

information statement

**red
nose**
saving little lives

why back to sleep is the safest position for your baby

Red Nose recommends:
Always sleep baby on back

Sudden Unexpected Death in Infancy (SUDI) refers to all cases of sudden and unexpected death in infancy and includes deaths from Sudden Infant Death Syndrome (SIDS) and fatal sleeping accidents. Safe sleeping recommendations target known risk factors associated with SUDI. Where studies specifically define the population as SIDS, this term will be used to describe the study findings.

key points

- Always place baby on the back to sleep and not on the tummy or side. There is an increased risk of sudden unexpected death for babies when they sleep on their tummies and there is a danger of rolling to this position if they are slept on their sides.
- It is important that babies are always placed on the back to sleep. Babies who are usually slept on the back and are placed on the tummy or side for the first time are at an increased risk of sudden unexpected death.
- Once a baby has been observed to repeatedly roll from back to front and back again on their own for several weeks, they can be left to find their preferred sleep position [this is usually around 5-6 months].
- At the critical time of starting to roll it is very important that the sleep environment remains safe
- Babies that can roll should no longer be wrapped
- Babies born preterm should be slept on the back as soon as they are medically stable [out of oxygen].



success of back to sleep campaigns in reducing SUDI

In Australia, between 1989 and 2014, 4,808 babies died suddenly and unexpectedly [<https://rednose.com.au/page/facts-and-figures>]. Baby deaths attributed to SUDI have fallen by 80% and it is estimated that 8,959 babies' lives have been saved as a result of Red Nose's baby safe sleeping campaigns. Evidence suggests that the marked reduction in incidence of babies dying suddenly and unexpectedly can be directly associated with Red Nose's Australian public health campaigns which promoted safe sleeping practices, particularly advice given to parents to place their baby on their back to sleep¹. These findings are consistent with international studies that have reported marked declines in SIDS in countries which have introduced similar public health campaigns to reduce known risk factors.²⁻⁵ In 2014 there were 54 SIDS deaths among the 113 SUDI deaths reported in Australia [<https://rednose.com.au/page/facts-and-figures>].

SIDS is a diagnosis of exclusion and there has been considerable research into the underlying mechanisms which may underpin the known risk factors for SIDS. SIDS has long been believed to be multifactorial in origin⁶ and a triple risk hypothesis has been proposed to model the current knowledge⁷ (see Triple Risk Model Information Statement for more details). This model proposes that SIDS may occur when a vulnerable baby, such as one born preterm or exposed to maternal smoking, at a critical but unstable developmental period in homeostatic control, is exposed to an exogenous stressor such as being placed on the tummy [prone] to sleep. The model further proposes that babies are more likely to die if all three factors occur simultaneously, and that the vulnerability lies dormant until they enter the critical developmental period and are exposed to an exogenous stressor. SIDS occurs during sleep and the peak incidence is between 2-4 months of age, when sleep patterns are rapidly maturing. The final pathway to SIDS is widely believed to involve immature cardiorespiratory control, in conjunction with a failure of arousal from sleep.²

The evidence for back sleeping being protective against SUDI

There is now conclusive evidence from many countries that sleeping babies prone significantly increases the risk of SUDI [In the late 1980s a peak in SIDS rates prompted several large scale case-controlled studies in a number of countries.⁸ These world-wide epidemiological studies consistently identified prone sleeping as the major risk factor for SIDS.⁹⁻¹⁶ In the prone compared to non-prone sleeping positions, the relative risk or odds ratio [OR] associated with SIDS ranged from 3.5 to 9.3.¹⁷ In Australia, the recommendation that babies should not be slept prone was made in 1991.¹⁸ In 1997 a second expert group recommended that babies be placed on the back to sleep and stressed that propping of babies on their sides should be avoided. These recommendations have been supported in most developed countries and implemented through targeted public health campaigns by national SIDS organisations such as Red Nose in Australia and New Zealand, The Lullaby Trust in the UK, First Candle in the USA.

Since the recommendation of putting babies on their back to sleep there has been, a rapid decline in SIDS mortality which has provided overwhelming evidence of the strong association between prone sleeping and SUDI.^{1,11,19-23}

Studies have identified that the side sleeping position is unstable and many babies are found prone after being placed to sleep on their side. The risks of side and prone sleep positions were similar in magnitude [OR: 2.0 and 2.6 respectively], largely due to infants being placed to sleep on their sides, but found prone²⁴ and the population-attributable risk for the side sleeping position is higher than the risk for the prone position due to a larger number of infants being placed on their side rather than prone to sleep.²⁵⁻²⁶

Babies who are unaccustomed to sleeping prone are particularly at risk in the prone sleeping position [adjusted OR: 8.7-45.4]²⁴⁻²⁷ Physiological studies have identified that babies inexperienced in prone sleeping have decreased ability to escape from asphyxiating sleep environments [environments which may block their airway or reduce the ability to breathe] when placed prone.²⁸

concerns about back sleeping

Risk of aspiration or choking

Some parents and health professionals have expressed concern about back sleeping and the risk of a baby choking in this position. However, careful study of the baby airway has shown that healthy babies placed to sleep on the back are less likely to choke on vomit than prone or tummy sleeping babies.²⁹ In the supine position the upper respiratory airway is above the oesophagus [digestive tract]. Therefore, regurgitated milk ascending the oesophagus is readily swallowed again such that aspiration into the respiratory tract is avoided. When the baby is placed on the tummy, the oesophagus sits above the baby's upper airway. If the baby regurgitates or vomits milk, it is relatively easy for the milk or fluid to be inhaled into the baby's upper airway leading to micro-aspiration and stimulating receptors leading to cessation of breathing [apnoea].²⁹ Several studies have now shown that the risk of aspiration is not increased by supine sleeping.³⁰⁻³²

There is often particular concern regarding aspiration in babies with gastro-oesophageal reflux. The AAP supports the recommendations of the North American Society for Pediatric Gastroenterology and Nutrition which

recommends that babies with gastro-oesophageal reflux be placed in the supine position to sleep. In babies with particular rare medical conditions for whom the risk of death from gastro-oesophageal reflux is greater than the risk of SIDS medical practitioners may provide specific advice on sleeping position.³³ Elevating the head of the cot while the baby is sleeping supine is not effective in reducing gastro-oesophageal reflux.³⁴⁻³⁵ In addition, elevating the cot can result in the baby sliding underneath the bedding and is not recommended.³⁶ Pillows or positional devices that position the baby with an elevation and are often marketed for baby reflux, are not recommended due to the risks of suffocation and lack of evidence supporting efficacy.

Positional plagiocephaly

An increase in skull deformity (deformational plagiocephaly and craniosynostosis) requiring treatment has been reported since the Back to Sleep campaign.³⁷ This is reported to be related to the concern that parents had in placing their baby on their tummy at any time, resulting in babies spending long periods of time on their back. In order to reduce the likelihood of skull shape problems, parents are encouraged to place babies prone for 'tummy time' from birth when babies are awake and under direct supervision. However, another earlier study demonstrated that there was no significant relationship between supine sleeping and the development of plagiocephaly; the baby's positional preference and baby care practices used by parents including the frequency of supervised tummy time, played a greater role.³⁸ [For further information about positional plagiocephaly and tips for tummy time see Information Statement Baby's Head Shape]

My baby sleeps longer and more deeply on their tummy

Many parents and grandparents report that the baby appears to sleep longer when on the tummy. This is thought to be due to reduced arousal responses.^{29,39-44} However, arousal and swallowing mechanisms are needed to protect baby's airway and work best when a baby is placed to sleep on the back.

the back sleeping position is best for newborn babies

Some health professionals and parents continue to place newborn babies on the side immediately after birth in the belief that they need to clear their airway of amniotic fluid and are less likely to aspirate when in the side position. There is no evidence that fluid is more readily cleared in the side position.³⁶ Babies should be placed on the back as soon as they are ready to be placed in the cot or bassinet. It is important that parents observe health professionals placing babies in the supine position as they are more likely to model this practice when they go home.⁴⁵⁻⁴⁸



the back sleeping position is best for preterm babies

Preterm babies are at increased risk for SUDI, including SIDS, compared to full term babies.⁴⁹⁻⁵¹ Studies in the UK and New Zealand have reported that at least four times as many SIDS infants were born

preterm compared to control infants who did not die [20% compared to 5%] and these proportional differences have remained unchanged since the introduction of public campaigns for reducing the risks.⁵²⁻⁵³ The association between the prone sleeping position and SIDS among low birth weight babies is equal to or stronger than that in babies born at term.²⁷ It has been suggested that if the mothers of preterm or low birth weight infants followed the safe sleeping recommendations and all placed their infants supine in a cot by the parental bed, this would potentially reduce the overall SIDS rate by a further 20%⁵².

Preterm babies are frequently placed prone as this position is thought to improve respiratory function and reduce energy requirements. It is common practice for babies requiring intensive care to be placed in the prone position during their acute illness. In one survey, approximately 95% of neonatal intensive care unit (NICU) nurses identified a non-supine position as the best sleep position for preterm babies. This study reported that nurses believed prone sleeping was beneficial for respiratory associated complications, such as upper airway anomalies and respiratory distress as well as non-respiratory complications, such as reflux and inconsolability.⁵⁴ However, it is likely that these improvements are simply due to babies spending more time in quiet sleep and less time in active sleep, a state associated with increased apnoeas and increased arousability.⁵⁵⁻⁵⁶ The current recommendation is that preterm

babies are placed supine as soon as clinically stable, i.e. out of oxygen, and as early as possible prior to discharge from hospital so that their parents are used to them sleeping in this position and are supported with settling their babies in the back sleeping position.

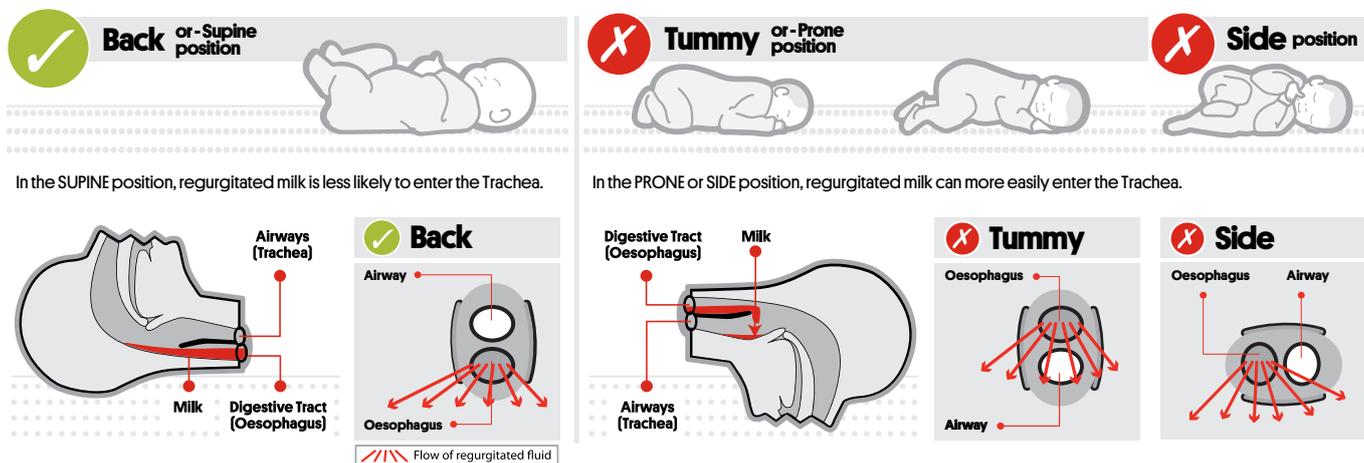
likely protective mechanism of back sleeping

Body position during sleep significantly modifies both the spontaneous and induced arousals in preterm and term babies, with babies being significantly less arousable when slept prone.³⁹⁻⁴⁴ Indeed, it is this perceived deeper sleep that reinforces parents' tendencies to prefer sleeping the baby in the prone position. Some studies have identified that babies sleep longer in the prone position and have increased quiet sleep, which is a state of reduced arousability.⁴² The prone sleeping position is associated with higher central and peripheral body temperatures when compared to the supine position.⁵⁷⁻⁵⁸ Cardiovascular control is also significantly altered in the prone sleeping position in both term and preterm babies. Compared to the supine sleeping position, heart rate in the prone position is increased during sleep in both term and preterm babies.^{40-42,59-63} Studies investigating heart rate variability, a measure of autonomic control of heart rate, have found that at both 1 and 3 months postnatal age, overall heart rate variability is decreased in the prone position during sleep in both term and preterm babies,^{41,61-62,64-67} suggestive of poor autonomic control in the prone sleeping position. It has been suggested that a reduction in parasympathetic control caused by an increase in peripheral skin temperature in the prone position may underlie the change in heart rate variability.⁶⁵ Several studies have found that the sympathetic effects on blood pressure and vasomotor tone are decreased in the prone sleeping position.^{57,59,68-69} Lower resting blood pressure and altered blood pressure responses^{57,68-69} and decreased vasoconstrictor ability⁵⁹ to head-up tilting have been identified in term babies when sleeping in the prone position compared with the supine position. The prone position has also been associated with lower cerebral oxygenation in healthy term babies, a finding which may underpin the reduced arousal responses in this position.⁷⁰ Studies have also shown that swallowing and arousal, which are essential mechanisms of airway protection, are also impaired in the prone position during active sleep,²⁹ and were improved in the supine position. When challenged with simulated reflux or postnasal secretions breathing rate was significantly reduced when infants slept prone.

The supine or back sleeping position is the safest position for babies to sleep for the first 12 months of life.

back is safest

There is overwhelming evidence that the "back" or "supine" position is safest for babies



The Red Nose Safe Sleeping program is based on scientific evidence and was developed by Australian SUDI researchers, paediatricians, pathologists, and child health experts with input from overseas experts in the field. The 80% drop in SIDS deaths and the more than 9,000 lives that have been saved is testament to the effectiveness of the program.

references

1. Tursan d'Espaignet, E., Bulsara, M., Wolfenden, L., Byard, R.W. & Stanley, F.J. (2008) Trends in Sudden Infant Death Syndrome in Australia from 1980 to 2002. *Forensic Sci Med Pathol*;4:83-90.
2. Moon, R.Y., Horne, R.S. & Hauck, F.R. (2007). Sudden Infant Death Syndrome. *The Lancet*, 370:1578-87.
3. Gilbert, R., Salanti, G., Harden, M. & See, S. (2005). Infant sleeping position and the Sudden Infant Death Syndrome: Systematic review of observational studies and historical review of recommendations from 1940 to 2002. *Int J Epidemiol*;34:874-87.
4. Byard, R.W. & Krous, H.F. (2003). Sudden Infant Death Syndrome: Overview and update. *Pediatr Dev Pathol*;6:112-27.
5. Mitchell, E.A. (2007). Recommendations for Sudden Infant Death Syndrome prevention: A discussion document. *Arch Dis Child*;92:155-9.
6. Read, D.J.C., Jeffery, H.E. & Rahilly, P. (1982). Sudden Infant Death Syndrome and suspected "near miss": An overview for clinicians. *Med J Aust*;1:82-5.
7. Filiano, J.J. & Kinney, H. (1994). A perspective on neuropathologic findings in victims of the Sudden Infant Death Syndrome: The triple risk model. *Biol Neonate*;65:194-7.
8. Carpenter, R.G., Irgens, L.M., Blair, P.S., England, P.D., Fleming, P., Huber J., ... & Schreuder, P. (2004). Sudden unexplained infant death in 20 regions in Europe: Case control study. *The Lancet*, 363:185-91.
9. Mitchell, E.A., Scragg, R., Stewart, A.W., Becroft, D.M., Taylor, B.J., Ford, R.P., ... & Roberts, A. P. (1991). Results from the first year of the New Zealand cot death study. *N Z Med J*;104:71-6.
10. Ponsonby, A.L., Dwyer, T., Gibbons, L.E., Cochrane, J.A. & Wang, Y.G. (1993). Factors potentiating the risk of Sudden Infant Death Syndrome associated with the prone position. *N Engl J Med*;329:377-82.
11. Platt, M.J., Pharoah, P.O. (1996). Child health statistical review, 1996. *Arch Dis Child*;75:527-33.
12. Dwyer, T., Ponsonby, A-L., Newman, N.M. & Gibbons, L.E. (1991). Prospective cohort study of prone sleeping position and Sudden Infant Death Syndrome. *The Lancet*, 337:1244-7.
13. Irgens, L.M., Markestad, T., Baste, V., Schreuder, P., Skjaerven, R. & Oyen, N. (1995). Sleeping position and Sudden Infant Death Syndrome in Norway 1967-91. *Arch Dis Child*;72:478-82.
14. Taylor, J.A., Krieger, J.W., Reay, D.T., Davis, R.L., Harruff, R. & Cheney, L.K. (1996). Prone sleep position and the Sudden Infant Death Syndrome in King County, Washington: A case-control study. *J Pediatr*;128:626-30.
15. Fleming, P.J., Gilbert, R., Azaz, Y., Berry, P.J., Rudd, P.T., Stewart, A.,... & Hall, E. (1990). Interaction between bedding and sleeping position in the Sudden Infant Death Syndrome: A population based case-control study. *BMJ*;301:85-9.
16. de Jonge, G.A., Engelberts, A.C., Koomen-Liefting, A.J. & Kostense, P.J. (1989). Cot death and prone sleeping position in The Netherlands. *BMJ*;298:722.
17. Guntheroth, W.G. & Spiers, P.S. (1992). Sleeping prone and the risk of Sudden Infant Death Syndrome. *JAMA*, 267: 2359-62.
18. Stanley, F.J. & Byard, R.W. (1991). The association between the prone sleeping position and Sudden Infant Death Syndrome (SIDS): An editorial overview. *J Paediatr Child Health*, 27:325-8.
19. Willinger, M., Hoffman, H.J., Wu, K.T., Hou, J.R., Kessler, R.C, Ward, S.L.,... & Corwin, M. J. (1998). Factors associated with the transition to nonprone sleep positions of infants in the United States: The National Infant Sleep Position Study. *JAMA*, 280: 329-35.
20. Dwyer, T., Ponsonby, A.L., Blizzard, L., Newman, N.M. & Cochrane, J.A. (1995). The contribution of changes in the prevalence of prone sleeping position to the decline in Sudden Infant Death Syndrome in Tasmania. *JAMA*; 273:783-9.
21. Australian Bureau of Statistics (ABS). (2000). *SIDS in Australia 1981-2000: A statistical overview*. Canberra: ABS.
22. Blair, P.S., Sidebotham, P., Berry, P.J., Evans, M. & Fleming, P.J. (2006). Major epidemiological changes in Sudden Infant Death Syndrome: A 20-year population-based study in the UK. *The Lancet*, 367:314-9.
23. Trachtenberg, F.L., Haas, E.A., Kinney, H.C., Stanley, C. & Krous, H.F. (2012). Risk factor changes for Sudden Infant Death Syndrome after initiation of Back-to-Sleep campaign. *Pediatrics*, 129:630-8.
24. Li, D.K., Petitti, D.B., Willinger, M., McMahon, R., Odouli, R., Vu, H.,... & Hoffman, H. J. (2003). Infant sleeping position and the risk of Sudden Infant Death Syndrome in California, 1997-2000. *Am J Epidemiol*;157:446-55.
25. Fleming, P.J., Blair, P.S., Bacon, C., Bensley, D., Smith, I., Taylor, E.,... & Tripp, J. (1996). Environment of infants during sleep and risk of the Sudden Infant Death Syndrome: Results of 1993-5 case-control study for confidential inquiry into stillbirths and deaths in infancy. *BMJ*;313:191-5.
26. Mitchell, E.A., Tuohy, P.G., Brunt, J.M., Thompson, J.M., Clements, M.S., Stewart, A.W., ... & Taylor, B. J. (1997). Risk factors for sudden infant death syndrome following the prevention campaign in New Zealand: a prospective study. *Pediatrics*, 100:835-40.
27. Oyen, N., Markestad, T., Skaerven, R., Irgens, L.M., Helweg-Larsen, K., Alm, B., Norvenius, G., & Wennergren, G. (1997). Combined effects of sleeping position and prenatal risk factors in sudden infant death syndrome: the Nordic Epidemiological SIDS Study. *Pediatrics*, 100:613-21.

28. Paluszynska, D.A., Harris, K.A. & Thach, B.T. (2004). Influence of sleep position experience on ability of prone-sleeping infants to escape from asphyxiating microenvironments by changing head position. *Pediatrics*, 114:1634-9.
29. Jeffery, H.E., Megevand A. & Page, H. (1999). Why the prone position is a risk factor for sudden infant death syndrome. *Pediatrics*, 104:263-9.
30. Byard, R.W. & Beal, S.M. (2000). Gastric aspiration and sleeping position in infancy and early childhood. *J Paediatr Child Health*, 36:403-5.
31. Malloy, M.H. (2002). Trends in postneonatal aspiration deaths and reclassification of Sudden Infant Death Syndrome: Impact of the "Back to Sleep" program. *Pediatrics*, 109: 661-5.
32. Tablizo, M.A., Jacinto, P., Parsley, D., Chen, M.L., Ramanathan, R. & Keens, T.G. (2007). Supine sleeping position does not cause clinical aspiration in neonates in hospital newborn nurseries. *Arch Pediatr Adolesc Med*; 161:507-10.
33. Vandeplass, Y., Rudolph, C.D., Di Lorenzo, C., Hassall, E., Liptak, G., Mazur, L., ... & Wenzl, T. G. (2009). Pediatric gastroesophageal reflux clinical practice guidelines: Joint recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN). *J Pediatr Gastroenterol Nutr*;49:498-547.
34. Meyers, W.F. & Herbst, J.J. (1982). Effectiveness of positioning therapy for gastroesophageal reflux. *Pediatrics*, 69:768-72.
35. Tobin, J.M., McCloud, P. & Cameron, D.J. (1997). Posture and gastro-oesophageal reflux: A case for left lateral positioning. *Arch Dis Child*;76: 254-8.
36. American Academy of Pediatrics. (2011). SIDS and other sleep-related infant deaths: Expansion of Recommendations for a safe infant sleeping environment. *Pediatrics*, 128:1030-9.
37. Branch, L.G., Kesty, K., Krebs, E., Wright, L., Leger, S. & David, L.R. (2015). Deformational plagiocephaly and craniosynostosis: Trends in diagnosis and treatment after the "back to sleep" campaign. *The Journal of Craniofacial Surgery*, 26:147-50.
38. van Vlimmeren, L.A., van der Graff, Y., Boere-Boonekamp, M.M., L'Hoir, M.P., Helders, P.J.M. & Engelbert, R.H.H. (2007) Risk factors for deformational plagiocephaly at birth and at 7 weeks of age: A prospective cohort study. *Pediatrics*, 119(2): e408-e418.
39. Franco, P., Pardou, A., Hassid, S., Lurquin, P., Groswasser, J. & Kahn, A. (1998). Auditory arousal thresholds are higher when infants sleep in the prone position. *J Pediatr*; 132:240-3.
40. Horne, R.S., Ferens, D., Watts, A.M., Vitkovic, J., Lacey, B., Andrew, S.,...& Adamson, T. M. (2001). The prone sleeping position impairs arousability in term infants. *J Pediatr*;138:811-6.
41. Galland, B.C., Reeves, G., Taylor, B.J. & Bolton, D.P. (1998). Sleep position, autonomic function, and arousal. *Arch Dis Child Fetal Neonatal Ed*;78: F189-94.
42. Kahn, A., Groswasser, J., Sottiaux, M., Rebuffat, E., Franco, P. & Dramaix, M. (1993). Prone or supine body position and sleep characteristics in infants. *Pediatrics*, 91:1112-5.
43. Groswasser, J., Simon, T., Scaillet, S., Franco, P. & Kahn, A. (2001). Reduced arousals following obstructive apneas in infants sleeping prone. *Pediatr Res*;49:402-6.
44. Richardson, H.L., Walker, A.M. & Horne, R.S. (2008). Sleep position alters arousal processes maximally at the high-risk age for Sudden Infant Death Syndrome. *J Sleep Res*;17:450-7.
45. Von Kohorn, I., Corwin, M.J., Rybin, D.V., Heeren, T.C., Lister, G. & Colson, E.R. (2010). Influence of prior advice and beliefs of mothers on infant sleep position. *Arch Pediatr Adolesc Med*;164:363-9.
46. Moon, R.Y., Oden, R.P., Joyner, B.L. & Ajao, T.I. (2010). Qualitative analysis of beliefs and perceptions about Sudden Infant Death Syndrome in African-American mothers: Implications for safe sleep recommendations. *J Pediatr*;157:92-7 e2.
47. Willinger, M., Ko, C.W., Hoffman, H.J., Kessler, R.C. & Corwin, M.J. (2000). Factors associated with caregivers' choice of infant sleep position, 1994-1998: The National Infant Sleep Position Study. *JAMA*;283:2135-42.
48. Brenner, R.A., Simons-Morton, B.G., Bhaskar, B., Mehta, N., Melnick, V.L., Revenis, M., ... & Clemens, J. D. (1998). Prevalence and predictors of the prone sleep position among inner-city infants. *JAMA*;280:341-6.
49. Malloy, M.H. & Hoffman, H.J. (1995). Prematurity, Sudden Infant Death Syndrome, and age of death. *Pediatrics*, 96:464-71.
50. Sowter, B., Doyle, L.W., Morley, C.J., Altmann, A. & Halliday, J. (1999). Is Sudden Infant Death Syndrome still more common in very low birthweight infants in the 1990s? *Med J Aust*;171:411-3.
51. Malloy, M.H. (2013). Prematurity and Sudden Infant Death Syndrome: United States 2005-2007. *Journal of Perinatology*, 33:470-5.
52. Blair, P.S., Platt, M.W., Smith, I.J. & Fleming, P.J. (2006). Sudden Infant Death Syndrome and sleeping position in pre-term and low birth weight infants: An opportunity for targeted intervention. *Archives of Diseases in Childhood*, 91:101-6.
53. Thompson, J.M. & Mitchell, E.A. (2006). Are the risk factors for SIDS different for preterm and term infants? *Archives of Diseases in Childhood*, 91:107-11.
54. Aris, C., Stevens, T.P., Lemura, C., Lipke, B., McMullen, S., Cote-Arsenault, D., & Consenstein, L. (2006). NICU nurses' knowledge and discharge teaching related to infant sleep position and risk of SIDS. *Adv Neonatal Care*, 6:281-94.

55. Elder, D.E., Campbell, A.J. & Doherty, D.A. (2005). Prone or supine for infants with chronic lung disease at neonatal discharge? *J Paediatr Child Health*, 41:180-5.
56. Elder, D.E., Campbell, A.J. & Galletly, D. (2011). Effect of position on oxygen saturation and requirement in convalescent preterm infants. *Acta Paediatr*;100:661-5.
57. Chong, A., Murphy, N. & Matthews, T. (2000). Effect of prone sleeping on circulatory control in infants. *Arch Dis Child*;82:253-6.
58. Ammari, A., Schulze, K.F., Ohira-Kist, K., Kashyap, S., Fifer, W.P., Myers, M.M. & Sahni, R. (2009). Effects of body position on thermal, cardiorespiratory and metabolic activity in low birth weight infants. *Early Hum Dev*;85:497-501.
59. Galland, B.C., Taylor, B.J., Bolton, D.P. & Sayers, R.M. (2000). Vasoconstriction following spontaneous sighs and head-up tilts in infants sleeping prone and supine. *Early Hum Dev*;58:119-32.
60. Skadberg, B.T. & Markestad, T. (1997). Behaviour and physiological responses during prone and supine sleep in early infancy. *Arch Dis Child*;76:320-4.
61. Sahni, R., Schulze, K.F., Kashyap, S., Ohira-Kist, K., Fifer, W.P. & Myers, M.M. (1999). Postural differences in cardiac dynamics during quiet and active sleep in low birthweight infants. *Acta Paediatr*;88:1396-401.
62. Ariagno, R.L., Mirmiran, M., Adams, M.M., Saporito, A.G., Dubin, A.M. & Baldwin, R.B. (2003). Effect of position on sleep, heart rate variability, and QT interval in preterm infants at 1 and 3 months' corrected age. *Pediatrics*, 111:622-5.
63. Yiallourou, S.R., Walker, A.M. & Horne, R.S. (2008). Effects of sleeping position on development of infant cardiovascular control. *Arch Dis Child*;93:868-72.
64. Franco, P., Groswasser, J., Sottiaux, M., Broadfield, E. & Kahn, A. (1996). Decreased cardiac responses to auditory stimulation during prone sleep. *Pediatrics*, 97:174-8.
65. Galland, B.C., Hayman, R.M., Taylor, B.J., Bolton, D.P., Sayers, R.M. & Williams, S.M. (2000). Factors affecting heart rate variability and heart rate responses to tilting in infants aged 1 and 3 months. *Pediatr Res*;48:360-8.
66. Gabai, N., Cohen, A., Mahagney, A., Bader, D. & Tirosh, E. (2006). Arterial blood flow and autonomic function in full-term infants. *Clin Physiol Funct Imaging*;26:127-31.
67. Goto, K., Mirmiran, M., Adams, M.M., Longford, R.V., Baldwin, R.B., Boeddiker, M.A. & Ariagno, R. L. (1999). More awakenings and heart rate variability during supine sleep in preterm infants. *Pediatrics*, 103:603-9.
68. White, M., Beckett, M., O'Regan, M. & Matthews, T. (1993). Autonomic function and SIDS. *Acta Paediatrica Suppl*;82:105-6.
69. Yiallourou, S.R., Walker, A.M. & Horne, R.S.C. (2008). Prone sleeping impairs circulatory control during sleep in healthy term infants; implications for Sudden Infant Death Syndrome. *Sleep*, 31:1139-46.
70. Wong, F.Y., Witcombe, N.B. Yiallourou, S.R., Yorkston, S., Dymowski, A.R., Krishnan, L.,... & Horne, R. S. (2011). Cerebral oxygenation is depressed during sleep in healthy term infants when they sleep prone. *Pediatrics*, 127:e558-65.



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



red nose

saving little lives

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1300 998 698 | rednose.com.au
education@rednose.com.au



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