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An Integrated Analysis of Maternal-Infant Sleep, Breastfeeding and Sudden Infant Death Syndrome Research Supporting A Balanced Discourse

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Key Messages

- Sudden Infant Death Syndrome studies have often been interpreted as consistent with policies to exclude breastfeeding mothers from sleeping with their infants even in the absence of risk factors for infant death.
- Except for policy in the United Kingdom, the primary source of information to guide families on safe sleeping and breastfeeding that does not separate the mother and the child comes from breastfeeding support organisations.
- In the context of "breastsleeping" we can emphasize the magnitude of risk surrounding unsafe sleeping practices involving alcohol, drugs and sofas or chairs and have a more coordinated approach with public health strategists on how to best care for infants and keep them safe.

An Integrated Analysis of Maternal-Infant Sleep, Breastfeeding and Sudden Infant Death Syndrome Research Supporting A Balanced Discourse

Abstract

Breastfeeding and the place of sleep of the mother and the infant have been controversial internationally due to reported concerns for infant deaths despite the known benefits of exclusive and prolonged breastfeeding, which are increased by breastfeeding at night. The aims of this integrated analysis were to (a) review breastfeeding and maternal and infant sleep research literature via historical, epidemiological, anthropological and methodological lenses; (b) use this information to determine where we are currently in safeguarding both infant lives and breastfeeding; and (c) postulate what direction research might take from this point forward to improve our knowledge and inform our policy and practice. Despite well-meaning but unsuccessful campaigns in some countries to dissuade parents from sleeping with their babies, many breastfeeding mothers and caregivers do sleep with their infants whether intentionally or unintentionally. Data supports policies to counsel parents and caregivers on safe sleep practices including bed-sharing in non-hazardous circumstances, particularly in the absence of parental smoking, recent parental alcohol consumption or sleeping next to an adult on a sofa, taking cultural contexts and socio-ecological circumstances into consideration. Further research with appropriate methodology is needed to drill down on actual rates of infant deaths paying close attention to the definitions of deaths, the circumstances of the deaths, and confounding factors to ensure we have the best information on which to derive public health policy. Introduction and use of the concept of "breastsleeping" is a plausible way to remove the negative connotations of "co-sleeping" and redirect ongoing data-driven discussions and education of best practices of breastfeeding and sleep.

Background

The matter of breastfeeding and the place of sleep of the mother and the infant has been and remains a contentious issue in maternal-child health globally. The aims of this paper were to review the literature associated with this topic using an historical, epidemiological, anthropological and methodological lens and then, with this information determine where we are now in safeguarding both infant lives and breastfeeding as well as what direction research might take from this point forward to improve our knowledge and inform our policy and practice.

History and Background to Current Debate

This is an issue of relevance for mothers and their babies and other caregivers throughout the world. The bed-sharing debate ignited in the late twentieth century during a period of intense research seeking explanations for unexplained infant deaths (known as SIDS or Sudden Infant Death Syndrome) that occurred during sleep and peaked during the second to third month of life. Although the cause of SIDS remains unknown, epidemiological studies identified a strong association with infant sleep position, leading to campaigns that informed parents to put babies to sleep on their backs (Gilbert, Salanti, Harden, & See, 2005). Further infant care practices in the sleep environment were intensely scrutinized in Western countries, for example the use of pacifiers, soft bedding, and infant head coverings.

Anthropologists noted how poorly Western sleep arrangements met the human infant's unique biological and behavioral needs (McKenna, 1986; Konner & Super, 1987), with babies predominantly sleeping alone in a crib in a separate room from their parents. As placental mammals, humans produce helpless young who require prolonged maternal post-natal care and lactation. This is especially characteristic of the human infant who is born neurologically the least mature primate of all, the most dependent on the caregiver for bodily regulation, and for the

longest period of time. Human milk follows the typical primate composition: low in protein and fat, but high in sugar (Jelliffe & Jelliffe, 1978). Cross-cultural studies emphasize that in most traditional societies, infants are maintained in physical contact with their mother day and night, experience frequent arousals during sleep, and suckle on demand throughout the first year of life (Ball, 2007). In contrast, social and cultural changes in industrial and post-industrial societies have encouraged solitary and prolonged sleep periods from an early postnatal age, and which are now considered characteristic of Western cultures (McKenna, Ball, & Gettler, 2007).

Against this backdrop anthropologists hypothesized that one explanation for SIDS could be the unusual practice of separating babies and mothers at night (McKenna, 1986; Konner & Super 1987; McKenna et al 1993a). That infants undergo dramatic changes in their breathing control around 3 months of age makes them particularly vulnerable to unpredictable breathing cessation (Mosko, Richard, & McKenna, 1997). SIDS researchers were investigating suppressed infant arousals and breathing pauses (apnea) as potential precursors to unexpected infant deaths when McKenna proposed that infants experiencing close sleep contact may be protected from apneic pauses and blunted arousal by maternal sounds, movements, and breathing (McKenna et al., 1993b). In a series of polysomnographic studies of breastfeeding mothers and babies McKenna and colleagues demonstrated that sleep contact between them promoted regular night-time interaction and lighter stages of sleep, with fewer obstructive apneas (McKenna, Mosko, Dungy, & McAninch, 1990; Mosko, McKenna, Dickel, & Hunt,1993; Mosko, Richard, & McKenna, 1997a; Mosko, Richard, & McKenna, 1997b). This led him to propose that mother-baby co-sleeping was adaptive for breastfeeding dyads and helped to protect babies from SIDS. However, epidemiologists studying sudden infant deaths were encountering different patterns in their data that indicated mother-baby co-sleeping was associated with increased risk (Mitchell &

Scragg, 1993). To them the notion that mothers and babies might choose to sleep together was inherently problematic. The ensuing discourse, debate and disagreements about the role of mother-infant sleep contact in reducing or increasing sudden and unexpected infant deaths has continued for over three decades.

The progression of the discussion over co-sleeping, breastfeeding and SIDS has been an iterative one involving negotiation and re-negotiation of research foci, data collection methods, variable definitions, and ever-closer interrogation of more detailed data sets. The more carefully the details are examined, the clearer it becomes that the answer to the simple question of whether mother-infant sleep contact is a good or bad thing is 'It depends' (Ball, 2017a).

Epidemiology of Bed-sharing

Prolonged physical contact between parents and infants during sleep is a normal infant care behavior in many different cultures and despite previous assumptions to the contrary is commonly practiced in Western society. In England, almost half of all neonates bed-share at some time with their parents, and a fifth of infants are brought into the parental bed on a regular basis over the first year of life (Blair & Ball, 2004). In the US bed-sharing prevalence peaks in early infancy declining with increasing age (Blair & Ball, 2004; McCoy et al., 2004; Blair, Heron, & Fleming, 2010; Colson et al., 2013). Older data from the US National Infant Sleep Position Study (Willinger, Ko, & Hoffman, 2003) found over 40% of 8000 parents reported their infants slept with them in an adult bed. The strongest predictors of bed-sharing in the US were being Black or Asian, breastfeeding, having a mother younger than 18 years of age, and low household income. An increase in bed-sharing between 1993 to 2000 was associated with maternal age>18 years, self-identification as White or Asian, infant age older than 8 weeks, and term infants with normal birth weight. More recently in the United States, about 21% of all

mothers and more than 25% of Hispanic mothers report bed-sharing for some or all of the night (Smith et al., 2016), although no doubt especially in the United States (US) this likely represents a significant undercount given the fact that the condemnation of bed-sharing and bed-sharing families makes it difficult for families to be honest about where their infants actually sleep.

Bed-sharing and Breastfeeding

A strong relationship between bed-sharing and breastfeeding was demonstrated in multiple studies, suggesting that a 'Never Bed-share' message may not only hinder maternal and child health promotion by impeding breastfeeding (Ball, 2003; Bartick & Smith, 2014), but also SIDS reduction itself, as breastfeeding has been associated with a greatly reduced risk of SIDS (Hauck, Thompson, Tanabe, Moon, & Vennemann, 2011; Thompson et al., 2017). It also became clear that although bed-sharing has been associated with particular cultural contexts and socio-ecological circumstances (Luijk et al., 2013; Salm Ward & Doering, 2014) SIDS rates were extremely low in some of these settings (e.g., Ball et al., 2012).

Epidemiology of Sudden Infant Death Syndrome and Bed-sharing

Although flagged as a potential risk factor three decades ago (Mitchell & Scragg, 1993), the definitions of 'bed-sharing deaths' varied widely, encompassing sofa-sharing, sleep-sharing with siblings or pets, and babies returned to a crib (Côté, 2006). Furthermore, control families' reports of 'bed-sharing' were not collected using standard definitions, and ranged from 'usual behavior', to sleep location on a particular night (or part of the night), to ever sharing a sleep surface. Data were not comparable between studies, or even between cases and controls in the same study (Ball, Hooker, & Kelly, 1999; Ball, 2007). Potential interactions between bed-sharing and hazardous circumstances such as sleeping next to parents who smoked, drank alcohol or used a sofa for the sleep started to emerge (Blair, 2009) but carried different weight in national

risk reduction campaigns. The relationship between bed-sharing and SIDS was revealed to be more complex than that initially assumed (Fetherston & Leach, 2012; Ball & Volpe, 2013) and the approach on how we advise parents diverged to both strict guidance to avoid bed-sharing to acknowledging bed-sharing happens and discussing when this may not be appropriate.

Although commonly known as 'cot death' or 'crib death', SIDS can occur in any infant sleeping environment and has increasingly been discovered to occur more often in shared sleeping spaces than expected. Recent observational case-control studies suggest as much as half of the SIDS deaths take place when infants sleep alongside an adult (Vennemann et al., 2012). This rather alarming proportional rise in SIDS deaths outside the cot has led some countries to recommend against bed sharing including the American Academy of Pediatrics (AAP) since 2005 (American Academy of Pediatrics, 2005; Moon, 2016a). A meta-analysis of 11 SIDS case-control studies published in 2012 showed a pooled three-fold increased risk associated with bed-sharing although this did not reach significance in older infants (>12 weeks) or those not exposed to tobacco smoke (Vennemann et al. 2012). Longitudinal data from Avon in England of 300 consecutive SIDS deaths over a 20-year period show that the proportional rise in bed-sharing SIDS deaths does not equate to a numerical increase (Blair, Sidebotham, Berry, Evans, & Fleming, 2006). The striking feature in this unique dataset is the seven-fold fall in deaths occurring in the cot (Figure 1). SIDS deaths in the parental bed also fell by half over this time-period but increased proportionally as part of the whole. Why the 'Back to Sleep' campaign (American Academy of Pediatrics, 2019) was less effective among bed-sharing deaths is not clear although data from the Avon cohort (Blair et al., 2006) and subsequent studies (Blair et al., 2014) suggested placing infants prone to sleep was far more common among those sleeping alone rather than those sleeping with someone. This may partly explain the inherent protection of

breastfeeding against SIDS in that to initiate or enable this a process infants are more likely to be placed supine and that the exposure of risk while bed-sharing may thus lay elsewhere. Notably the only sleeping environment in which the SIDS deaths increased during these 20 years was infants found sleeping next to a parent on a sofa. This is particularly important to observe because any caregiver who wants to avoid the potential risk of bringing the baby into bed to breastfeed and inadvertently falling asleep may put the infant at greater risk by getting out of bed and sitting in a chair or on a sofa.

Significant interactions providing hazardous exposure to the infant

The interaction between maternal smoking and bed-sharing as a risk for SIDS was first identified by Mitchell and colleague's large 1993 New Zealand study (Scragg et al., 1993) and has been confirmed in their most recent study in 2017 (Mitchell et al., 2017). The risk among infants bed-sharing next to mothers who smoked was more than four-fold (OR = 4.55 [95% CI: 2.63 to 7.88]) compared to no risk among infants sleeping next to non-smoking mothers (OR = 0.98 [95% CI: 0.44 to 2.18]). Similar findings were observed in subsequent studies. It is not clear why this exposure would put the infant at risk; innate vulnerability due to fetal exposure of tobacco smoke during pregnancy, postnatal prolonged passive exposure or a proxy marker for some other unmeasured risk-taking parental behavior have all been postulated but little further evidence has been provided. Significant interactions have also been observed between bed-sharing and parental use of alcohol or drugs prior to the last sleep and using a sofa to sleep with the infant (Blair et al., 2009). A combined analysis from two English studies (Blair et al., 2014) suggested an 18-fold increase in SIDS deaths if an infant sleeps next to an adult who drinks more than two units of alcohol or an infant sleeps with an adult on a sofa. Both hazardous circumstances are suggestive that overlaying is a potential causal explanation for these SIDS

deaths although it is difficult to verify a causal classification using current post-mortem techniques. Noticeably, the exposure of these two hazardous circumstances was very rare amongst the controls (<1%) suggesting these practices are potentially lethal. Researchers report of an observational study of nearly 8,000 sleep-related infant deaths in 24 US states from 2004 to 2012 showed that over 800 occurred while the infants slept with an adult on a sofa (Rechtman, Colvin, Blair, Moon, 2014). The diagnoses of these deaths were fairly evenly split between SIDS, ill defined and accidental suffocation and strangulation in bed (ASSB) suggesting the prevalence of sofa-sharing deaths is far higher than first reported in observational SIDS studies. Bed-sharing SIDS victims are younger than those infants found in cots/cribs, and other potential characteristics that may lead to increased risk include the use of pillows near the infant, parental exhaustion, vulnerable low birthweight or premature infants, not breastfeeding, and lack of provision for a cot/crib, although further evidence is needed for these factors.

The Risk of Bed-sharing in Non-Hazardous Circumstances

The combined analysis from England suggested there was no risk of bed-sharing in the absence of three particular hazards—parental smoking, recent parental alcohol consumption or sleeping next to an adult on the sofa. A sub-group analysis in the same study limited to younger infants (under 12 weeks) increases the observed risk (OR=1.62 [95%: 0.96 to 2.73]) but this did not become significant (Blair et al., 2014). In contrast, a similar combined analysis showed a five-fold increased risk associated with younger infants bed-sharing in non-hazardous circumstances. However, the idealized reference group used was breastfed infants placed on their back to sleep in a separate room by non-smoking parents in the absence of any other risk factors. This renders this quantification as uninterpretable as these two groups are not comparable despite this assumption (Carpenter et al., 2013). The AAP (Moon, 2016b), in their review of the

evidence to support their 2016 guidelines, concluded that the data from these two different analyses do not support a definitive conclusion that bed-sharing among the youngest infants is safe, even under less hazardous circumstances. In contrast a 2014 review of these two analyses by the independent body NICE (National Institute for Health and Care Excellence, 2014a) in the UK concluded that bed-sharing in itself is not causal and that parents need to be informed of the specific hazards associated with this practice.

Benefits of Bed-sharing

When parents are interviewed about sleeping with their baby they give various reasons for doing so (Ball, 2002; McKenna & Volpe, 2007; Ateah & Hamelin, 2008; Culver, 2009; Crane & Ball, 2013). Their answers express deeply-rooted cultural or religious beliefs and parenting philosophies, invoke the physiological links between lactation and night-time breastfeeding, and reflect the biological compulsion that drives the urge for close contact (Salm-Ward, 2015). On a practical level they explain that sleeping with the baby makes night-time care easier, helps them to monitor the baby, provide comfort, and yet obtain sleep (Ball, 2002; Ball, 2003; Rudzik & Ball, 2016). Sometimes parents report having nowhere else to put their baby at night, or that they have fallen asleep with their baby unintentionally.

For breastfeeding mothers all the above reasons may apply, so it is unsurprising that the largest group of bed-sharers around the globe are breastfeeding mothers. Of 34 studies exploring maternal reasons for co-sleeping 26 reported breastfeeding as the key (Salm-Ward, 2015). Bed-sharing facilitates night-time breastfeeding, is associated with more frequent night-time feeds (which promotes milk production taking advantage of the physiological prolactin surge), and with more months of breastfeeding. The observed association between bed-sharing and greater breastfeeding duration was demonstrated in Brazil where researchers investigated breastfeeding

outcomes at 12 months by interviewing mothers of infants at birth (*N*=4231), 3 and 12 months about their feeding and sleeping arrangements. Breastfeeding prevalence at 12 months was 59% for those who bed-shared (habitually for all or part of the night) at 3 months and 44% for those who did not. Among infants exclusively breastfed at 3 months, 75% of bed-sharers were still breastfed at 12 months, versus 52% of non-sharers (Santos, Mota, Matijasevich, Barros, & Barros, 2009). Although the authors accepted these results as evidence that bed-sharing protects against early weaning, the association did not reveal the direction of causality. In the UK a similar association was found with mothers being twice as likely to still be breastfeeding 6 months post-birth, if they commenced bed-sharing within the first 3 months, than if they did not; however in this study strength of intent to breastfeed had been assessed in early pregnancy and it was found that mothers who chose to bed-share were those with the strongest intent to breastfeed to 6 months or beyond (Ball et al., 2016). These data are consistent with the interpretation that bed-sharing is a strategy used by breastfeeding mothers to reduce the costs (e.g. sleep disruption) of prolonged breastfeeding (Tully & Ball, 2013). Prevention of bed-sharing is therefore likely to undermine breastfeeding goals (Ball 2003).

With regard to maternal sleep, numerous studies have confirmed that although bed-sharing breastfeeding mothers wake frequently to feed, they also wake for shorter periods, fall back to sleep more rapidly (Mosko et al., 1997b), and achieve greater sleep duration (Quillin, & Glenn, 2004), when compared to those not bed-sharing. Mothers choose to bed-share to make night-time care easier and reduce sleep disruption, particularly when breastfeeding (Ateah et al., 2008; Rudzik et al., 2016). Although many breastfeeding mothers report having been told that bed-sharing is 'wrong', almost every breastfeeding mother sometimes falls asleep with her baby, in bed, in a chair, or on a couch, regardless of whether or not she considers herself to be a 'bed-

sharer'. It is vital, therefore, that all health professionals who support breastfeeding mothers are well informed about the issues surrounding sleep-sharing and can help new mothers make sense of how the research evidence relates to their own situations.

The Concept of Breastsleeping

In 2016 Mobbs and colleagues described the need for, and benefits of, immediate and sustained contact, including co-sleeping, to establish an appropriate foundation for optimal human infant breastfeeding, neonatal attachment and brain growth. In further support of this model, and building upon existing knowledge of breastfeeding and sleep data, McKenna and Gettler (2016) proposed the concept, 'breastsleeping', with which they aimed to help resolve the bed-sharing debate and to distinguish the known and potential differences between breastfeeding–bed-sharing dyads and non-breastfeeding–bed-sharing situations, particularly when breastfeeding–bed-sharing is practiced in the absence of all known hazardous factors. They argued that, because breastfeeding "is so physiologically and behaviorally entwined and functionally interdependent with forms of co-sleeping" (McKenna & Gettler, 2016, pg. 17) that a new term 'breastsleeping' would encourage acknowledgment of the following components:

(i) the critical role that immediate and sustained maternal contact plays in helping to establish optimal breastfeeding (Ball, 2017b; Ball & Russell, 2012; Ball, 2008);

(ii) normal, human (species wide) infant sleep parameters should only be derived from studies of breastsleeping dyads because of the ways maternal–infant contact affects the delivery of mother's milk, the milk's ingestion, the infant's concomitant and subsequent metabolism and other physiological processes, maternal and infant sleep architecture, including arousal patterns, (McKenna et al., 1990; Mosko et al., 1997a;

Mosko et al 1997b) as well as breastfeeding frequency and prolongation (Ball et al., 2016; Ball et al., 2006); and

that breastsleeping by mother–infant pairs appears to involve substantially different behavioral and physiological characteristics compared with never-breastfeeding mothers and infants, that this dyadic context must be more closely researched and more carefully understood, and potentially distinguished as a separate epidemiological category for the purpose of benefit and risk assessment (Baddock et al 2019; Ball 2006; Mobbs et al., 2016; McKenna, 2016).

As can be seen, there have been a number of studies done over the past 20 or more years, attempting to look at the relationships of maternal/caregiver sleep, hazardous risk factors, breastfeeding, and infant death. Many are limited by poor or inadequate data collection (e.g., unclear where baby was positioned and in what position—bed, sofa, at the time of death or what part of the night); confounders like cigarette smoking, drug and alcohol use not collected; and cultural and socioecological factors that differ between populations that must to be considered. There are many factors that we do know. We know the benefits of human milk and breastfeeding to infants and their mothers, and that these are dose-dependent; that breastfeeding through the night makes physiological sense because the one largest prolactin surge in 24 hours occurs in the middle of the night; that breastfeeding through the night is associated with higher rates of exclusive breastfeeding and longer duration of breastfeeding, with leads to higher doses of human milk. So, it is not a huge leap to accept that safe breastfeeding through the night, that does not lead to an increase in infant death, hence “breastsleeping”, is desirable. With current data, correctly interpreted, we are able to say this and develop public policy, in line with that already in place in the United Kingdom, to support families to safely sleep with and breastfeed their infants through the night. This concept is a potential game-changer given the current polarised

debate on what we should be advising parents. In many places healthcare providers, including physicians, nurses, and International Board Certified Lactation Consultants are hampered by current policy in not being able to counsel families on safe sleep practices. This evokes fear of sleeping on the safe surface of their bed and puts these families at risk of getting out of bed to feed their baby on a chair/sofa, falling asleep there instead, a significantly more unsafe place. The onus is on us to call for better designed studies, with adequate interpretation and appropriate translation into public policy for the safety of families globally.

Risk-reduction Strategies

Different strategies have been adopted to advise parents on bed-sharing over the last decade. One is to advise against bed-sharing which has been adopted in some countries like the US since 2005 (Table 1) (American Academy of Pediatrics, 2005; Moon, 2016a). Another strategy, adopted in some countries, for example the UK (Table 2), is to acknowledge that bed-sharing occurs either intentionally or unintentionally and it is appropriate to discuss the circumstances when it would be risky to bedshare (National Institute for Health and Care Excellence, 2014b).

The US strategy has the advantage of being a clear direct message to the public and perceived to be an easier one to get across. Despite campaigns to decrease bed-sharing in some States, bed-sharing has increased in the US in recent years, especially among black and Hispanic communities (Colson et al., 2014). Taking into account the potential diagnostic shift currently happening in the US from SIDS to Accidental Suffocation and Strangulation in Bed (ASSB), the combined sudden unexpected infant death rate (SUID) appears to be almost flat-lining (Figure 2) (CDC/NHCHS, 2019). There is now recognition that current AAP (2016) recommendations about bed-sharing are not being followed, as widely as hoped, due to the complexity of the

practice and reasons for choosing it. Bed-sharing is a culturally ingrained infant care practice and in some low income communities, used to keep infants safe (Joyner, Oden, Ajao, & Moon, 2010), while others choose to bedshare to facilitate breastfeeding. In one trial using enhanced messaging with high-risk families to avoid bed-sharing, the prevalence of bed-sharing actually increased rather than decreased during (Moon et al., 2017).

Although the UK approach lacks the same simplicity as the US approach, it is more closely aligned to the evidence; acknowledging that bed-sharing happens means it can be discussed without judgement and specific hazardous situations or environments can be discussed (UNICEF UK, 2019). In the UK both the SIDS rate and combined SUDI rate have fallen over the last 10 years (Figure 3) (Office for National Statistics Great Britain, 2017), albeit it is not clear which elements of the risk reduction strategy have had the greater influence. The approach in the US in its most recent 2016 set of guidelines has been more nuanced; although they do not recommend bed-sharing they do acknowledge that mothers often fall asleep while breastfeeding their babies in bed, and advise that the parental bed should be prepared to avoid hazardous bedding should this occur (Moon, 2016a). The latest guidelines also advise that it is safer to breastfeed in bed at nighttime, compared with on sofas or armchairs, and strongly advise against the latter.

In New Zealand, the high SIDS rate among the Māori population, who often bed-share and where smoking rates are high, has led to an intervention based on the premise that the provision of a separate sleep surface deployed in a shared sleep environment would reduce the risk of hazardous bed-sharing. The *wahakura*, a woven flax bassinet-like structure and the Pēpi-Pod™, a plastic box of similar proportions, were introduced into SIDS/SUDI prevention efforts in 2006 and 2011, respectively (Abel, Tipene-Leach, 2013). The intervention involved the

distribution of these devices in high SUDI risk situations like smoking in pregnancy, and the provision of one-on-one counseling that heightened awareness of risk and promoted 'Safe Sleep'. Importantly, the acceptability of this change to a culturally valued practice has been enhanced by the appeal of 'reclaiming' a traditional Māori infant care practice (Abel, Stockdale-Frost, Rolls, & Tipene-Leach, 2015) and the fact that this device, placed in the shared bed, maintains the highly valued proximity of mother and infant. The high SIDS and SUDI rates in New Zealand have fallen dramatically since 2009, especially among Māori infants and in the areas with the most intensive Safe Sleep programs (Mitchell, Cowan, & Tipene-Leach 2016). Based on these results, the New Zealand Ministry of Health has recently adopted the Safe Sleep program as national policy.

The Way Forward

It is now clear that bed-sharing on its own does not substantially increase the risk of SIDS, but bed-sharing in conjunction with other hazardous circumstances—for instance smoking, alcohol consumption, drug use, and ad-hoc sleeping arrangements (e.g., sofa-sharing) are clearly implicated (Blair, Sidebotham, Pease, & Fleming, 2014), within a larger context of poverty and inequality (Bartick & Tomori, 2018). Different risk reduction strategies have been used in different populations, although there are signs that a mixed-strategy approach targeting certain populations may be more beneficial in the future. What is clear is that the negative rhetoric that eliminates any hope of honest, bi-directional conversations between bed-sharing parents and their health providers must cease and be replaced by an emphasis on the magnitude of risk surrounding unsafe sleeping practices involving alcohol, drugs and sofas/chairs and have a more coordinated approach with other public health strategists on how to best care for the infants as well as keep them safe.

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Dr. Helen Ball served on the 2014 NICE Guidance Update Committee on Co-sleeping & SIDS. She is Chair of the Lullaby Trust Scientific Committee and a Scientific Advisor to the Trust, and she has collaborated with both UNICEF UK Baby Friendly Initiative and Lullaby Trust in the production of safer sleep guidance for parents and health professionals in the UK. She has also served on the Board of ISPID (International Society for the Study and Prevention of Infant Deaths) and serves on the *JHL* Editorial Review Board.

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Table 1.

National Institute for Health and Care Excellence Guidance on Cosleeping and Sudden Infant Death Syndrome Issued for England and Wales (2014)

Co-sleeping and sudden infant death syndrome
The cause of sudden infant death syndrome (SIDS) is not known. It is possible that many factors contribute, but some factors are known to make SIDS more likely. These include placing a baby on her or his front or side to sleep. We need clear evidence to say that a factor directly causes SIDS. Evidence was reviewed relating to co-sleeping (parents or carers sleeping on a bed or sofa or chair with an infant) in the 1st year of an infant's life. Some of the reviewed evidence showed that there is a statistical relationship between SIDS and co-sleeping. This means that where co-sleeping occurs, there may be an increase in the number of cases of SIDS. However, the evidence does not allow us to say that co-sleeping causes SIDS. Therefore, the term association has been used in the recommendations to describe the relationship between co-sleeping and SIDS. The recommendations on co-sleeping and SIDS cover the 1st year of an infant's life.
1.4.47 Recognize that co-sleeping can be intentional or unintentional. Discuss this with parents and carers and inform them that there is an association between co-sleeping (parents or carers sleeping on a bed or sofa or chair with an infant) and SIDS.
1.4.48 Inform parents and carers that the association between co-sleeping (sleeping on a bed or sofa or chair with an infant) and SIDS is likely to be greater when they, or their partner, smoke.
1.4.49 Inform parents and carers that the association between co-sleeping (sleeping on a bed or sofa or chair with an infant) and SIDS may be greater with • parental or carer recent alcohol consumption, or • parental or carer drug use, or

• low birth weight or premature infants.

Adapted from https://www.nice.org.uk/guidance/cg37/chapter/1-Recommendations#maintaining-infant-health Retrieved April 28, 2019.

Table 2.

American Academy of Pediatrics Guidance on Bed-Sharing and Sudden Infant Death Syndrome and Other Sleep-Related Infant Deaths for the United States (2016)

It is recommended that infants sleep in the parents' room, close to the parents' bed but on a separate surface designed for infants, ideally for the 1st year of life, but at least for the first 6 months.

There is evidence that sleeping in the parents' room but on a separate surface decreases the risk of sudden infant death syndrome (SIDS) by as much as 50%. In addition, this arrangement is most likely to prevent suffocation, strangulation, and entrapment that may occur when the infant is sleeping in the adult bed.

Infants who are brought into the bed for feeding or comforting should be returned to their own crib or bassinet when the parent is ready to return to sleep.

Couches and armchairs are extremely dangerous places for infants. Sleeping on couches and armchairs places infants at extraordinarily high risk of infant death, including SIDS, suffocation through entrapment or wedging between seat cushions, or overlay if another person is also sharing this surface. Therefore, parents and other caregivers should be especially vigilant as to their wakefulness when feeding infants or lying with infants on these surfaces. Infants should never be placed on a couch or armchair for sleep.

The safest place for an infant to sleep is on a separate sleep surface designed for infants close to the parents' bed. However, the American Academy of Pediatrics acknowledges that parents frequently fall asleep while feeding the infant. Evidence suggests that it is less hazardous to fall asleep with the infant in the adult bed than on a sofa or armchair, should the parent fall asleep. It is important to note that a large percentage of infants who die of SIDS are found with their head

covered by bedding. Therefore, no pillows, sheets, blankets, or any other items that could obstruct infant breathing or cause overheating should be in the bed. Parents should also follow safe sleep recommendations outlined elsewhere in this statement. Because there is evidence that the risk of bed-sharing is higher with longer duration, if the parent falls asleep while feeding the infant in bed, the infant should be placed on a separate sleep surface as soon as the parent awakens.

There are specific circumstances that, in case-control studies and case series, have been shown to substantially increase the risk of SIDS or unintentional injury or death while bed-sharing, and these should be avoided at all times:

• Bed-sharing with a term normal-weight infant younger than 4 months or infant born preterm and/or with low birth weight, regardless of parental smoking status. Even for breastfed infants, there is an increased risk of SIDS when bed-sharing if younger than 4 months. This appears to be a particularly vulnerable time, so if parents choose to feed their infants younger than 4 months in bed, they should be especially vigilant to not fall asleep.

• Bed-sharing with a current smoker (even if he or she does not smoke in bed) or if the mother smoked during pregnancy.

• Bed-sharing with someone who is impaired in his or her alertness or ability to arouse because of fatigue or use of sedating medications (e.g., certain antidepressants, pain medications) or substances (e.g., alcohol, illicit drugs).

• Bed-sharing with anyone who is not the infant's parent, including nonparental caregivers and other children.

• Bed-sharing on a soft surface, such as a waterbed, old mattress, sofa, couch, or armchair.

- Bed-sharing with soft bedding accessories, such as pillows or blankets.

Adapted from Moon R. Y., & Task Force on Sudden Infant Death Syndrome. (2016a). SIDS and other sleep-related infant deaths: Updated 2016 recommendations for a safe infant sleeping environment. *Pediatrics, 138*(5). e20162938.

Figure 1. *SIDS deaths by sleeping environment (300 consecutive SIDS deaths in Avon, UK between 1984 and 2003)*

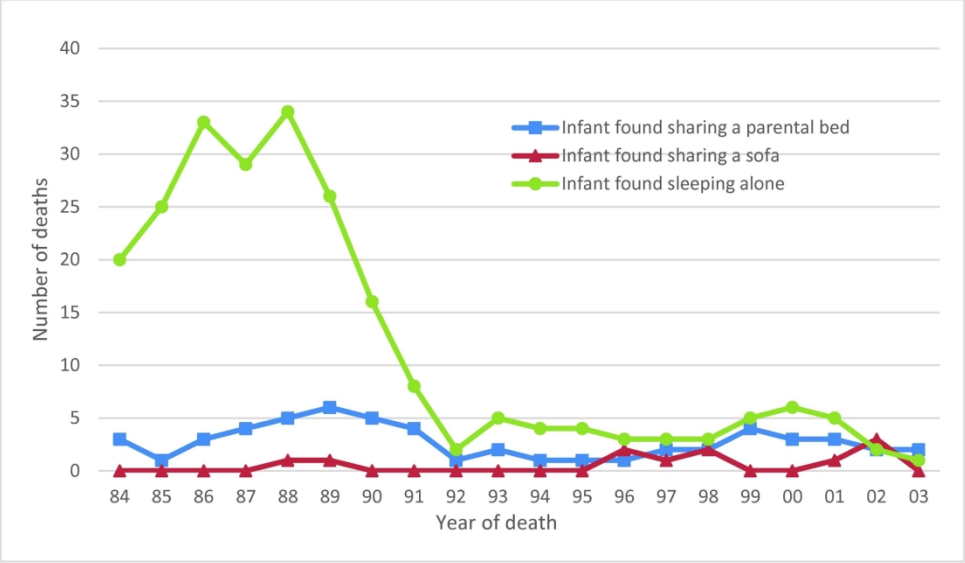


Figure 1. SIDS deaths by sleeping environment (300 consecutive SIDS deaths in Avon, UK between 1984 and 2003)

158x107mm (300 x 300 DPI)

Figure 2. *Trends in US Sudden Unexpected Infant Death by Cause, 1990-2017*

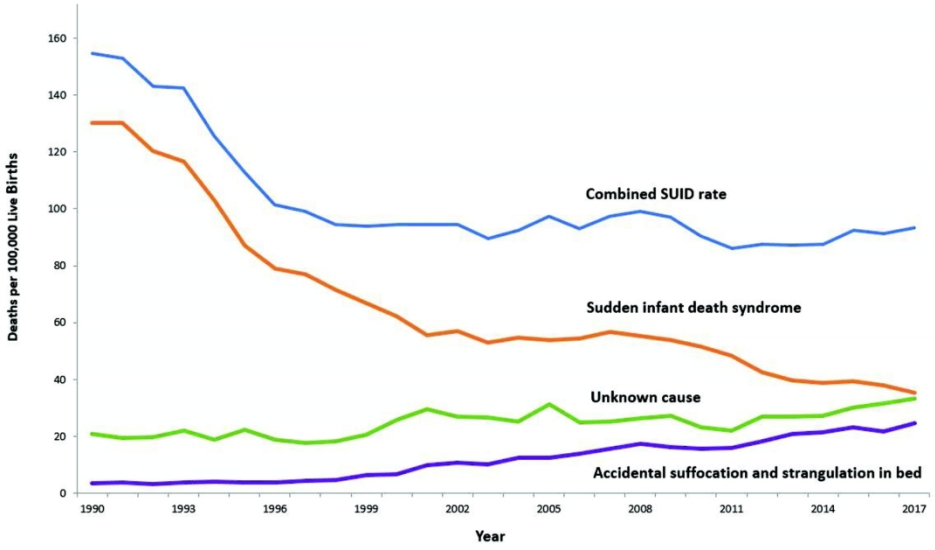
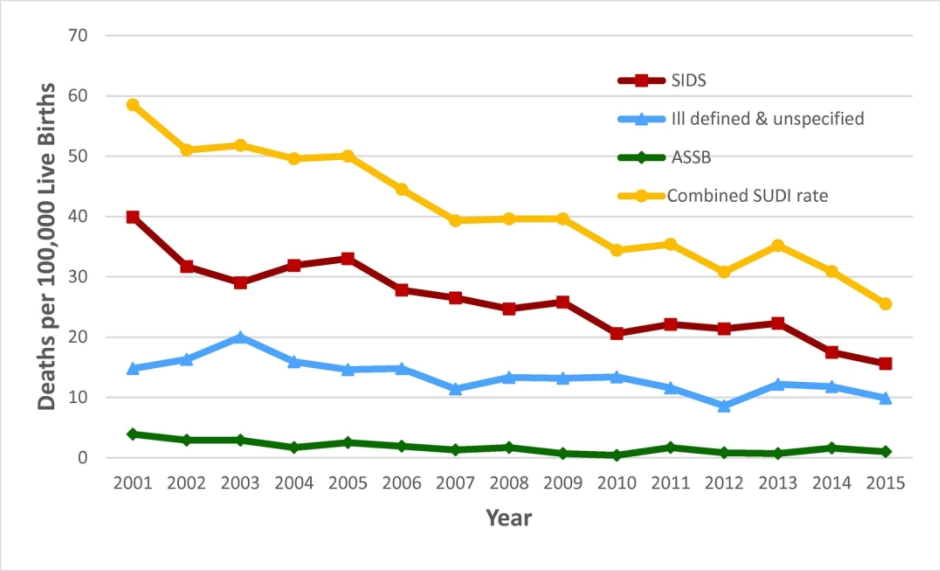


Figure 2. Trends in US Sudden Unexpected Infant Death by Cause, 1990-2017

171x111mm (300 x 300 DPI)

Figure 3: *England and Wales Trends in SIDS and SUDI (2000-2015)*



SIDS, Sudden Infant Death Syndrome

ASSB, Accidental Suffocation and Strangulation in Bed

SUDI, Sudden and Unexpected Infant Death

Figure 3: England and Wales Trends in SIDS and SUDI (2000-2015)

161x130mm (300 x 300 DPI)