Safe Infant Sleep

Molly K Ball, MD & Bryanne N Colvin, MD

There is a time for many words, and there is also a time for sleep.

—Homer

Learning Objectives:
1. State the prevalence of and factors associated with sudden unexpected infant death (SUID)
2. Educate parents and caregivers on published guidelines to optimize safety of the infant sleep environment
3. Address common parental concerns regarding SUID prevention

Primary Reference:

Editor’s Note: The primary reference provides a brief summary of the AAP recommendations. An AAP Technical Report, published simultaneously, provides a detailed discussion of the recommendations and the rationale behind them. It is listed at the end of the chapter and can found at https://doi.org/10.1542/peds.2022-057991.

CASE ONE:
You are discharging a newborn from the well newborn nursery. Belle E. Sleep is a healthy two-day-old full term baby girl. Her mother, Wanna, is 19 years old. This is her first child, she is a non-smoker and she had appropriate prenatal care. Wanna asks you how to prevent “crib death.”

1. What is the difference between SUID and SIDS? What is this infant’s risk of SIDS? What factors increase this risk?

Sudden unexpected infant death (SUID) is used to classify any unanticipated death occurring in an infant less than 1 year of age, either by unexplained (i.e., SIDS) or explained causes (e.g., suffocation, asphyxia, entrapment, infection, ingestions, metabolic disease, arrhythmia-associated cardiac channelopathies, trauma). Sudden infant death syndrome (SIDS) is defined as the sudden death of an infant which remains unexplained, despite autopsy, examination of the death scene, and review of clinical history. Overwhelmingly, deaths attributable to SIDS occur during or around sleep. Every year in the United States, 3500 infants—almost 10 babies each day—die of sleep-related deaths.

SIDS is currently theorized to involve the convergence of 3 critical factors: - exogenous stressors (which may be environmental factors resulting in unsafe sleep conditions) superimposed on inherent intrinsic vulnerability (i.e., dysfunctional or immature cardiorespiratory systems) during a critical period of infantile development. SIDS is uncommon before 1 month of age (those under 1 month represent only 10% of SIDS deaths), peaks between 1 and 6 months of age, and is rare after 8 months. Studies have identified several demographic risk factors for the development of SIDS: young maternal age, preterm birth, low birth weight, male sex, multiple births, multiple siblings, previous stillbirths, and non-Hispanic Black or American Indian/Alaska Native race. This persistent racial disparity in sleep-related deaths is important to acknowledge, as it mirrors national racial and ethnic socioeconomic and health disparities: longitudinal data demonstrate that relative to non-Hispanic white infants, the risk of both SIDS and sleep death by strangulation or suffocation among non-Hispanic Black and American Indian/Alaska Native infants is increased 2- to 3-fold. Potentially preventable risk factors for both SIDS and SUIDs include the prone (chest down) and side sleep positions, sleeping on a soft surface or on soft bedding, exposure to secondhand smoke during or after pregnancy, overheating, and bed-sharing (defined as adult(s) and

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infant sleeping together on any surface, including bed, couch, chair). The presence of an upper respiratory infection has also been found to increase the risk.

Studies have looked at multiple risk factors in combination. A population-based retrospective review of infants who died of SIDS demonstrated that only 0.8% of these infants had none of the risk factors examined. Most cases were seen in infants with more than one of the above-listed risk factors, highlighting the multifactorial nature of a safe sleep environment; this underscores the importance of providing comprehensive counseling and education regarding risk reduction strategies.

The incidence of SIDS in 1992 prior to the “Back to Sleep” campaign was 1.2/1000 live births, and following the campaign it gradually decreased along with all-cause infant mortality until 2001 to 0.56/1000 live births. Since 2001, the incidence of SIDS has remained relatively stable, with only a modest decrease to 0.38/1000 in 2020, possibly due to the stable prevalence of supine sleep positioning. There is much room for improvement, as a 2017 study found that only 77% of mothers “usually” and 49% “exclusively” used the supine position for infant sleep. However, rates of sleep-related deaths due to preventable causes (SUID), such as suffocation and asphyxia, have actually been increasing. The AAP infant sleep guidelines have expanded the focus from reduction of SIDS alone to reduction of all sleep-related infant deaths through establishment and maintenance of safe sleep environments.

2. What are the current guidelines for the prevention of sleep-related infant death and how have they changed?

In 1992, the AAP recommended any non-prone position (back or side-lying) as optimal for decreasing SIDS risk. Epidemiologically, this led to a significant decrease in SIDS deaths. However, since that time, Side-sleeping, was found to confer risk equal to or greater than prone positioning. Studies found side positioning to be unstable, with infants frequently rolling to the prone position. Additionally, a higher risk for sleep-related infant death was found among infants unaccustomed to prone positioning but who were placed or found prone during their last sleep. Therefore, in 2000, the AAP revised their initial recommendations to reflect that placing infants exclusively on their backs to sleep was the safest position. Over the past 20 years, revisions and updates to the AAP policy statement have expanded its scope to address comprehensive safety of the sleep environment. Moderators should review table 2 from the Primary Reference (summary of recommendations) with learners.

CASE continued:

As you begin to explain the AAP guidelines, Belle’s grandmother interjects, “I had 5 children and all of them slept on their tummies; Belle will do just fine on her tummy.”

3. How can you address common barriers to acceptance of the “Back to Sleep” campaign?

In a study published in Ambulatory Pediatrics, focus groups identified four major themes as barriers to supine positioning for infant sleep:

1. Safety - Caregivers were concerned about gagging and choking. They felt that prone positioning and sometimes bedsharing enabled them to both prevent choking and improve safety by allowing the milk to fall out of the babies’ mouths and permitting direct observation and assistance for the babies when gagging.
2. Comfort - Caregivers noted improved sleeping and perceived comfort when babies were in the prone position. They felt that back-sleeping resulted in increased awakenings and disturbances.
3. Advice - Study participants noted distrust in the advice given by health care providers and felt more comfortable with advice from experienced family members. They noted an inconsistent message from the health care community and a changing message throughout the years.
4. Knowledge - Several caregivers thought of SIDS as “crib death” and therefore avoided placing their children in cribs. Additionally, many did not recognize SIDS as a specific entity and had spiritual and religious beliefs about the deaths.

Many families turn to the internet for health education. Although the AAP widely publishes sleep recommendations, less than half of the internet resources (43.5%) found in a 2012 study contained...
accurate sleep-related information. Further, a recent study by Hirai, et al., demonstrated wide variability in reported caregiver receipt of comprehensive safe sleep education by their health provider, with only 48% reporting the recommendation to room-share but not bed-share. Such statistics highlight the need for health care providers to reliably and repeatedly educate all caregivers.

Racial and ethnic disparities in rates of sleep-related infant death speak to a complex interplay of cultural norms and inclusion in public health outreach efforts. For example, Mathews and colleagues found that African-American families heavily rely on trusted familial sources, such as grandmothers, to influence their sleep practices, and that prone sleep positioning is often the family norm. However, conversations with individual families and in public health messages may not account for the importance of multigenerational support.

In this case, you would want to explore with both Wanna and her mother their beliefs and understanding about the supine sleep position. To address the potential for distrust of the health care system and the reliance on experienced caregiver recommendations, it is important to include the extended family in the discussion and acknowledge the important role that extended family play in caring for a child. Nonjudgmentally, consider developing discrepancy between the family’s goals (e.g., of being a good parent, keeping baby safe, wanting to see the baby grow up) and the sleep-death risk associated with the behavior to which they are ascribing. Safety and knowledge can be addressed by a thorough and understandable explanation of the risks and benefits of each sleep position and how the incidence of SIDS decreased after the Back to Sleep campaign. The focus groups in the Ambulatory Pediatrics study mentioned that it is important for the health care provider to explain, using patient-centered language, the reasoning behind the recommendation in order to overcome adherence barriers; other studies have verified that anticipatory guidance on safe sleep does change behavior.

There are no data to support parental concerns about gagging and choking, and studies have demonstrated that normal babies are able to protect their airways. While parents often state that infants are more comfortable in a prone sleep position, increased infant arousals and awakenings have been shown to be protective and may actually be one reason that babies are safer sleeping on their backs. This should be discussed with the caregiver.

CASE continued:

As you explain, Wanna nods thoughtfully and appears to be listening closely. However, when you return to the safe sleep recommendations, she states, “I plan to breastfeed. I thought you should avoid pacifiers if you are breastfeeding. And I want her in my bed so she can be close to me at night.”

4. What is the evidence for breast feeding or feeding of human milk in reducing sleep-related infant death?

Breastfeeding is associated with a reduced risk of sleep-related infant death. While the mechanism for the reduction in risk is not yet clear, physiologic studies examining the differences between breast fed and formula fed infants show that breast fed infants are more easily-aroused during sleep than formula fed infants. Additionally, breast fed infants have a lower incidence of respiratory infections, which are associated with a higher incidence of SIDS. Furthermore, the protective effect of breast feeding is increased with both duration of breastfeeding and exclusivity. One meta-analysis found that any breast feeding for longer than 6 months had an adjusted odds ratio of 0.36 (95% CI: 0.22-0.61), and a separate meta-analysis showed that exclusive breast feeding had an unadjusted odds ratio of 0.27 (95% CI: 0.24-0.31)

Given the importance of breast feeding for not only prevention of sleep-related death, but also the multitude of other health benefits to the infant, Wanna should be encouraged in her decision to provide human milk to her baby. Following AAP recommendations, ideally Wanna should exclusively breast feed or provide expressed human milk for a minimum of 6 months, with a goal of continuing breast feeding for 1 year or longer as desired by mother and infant.
5. What is the evidence for pacifier use?

Multiple large studies have demonstrated the protective effect of pacifiers when used at the time of last sleep. Although the exact mechanism has yet to be identified, putative rationales include a reduction of arousal thresholds in infants sleeping with pacifiers, a more anterior position of the tongue with a pacifier in the mouth reducing the risk of obstructive apnea, or an improved ability to mouth breathe if the nasal passages are obstructed. Alternatively, there might be yet-unidentified factors which cause the reduced SIDS risk in infants who sleep with pacifiers. No matter the reason, a meta-analysis showed that infants using a pacifier at their last sleep had an adjusted odds ratio for SIDS of 0.39 (95% CI: 0.31-0.50) in multivariate analysis, indicating decreased odds of SIDS with pacifier use.

However, there is concern that use of pacifiers may impede breastfeeding; this represents a particularly important point to address since use of human milk represents one important recommendation to decrease sleep-related death risk in infants. Studies have shown conflicting results regarding an association between pacifier use and reduced breastfeeding duration. Both the AAP and La Leche League recommend waiting until breastfeeding is clearly established before introducing a pacifier in breastfed babies. This is defined as having a sufficient milk supply; consistent, comfortable, and effective latch for milk transfer; and appropriate infant weight gain as defined by established normative growth curves. Additionally, the AAP’s most recent recommendations specifically state that a pacifier can be offered but not forced, and need not be re-introduced if it falls out of the baby’s mouth while sleeping.

Other concerns surrounding pacifier use include the risk of dental malocclusion and development of otitis media. However, the American Academy of Pediatric Dentistry policy statement concludes that non-nutritive sucking (which would include pacifier use) under the age of three is unlikely to cause problems. There is some association between pacifier use and an increased incidence of otitis media, particularly with prolonged pacifier use through 2 to 3 years of age. Therefore, when the protective effect of a pacifier against sleep-related infant death is no longer relevant, the child should be weaned from the pacifier due to the ongoing increased risk of otitis media and dental malocclusion.

6. What is the difference between bed-sharing and co-sleeping? What is room-sharing? Which is safe?

In co-sleeping, the infant sleeps in the same room as an adult, either with the adult in the same bed (known as bed-sharing) or by herself in her own space (room-sharing). Since the term co-sleeping lacks critical clarity, the AAP recommends using the terms bed-sharing and room-sharing, and avoidance of the term co-sleeping to avoid confusion. There is growing evidence that room-sharing, but not bed-sharing, is protective against sleep-related death, and thus the AAP recommends that infants do sleep in a separate but proximate environment, such as a bassinet or a safety-approved co-sleeper (e.g., an infant bed attached to the parent’s bed), in the parent’s room, and is unable to recommend bed sharing under any circumstances in their 2022 update. If an infant is taken from the bassinet or co-sleeper to breast- or formula-feed, she should be returned to her own crib or bassinet when the parent is ready to sleep. However, data from two recent studies suggest that only about half of mothers follow this recommendation. Notably, in one of these studies, only 48.8% of women received advice from their provider to room-share without bed-sharing. This presents yet another opportunity for providers to impact families’ safe sleep practices.

Bed-sharing can be a controversial and emotional topic for families, and the practice may be ingrained in some community and family norms. For example, in a qualitative study of African-American and Native American families, Herman and colleagues found that many participants decided to bed-share because they were concerned about their infants’ safety, and felt bed-sharing helped protect their infants. Clinicians should partner with the family and attempt to obtain understanding about the context around a family’s motivation for infant sleep practices prior to offering advice.

Some studies have found a correlation between bed-sharing and death only in babies of mothers who smoke; however, it is worth noting that the associated risk reported among bed-sharing with a mother who smoked during pregnancy or is a current smoker to be 10 times greater than baseline bed-sharing risk. There are several studies demonstrating increased incidence of death with bed-sharing even among mothers that do not smoke. Infantile factors which have been demonstrated to confer significantly increased risk for bed-sharing sleep-related deaths include preterm or low birth weight infants (2-5 times
the risk of baseline parent-infant bed-sharing risk) and infants less than 4 months of age (5-10 times the risk of baseline bed-sharing). Parental factors include multiple bed-sharers, consumption of alcohol, illicit drugs, or sedating medications (10 times the risk of baseline bed-sharing), and bed-sharer being over-tired. Environmental risk factors include sleeping with infants in locations outside of the bed (10 times the risk of baseline bed-sharing). This last factor is critical, and providers should be sure to educate families about the increased risk sleeping with an infant on a couch, chair, or other sleep space.

Complicating the bed sharing debate, other experts and parents feel strongly that bed-sharing is important to strengthen maternal bonding and to facilitate breastfeeding, and it is a common practice for families to bed-share for at least part of the night (21.7% of families of infants 12-15 weeks of age in one study of over 3000 mothers). However, in a longitudinal study, Bilgen and Wolke found no associations with bed-sharing at 3 and 6 months of age and future attachment, bonding, or other developmental outcomes; outcomes were equivalent irrespective of bed-sharing behavior.

If a family chooses to bed-share with their baby despite your strong advice, you could focus on some important safety considerations outlined in the 2022 updated AAP Safe Sleep Recommendations. Bed-sharing should not be done with anyone but a parent (including a twin) or with multiple persons. Bed-sharing should not be done with infants who are preterm, have a low birth weight, or are less than 4 months old. Parents should be advised not to bed-share with babies if they are smokers, if the biological mother smoked during pregnancy, if they are excessively tired, or have ingested alcohol, drugs, or medications known to cause excessive drowsiness. Bed-sharing should be done on a firm bed mattress without space between the bed and the adjoining wall or headboard for the baby to become trapped, and never on a waterbed, couch, or armchair. Loose pillows and blankets should be avoided, or at least be far from the baby’s face, and the baby should be supine in the bed.

These recommendations offer providers the ability to partner with parents who ultimately choose to bed-share, to do so in the safest way possible, although this practice should be discouraged overall based on existing evidence. It is also important to note that bed sharing can occur unintentionally if parents fall asleep while feeding their infant or if their infant becomes fussy. In these situations, the AAP recommends that at this time, the evidence suggests it is relatively less hazardous for the infant if this occurs in an adult bed as compared to a sofa or armchair.

7. What about swaddling as a way to avoid the use of loose blankets? Is this practice safe?

Swaddling has been used in many cultures for generations and is gaining popularity in the United States. Reported benefits of swaddling include more quiet sleep, fewer arousals during sleep, and a slight reduction in crying in newborns. The practice has also been shown to reduce physiologic distress in pre-term infants and to improve periods of sleep and calm in infants with neonatal opioid withdrawal syndrome. However, there is evidence that swaddling may increase the risk of SIDS due to these fewer arousals and increased sleep time. In particular, infants who are naïve to swaddling may have a higher risk of SIDS. Furthermore, swaddling may also increase the risk of developmental dysplasia of the hip, pneumonia, and upper respiratory tract infections, though hip-safe swaddling methods exist (see Resources).

A recent meta-analysis revealed that the risk of SIDS with swaddling varies with sleep position and age. Infants that are swaddled and placed in the prone or side positions had twice the risk of SIDS than did infants that were not swaddled. Swaddled infants older than 6 months of age were also much more likely to die of SIDS than were infants less than 6 months. As a result, it is recommended that the practice of swaddling not be initiated after 3 months of age and that swaddling should be stopped when the infant reaches the developmental readiness for trying to roll over.

Additional References:

Resources:
2. CDC information page on SUID and SIDS. https://www.cdc.gov/sids/index.htm
3. Video on hip-safe swaddling from Yale Primary Care Pediatrics Curriculum. https://www.youtube.com/watch?v=wyCPwGa3WVQ
4. Educational apps for families:
   Safe sleep for babies: (developed for the MA DA’s office) https://itunes.apple.com/st/app/safe-sleep-for-babies/id1206448549?mt=8 (apple)

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