

# information statement

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saving little lives

## **breastfeeding and the risk of sudden unexpected death in infancy**

### **introduction**

Breastfeeding is the optimal source of nutrition for a baby, with many benefits for both mother and baby. Breastfeeding has been shown to reduce the risk of Sudden Unexpected Death in Infancy (SUDI). Red Nose recommends that babies are breastfed. Red Nose also supports parents who bottle feed their babies through the other five evidence-based strategies that they can use to reduce the risk of Sudden Unexpected Deaths in Infancy.

### **summary points**

- Breastfeeding is the optimal form of nutrition for babies<sup>1-3</sup>
- Breastfeeding has multiple benefits for both babies and mothers<sup>1,3-4</sup>
- Breastfeeding has been demonstrated to reduce the risk of Sudden Unexpected Deaths in Infancy<sup>5</sup>
- Breastfeeding a baby more than halves the odds of a baby dying suddenly and unexpectedly<sup>5</sup>
- The protective effect of breastfeeding is stronger for exclusive breastfeeding over a longer period of time<sup>5</sup>
- Babies should be exclusively breastfed for the first 6 months of life<sup>3,6</sup>
- Introduction of solid foods to healthy infants should commence at 6 months of age<sup>6-9</sup>
- Breastfeeding (and/or milk or breast milk substitutes, if used) should continue beyond the first six months and ideally to at least 2 years of age with appropriate intake of solid food<sup>3</sup>
- Parents should be informed of the benefits of breastfeeding and of the risks of not breastfeeding when a change from breastfeeding is being considered<sup>9</sup>
- Parents who feed their baby infant formula or supplementary feeds will reduce the risk of SUDI using the other five evidence based safe sleeping strategies<sup>10</sup>



# the evidence to support breastfeeding

The importance of breastfeeding for mothers and infants is well established<sup>1,3,8,11</sup>. Breastfeeding confers multiple benefits by promoting optimal health, growth and development of babies, and in reducing morbidity and mortality of both babies and their mothers<sup>2-3,8-9,11</sup>.

## benefits for babies

Babies who are breastfed have a lower risk of gastroenteritis, respiratory infections, asthma, necrotising enterocolitis, otitis media, allergic disease, coeliac disease, inflammatory bowel disease, childhood leukaemia and lymphoma<sup>1,3,8-9,12</sup>. Breastfed babies have better feed tolerance and less physiological gastro-oesophageal reflux<sup>8-9</sup>. Breastfeeding has also been associated with other health, social and cognitive outcomes including improved cognitive development<sup>8-9,11,13</sup>, maternal-child attachment<sup>14</sup>, reduced dental malocclusion<sup>8-9</sup> and reductions in childhood and adult obesity, diabetes, and cardiovascular disease (including hypertension and LDL cholesterol)<sup>8-9,11-12</sup>.

Infants who are exclusively breastfed for six months experience less morbidity from gastrointestinal infection than those who are partially breastfed at three or four months, and no deficits have been demonstrated in growth among infants from either developing or developed countries who are exclusively breastfed for six months or longer<sup>3,6,11</sup>.

Premature babies who have received breastmilk have fewer hospital readmissions for illness in the year post Neonatal Intensive Care Unit discharge and improved neurodevelopmental outcomes including cognitive, motor and behaviour scores even when confounding factors such as maternal age, education, marital status, race and infant morbidities are controlled for, compared to babies who are not breastfed<sup>11,15</sup>.

## benefits for mothers

Breastfeeding has well documented short and long-term maternal health benefits<sup>3,8-9,16</sup>. Benefits include a reduced incidence of anaemia and associated complications postpartum<sup>17</sup>; prolonged return of menstruation<sup>18</sup> and a lower incidence of pregnancy<sup>18-19</sup>; reduced Type 2 Diabetes especially for women who experienced gestational diabetes<sup>1,8-9</sup>; and a lower incidence of breast and ovarian cancer<sup>1,8-9,20</sup>.

## benefits to society

Breastfeeding offers economic benefits for the family and for society as a whole. Infant formula feeding has significant cost implications within a family budget, and society in general benefits considerably through the reduced occurrence of common childhood illnesses known to be improved by breastfeeding<sup>9-10</sup>.

The World Health Organisation summarises a consensus of the extensive research stating that breastfeeding is the most cost-effective, health-promoting and disease-preventing activity that new mothers can perform<sup>3,8-9,11</sup>.

## breastfeeding and sudden infant death syndrome

### Changes to the public health recommendations in response to the scientific evidence

Despite universal agreement that breastfeeding reduces infant morbidity and mortality worldwide<sup>8,21</sup> until recently epidemiologic studies had reported inconsistent findings on the protective effects of breastfeeding in relation to SIDS<sup>5,10,22</sup>.

Breastfeeding was included in the first Australian Reducing the Risk of SIDS campaign which was launched in 1991<sup>10,23</sup>. Between 1991 and 1997 however, research into the potential causal and preventative relationships between SIDS and breastfeeding reported findings that were inconclusive once confounding factors were controlled for in study analyses<sup>10,24</sup>.

Between research studies, variation in subject selection criteria, definitions used in different countries for SIDS and SUDI, definitions for breastfeeding exposure, and adjustment for potential confounders such as sleep position, smoking status, head covering and socioeconomic status, have each contributed to the difficulty in rigorously evaluating the evidence to determine if breastfeeding was an independent protective factor for reducing the risk of sudden infant deaths<sup>1,5,10</sup>. The National SIDS Council of Australia was therefore impelled to remove breastfeeding from the national recommendations as a specific protective factor for SIDS in the 1997 revision of the Reduce the Risk messages<sup>10,23</sup>, although the recommendations continued to support breastfeeding as the optimal source of nutrition for babies.

Since 1997, more studies have measured breastfeeding in similar ways. Several meta-analyses (similarly conducted studies which allow pooling of data; regarded as highest level of scientific evidence in which the true effect of a factor can be better determined) have now been conducted and have consistently found a strong association between a baby receiving breast milk and a reduction in the risk of SIDS<sup>1,5,9-10,24-25</sup>.

## the evidence

McVea, Turner & Peppler (2000) in their meta-analysis of breastfeeding and SIDS identified that there was a two-fold increased incidence of SIDS amongst infants who were formula-fed<sup>26</sup>. Alm et al (2002) demonstrated a relationship, although weak, between breastfeeding and SIDS reduction in their case control study<sup>27</sup>.

The Agency for Healthcare Research and Quality report<sup>1</sup> reaffirmed health risks associated with formula-feeding and early breastfeeding cessation and included a meta-analysis examining SIDS risk which addressed the limitations identified in previous studies and systematic reviews. Ip and colleagues (2007) found statistically significant reductions in risk for SIDS for 'ever breastfed' infants<sup>1</sup>. This analysis used only studies (n=6) which provided a clear definition of SIDS [autopsy confirmed SIDS among infants 1 week to 1 year of age], clear reporting of breastfeeding data, and outcomes adjusted for important confounders or risk factors (e.g. sleep position, maternal smoking, socioeconomic status). Results demonstrated that 'ever' breastfeeding was associated with a reduction in the crude and adjusted risk of SIDS [crude OR 0.41; 95%CI [0.28, 0.58], and adjusted OR 0.64; 95%CI [0.51, 0.81], respectively]. The authors concluded that the risk of SIDS is 56% higher among infants who are never breastfed<sup>1,20</sup> compared to 'ever breastfed' infants. However results for exclusive breastfeeding or specific durations were not reported.

In a German case-control study, Vennemann and colleagues (2009) examined risk factors for SIDS and the relationship with breastfeeding. Exclusive breastfeeding at 1 month of age halved the risk while partial breastfeeding at the age of 1 month also reduced SIDS risk; after adjustment the reduction in risk was not significant. Breastfeeding survival curves showed both partial breastfeeding and exclusive breastfeeding were associated with a reduced risk of SIDS. These authors concluded that breastfeeding reduces the risk of SIDS by 50% at all ages throughout infancy<sup>25</sup>.

Most recently, Hauck and colleagues (2011) conducted a meta-analysis to address this relationship. In this review, 18 case-controlled studies were included in the analysis of the relationship between 'any' breastfeeding and SIDS risk reduction. Studies were grouped according to the exclusivity and duration of breastfeeding. For babies who received any amount of breast milk for any duration the univariate summary odds ratio (SOR) was 0.40 [95% CI: 0.35–0.44] and the multivariable SOR was 0.55 [95% CI: 0.44–0.69]. The univariable SOR for exclusive breastfeeding of any duration was 0.27 [95% CI: 0.24–0.31]. Hauck and colleagues (2011) concluded that any duration of breastfeeding is protective against SIDS, while the protective effect is stronger for exclusive breastfeeding. The authors argued, that while causation cannot be proven based on evidence from case-control studies [which would be unethical and unrealistic to conduct], that factors that have been proposed to support causality in observational studies were found in this meta-analysis: consistent findings, strong association, dose-response effect, causal factor preceding outcome, and biological plausibility<sup>5</sup>.

Any duration of breastfeeding is protective against sudden infant death, while the protective effect is stronger for exclusive breastfeeding over a longer period of time<sup>1,5,24</sup>.

## potential mechanisms

The specific mechanism(s) by which breastfeeding is protective is not fully understood but is believed to be multifactorial and related to breast milk components, maternal behaviour and the mechanism of breastfeeding<sup>10,28-29</sup>.

### Potential mechanisms which have biological plausibility include:

- **Milk:** Breast milk contains substances which reduce the risk of infection and improve central nervous system development during the 0-6 month period when SIDS risk is greatest. Breastmilk contains immunoglobulins to fight infection; babies whose deaths were attributed to SIDS were 45-80% more likely to have had an infection in the 2 weeks preceding death<sup>9,24</sup>. Mothers effectively update their baby's immunity with every breastfeed through the enteromammary pathway. Breastmilk also contains substances that contribute to myelin development; autopsies of some babies showed deficient myelination<sup>28,30,34</sup>. Breastfeeding is reported to modify infant gut microbiota development<sup>31</sup>. Breast milk contains lysozymes, lactoferrin and oligosaccharides, which support the growth of beneficial bacteria which have been shown to be protective against gut barrier dysfunction, metabolic endotoxaemia, insulin resistance and obesity<sup>31,2</sup>.
- **Mother:** Breastfeeding mothers are more aware and responsive to a baby's behavioural cues which in turn impact baby's sleep and arousal patterns in potentially protective ways, compared to mothers of formula fed babies<sup>35-7</sup>. The hormones, prolactin and oxytocin, produced during breastfeeding also promote adaptation to the maternal role<sup>28,33,38-9</sup>.
- **Method:** Breastfeeding also promotes better oral development and alignment that assists in protecting the airway patency<sup>12</sup>, and babies who are breastfed are more likely to be placed on their back to sleep<sup>28,31</sup>. The mechanics of breastfeeding improves coordination of breathing and swallowing, and increases arousal during active sleep<sup>41</sup>. Increased duration and frequency of breastfeeding is associated with increased arousal compared

to formula fed infants<sup>40</sup>. It has also been suggested that as breastfeeding is associated with increased quiet sleep<sup>42-3</sup> compared with formula fed infants; this may offer protection from any trigger to a laryngeal-chemoreflex [LCR]<sup>44</sup>. The LCR is activated by direct fluid stimulation of the laryngeal mucosa and leads to a complex series of responses including apnoea, bradycardia, swallowing, startle, hypertension and redistribution of blood flow. This reflex is activated in active sleep and a prolongation of LCR-induced apnoea may be associated with infection (increased respiratory secretions) and common drugs used for upper respiratory tract infections which reduce spontaneous arousal (e.g. antihistamines such as phenothiazines). Therefore both an increase in Quiet sleep<sup>42-3</sup> and reduction in infection afforded by breastfeeding would be protective from the potentially lethal LCR reflex<sup>44</sup>.

## Red Nose breastfeeding recommendation: breastfeed baby

Following a review of evidence supporting the Australian Safe Sleeping campaign<sup>45</sup> and the publication of key systematic reviews and case-control studies<sup>5,25</sup> the Red Nose National Scientific Advisory Group supported the decision that a critical threshold had been reached within the evidence that breastfeeding is specific protective factor for SUDI. A sixth recommendation, Breastfeed baby if you can, was included in the May 2012 launch of the Red Nose Safe Sleeping national public health campaign<sup>10</sup> and further revised to Breastfeed baby in 2013, following feedback from key stakeholders.

Breastfeeding outcomes may be impacted by other common infant care practices, including dummy use and sharing a bed with a baby<sup>30</sup>. These infant care practices and their relationship with breastfeeding and risk for sudden unexpected death in infancy are addressed in Red Nose Information statements entitled 'Using a Dummy or Pacifier'<sup>46</sup> and 'Sharing a Sleep Surface with a Baby'<sup>47</sup> located at [rednose.com.au](http://rednose.com.au).

## breastfeeding recommendations

Red Nose and Australia's National Health and Medical Research Council<sup>8-9</sup> supports the World Health Organisation's global public health recommendation that babies should be exclusively breastfed for the first 6 months of life to achieve optimal growth, development and health<sup>2,7-9</sup>. Introduction of solid foods to healthy infants should commence at around 6 months of age, while breast feeding is continued ideally to at least 2 years of age or beyond, with an appropriate intake of solid food<sup>8-9</sup>.

Parents should be informed of the benefits of breastfeeding and of the risks of not breastfeeding when a change from breastfeeding is being considered.

All pregnant women should be encouraged and supported to breastfeed and their right to be supported in their decision to breastfeed should be protected<sup>8</sup>. Support should extend from the antenatal period to the postnatal period and beyond into the home, community and workplace.



Red Nose supports the Australian Government commitment to protecting, promoting and supporting exclusive breastfeeding to around 6 months and continued breastfeeding thereafter<sup>8-9,48</sup>.

### Further information:

- Red Nose - [rednose.com.au](http://rednose.com.au) or call 1300 998 698.
- The Australian Breastfeeding Association - [www.breastfeeding.asn.au](http://www.breastfeeding.asn.au)
- The Breastfeeding page on the Healthdirect Australia website, an Australian government initiative funded by the Department of Health and Ageing - [www.healthdirect.gov.au/article/breastfeeding](http://www.healthdirect.gov.au/article/breastfeeding)

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## to reduce the risks of SIDS and fatal sleep accidents

1. Sleep **baby on the back from birth**, not on the tummy or side
2. Sleep baby with **head and face uncovered**
3. Keep baby **smoke free** before birth and after
4. Provide a **safe sleeping environment** night and day
5. Sleep baby in their **own safe sleeping place** in the **same room as an adult care-giver** for the first six to twelve months
6. **Breastfeed** baby

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