Literature Review

and Recommendations for Safe Infant Sleeping

prepared for

The Victorian Government Maternity and Newborn Clinical Network

by

The Ritchie Centre, Monash University

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# Table of Contents

Disclaimer ........................................................................................................ 3  
Authors .......................................................................................................... 3  
Acknowledgements ...................................................................................... 4  
**Summary of Key Recommendations** ..................................................... 5  
Introduction .................................................................................................. 7  
Process of Guideline Development .............................................................. 7  
Definitions of terms .................................................................................... 8  
Background .................................................................................................. 9  
Bed sharing or sharing a sleep surface ....................................................... 11  
In which room should the baby sleep? ..................................................... 14  
Infant sleeping position .......................................................................... 15  
Sleeping baby with head and face uncovered ........................................ 17  
Keeping baby smoke free before and after birth ................................... 18  
Breastfeeding and SIDS ............................................................................ 19  
Skin to skin contact immediately after birth ........................................... 20  
The preterm infant ..................................................................................... 21  
Infant swaddling or wrapping ................................................................ 22  
Dummy (pacifier) use and risk of SIDS .................................................... 24  
Infant immunisation and SIDS ................................................................. 27  
References .................................................................................................. 29  
Appendix 1 .................................................................................................. 42  
Appendix 2 .................................................................................................. 44
Disclaimer
This review of the evidence provides the basis for the development of new clinical practice guidelines and has been prepared to inform the development of a Victorian Guideline on Safe Infant Sleeping that will inform health professionals and parents to facilitate standardisation, clarity and consistency in care provision for safer sleeping environments for infants. Information summarised in the guideline is current at the time of publication. Neither the authors nor The Ritchie Centre accept liability for any person for loss or damage incurred as a result of reliance upon the material contained in this guideline. Clinical material offered in this guideline does not replace or remove clinical judgment or the professional care and duty necessary for each specific patient. Clinical care carried out in accordance with this literature review should be provided within the context of locally available resources and expertise. This guideline does not address all elements of standard practice and assumes that individual clinicians will:

- discuss care with parent(s) in an environment that is culturally appropriate and which enables respectful confidential discussion. This includes the use of interpreter service where necessary;
- advise parents of their choice; and ensure they understand the information:
- provide care within scope of practice, meet all legislative requirements and maintain standards of professional conduct;
- apply standard precautions and additional precautions as necessary, when providing care and advice;
- document care in accordance with local and mandatory requirements.

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Consultation

The document was circulated to stakeholders and feedback received from groups listed below and relevant information has been included in the final document.

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Summary of Key Recommendations

**Bed sharing**

1. All infants under 6 months of age should sleep in their own cot and not share a sleeping surface with a parent, caregiver or child. *(Level III-2 evidence)*

2. Parents should be advised of the risks of bed sharing with their infant even if they do not smoke or drink alcohol and the infant is breast fed, if the infant is under three months of age. *(Level III-2 evidence)*

3. Bed sharing if parents smoke, drink alcohol or take drugs is particularly dangerous and parents should be warned of the significantly increased risk of infant suffocation. *(Level III-2 evidence)*

4. Parents should be advised that sleeping on a sofa with an infant significantly increases the risk for SUDI and should always be avoided. *(Level III-2 evidence)*

**In which room should the baby sleep?**

5. All infants should be slept in their own cot in the parental or adult caregiver bedroom until at least 6 months of age and preferably until 12 months. *(Level III-2 evidence)*

**Infant sleeping position**

6. All infants should be placed supine for sleep. *(Level III-2 evidence)*

7. Parents and caregivers should be educated about the need to sleep the baby supine.

**Sleeping baby with head and face uncovered**

8. All infants should be put to sleep with their head uncovered. *(Level III-2 evidence)*

9. Parents should be advised to avoid the use of any loose or soft bedding that could cover the infant’s face and not to use doonas, pillows, or cot bumpers, and not to place toys in the cot. *(Level III-2 evidence)*

10. Parents should be advised to sleep their infant at the foot of the cot to reduce the risk of accidental head covering by bedding. *(Level III-2 evidence)*

11. Currently there is no evidence to support advice regarding the use of safe infant sleeping bags. *(Level 4 evidence)*

**Keeping baby smoke free before and after birth**

12. Infants should be kept in a smoke free environment. *(Level III-2 evidence)*
**Breastfeeding and SIDS**

13. Mothers who wish to breast feed their infant should be encouraged and assisted to do so.  
   *(Level III-2 evidence)*

**Skin to skin contact immediately after birth**

14. Babies should be observed by a responsible third party when in skin to skin contact and during breast feeding in the first hours after birth. *(Level IV evidence)*

**The preterm infant**

15. The preterm infant should be slept supine as soon as clinically stable and clinical care allows it. *(AAP recommendation)*

16. Co-sleeping of twins cannot be recommended. *(AAP recommendation)*

**Infant swaddling or wrapping**

17. Swaddling cannot be recommended. It may increase the risk of SIDS, especially if swaddling is introduced when the baby is not newborn. *(Level III-2 evidence)*

**Dummy use and the risk of SIDS**

18. Parents should be made aware that the routine use of a dummy is protective against SIDS, however it is important to establish breast feeding first for 3-4 weeks. *(Level III-2 evidence)*

**Infant immunisation and SIDS**

19. Immunisation consistent with the standard schedule for Australian children should be recommended *(Level III-2 evidence).*
Introduction
The Victorian Government Department of Health’s Maternal and Newborn Clinical Network commissioned the Ritchie Centre, Monash University to develop a Victorian evidence-based literature review on Safe Infant Sleeping that could inform and guide both clinical care and parental behaviour. The need for such a document based on a systematic review of the current peer reviewed literature had become apparent because of variation in clinical care and confused, and confusing, messages being provided to new parents. It was thought important that parents, health care workers and policy makers had access to the best available current evidence to ensure they are well informed and to ensure that evidence informs future Victorian policy and practice.

The Process
This literature review and resulting draft Clinical Guidelines have been developed using gold standard guidelines, including a systematic identification and synthesis of the best available evidence assessing the evidence for the current advice offered by SIDS and Kids (http://www.sidsandkids.org/safe-sleeping/) and other risk factors for Sudden Unexpected Death in Infancy (SUDI) including bed-sharing. Statements assessing the most recent evidence base and the consistency of this, together with the underlying mechanisms which may be involved in the increased risk for SUDI are documented and the level of evidence cited following the National Health and Medical Research Council of Australia (NHMRC) evidence hierarchy http://www.nhmrc.gov.au/_files_nhmrc/file/guidelines/stage_2_consultation_levels_and_grades.pdf as documented in Appendix 1. This draft Guideline has been circulated among all authors and to content experts and subsequently revised in accordance with agreed changes.

In addition to the authors (page 3), the experts engaged in this revision process to ensure that all available references were included were:

Professor Rachel Moon, Associate Chief, Division of General Pediatrics and Community Health, Director of Academic Development Goldberg Center for Community Pediatric Health Children's National Medical Center, Professor of Pediatrics George Washington University School of Medicine and Health Sciences

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The document has also been circulated to the National Scientific Advisory Group of SIDS and Kids Australia and to representatives of the Consultative Groups listed below.

SIDS and Kids Victoria
National SIDS and Kids
Australian College of Midwives
Association of Neonatal Nurses
Victorian Association of Maternal and Child Health Nurses
International Society for the Study and Prevention of Infant Death
Coroners Court of Victoria
Victorian Department of Health
Royal Australian College of Physicians (VIC)
Royal Australian and New Zealand College of Obstetricians and Gynaecologists
Department of Human Services
Child Protection and Youth Justice
Statutory and Forensic Services Design Branch
Clinical Service Development
Royal Children’s Hospital
Australian Breastfeeding Association
Department of Education and Early Childhood Development
Commission for Young People and Children
Victorian Managed Insurance Authority
Victorian Department of Health:
  Aboriginal Health
  Paediatric Network
  MNCN Database
  Clinical Councils Unit
  Maternity and Newborn Programs
Definitions of terms

In this document the term Sudden Unexpected Death in Infancy (SUDI) will be used based on the definition proposed by Blair et al.,[1]. SUDI is the term used to refer to all cases of sudden and unexpected death in infancy and includes deaths from the Sudden Infant Death Syndrome (SIDS) and fatal sleeping accidents. The adoption of this overarching term has been used for a number of reasons. Firstly, there has been a trend over recent years for pathologists to return findings of “undetermined” or “unascertained” rather than SIDS when the findings are not typical of SIDS but no cause has been found. However this term can have a negative effect on parents. The overarching term would cover deaths of infants found in a shared sleeping surface situation which may have been classified as either SIDS, unascertained or overlaying by different pathologists. SUDI is essentially a research classification, and refers to a broad category of sudden and unexpected deaths which include SIDS, infections or anatomical or developmental abnormalities not recognised before death, sleep accidents due to unsafe sleep environments and sudden unexpected deaths that are revealed by investigations to have been the result of non-accidental injuries.

A death is generally classified as a SUDI if it occurs between 7 and 365 completed days of life and fulfils the following criteria [2] However, SUDI can also occur in the neonatal period and account for around 15% of all SUDI [3]:

- deaths that were unexpected and unexplained at autopsy
- deaths during acute illness that was not recognised as life threatening
- deaths due to an acute illness of less than 24 hours duration in a previously healthy infant (or death after this if life had only been prolonged by intensive care)
- deaths from a pre-existing occult condition, and
- deaths from any form of accident, trauma or poisoning

SUDI can be characterised into explained and unexplained deaths; the latter which are classified as SIDS.

SIDS is currently defined as:
“the sudden and unexpected death of an infant under 1 year of age, with the onset of the lethal episode apparently occurring during sleep, that remains unexplained after a thorough investigation including performance of a complete autopsy, and review of the circumstances of death.”[4]

The current definition of SIDS has become more stringent, and some deaths that would have been classified as SIDS in the past are now classified as SUDI in the unexplained group, particularly those of infants found in a parental bed.

Bed sharing and co-sleeping definitions

There is often confusion about the various terms used to define shared sleeping environments between infants and their carers including co-sleeping and bed sharing. In this document bed sharing will be used to describe the situation where an adult (typically the mother or father, or both) brings the infant onto the same sleeping surface (usually, but not limited to, a mattress) when co-sleeping is possible, whether intended or not.

A preterm infant is defined as an infant born before 37 weeks of gestational age.
Background
In recent years, the incidence of the SIDS has been more than halved by world-wide public health campaigns introduced in the early 1990s which publicised the known major risk factors of prone sleeping, maternal smoking and overheating [5]. However, despite this dramatic decline in incidence, SIDS still remains the major cause of unexpected death in infants in western countries contributing to almost 50% of all post-neonatal deaths [6, 7]. SIDS was the third leading cause of infant death in the United States in 2007 accounting for 8% of infant deaths [8, 9]. SIDS was the fourth leading cause of infant death in Australia in 2005 [10, 11] and in 2008-2010 symptoms, signs and abnormal findings (in which SIDS cases are included) was the third leading cause of death (10%), with more than two-thirds of these being due to SIDS (http://www.sidsandkids.org/research/sids-and-kids-facts-figures).

In Australia, between 1989 and 2010 there have been almost 4,000 SIDS deaths (http://www.sidsandkids.org/research/). Infant deaths attributed to SIDS have fallen approximately 83 percent during the last 20 years [11]. Evidence suggests that the marked reduction in SIDS incidence can be directly associated with Australian public health campaigns which promoted safe sleeping practices, particularly advice given to parents to place their baby on their back to sleep [12]. 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 [5, 7, 13, 14]. Currently, there are around 140 SUDI deaths and 80 SIDS deaths reported in Australia annually (http://www.sidsandkids.org/research/).

Importantly, most SUDI deaths occur as a result of either SIDS or a fatal sleep accident. Epidemiological studies have shown that many of the maternal, infant and socio-demographic risk factors for SIDS are common to SUDI and fatal sleep accidents [15]. Accordingly, it is anticipated that safe sleeping strategies that target all three of these causes of infant death will lead to further and sustained reductions in infant mortality. The Scientific Consensus Forum to review the evidence underpinning the recommendations of the Australian SIDS and Kids Safe Sleeping Health Promotion Programme in 2010 [16] concluded that:

“There is sufficient and compelling evidence to suggest that over 90% of sudden and unexpected deaths in infancy are associated with preventable risk factors. Implementation of these ‘Reducing the Risk’ messages could result in a reduction of sudden and unexpected death in infancy to less than 0.1 per 1000 live births. The challenge is to implement this knowledge.”

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 origin [17] and a triple risk hypothesis has been proposed to model the current knowledge [18]. This model proposes that when a vulnerable infant, such as one born preterm or exposed to maternal smoking is at a critical but unstable developmental period in homeostatic control is exposed to an exogenous stressor such as being place prone to sleep, then SIDS may occur. The model proposes that infants will die of SIDS only if they possess all three factors, 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 [5]. For completeness the likely mechanisms underpinning the risk factors will be also be reported.


Both the Victorian and South Australian Coroners have recently raised concerns about the circumstances surrounding deaths and serious injuries to infants in unsafe sleeping environments. In particular, they have called for consistent advice to be provided to parents regarding the practice of bed-sharing and co-sleeping because around half of infant deaths investigated have been in such situations. Indeed, following the inquests into the deaths of four infants in 2011/12 who were found in a bed sharing situation the Victorian Coroner, Dr John Olle, recommended that the Victorian Department of Health and Department of Education and Early Childhood Development align public health and health promotion advice on sharing sleeping surfaces with infants to those contained in the SIDS and Kids Information Statement “Sleeping with a Baby” in the form of a revised Infant Safe Sleeping Policy. Consistent public health and health promotion advice should be delivered to caregivers at key developmental milestones throughout the pre and postnatal period.

The development of this Literature Review and draft recommendations was in response to the Coronial call for clear and evidence-based advice for carers and parents. It is intended that the Review and recommendations form the basis for the development of a Victorian Guideline on all aspects of Safe Infant Sleeping. In accord with the Coronial recommendations, the literature and evidence synthesis undertaken was initially structured to provide evidence underpinning the six current recommendations of the 2012 SIDS and Kids Safe Sleeping Brochure (http://www.sidsandkids.org/safe-sleeping/) (Appendix 2) The evidence on which each recommendation was made was reviewed. The physiological mechanism(s) that are thought to underpin the increased or decreased risk related to each recommendation was then reviewed, summarised and discussed and the evidence categorised according to NHMRC guidelines (Appendix 1). An identical process was then applied to other aspects of safe infant sleeping resulting in the current Literature Review and draft Clinical Guideline.
An association between bed sharing or sharing a sleeping surface with an infant and SUDI has been recognised for some time. This is important because parent-infant bed sharing is common. In one survey in the USA 45% of parents reported that they had shared a bed with their infant under 8 months of age in the last 2 weeks [19]. In England it was reported that almost half of all neonates bed shared at some time with their parents, and on any one night in the first month of life more than a quarter of parents slept with their baby [20]. Bed sharing was more common amongst the least deprived infants in the first month of life [20]. A recent survey of 3082 participants with infants aged 2-4 months in Bradford in the UK found that 15.5% of families had ever bed shared with 7.2% regularly bed sharing [21]. Regular bed sharers were more likely to be Pakistani, have higher qualifications or breast fed for more than 8 weeks. The association between bed sharing and breastfeeding is important because some commentators have suggested that bed sharing facilitates breast feeding. This is discussed further below (Possible advantages of bed sharing). Almost 10% of families had ever sofa shared but only around 1.5% reported both bed and sofa sharing. The authors concluded that bed and sofa sharing were two distinct practices and should not be combined when examining SIDS/SUDI risk factors [21]. In a Canadian study although 89% of 293 participants agreed that bed sharing had some risks associated with it, 72% reported that they had bed shared either routinely or occasionally [22]. 13% of participants reported rolling onto or part way onto their infants. In an analysis of nearly 20,000 parents in the USA more than 1 in 10 reported bed sharing as a usual practice [23] and routine bed sharing had increased from 6.5% in 1993 to 13.5% in 2010. Almost half of respondents discussed bed sharing with their doctor and reported that their doctor’s attitude to bed sharing affected their practice. Where the family doctor advised against bed sharing, parents were less likely to do so [23].

**What is the evidence regarding bed sharing and risk of SUDI?**

Case studies have suggested that more than half of all SUDI cases occur whilst the infant is bed sharing [24-31]. While initial studies identified that the risk of SUDI is greatest for infants who bed share and whose mothers smoke [6, 32-37], it has become apparent more recently that the risk of SUDI is also increased in young infants under 3 months of age even if neither parent is a smoker [6, 32]. Importantly, of 11 case control studies reporting bed sharing there are no studies that have reported a reduced risk of SIDS in bed sharing infants. All studies have found an increased risk of SUDI in infants who are bed sharing [37]. In May 2013 the largest meta-analysis undertaken to date, of 19 studies from 9 data sets across the UK, Europe and Australasia with 1472 SIDS cases and 4679 controls, was published [38].

In this meta-analysis the individual data from the separate studies was combined to derive estimates of the risk associated with bed sharing in relation to breast feeding, smoking, mother’s recent alcohol consumption and illicit drug use. The collation of data from the various studies allowed an analysis that controlled for other significant risk factors for SUDI such as whether the baby slept in the parent’s room or elsewhere, sleeping position, mother’s marital status, age and parity and baby’s birth weight. Importantly, the meta-analysis showed that in low risk infants who were breast fed and where neither parent smoked bed sharing increased the risk of SUDI in the first 3 months five-fold, adjusted Odds Ratio (aOR) 5.1 (2.3-11.4), compared to those infants put to sleep supine in his or her own cot in the parent’s bed room. In the first 2 weeks of life the risk of SUDI for those bed sharing was more than 8-fold higher, aOR 8.3 (3.7-
There was no apparent increased risk of SUDI for infants more than 3 months of age, aOR 1.0 (0.3-3.0). Furthermore, the model predicts that, overall, nearly 9 out of 10 infant deaths that occurred while bed sharing would probably not have occurred had the baby had been placed supine in its own cot in the parent’s bedroom. Even in very low risk healthy infants under 3 months of age it is predicted that over 80% of deaths would have been prevented had bed sharing not occurred.

A number of criticisms of this study have been made, including the large amount of imputed missing data on parental alcohol and drug consumption and that the study used older studies carried out between 1987 and 2003, and did not include data from a study carried out in South West England between 2003-2006 [24]. These criticisms and the authors responses can be found at [http://bmjopen.bmj.com/content/3/5/e002299.abstract/reply](http://bmjopen.bmj.com/content/3/5/e002299.abstract/reply). However, the criticisms do not materially alter the validity of the risk estimates and conclusions.

In summary, the meta-analysis clearly shows that even in healthy, breastfed infants with no parental or environmental risk factors for SIDS bed sharing is associated with an 8-fold increased risk of SIDS in infants under 2 weeks of age and a 5-fold increased risk of SIDS in infants under 3 months of age compared to if the infant is slept in a cot in the parents’ bedroom. Where there is parental smoking, alcohol and/or illicit drug use the risk is increased yet further.

Avoidance of bed sharing for all infants less than 3 months old would be expected to prevent the majority of SUDI.

However, not all studies have shown that bed sharing increases risks of SUDI for low risk infants. One study that attempted to separate the risks of bed sharing in infants who were not exposed to parental smoking identified that infants were not at increased risk (OR 1.66; 95% CI 0.91-3.01) where neither parent smoked [37]. However, because of the system of classification of infant deaths in the USA, the study did not distinguish between SIDS and those babies who may have suffocated [39]. A study from Adelaide found that there were more female infants found dead in bed sharing situations compared to male infants, which is not the case for non bed sharing SIDS deaths, suggesting that the two groups of infants may be different [40].

Additional risks

Irrespective of bed sharing, there are a number of other established risk factors for SIDS/SUDI. It has been reported from the San Diego SIDS/SUDI in Childhood Research project that 99% of infants dying of SIDS had at least 1 intrinsic or extrinsic risk factor, 75% had at least one of each with 57% having at least 2 extrinsic risks and 1 intrinsic risk factor [41]. Intrinsic risk factors were male gender, prematurity, genetic polymorphisms, prenatal exposure to cigarettes and/or alcohol. Extrinsic risk factors were prone or side sleeping position, bed sharing, over wrapping, soft bedding or face covered. In the Carpenter meta analysis [38] the position last left, parental smoking, maternal alcohol consumption in the last 24 hours and maternal illicit drug use interacted with bed sharing. If the partner smoked the risk aOR was 17.6, if the mother smoked aOR 47.5 and if both parents smoked aOR 64.9, i.e. there was a 65-fold increase in the risk of SIDS. If the mother consumed more than 2 units of alcohol the aOR was 89.7 and if she took illicit drugs the risk was inestimably high. If the baby was sleeping in a cot there was an increased risk if the infant was placed on the side or prone, however sleeping position was not associated with increased risk in infants in the first 3 months of life when bed sharing. In contrast to this finding, recent Australian data
suggests that 63% of 104 neonates were not in a supine position when found. This is at odds to the position in which parents stated they were placed [3].

**Likely mechanisms of SUDI in infant bed sharing**

There have been limited studies on the physiology of bed sharing and how bed sharing may increase the risk of SIDS/SUDI. Studies by Baddock et al., in New Zealand of 40 routinely bed sharing and 40 routinely cot sleeping term born infants have reported that although bed sharing infants were exposed to more bedding and higher thermal temperatures, they were able to maintain their thermoregulation to maintain a normal core temperature [42]. In addition, head covering was more common in bed sharing infants and they awoke more frequently to feed than their cot sleeping counterparts [42, 43] and also displayed more oxygen desaturations [44]. In term born, breast fed low risk infants aged 11-15 weeks bed sharing promoted both infant arousals [45] and maternal arousals [46].

**Possible advantages of bed sharing**

Understandably, given that bed sharing is common, suggesting that bed sharing is inadvisable because of increased risks of SIDS is very controversial. It has been reported that co-sleeping is normal practice for 90% of the world’s population, with mothers in two thirds of all cultures sharing a sleeping surface with their infant [47]. Specifically, it has been suggested that bed sharing has a number of advantages, namely increased breast feeding rates, improved mother/infant bonding and improved maternal/infant sleep. Three prospective cohort studies published between 1999 and 2004 from England, the USA and New Zealand all reported that breast feeding duration increased in bed-sharing infants [48-52]. A recent systematic review of the literature reported that the association between bed sharing and maternal/infant bonding has not been studied [53]. There have also been limited studies on the effects of bed sharing on infant and maternal sleep, but the studies which have been carried out have shown that bed sharing infants have more arousals from sleep [43, 54] but the arousals were of shorter duration [54]. In some cultures bed sharing is normal practice and yet the rate of SUDI is low, such as Japan. However, there are other cultures where bed sharing is the norm and the rate of SUDI is high, such as in the Maori population in New Zealand. Importantly, in countries where bed sharing is not associated with an increased incidence of SUDI the sleeping environment is very different to that in Western society. Beds are often firm mats on the floor with a separate mat for the infant and there is no soft bedding or pillows that may be a potential risk. Furthermore, infants are breast fed and mothers do not smoke, drink alcohol or take drugs which could impair maternal arousal.

**Existing recommendations regarding bed sharing**

Currently, advice to parents about bed sharing differs internationally. In the Netherlands parents are advised not to bed share with their infant for the first 3 months of life based on their own research [56]. Importantly, the US advice, from the American Academy of Pediatrics (AAP) recently changed to advise against bed sharing. Previously, the AAP had advised of the increased risk of bed sharing on soft sleep surfaces and if the caregiver smoked, or used drugs or alcohol [55]. The AAP now has a clear statement advising against bed sharing, irrespective of parental smoking, and alcohol or drug use [57]. Some expert bodies in other countries, including Australia and the UK, have not altered recommendations, continuing to only advise that certain groups, such as those parents who smoke, drink alcohol or take drugs should not bed share with their baby (http://www.sidsandkids.org/wp-content/uploads/LongB2013LR.pdf).
The guidelines from The South Australian Government’s Centre for Health Promotion (http://www.healthpromotion.cywhs.sa.gov.au/library/safe_sleeping_standards.pdf) advise ALL parents that co-sleeping with an infant increases the risk of infant death. It is based on an understanding that, as part of their normal practice, professionals will provide information and education to parents about the behaviours and circumstances that may pose unintentional risks to their infants and the rationale for such advice.

‘Co-sleeping with infants (whether in a bed or on a sofa, mattress or chair) should be strongly discouraged because it carries with it a clear risk of the infant dying particularly if the baby is of low birth weight or premature, or if adults in the household are smokers, or if the co-sleeping adult has been drinking, has taken medication or drugs or is very tired.’

The current SIDS and Kids advice on bed sharing is provided in the more detailed brochure on Safe Sleeping available on the SIDS and Kids website (http://www.sidsandkids.org/wp-content/uploads/LongB2013LR.pdf).

“Many parents bring baby into bed to feed, cuddle and settle their baby. In cultures across the world, including Australia, many parents choose to share a bed with their baby. Sharing a sleep surface with a baby increases the risk of SUDI in some circumstances. Babies who are most at risk of sleeping accidents whilst sharing a sleep surface are babies less than three months of age, and babies born preterm or small for gestational age (low birth weight).

Sharing a sleep surface with a baby must be avoided in the following circumstances where:
• baby shares the sleep surface with a smoker
• care-giver is under the influence of alcohol or drugs that cause sedation
• baby is premature, small when born, or less than 3 months of age
• care-giver is overly tired
• there is adult bedding, doonas or pillows that may cover the infant
• baby could be trapped between the wall and bed, fall out of bed or could be rolled on
• baby is sharing bed with other children or pets
• baby is placed to sleep on a sofa, beanbag, waterbed or sagging mattress”

In addition to bed sharing, falling asleep on a sofa or couch with an infant, whether intended or by accidentally falling asleep, is of considerable risk for SUDI. In England, the proportion of infants who died while sleeping with an adult on a sofa or couch increased from 6% between 1993-1996 to 16% between 2003-2006 [24], with about one sixth of SUDI infants being found in this situation. Similar proportions have been reported in Scotland [58] and Northern Ireland [59].

Summary and recommendations (with levels of evidence)

Bed sharing increases the risk for SIDS for all infants under 3 months of age [24-31]. The risk of SIDS when bed sharing is further increased with maternal smoking, alcohol or drug use [6, 32-37]. (Level III-2 evidence). Sharing a sofa or couch with an infant significantly increases the risk for SIDS [24, 58, 59] (Level III-2 evidence).

1. All infants under 6 months of age should sleep in their own cot and not share a sleeping surface with a parent, caregiver or child.
2. Parents should be advised of the risks of bed sharing with their infant, even if they do not smoke or drink alcohol and the infant is breastfed, if the infant is under six months of age.

3. Bed sharing if parents smoke, drink alcohol or take drugs is extremely dangerous and parents should be warned of this significantly increased risk.

4. Parents should be advised that sleeping on a sofa with an infant significantly increases the risk for SUDI and should always be avoided.

**In which room should the baby sleep?**

Several studies have reported that sleeping in the parental bedroom is protective against SUDI [6, 32, 60-62], reducing the risk by as much as 50%. One large case control study demonstrated a 10-fold increased risk in infants who slept in a separate bedroom [61]. Importantly, the protective effect of room sharing does not appear to include room sharing with a sibling or other children [60, 62]. Infants who died from SUDI were more likely to be found with their heads covered by bedding and infants placed on their side to sleep were more likely to have rolled prone when sleeping alone compared to infants who slept in the parental bed room [63]. Sleeping in the parental bedroom is also more likely to prevent suffocation, strangulation or entrapment and allows close proximity for feeding comforting and general monitoring of the infant. The advice to room share with parents for the first 6-12 months is supported by studies from a number of countries [33, 64].

The mechanisms by which sleeping in the parental room may reduce risks of SIDS remain unclear.

**Summary and recommendations (with levels of evidence)**

Sleeping in a cot in the parent’s bed room reduces the risk of SIDS [6, 32, 60-62] (Level III-2 evidence).

5. Parents should be advised to sleep their infant in their own cot in the parental or adult caregiver bedroom until at least 6 months of age and preferably to 12 months.

**Infant sleeping position**

There is now conclusive evidence from many countries that sleeping infants on their tummies (prone sleeping) significantly increases the risk of SIDS. In the late 1980s a peak in SIDS rates prompted several large scale case-controlled studies in a number of countries [6]. These world-wide epidemiological studies consistently identified prone sleeping as the major risk factor for SIDS [65-72]. 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 [73]. In Australia, the recommendation that infants should not be slept prone was made in 1991 [74]. In 1997 a second expert group recommended that infants be placed on their back and stressed that propping of infants on their sides should be avoided [75]. These recommendations were subsequently adopted by the American Academy of Pediatrics (AAP) which also recommended the non-prone sleeping position
in 1992 [76] and the back sleeping position in 2000 [77]. Since the introduction of supine sleeping recommendations, a rapid decline in SIDS mortality has provided overwhelming evidence of the strong association between prone sleeping and SIDS [12, 67, 78-81]. Since the introduction of these recommendations the number of SIDS infant placed prone decreased from 85.4% in 1991-1993 to 30.1% in 1996-2008 in the USA [41]. Studies have identified that the side sleeping position is unstable and many infants are found prone after being placed to sleep on their side. The risks of side and prone are now similar in magnitude (OR: 2.0 and 2.6 respectively) [82] and the population-attributable risk for the side sleeping position is higher than that for the prone position [36, 83]. Infants who are unaccustomed to sleeping prone are particularly at risk in the prone position (adjusted OR:8.7-45.4) [82, 84]. Physiological studies have identified that infants inexperienced in prone sleeping have decreased ability to escape from asphyxiating sleep environments when placed prone [85].

Some parents and health professionals have expressed concern about supine sleeping and the risk of an infant choking in this position. However, careful study of the infant airway has shown that healthy infants placed to sleep on the back are less likely to choke on vomit than prone or tummy sleeping infants [86]. 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 infant is placed on the tummy the oesophagus sits above the infant’s upper airway. If the infant regurgitates or vomits milk, it is relatively easy for it to be inhaled into the infant’s airway and lungs, leading to aspiration or choking. Several studies have now shown that the risk of aspiration is not increased by supine sleeping [87-89]. There is often particular concern regarding aspiration in infants with gastrooesophageal reflux. The AAP supports the recommendations of the North American Society for Pediatric Gastroenterology and Nutrition which recommends that infants with gastrooesophageal reflux be placed in the supine position to sleep, with the rare exception of infants for whom the risk of death from gastrooesophageal reflux is greater than the risk of SIDS [90]. Elevating the head of the infant’s cot while the infant is sleeping supine has been shown not to be effective in reducing gastrooesophageal reflux [91, 92]. In addition elevating the cot can result in the infant sliding to the foot of the cot underneath the bedding and is not recommended [57].

Some health professionals continue to place newborn infants on their sides immediately after birth in the belief that they need to clear their airways of amniotic fluid and are less likely to aspirate on their sides. There is no evidence that fluid is more readily cleared in the side position [57]. Infants should be placed on their backs as soon as they are ready to be placed in their cot or bassinet. It is important that parents observe health professionals placing infants in the supine position as they are more likely to copy this practice when they go home [93-96].

**Likely protective mechanism of supine sleeping**

Body position during sleep significantly modifies both the spontaneous and induced arousals in preterm and term infants with infants being significantly less arousable when slept prone [97-102]. Indeed, it is this perceived deeper sleep that reinforces parent’s tendencies to prefer sleeping their infant in the prone position. Some studies have identified that infants sleep longer in the prone position and have increased quiet sleep, which is a state of reduced arousability [100]. The prone sleeping position is associated
with higher central and peripheral body temperatures when compared to the supine position [103, 104]. Cardiovascular control is also significantly altered in the prone sleeping position in both term and preterm infants. Compared to the supine sleeping position, heart rate in the prone position is increased during sleep in both term and preterm infants [98-100, 105-109]. 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 infants [99, 107, 108, 110-113], 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 [111]. Several studies have found that the sympathetic effects on blood pressure and vasomotor tone are decreased in the prone sleeping position [103, 114-116]. Lower resting blood pressure and altered blood pressure responses [103, 114, 116] and decreased vasoconstrictor ability [115] to head-up tilting have been identified in term infants 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 infants, a finding which may underpin the reduced arousal responses in this position [117]. 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 [86].

Summary and recommendations (with levels of evidence)

Sleeping in the supine position decreases the risk for SIDS [65-72] (Level III-2 evidence) and side sleeping positions are unstable [36, 83] (Level III-2 evidence).

6. All infants should be placed supine for sleep. (Level III-2 evidence)

7. Parents and caregivers should be educated about the need to sleep the baby supine. (Level III-2 evidence)

Sleeping baby with head and face uncovered

A meta analysis of 10 case control studies carried out between 1958 and 2003 found the pooled prevalence in SIDS victims with their heads covered by bedding was 24.6% (95% CI 22.3% to 27.1%) compared to 3.2% (95% CI 2.7% to 3.8%) among controls [118]. The pooled univariate odds ratio (OR) was 9.6 (95% CI 7.9 to 11.7) and the pooled adjusted OR from studies mainly conducted after the fall in SIDS rate was 16.9 (95% CI 12.6 to 22.7). The risk varied in strength but was significant across all studies. In a quarter of cases and controls head covering had occurred at least once previously (pooled adjusted OR=1.1; 95% CI 0.9 to 1.4). The population attributable risk (27.1%; 95% CI 24.7% to 29.4%) suggests avoiding head covering might reduce SIDS deaths by more than a quarter [118]. In another study published the same year and pooling data from the New Zealand Cot Death Study (1987–1990, 393 SIDS cases) and the German SIDS Case Control Study (1998–2001, 333 SIDS cases), the proportion of SIDS cases in which infants were found with their head covered was 15.6% in the New Zealand study and 28.1% in the German study [119].

Advice to avoid doonas, duvets and quilts in infant cots has been widely distributed internationally because of the propensity for them to totally cover the infant [83, 118]. Furthermore, such soft bedding should never be placed under the infant, nor should pillows or sheepskin rugs be used in infant cots, because it is thought to increase the
chances of suffocation and rebreathing [120-122]. Soft bedding in an infant cot has been shown to increase the risk of SUDI five fold, regardless of sleep position [123, 124], and over 20-fold if infants are placed prone on soft bedding [123]. It is recommended that infants be placed to sleep in a cot with a firm, well fitting mattress that is clean and flat (not tilted or elevated) with no pillow or loose bedding. Cot bumper pads and similar products which attach to the sides of the cot are also not recommended because of the danger of entrapment between the mattress or cot and firm bumper pads, the risk of suffocation against soft bumper pads or strangulation with bumper pad ties [125].

Parents are currently advised to place the infant at the foot of the cot in the so called “feet to foot” position and to make the bedding up with a sheet and blanket so that there is a reduced risk of the infant slipping under the bedding. Although this advice makes sense to avoid infant head covering there is no evidence to support that this is protective [16]. Results of the study by Blair et al., [24] found that between 2003-2006 the proportion of infants found with their head covered had fallen significantly from 16% ten years earlier to 5%, suggesting that parents were following this advice. More recently carers have been advised to use a safe infant sleeping bag. A safe infant sleeping bag is one which is constructed in such a way that the infant cannot slip inside the bag and the head become covered. The infant sleeping bag should be the correct size for the infant with a fitted neck and armholes or sleeves to keep the baby warm and no hood to avoid any chance of head covering. Again, although this advice seems logical there is currently very little evidence that this is protective. A study from the Netherlands found that 19% of SIDS infants compared to 40% of controls were sleeping in a traditional Dutch sleep sack OR 0.51 (95% confidence limits 0.15 to 1.74) although this finding was not significant [126].

In addition, SIDS and Kids advise that for a safe sleeping environment all new and second hand cots sold in Australia must meet the current mandatory Australian Standard for Cots (AS/NZS 2172) and should carry a label to say so. Old and second hand cots that do not meet current standards may be dangerous. When buying or being gifted a cot, parents should be advised to ensure that the cot meets the current standards by referring to the guide to infant and nursery products publication “Keeping baby safe” available from the Australian Competition and Consumer Commission’s website (www.productsafety.gov.au). The mattress must fit the cot so there is no risk of the infant becoming wedged between the cot side and mattress. There is no more than 20mm (less than 1 inch) gap between the mattress and the cot sides and ends. Remove plastic packaging from the mattress. Always make sure that the waterproof mattress protector is strong, not torn, and a tight fit. The mattress should be firm, clean and flat (not tilted or elevated). Elevating the head of a cot does not improve reflux for babies under 12 months of age, furthermore, elevating the head of the cot can increase the risk of SUDI. All portable cots sold in Australia must meet the current mandatory Australian Standard for children’s portable folding cots AS/NZS 2195 and carry a label to say so. (http://www.sidsandkids.org/wp-content/uploads/LongB2013LR.pdf).

Likely mechanisms of increased risk of SIDS with head covering
There has only been one study investigating the physiology of infants sleeping with their faces covered by bedding. That study found that infants sleeping with their face covered by a bed sheet had higher auditory arousal thresholds in active sleep, and greater rectal and pericephalic temperatures and increased CO₂ levels [127].
Summary and recommendations (with levels of evidence)

Head covering is associated with an increased risk of SIDS [118] (Level III-2). Advice to place the infant with “feet to foot” may decrease the risk SIDS by reducing the risk of head covering [24]. (Level III-2) There is insufficient evidence to offer recommendations on the use of infant sleeping bags [16] (Level IV evidence).

8. All infants should be put to sleep with his/her head uncovered.

9. Parents should be advised to avoid the use of any loose bedding that could cover the infant’s face and not to use doonas, pillows, or cot bumpers, and not to place toys in the cot.

10. Parents should be advised to sleep their infant at the foot of the cot to avoid head covering by bedding.

11. Currently as there is no evidence to support advice regarding the use of safe infant sleeping bags, their use can be neither recommended nor discouraged.

Keeping baby smoke free before birth and after

Over 60 studies have now identified that smoking during pregnancy increases the risk of SUDI, with the majority showing a positive association with a risk ratio of between 0.7 and 4.85 [128-132]. Following the success of the back to sleep campaigns, maternal smoking is now the most important modifiable risk factor for SUDI. It has been estimated that a third of residual SUDI deaths could be prevented if in utero smoke exposure was eliminated [133, 134]. Importantly, there is a dose-response relationship between maternal smoking and SUDI risk. A number of studies have shown that the risk of SIDS increases directly with the number of cigarettes smoked by the mother during her pregnancy [128, 131, 132, 135, 136]. Moreover, paternal smoking and passive smoke exposure during infancy have been associated with an increased risk of SIDS, with some data demonstrating that these relationships are also dose-dependent [135-137]. Maternal smoking may also be a confounding risk factor for SUDI due to its association with other risk factors, such as preterm birth and intra-uterine growth restriction (IUGR) [134, 136, 138, 139], which likely result from suboptimal intrauterine environments.

Likely mechanisms of increased risk of SIDS with smoking exposure

This increased SIDS risk is likely to be due to the effects of nicotine exposure on autonomic control and arousal. In support of this idea, Duncan and colleagues [140] found that chronic exposure to nicotine in the prenatal baboon fetus altered serotonergic and nicotinic acetylcholine receptor binding in regions of the medulla, critical to cardiorespiratory control. Furthermore, they identified that these alterations were associated with abnormalities in fetal heart rate variability, indicating altered cardiovascular control [140]. Studies in infants exposed to maternal smoking have demonstrated altered heart rate and blood pressure control compared with control infants [141-147]. Maternal tobacco smoking also decreases both total arousability and the proportion of cortical arousals. Arousal impairment was observed for both spontaneous arousals from sleep and responses induced by various stimuli [148-154]. As few mothers change their smoking behaviour postpartum [155], it is difficult to discern whether these physiological effects are caused by prenatal or postnatal smoke.
exposure. Of course, environmental smoke (in the same room) independently increases the risk of SIDS [156, 157]. A more recent study, however, showed that before discharge home from hospital prior to any postnatal smoke exposure, preterm infants of smoking mothers already exhibited disruptions in sleep patterns, [158]. Thus, there is considerable evidence from both animal and human studies suggesting that prenatal exposure to cigarette smoke has deleterious effects on the developing brain and cardiorespiratory system.

Summary and recommendations (with levels of evidence)
Infants who have been exposed to maternal smoking are at significantly increased risk for SIDS [128-132]. (Level III-2 evidence)

12. Infants should be kept in a smoke free environment.
   (Level III-2 evidence)

Breastfeeding and SIDS

Earlier epidemiological studies found inconsistent evidence on the protective effect of breast feeding on SUDI with some studies only finding a univariate effect which was lost when confounding factors were taken into account [58, 123, 139, 159, 160]. Other studies did however find a protective effect [36, 126, 161]. However, more recent reports have found breast feeding to be protective even when taking other potential confounding factors into account [162, 163]. A recent meta-analysis of 18 case control studies showed that breast feeding, of any extent or duration, was protective of SIDS and that the protective effect was strongest for exclusive breast feeding [164]. The recommendation to “breast feed if you can” was made at the 2010 Scientific Consensus Forum [16] based on the presentation of this new evidence prior to publication [164]. This sixth recommendation was included in the 2012 SIDS and Kids Safe Sleeping national public health campaign [165] (http://www.sidsandkids.org/safe-sleeping/) and now reads “Breast feed baby”.

Likely protective mechanisms of breastfeeding
Physiological studies on sleeping infants have demonstrated that breast fed infants are more easily aroused from sleep compared to formula fed infants [166, 167]. In addition, breast feeding is associated with a decreased incidence of diarrhoea, both upper and lower respiratory tract infections and other infectious diseases [168].

Summary and recommendations (with levels of evidence)

Any breast feeding is protective for SIDS [162, 163]. The protective effect of breast feeding is greatest for exclusive breast feeding [164]. (Level III-2 evidence).

13. Mothers who wish to breast feed their infant should be encouraged and assisted to do so.
Skin to skin contact immediately after birth

Skin to skin contact immediately after birth has been shown to increase breast feeding at both 1 and 4 months of age (OR 1.27, CI 1.06-1.53) and to increase breast feeding duration by a mean of 43 days (CI 1.69-86.79, p=0.06) [169]. In addition, late preterm infants have been shown to have better cardiorespiratory stability with early skin to skin contact [169]. However, recently there has been concern that enthusiasm for prolonged skin-to-skin contact, particularly immediately following birth or in the early postnatal days in hospital, may increase the risk of suffocation, especially where the mother is exhausted and may inadvertently fall asleep unobserved. Specifically, there have been reports of infants with apparent life threatening events (ALTE) within the first day of life. A nationwide retrospective German study reported a rate of 2.6 per 100,000 live births of severe ALTE requiring resuscitation and SIDS in the first 24 hours after birth [170]. Of the 17 infants who met the inclusion criteria 7 infants died; 3 after unsuccessful resuscitation and 4 had initially been resuscitated but had treatment discontinued because of severe hypoxic brain damage. Of the 10 survivors, 6 were neurologically abnormal on discharge. Twelve infants were found lifeless lying on their mother’s breast/abdomen or very close to and facing her, two were supine in their cots, two were being held by their fathers and one was lying supine next to their mother. Among the 26 cases excluded from the analysis 4 were preterm but otherwise met the inclusion criteria. A further 3 infants were resuscitated with vigorous stimulation only. Another study reported 6 cases of healthy term newborns (all with normal Apgar scores) who suffered an ALTE within 2 hours of delivery whilst in skin to skin contact with their mother. Three of the six infants died [171]. A prospective French regional study reported a rate of ALTE and SIDS of 0.032 deaths per 1,000 live births within the first 2 hours after birth [172]. These studies highlight that there are risks associated with early skin-to-skin contact or breast feeding especially when the mother is exhausted from her labour and where the infant is not being closely observed by healthcare professionals.

Breast feeding is to be encouraged and postnatal unit rooming in has been shown to promote initiation and duration of breast feeding [173]. However, as at home, bed sharing in hospital cannot be recommended. Furthermore, the safety of devices such as those which are marketed to promote “safe” bed sharing such as side-car bassinette which attach to the side of the bed do not appear to have been studied adequately. Accordingly, the American Academy of Pediatrics (AAP) does not recommend their use [57]. One small study of 20 infants and their mothers found that although mothers overwhelmingly preferred the side-car bassinettes, breast feeding rates were not improved [174].

A number of case studies of infants have suffered an ALTEs during skin to skin contact immediately after birth have been reported. This may be due, in part, to the exhaustion of the mother. (Level IV evidence).

14. Babies should be observed by a responsible third party when in skin to skin contact and during breast feeding in the first few hours after birth.

Good Practice Note: In accord with Recommendation 1 that adults should not share a sleeping surface with infants less than 3 months old, mothers should not share a bed with their newborn baby in hospital – unless she is able to be
supervised. Healthcare providers should be educated to ensure that they provide this advice to mothers.

The preterm infant

Preterm infants are at increased risk for SIDS compared to their term born counterparts [175-177]. The proportion of infants who die from SIDS who are preterm is approximately four times as great as those born at term (20% compared to 5%) and these proportional differences have remained unchanged since the introduction of public campaigns for reducing the risks [178, 179]. The association between the prone sleeping position and SIDS among low birth weight infants is equal to or stronger than that in infants born at term [84]. Preterm infants are frequently placed prone as this position is thought to improve respiratory function. It is common practice for infants 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 infants. 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 [180]. However, it is likely that these improvements are simply due to infants spending more time in quiet sleep and less time in active sleep, a state associated with increased apnoeas and arousability [181, 182].

As preterm infants are at increased risk for SIDS/SUDD they should be placed supine as soon as clinically stable. The AAP recommends that hospitalised infants should be placed supine from 32 weeks of postmenstrual age [183], so that they can become used to this position well before discharge from hospital and also that their parents are used to them sleeping in this position.

Co-bedding of twins and infants from other multiple births is a common practice both in the hospital and at home [184]. One small study of 10 pairs of term born twins aged between 1-3 months who were slept either side by side or head to head found that sleep variables were unaffected when co-bedded [185]. Babies were observed to occasionally place an arm over the other twins face, but this did not impair breathing and there was no evidence of overheating. Co-bedded twins demonstrated synchronised sleep patterns, which the author suggested would be advantageous to the parents for overnight care. However, reviews have reported no benefits of this practice [186-188]. Furthermore, as multiple births are more likely to be preterm or low birth weight and preterm and low birth weight infants are at increased risk for SIDS [175-177], co-bedding of twins is not recommended [57].

Kangaroo care of preterm infants.
Skin-to-skin contact for parents and preterm babies, commonly referred to as Kangaroo care, has been shown to reduce mortality, hospital stay, infections and hypothermia and have some benefits in relation to parent infant bonding and initiation and maintenance of breast feeding [189]. The review supports the use of KMC in low birth weight infants as an alternative to conventional neonatal care mainly in resource-limited settings. Further information is required concerning effectiveness and safety of early onset continuous kangaroo care in unstabilised low birth weight infants, long term neurodevelopmental outcomes, and costs of care. Recommendations for kangaroo care
in the neonatal intensive care environment have been documented and suggest that routine monitoring, nursing and medical care is provided during this time [190].

**Likely mechanisms of increased risks in the preterm infant**
Numerous studies have shown that control of heart rate and blood pressure is impaired in preterm infants compared to term born infant over the first year of life which may underpin their increased risk for SIDS [191]. In addition preterm infants have been shown to have lower blood pressure compared to age matched term born infants over the first six months after term corrected age [192]. Preterm infants have also been shown to have impaired arousal responses from sleep [193, 194].

**Summary and recommendations (with level of evidence)**
Compared to the term infant, the preterm infant is at an increased risk for SIDS [175-177] (Level III-2 evidence). Theoretically, the preterm infant should benefit more than the term infant from being slept supine but there are not clinical trials to confirm this. The risk of SIDS in twins may be increased if they co-sleep.

15. The preterm infant should be slept supine as soon as clinically stable and clinical care allows it. (AAP recommendation)

16. Co-bedding of twins cannot be recommended. (AAP recommendation)

**Infant swaddling or wrapping**
Swaddling, or firm wrapping, is a traditional infant care practice which has been used in some form or another by various cultures since medieval and ancient times [195]. Low SIDS incidences associated with populations where swaddling is common, have led to proposal that swaddling may be protective for SIDS [196, 197]. However, in relation to the risk of SIDS, the role of swaddling has been difficult to determine. In one study, a reduced risk of SIDS was observed when bedding was firmly tucked in (OR = 0.63), however this protective effect may have been a consequence of the reduced probability of head-covering by loose bedding or the inability of infants to roll into the high-risk prone position [198]. In another study, Ponsonby et al., [66] found that swaddling increased the risk of SIDS when infants slept in the prone position (to 12-fold from 3-fold when infants were unswaddled), but had no significant effect on SIDS risk when infants slept supine/lateral. In the United Kingdom during the mid-1990s, swaddling during the last sleep was more common amongst SIDS infants than age-matched controls (14% vs. 9%). Furthermore, a more recent study showed that this difference has since become more marked (19% vs. 6%) [24].

Additional concerns raised regarding swaddling have included potentially increased incidences of developmental hip dysplasia, acute respiratory infections and overheating [24, 66, 199]; however these complications may be circumvented by modifying the swaddling style used and by avoiding extra bedding.

Numerous studies have documented a “tranquil” behavioural state and longer sleep periods in swaddled infants [24, 66, 199-201]. Thus, despite the unknown effects on the risk for SIDS, swaddling is becoming increasingly popular as a settling technique in the
Netherlands, the United Kingdom and the United States [202, 203]. It has been suggested that by effectively pacifying distressed infants, swaddling may reduce parental-child tension. Furthermore, a style of swaddling has been recommended by SIDS and Kids as a method to settle infants in the supine position, with the aim of reducing the prevalence of upset infants being placed prone. The recommended methods for “safe swaddling” are available on the SIDS and Kids website (http://www.sidsandkids.org/safe-sleeping/).

These findings suggest that infant swaddling would increase infant sleep time by preventing awakening. However, this may not be a desirable outcome because the pathogenesis of SIDS is thought to involve an impaired ability to arouse from sleep in response to a life threatening respiratory or cardiovascular challenge [204]. Arousal from sleep in infants is a hierarchical response proceeding from sub-cortical activation involving changes in heart rate and breathing, to full cortical arousal involving changes in brain activity. This progression has been reported to be incomplete in infants who later died of SIDS [205]. Since infant swaddling has been shown to minimise arousals from sleep, crying time, spontaneous startles and the progression to full arousal [195, 206-208] it is possible that swaddling may impair the response to a cardiorespiratory challenge and thereby increase the risk of SIDS. However, other studies have reported that infants are more sensitive to auditory challenges and arouse more readily in active sleep when swaddled [209, 210]. Recent studies carried out in Australia have examined both arousal responses to external stimuli and spontaneous arousal from sleep in infants who were routinely swaddled at home and those who were not (i.e. were naïve to swaddling) [211, 212]. Infants were studied at both 1 month (when SIDS risk is low) and 3 months of age (the peak age of SIDS risk), both unwrapped and swaddled in light muslin (cotton) wrap with their arms folded across the chest, as recommended by SIDS and Kids. The study reported a decrease in total arousability (i.e. increased arousal thresholds to nasal air-jet stimulation) when infants were swaddled, together with a decrease in the frequency and duration of cortical arousals. When the usual care practice of the infants was considered, swaddling had no effect on the arousability of infants who routinely slept swaddled at home, yet a significant decrease in both total arousability and frequency of cortical arousal was observed in the infants who were not accustomed (naïve) to being swaddled. Additionally, in the naïve group only, a decrease in spontaneous cortical arousals was also observed with swaddling [213].

These findings suggest that arousal suppression may not simply be a consequence of swaddling per se, but rather, of being unfamiliar with sleeping swaddled. This concept of risks associated with unfamiliar sleeping conditions might also apply to other care practices; for example, there have been numerous reports of increased SIDS incidence and compromised airway protective behaviours in infants who were inexperienced in sleeping in the prone position [85, 214, 215]. Of particular relevance to SIDS, the effects of swaddling on arousal in the recent Australian study were primarily observed when infants were 3 months old, corresponding not only with the age of peak SIDS incidence, but also with the time that many mothers return to work [216, 217]. Thus, adopting unfamiliar sleep practices at this age may have grave implications for infants being cared for by secondary caregivers, particularly as many do not consider how infants are placed to sleep at home. Highlighting this risk, it has previously been hypothesised that a change in routine care may be associated with the disproportionately high percentage of SIDS deaths (16%) in organised child care programmes [218, 219]. The finding of altered arousability only in the naïve to swaddling group of infants provides new physiological support for this concern.
In summary, parents should be aware of the potential risks of swaddling their infant, particularly of the use of heavy materials for swaddling. Infants must NEVER be placed prone (on their stomach) when swaddled. Current research suggests that it is safest to swaddle infants from birth and not to change infant care practices by beginning to swaddle their infant at 3 months of age when SIDS risk is greatest. It is also important that secondary caregivers should be made aware of their infant’s usual sleeping environment and practices.

Summary and recommendations

17. Swaddling cannot be recommended. It may increase the risk of SIDS, especially if swaddling is introduced when the baby is not newborn. [24]. (Level III-2 evidence).

Dummy (pacifier) use and the risk of SIDS

It was first postulated in 1979 at a time when it was thought that SIDS may be due to sleep apnoea, that dummy or pacifier use might decrease the risk for sudden SIDS [220]. Although the relationship between SIDS and sleep apnoea is no longer thought plausible, there is strong and consistent evidence that fewer SIDS infants use a dummy than age-matched control infants for the final sleep. In some countries dummy use is promoted as a risk reduction strategy for SIDS whilst in other jurisdictions expert opinion is more ambivalent, requiring further evidence of how this device confers protection.

The New Zealand Cot Death Study [221] was the first to report an association between dummy use and lower risk for SIDS. In following years several more case-control studies examined the association between SIDS and dummy use [6, 58, 123, 222-225]. A meta-analysis of 7 case control studies reported a 61% reduction in SIDS among dummy users compared to a control group in the last sleep [226] based on multivariate odds ratios (OR=0.39, 95% CI: 0.31-0.50), and the authors concluded that dummies should be recommended as a potential risk reduction strategy.

Another meta-analysis published the following year using essentially the same studies found a 52% reduction in SIDS among dummy users, based on univariate odds ratios [227]. However, these authors were more ambivalent in their conclusion, suggesting such a recommendation was open to debate and questioning the impact of dummy use on breastfeeding and highlighting the lack of understanding of a causal mechanism [227]. Subsequent studies have also found a reduced risk for SIDS amongst dummy users [228, 229] and one suggested an even greater risk reduction of 90% for infants using dummies [229].

However, some authors have challenged these claims, citing that the assumption of a direct causal relationship between the lack of dummy use and SIDS has not been substantiated [230]. Additional analysis of the German case control study of 333 SIDS infants and 998 matched controls also found that using a dummy for the last sleep was protective for SIDS (aOR=0.49, 95% CI 0.32-0.76) [33]. However, a smaller English case control study (based on 70 cases and 87 controls) published in the same year did not identify a significant protective effect of dummies [24].
Most recently further analysis of the Chicago study which was conducted between 1993 and 1996 suggested dummy use decreased SIDS risk more when mothers were ≥20 years of age, married, non-smokers, had adequate prenatal care, and if the infant was ever breastfed [231]. Dummy use also decreased the risk of SIDS more when the infant was sleeping in the prone/side position, bed-sharing, and when soft bedding was present. The association between adverse environmental factors and SIDS risk was modified favourably by dummy use, but the interactions between dummy use and these factors were not significant. The study concluded that dummy use may provide an additional strategy to reduce the risk of SIDS for infants at high risk or in adverse sleep environments [231].

An Irish study reported that infants are at increased risk for SIDS if they habitually used a dummy but did not use it for the last sleep, and a British study reported a similar finding, but in multivariate analysis the association did not reach statistical significance [222, 225]. These findings imply one of two or more possibilities, that dummies have to be used consistently for all sleep periods, or that the absence of a dummy is a marker for an unmeasured disruption in routine.

There are also conflicting data regarding dummy use and SIDS rates in various countries. For instance, although prone positioning was advised for Swedish infants in the 1980’s, the rate of SIDS in Sweden was low compared to other Nordic countries [161, 232]; the high (70%) prevalence of dummy [233] use may have been a contributing factor. In contrast, the UK has seen a halving in the use of dummies over the last 10 years from 51% [222] to 21% [24]; during the same period the incidence of SIDS has also declined by 50% [24]. This suggests that the decreased SIDS incidence in the past 10 years cannot be attributed to dummy use.

**Likely protective mechanisms of dummies**

Currently, the mechanisms whereby dummies provide protection are unclear. A study in one infant with micrognathia (small jaw) has provided evidence that airway size is increased when sucking on a dummy [234]. One major confounding factor for this mechanism being involved which needs to be addressed is that it has been reported that infants lose their dummy soon after falling asleep [166].

Two further mechanisms have been proposed as to why a dummy may be protective against SIDS. Firstly, protection may be related to effects on autonomic control and secondly dummies may also alter arousability from sleep, potentially increasing arousability. There is only one study investigating the effects of dummies on cardiovascular control and this study suggested that sucking on a dummy may in some way alter cardiovascular control, with sucking periods being associated with increased sympathetic activation, whilst during non-sucking periods infants who used a dummy had decreased sympathetic activation and increased parasympathetic activation of heart rate compared to infants who had never used a dummy [235]. The authors suggested that sucking on a dummy may contribute to the resetting of cardiac autonomic tone, thereby improving behavioural responses to environmental stresses, and thus improving survival.

There is contradictory evidence for the effects of dummies on infant arousability, with one study reporting that infants were more arousable in active sleep (tests were not carried out in quiet sleep, a sleep state of inherent reduced arousability) when they used
a dummy [166], however a more recent study which examined both sleep states has shown no effects on arousability of dummy use [236].

**Potential disadvantages of dummies**

There are a number of concerns regarding other health issues with the use of dummies that need to be considered. The primary concern is that dummies may be associated with a decreased frequency and duration of breastfeeding. However, the studies that have investigated this have produced conflicting findings. Some studies have showed reduced exclusive and overall breastfeeding rates [237, 238]. In contrast, a recent Cochrane review of 2 randomised and quasi-randomised controlled trials comparing dummy use versus no dummy use in 1302 healthy full-term newborns who had initiated breastfeeding found no significant effects of dummy use [239]. The study found no differences in the proportion of infants exclusively breastfed at three months (risk ratio (RR) 1.00; 95% confidence interval (CI) 0.95 to 1.06) and at four months of age (RR 0.99; 95% CI 0.92 to 1.06). Also, there was no effect on the proportion of infants partially breastfed at three months (RR 1.00; 95% CI 0.97 to 1.02) and at 4 months of age (RR 1.01; 95% CI 0.98 to 1.03). However, this review was limited to healthy infants where breastfeeding was already established and concludes that ‘evidence to assess the short-term breastfeeding difficulties faced by mothers and long-term effect of pacifiers on infants’ health is lacking’.

A systematic review examining the association between dummies and breastfeeding included 29 studies: 4 randomised controlled trials (RCTs), 20 cohort studies, and 5 cross-sectional studies [240]. None of the RCTs found a significant difference in breastfeeding outcomes with the dummy/pacifier-related intervention. Seventeen of the observational studies reported an odds ratio, hazard ratio or relative risk of shortened duration or exclusivity of breastfeeding with dummy use, whilst some of the eight remaining studies found trends (statistically not significant) in the same direction. RCTs are generally considered as providing stronger evidence than observational studies, as the latter cannot prove the direction of causality, i.e., does dummy use lead to decreased breastfeeding or does decrease in breastfeeding, such as during weaning, lead to increased use of dummies? However, there is some concern that randomisation in RCTs of mothers to dummy use or non-use may not be truly representative of the behaviours and motivations typically seen in mothers who would make this decision on their own.

Another concern with dummy use is that of increased infection rates, particularly otitis media (ear infections) [241]. An intervention to limit use of dummies to bedtime was effective in reducing the incidence of otitis media by 33% in non-continuous users compared with continuous users [242]. A more recent study found similar rates of one or more episodes of otitis media between infants who used and did not use a dummy, however dummy users had more bouts of recurrent otitis media (16% versus 11%) compared with nonusers [243].

Another study found that there were more mother-reported episodes of cough, wheezing, earache, and diarrhoea/gastroenteritis among infants using dummies through 6 months of age [244]. Increased oral colonisation with Candida (a type of yeast) has also been reported in dummy users [245].
Finally, concern has been expressed about the possible detrimental effects of dummies on dentition in infants and young children [226]. Some dental malocclusions, notably posterior crossbite, have been found more commonly among dummy users than among nonusers. These differences disappeared after discontinuing dummy use [246]. It has been shown that infants not offered dummies were more likely to suck their fingers, a habit that is more difficult to break [247] and more likely to cause malocclusion [246]. The AAP Dentistry’s policy on oral habits states: “non-nutritive sucking behaviours (i.e., finger or pacifier sucking) are considered normal in infants and young children and usually are associated with their need to satisfy their urge for contact and security” [248]. The policy notes that dummies are unlikely to cause long-term problems if stopped by the age of 3 years. Others have recommended decreasing dummy use at the age of 2 years and discontinuation by the age of 4 to minimise the development of malocclusion [249].

Other advantages of dummy use have been reported. Dummy use has been shown to help reduce pain during painful procedures, as measured by reduction of crying [250, 251]. A review of 19 studies of preterm infants found that dummy users had a reduced length of hospital stay without any adverse outcomes compared with nonusers [252].

The current safe sleeping recommendations of some countries include the recommendation that a dummy be offered for sleep, however it is stressed that this should not be offered in breastfed babies until breastfeeding is established. The introduction of a dummy at 3-4 weeks of age may provide an additional protection when infants are at the peak age of SIDS risk (2-4 months of age). Breastfed babies who use dummies at this age may have added protection, however further studies to confirm this are needed [253]. In other countries dummies (pacifiers) are not discouraged but neither are they encouraged [16]. Parents and health professionals need to be made aware of the different arguments and the need to resolve issues regarding breastfeeding and causality.

Summary and recommendations (with level of evidence)

Dummy use is associated with a more than halving of the risk of SIDS. [6, 58, 123, 222-226, 228, 229]. (Level III-2 evidence)

18. Parents should be made aware that routine use of a dummy is protective against SIDS, however it is important to establish breast feeding first for 3-4 weeks. (Level III-2 evidence)

Infant immunisation and SIDS

The peak incidence of SUDI coincides at the time when infants are receiving their first triple antigen vaccinations. In the 1970’s there were case reports of infant deaths shortly after the diphtheria-tetanus-pertussis immunisation and there were concerns that there was a causal relationship. In 2003 the National Academy of Sciences in the USA reviewed the available data and rejected the idea that there was a causal relationship [254]. Additionally, large population case-control studies have found that fewer immunised infants die from SUDI, and thus immunisation is protective [255-257]. A recent meta analysis found that a multivariate OR for immunisation and SUDI to be 0.54 (95% CI 0.31-0.76), in other words the risk of SUDI is halved in immunised infants [258,
To examine the temporal relationship between SIDS and vaccination in 2012 a reanalysis of three of the case control studies included in the meta analysis was undertaken [260]. The study reported that there was neither an increased or decreased risk of SUDI in the early post-vaccination period, but that the risk was higher in both unvaccinated cases and controls [260]. The authors suggest that the earlier identified protective effect of vaccination was due to the inclusion of unvaccinated cases.

Summary and recommendations (with level of evidence)

No studies have shown a causal relationship between immunisation and SIDS and several have identified that immunised infants are protected from SIDS [255-259]. Reanalysis of the data using only vaccinated cases and controls showed that in the early vaccination period there was no effect of routine infant immunisation on the risk of SIDS [260].

20. Immunisation consistent with the standard schedule for Australian children should be recommended (Level III-2 evidence).

Emerging Issues

Infant sleeping bag use
More detailed studies need to be carried out to investigate the physiology of infants sleeping in infant sleeping bags and to investigate their effectiveness in reducing SIDS risk.

Use of baby hammocks for sleeping
There are no Australian safety standards for baby hammocks. In some hammocks a baby might roll to one side and end up with their face pressed against material they can’t breathe through. In a cot a baby lies flat, but in some hammocks the base may be so flexible a baby's chin could be pushed forward onto their chest making breathing difficult. Babies old enough to roll over have fallen out of hammocks, and babies have strangled in hammocks which have strings or cords. [HTTP://WWW.CYH.COM/HEALTHTOPICS/HEALTHTOPICDETAILS]. To date there appears to be no literature on the safety of infants sleeping in hammocks or on infant physiology during sleep in hammock but they are not recommended by SIDS and Kids.

Use of baby carrying slings
Slings are carriers that allow an adult to carry an infant hands-free. The sling straps around the adult’s neck, allowing the infant to lie in front of the adult, curved in a C-shape position. Babies can suffocate lying with a curved back with the chin resting on the chest or the face pressed against the fabric of the sling or the wearer’s body. At particular risk from these products are babies with a low birth weight, those that were born prematurely, or have breathing issues such as a cold. Injuries can also occur from the baby falling from the sling when the caregiver trips and falls; the product malfunctions or its hardware breaks; or the baby slips and falls over the side. Advice on the safe use of baby slings can be found at: [HTTP://WWW.PRODUCTSAFETY.GOV.AU/CONTENT/INDEX.PHTML/ITEMID/986870/FROMITEMID/989114] and
If parent’s choose to carry baby in a sling, at all times they must ensure that:
• baby’s airways are clear at all times
• they can see their baby’s face

Swaddling devices
If parents choose to swaddle their infant from birth then they should follow advice from SIDs and Kids on “Safe Wrapping” [http://www.sidsandkids.org/safe-sleeping/safe-wrapping/](http://www.sidsandkids.org/safe-sleeping/safe-wrapping/).

Recommended fabrics for wrapping include a muslin or light cotton sheet or wrap. Bunny rugs and blankets are not as safe for wrapping as they may cause over-heating. Devices which use velco to securely wrap the baby are not recommended as there is a risk that if the infant turns prone or their face becomes covered in bedding they cannot move to escape potentially suffocating positions as their movements have been severely restricted. Several deaths of infants placed in these devices have been reported in the USA. Currently there is little evidence of the safety of these devices which are being widely sold in baby shops.

Advice to substance abusing mothers to breastfeed their infant.
Illicit substance use and dependence in pregnancy has been associated with a significant increase in obstetric complications, neonatal morbidity and mortality. Problems such as preterm labour, antepartum haemorrhage, intrauterine growth restriction (IUGR) and Neonatal Abstinence Syndrome (NAS) are not uncommon and infants are more likely to be admitted to Special Care Nursery (SCN) as a result [261]. Infants exposed to substances including maternal smoking during and after pregnancy are at higher risk of SIDS [57]. Many illicit drugs and also prescribed drugs can cause drowsiness and reduced responsiveness in parents and may be passed to the infant via breast milk. Potential risks to the infant need to be weighed against the potential benefits of breast feeding in such circumstances [261]. Currently there is little evidence about the effects of most drugs whether they are illicit or prescribed on infants via breastfeeding.
References


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### Table 1  NHMRC Evidence Hierarchy: designations of ‘levels of evidence’ according to type of research question (including explanatory notes)

<table>
<thead>
<tr>
<th>Level</th>
<th>Intervention</th>
<th>Diagnostic accuracy</th>
<th>Prognosis</th>
<th>Aetiology</th>
<th>Screening Intervention</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>A systematic review of level II studies</td>
<td>A systematic review of level II studies</td>
<td>A systematic review of level II studies</td>
<td>A systematic review of level II studies</td>
<td>A systematic review of level II studies</td>
</tr>
<tr>
<td>II</td>
<td>A randomised controlled trial</td>
<td>A study of test accuracy with an independent, blinded comparison with a valid reference standard, among consecutive persons with a defined clinical presentation</td>
<td>A prospective cohort study</td>
<td>A prospective cohort study</td>
<td>A randomised controlled trial</td>
</tr>
<tr>
<td>III-1</td>
<td>A pseudorandomised controlled trial (i.e. alternate allocation or some other method)</td>
<td>A study of test accuracy with an independent, blinded comparison with a valid reference standard, among non-consecutive persons with a defined clinical presentation</td>
<td>All or none</td>
<td>All or none</td>
<td>A pseudorandomised controlled trial (i.e. alternate allocation or some other method)</td>
</tr>
<tr>
<td>III-2</td>
<td>A comparative study with concurrent controls:  - Non-randomised, experimental trial  - Cohort study  - Case-control study  - Interrupted time series with a control group</td>
<td>A comparison with reference standard that does not meet the criteria required for Level II and III-1 evidence</td>
<td>Analysis of prognostic factors amongst persons in a single arm of a randomised controlled trial</td>
<td>A retrospective cohort study</td>
<td>A comparative study with concurrent controls:  - Non-randomised, experimental trial  - Cohort study  - Case-control study</td>
</tr>
<tr>
<td>III-3</td>
<td>A comparative study without concurrent controls:  - Historical control study  - Two or more single arm study  - Interrupted time series without a parallel control group</td>
<td>Diagnostic case-control study</td>
<td>A retrospective cohort study</td>
<td>A case-control study</td>
<td>A comparative study without concurrent controls:  - Historical control study  - Two or more single arm study</td>
</tr>
<tr>
<td>IV</td>
<td>Case series with either post-test or pre-test/post-test outcomes</td>
<td>Study of diagnostic yield (no reference standard)</td>
<td>Case series, or cohort study of persons at different stages of disease</td>
<td>A cross-sectional study or case series</td>
<td>Case series</td>
</tr>
</tbody>
</table>
Explanatory notes

1 Definitions of these study designs are provided on pages 7-8 How to use the evidence: assessment and application of scientific evidence (NHMRC 2000b).

2 The dimensions of evidence apply only to studies of diagnostic accuracy. To assess the effectiveness of a diagnostic test there also needs to be a consideration of the impact of the test on patient management and health outcomes (Medical Services Advisory Committee 2005, Sackett and Haynes 2002).

3 If it is possible and/or ethical to determine a causal relationship using experimental evidence, then the ‘Intervention’ hierarchy of evidence should be utilised. If it is only possible and/or ethical to determine a causal relationship using observational evidence (ie cannot allocate groups to a potential harmful exposure, such as nuclear radiation), then the ‘Astrology’ hierarchy of evidence should be utilised.

4 A systematic review will only be assigned a level of evidence as high as the studies it contains, excepting where those studies are of level II evidence. Systematic reviews of level II evidence provide more data than the individual studies and any meta-analyses will increase the precision of the overall results, reducing the likelihood that the results are affected by chance. Systematic reviews of lower level evidence present results of likely poor internal validity and thus are rated on the likelihood that the results have been affected by bias, rather than whether the systematic review itself is of good quality. Systematic review quality should be assessed separately. A systematic review should consist of at least two studies. In systematic reviews that include different study designs, the overall level of evidence should relate to each individual outcome result; as different studies and study designs may contribute to each different outcome.

5 The validity of the reference standard should be determined in the context of the disease under review. Criteria for determining the validity of the reference standard should be pre-specified. This can include the choice of the reference standard(s) and its timing in relation to the index test. The validity of the reference standard can be determined through quality appraisal of the study (Whiting et al 2003).

6 Well-designed population based case-control studies (eg. population based screening studies where test accuracy is assessed on all cases, with a random sample of controls) do capture a population with a representative spectrum of disease and thus fulfil the requirements for a valid assembly of patients. However, in some cases the population assembled is not representative of the use of the test in practice. In diagnostic case-control studies a selected sample of patients already known to have the disease are compared with a separate group of normal/healthy people known to be free of the disease. In this situation patients with borderline or mild expressions of the disease, and conditions mimicking the disease are excluded, which can lead to exaggeration of both sensitivity and specificity. This is called spectrum bias or spectrum effect because the spectrum of study participants will not be representative of patients seen in practice (Mulherin and Miller 2002).

7 At study inception the cohort is either non-diseased or all at the same stage of the disease. A randomised controlled trial with persons either non-diseased or at the same stage of the disease in both arms of the trial would also meet the criterion for this level of evidence.

8 All or none of the people with the risk factor(s) experience the outcome; and the data arises from an unselected or representative case series which provides an unbiased representation of the prognostic effect. For example, no smallpox develops in the absence of the specific virus; and clear proof of the causal link has come from the disappearance of smallpox after large-scale vaccination.

9 This also includes controlled before-and-after (pre-test/post-test) studies, as well as adjusted indirect comparisons (ie. utilise A vs B and B vs C, to determine A vs C with statistical adjustment for B).

10 Comparing single arm studies ie. case series from two studies. This would also include unadjusted indirect comparisons (ie. utilise A vs B and B vs C, to determine A vs C but where there is no statistical adjustment for B).

11 Studies of diagnostic yield provide the yield of diagnosed patients, as determined by an index test, without confirmation of the accuracy of this diagnosis by a reference standard. These may be the only alternative when there is no reliable reference standard.

Note A: Assessment of comparative harms/safety should occur according to the hierarchy presented for each of the research questions, with the proviso that this assessment occurs within the context of the logic being assessed. Some harms are rare and cannot feasibly be captured within randomised controlled trials; physical harms and psychological harms may need to be addressed by different study designs; harms from diagnostic testing include the likelihood of false positive and false negative results, harms from screening include the likelihood of false alarm and false reassurance results.

Note B: When a level of evidence is attributed in the text of a document, it should also be framed according to its corresponding research question eg. level II intervention evidence, level IV diagnostic evidence; level III-2 prognostic evidence.

Six ways to sleep baby safely and reduce the risk of sudden unexpected death in infancy:

1. Sleep baby on back
   - Baby on back
   - Feet to bottom of cot
   - Blankets tucked in firmly

2. Keep head and face uncovered
   - Use a safe baby sleeping bag with fitted neck and armholes and no hood
   - Covering baby’s head or face increases the risk of sudden infant death

Sleeping baby on the side or tummy increases the risk of sudden infant death.
4. Safe sleeping environment night and day

- **Safe cot** (should meet current Australian Standard AS2172)
- **Safe mattress** — firm, clean, flat, right size for cot
- **Safe bedding** — soft surfaces and bulky bedding increase the risk of sudden infant death

**No soft surfaces or bulky bedding**

- pillow
- cot bumper
- lambs wool
- soft toy eg: teddy
- doona

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**Unsafe ‘X’ sleeping places**

Pictures with a ‘X’ are **NOT** safe sleeping places

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**6. Breastfeed baby if you can**

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**Six ways to sleep baby safely and reduce the risk of sudden unexpected death in infancy:**

- Sleep baby on back
- Keep head and face uncovered
- Keep baby smoke free before and after birth
- Safe sleeping environment night and day
- Sleep baby in safe cot in parents' room
- Breastfeed baby if you can

Special thanks to SIDS and Kids ACT and ACT Health and the Department of Disability, Housing and Community Services for original development.

For further information talk to your midwife, child and family health nurse or doctor; call SIDS and Kids in your state or territory on 1300 308 307 or visit www.sidsandkids.org

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