interventions are **low cost** the review findings has been **strongly**

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recommended for implementation in practice in Low and Middle Income Countries and are directly related to achieving the United nations' Millennium Development Goal #4 to reduce infant and child mortality(1).

The review was the basis of a strong recommendation for the use of low cost thermal interventions for the **essential care of premature babies** (2) and its reach has been demonstrated through its use as the foundation of numerous **clinical practice guidelines worldwide** since its first publication in 2005. Examples are provided below from the UK (3), Europe (4), North America (5), South America (6) and Australia (7). Its widespread use in practice guidelines is reflected in the review being among the top 10 most accessed reviews in the Neonatal Group having been accessed 1,558 times in 2009 through the Cochrane Library alone. Ongoing access data suggested that it also remained in the top 10 in 2010. The significance of our review in this area is reflected not only in being **widely accessed** by a range of users through the Cochrane Library, but also by the **many translations** that are now available through WHO and Minds Medical Information Services. It has also been made available through the National Institute for Health website (NIH) and the World Health Organisation (WHO) library (http://www.nichd.nih.gov/cochrane_data/mccalle_01/mccalle_01.html; <http://apps.who.int/rhl/newborn/reviews/cd004210/en/index.html>).

Reviews and commentaries have also highlighted the importance of the review in terms of reach. As simple cost-effective interventions these have been highlighted by WHO and a recent review article (8) as being able to **impact in both developing countries and crisis settings**. The review has been documented as the evidence source in a RTI International technology summary on infant warmers (9). RTI International are supported by the Bill and Belinda Gates Foundation to provide information on technologies to save lives in low-resource setting. It has also been cited as the evidence source in the **development of a low cost innovation** which is a sleeping bag with a pouch for a hot water bottle that can be used in rural and low resource settings for low birthweight babies (10).

Based on the findings of the review, the Reproductive Health Library on the WHO website also provides a commentary by Wariki WMV and Mori R **recommending implementation of 'community-based hypothermia prevention approaches** involving behaviour change and home visits'. The commentary also recommends that 'an integrated package of preventive and curative newborn care and social networks that target multiple levels of community stakeholders should be developed and utilized'. http://apps.who.int/rhl/newborn/cd004210_Warikiwmv_com/en/index.html.

The review was also cited as evidence in a case review which highlighted the **additional benefits** of plastic wraps in the case of a 24-week infant who was placed in a plastic wrap and experienced a cord bleed soon after birth. The rapidness of the problem indicated an additional advantage of the application of plastic wraps (reported by Smith and Usher, Journal of Neonatal Nursing 2013). The use of these wraps not only offer increased observation of the infant but also offers the opportunity for family contact with the vulnerable infant prior to transfer to NICU.

5. Sources to corroborate the impact (indicative maximum of 10 references)

1. Born Too Soon: The Global Action Report on Preterm Birth 2012. March of dimes, The Partnership for Maternal, Newborn and Child Health, Save the Children and World Health Organisation.
2. Barros FC, Bhutta Z A, Batra, M., Hansen TN, Victoria CG, Rubens C E. Global report on preterm birth and stillbirth (3 of 7) evidence for effectiveness of interventions. BMC

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Pregnancy and Childbirth 2010 10 (Suppl 1) 53.

United Kingdom guidelines

3. Northampton General Hospital Quality and Innovation Scheme

www.northamptongeneral.nhs.uk/Downloads/FOI/.../appendix2.pdf

Europe

4. European Consensus Guidelines on the Management of Neonatal Respiratory Distress Syndrome in Preterm Infants – 2013 Update. *Neonatology* 2013;103353-368
DOI:10.1159/000349928

North America Guidelines

5. Golden Hour of Care for Very-Low-Birth-Weight Infants National Association of Neonatal Nurses USA 2010

<http://www.nann.org/pubs/enews/2010jul.html#nannnannpadvocacy>

South American Guidelines

6. Guide on neonatal resuscitation (2008) Uruguay

http://www.microsofttranslator.com/bv.aspx?ref=SERP&br=ro&mkt=en-GB&dl=en&lp=ES_EN&a=http%3a%2f%2fwww.scielo.edu.uy%2fscielo.php%3fpid%3dS0004-05842008000200012%26script%3dsci_arttextDres.

Australia and New Zealand

7. Management of infants < 27 weeks gestation (2010) Royal Prince Alfred

Hospital NSW Australia

http://www.sswahs.nsw.gov.au/rpa/neonatal/html/newprot/small_baby.html

Reviews

8. Turner TJ, Barnes H, Reid J, Garrubba M. Evidence for perinatal and child health care guideline in crisis settings: can Cochrane Help BMC Public Health 2010 10:170

Technology and Innovation

9. RTI MANDATE technology summary on current technologies technologies in development in low cost infant warmers <http://mnhtech.org/technology/technology-briefs/infant-warmer/>

10. Low cost innovative infant warmer for low birthweight babies

http://www.who.int/pmnch/events/2010/2010_pf_innovation_warmers/en/

Organisations who could corroborate evidence

The Cochrane Neonatal review group who can corroborate evidence in regard to process and access data.