



SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations for a Safe Infant Sleeping Environment

TASK FORCE ON SUDDEN INFANT DEATH SYNDROME

Approximately 3500 infants die annually in the United States from sleep-related infant deaths, including sudden infant death syndrome (SIDS; International Classification of Diseases, 10th Revision [ICD-10], R95), ill-defined deaths (ICD-10 R99), and accidental suffocation and strangulation in bed (ICD-10 W75). After an initial decrease in the 1990s, the overall death rate attributable to sleep-related infant deaths has not declined in more recent years. Many of the modifiable and nonmodifiable risk factors for SIDS and other sleep-related infant deaths are strikingly similar. The American Academy of Pediatrics recommends a safe sleep environment that can reduce the risk of all sleep-related infant deaths. Recommendations for a safe sleep environment include supine positioning, the use of a firm sleep surface, room-sharing without bed-sharing, and the avoidance of soft bedding and overheating. Additional recommendations for SIDS reduction include the avoidance of exposure to smoke, alcohol, and illicit drugs; breastfeeding; routine immunization; and use of a pacifier. New evidence is presented for skin-to-skin care for newborn infants, use of bedside and in-bed sleepers, sleeping on couches/armchairs and in sitting devices, and use of soft bedding after 4 months of age. The recommendations and strength of evidence for each recommendation are included in this policy statement. The rationale for these recommendations is discussed in detail in the accompanying technical report (www.pediatrics.org/cgi/doi/10.1542/peds.2015-3147).

BACKGROUND

Sudden unexpected infant death (SUID), also known as sudden unexpected death in infancy, or SUDI, is a term used to describe any sudden and unexpected death, whether explained or unexplained

abstract

FREE

This document is copyrighted and is property of the American Academy of Pediatrics and its Board of Directors. All authors have filed conflict of interest statements with the American Academy of Pediatrics. Any conflicts have been resolved through a process approved by the Board of Directors. The American Academy of Pediatrics has neither solicited nor accepted any commercial involvement in the development of the content of this publication.

Policy statements from the American Academy of Pediatrics benefit from expertise and resources of liaisons and internal (AAP) and external reviewers. However, policy statements from the American Academy of Pediatrics may not reflect the views of the liaisons or the organizations or government agencies that they represent.

The guidance in this statement does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations, taking into account individual circumstances, may be appropriate.

All policy statements from the American Academy of Pediatrics automatically expire 5 years after publication unless reaffirmed, revised, or retired at or before that time.

DOI: 10.1542/peds.2016-2938

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

Copyright © 2016 by the American Academy of Pediatrics

FINANCIAL DISCLOSURE: The author has indicated she does not have a financial relationship relevant to this article to disclose.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: The author has indicated she has no potential conflicts of interest to disclose.

To cite: AAP TASK FORCE ON SUDDEN INFANT DEATH SYNDROME. SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations for a Safe Infant Sleeping Environment. *Pediatrics*. 2016;138(5):e20162938

TABLE 1 Definitions of Terms

Bed-sharing: Parent(s) and infant sleeping together on any surface (bed, couch, chair).

Caregivers: Throughout the document, “parents” are used, but this term is meant to indicate any infant caregivers.

Cosleeping: This term is commonly used, but the task force finds it confusing, and it is not used in this document. When used, authors need to make clear whether they are referring to sleeping in close proximity (which does not necessarily entail bed-sharing) or bed-sharing.

Room-sharing: Parent(s) and infant sleeping in the same room on separate surfaces.

Sleep-related infant death: SUID that occurs during an observed or unobserved sleep period.

Sudden infant death syndrome (SIDS): Cause assigned to infant deaths that cannot be explained after a thorough case investigation, including a scene investigation, autopsy, and review of the clinical history.¹

Sudden unexpected infant death (SUID), or sudden unexpected death in infancy (SUDI): A sudden and unexpected death, whether explained or unexplained (including SIDS), occurring during infancy.

TABLE 2 Summary of Recommendations With Strength of Recommendation

A-level recommendations

- Back to sleep for every sleep.
- Use a firm sleep surface.
- Breastfeeding is recommended.
- Room-sharing with the infant on a separate sleep surface is recommended.
- Keep soft objects and loose bedding away from the infant’s sleep area.
- Consider offering a pacifier at naptime and bedtime.
- Avoid smoke exposure during pregnancy and after birth.
- Avoid alcohol and illicit drug use during pregnancy and after birth.
- Avoid overheating.
- Pregnant women should seek and obtain regular prenatal care.
- Infants should be immunized in accordance with AAP and CDC recommendations.
- Do not use home cardiorespiratory monitors as a strategy to reduce the risk of SIDS.
- Health care providers, staff in newborn nurseries and NICUs, and child care providers should endorse and model the SIDS risk-reduction recommendations from birth.
- Media and manufacturers should follow safe sleep guidelines in their messaging and advertising.
- Continue the “Safe to Sleep” campaign, focusing on ways to reduce the risk of all sleep-related infant deaths, including SIDS, suffocation, and other unintentional deaths. Pediatricians and other primary care providers should actively participate in this campaign.

B-level recommendations

- Avoid the use of commercial devices that are inconsistent with safe sleep recommendations.
- Supervised, awake tummy time is recommended to facilitate development and to minimize development of positional plagiocephaly.

C-level recommendations

- Continue research and surveillance on the risk factors, causes, and pathophysiologic mechanisms of SIDS and other sleep-related infant deaths, with the ultimate goal of eliminating these deaths entirely.
- There is no evidence to recommend swaddling as a strategy to reduce the risk of SIDS.

The following levels are based on the Strength-of-Recommendation Taxonomy (SORT) for the assignment of letter grades to each of its recommendations (A, B, or C).² Level A: There is good-quality patient-oriented evidence. Level B: There is inconsistent or limited-quality patient-oriented evidence. Level C: The recommendation is based on consensus, disease-oriented evidence, usual practice, expert opinion, or case series for studies of diagnosis, treatment, prevention, or screening. Note: “patient-oriented evidence” measures outcomes that matter to patients: morbidity, mortality, symptom improvement, cost reduction, and quality of life; “disease-oriented evidence” measures immediate, physiologic, or surrogate end points that may or may not reflect improvements in patient outcomes (eg, blood pressure, blood chemistry, physiologic function, pathologic findings). CDC, Centers for Disease Control and Prevention.

(including sudden infant death syndrome [SIDS] and ill-defined deaths), occurring during infancy. After case investigation, SUID can be attributed to suffocation, asphyxia, entrapment, infection, ingestions, metabolic diseases, arrhythmia-associated cardiac channelopathies, and trauma (unintentional or

nonaccidental). SIDS is a subcategory of SUID and is a cause assigned to infant deaths that cannot be explained after a thorough case investigation, including a scene investigation, autopsy, and review of the clinical history.¹ (See Table 1 for definitions of terms.) The distinction between SIDS and other

SUIDs, particularly those that occur during an unobserved sleep period (sleep-related infant deaths), such as unintentional suffocation, is challenging, cannot be determined by autopsy alone, and may remain unresolved after a full case investigation. Many of the modifiable and nonmodifiable risk factors for SIDS and suffocation are strikingly similar. This document focuses on the subset of SUIDs that occur during sleep.

The recommendations outlined herein were developed to reduce the risk of SIDS and sleep-related suffocation, asphyxia, and entrapment among infants in the general population. As defined by epidemiologists, risk refers to the probability that an outcome will occur given the presence of a particular factor or set of factors. Although all 19 recommendations are intended for all who care for infants, the last 4 recommendations also are directed toward health policy makers, researchers, and professionals who care for or work on behalf of infants. In addition, because certain behaviors, such as smoking, can increase risk for the infant, some recommendations are directed toward women who are pregnant or may become pregnant in the near future.

Table 2 summarizes each recommendation and provides the strength of the recommendation, which is based on the Strength-of-Recommendation Taxonomy.² It should be noted that there are no randomized controlled trials with regard to SIDS and other sleep-related deaths; instead, case-control studies are the standard.

The recommendations are based on epidemiologic studies that include infants up to 1 year of age. Therefore, recommendations for sleep position and the sleep environment, unless otherwise specified, are for the first year after birth. The evidence-based recommendations that

follow are provided to guide health care providers in conversations with parents and others who care for infants. Health care providers are encouraged to have open and nonjudgmental conversations with families about their sleep practices. Individual medical conditions may warrant that a health care provider recommend otherwise after weighing the relative risks and benefits.

For the background literature review and data analyses on which this policy statement and recommendations are based, refer to the accompanying technical report, "SIDS and Other Sleep-Related Infant Deaths: Evidence Base for 2016 Updated Recommendations for a Safe Infant Sleeping Environment," available in the electronic pages of this issue (www.pediatrics.org/cgi/doi/10.1542/peds.2016-2940).³

RECOMMENDATIONS TO REDUCE THE RISK OF SIDS AND OTHER SLEEP-RELATED INFANT DEATHS

1. Back to sleep for every sleep.

To reduce the risk of SIDS, infants should be placed for sleep in a supine position (wholly on the back) for every sleep by every caregiver until the child reaches 1 year of age.⁴⁻⁸ Side sleeping is not safe and is not advised.^{5,7}

The supine sleep position does not increase the risk of choking and aspiration in infants, even those with gastroesophageal reflux, because infants have airway anatomy and mechanisms that protect against aspiration.^{9,10} The American Academy of Pediatrics (AAP) concurs with the North American Society for Pediatric Gastroenterology and Nutrition that "the risk of SIDS outweighs the benefit of prone or lateral sleep position on GER [gastroesophageal reflux]; therefore, in most infants from birth to 12 months of age, supine positioning during sleep is recommended. ...Therefore, prone positioning is acceptable if the infant

is observed and awake, particularly in the postprandial period, but prone positioning during sleep can only be considered in infants with certain upper airway disorders in which the risk of death from GERD [gastroesophageal reflux disease] may outweigh the risk of SIDS."¹¹ Examples of such upper airway disorders are those in which airway-protective mechanisms are impaired, including infants with anatomic abnormalities, such as type 3 or 4 laryngeal clefts, who have not undergone antireflux surgery. There is no evidence to suggest that infants receiving nasogastric or orogastric feeds are at an increased risk of aspiration if placed in the supine position. Elevating the head of the infant's crib is ineffective in reducing gastroesophageal reflux¹² and is not recommended; in addition, elevating the head of the crib may result in the infant sliding to the foot of the crib into a position that may compromise respiration.

Preterm infants should be placed supine as soon as possible. Preterm infants are at increased risk of SIDS,^{13,14} and the association between prone sleep position and SIDS among low birth weight and preterm infants is equal to, or perhaps even stronger than, the association among those born at term.¹⁵ The task force concurs with the AAP Committee on Fetus and Newborn that "preterm infants should be placed supine for sleeping, just as term infants should, and the parents of preterm infants should be counseled about the importance of supine sleeping in preventing SIDS. Hospitalized preterm infants should be kept predominantly in the supine position, at least from the postmenstrual age of 32 weeks onward, so that they become acclimated to supine sleeping before discharge."¹⁶ NICU personnel should endorse safe sleeping guidelines with parents of infants from the time of admission to the NICU.

As stated in the AAP clinical report, "skin-to-skin care is recommended for all mothers and newborns, regardless of feeding or delivery method, immediately following birth (as soon as the mother is medically stable, awake, and able to respond to her newborn), and to continue for at least an hour."¹⁷ Thereafter, or when the mother needs to sleep or take care of other needs, infants should be placed supine in a bassinet. There is no evidence that placing infants on their side during the first few hours after delivery promotes clearance of amniotic fluid and decreases the risk of aspiration. Infants in the newborn nursery and infants who are rooming in with their parents should be placed in the supine position as soon as they are ready to be placed in the bassinet.

Although data to make specific recommendations as to when it is safe for infants to sleep in the prone or side position are lacking, studies establishing prone and side sleeping as risk factors for SIDS include infants up to 1 year of age. Therefore, the best evidence suggests that infants should continue to be placed supine until 1 year of age. Once an infant can roll from supine to prone and from prone to supine, the infant can be allowed to remain in the sleep position that he or she assumes. Because rolling into soft bedding is an important risk factor for SUID after 3 months of age,¹⁸ parents and caregivers should continue to keep the infant's sleep environment clear of soft or loose bedding.

2. Use a firm sleep surface.

Infants should be placed on a firm sleep surface (eg, mattress in a safety-approved crib) covered by a fitted sheet with no other bedding or soft objects to reduce the risk of SIDS and suffocation.

A firm surface maintains its shape and will not indent or conform to the shape of the infant's head when the infant is placed on the surface.

Soft mattresses, including those made from memory foam, could create a pocket (or indentation) and increase the chance of rebreathing or suffocation if the infant is placed in or rolls over to the prone position.^{19,20}

A crib, bassinet, portable crib, or play yard that conforms to the safety standards of the Consumer Product Safety Commission (CPSC), including those for slat spacing less than 2-3/8 inches, snugly fitting and firm mattresses, and no drop sides, is recommended.²¹ In addition, parents and providers should check to make sure that the product has not been recalled. This is particularly important for used cribs. Cribs with missing hardware should not be used, nor should the parent or provider attempt to fix broken components of a crib, because many deaths are associated with cribs that are broken or with missing parts (including those that have presumably been fixed). Local organizations throughout the United States can help to provide low-cost or free cribs or play yards for families with financial constraints.

Bedside sleepers are attached to the side of the parental bed. The CPSC has published safety standards for these products,²² and they may be considered by some parents as an option. However, there are no CPSC safety standards for in-bed sleepers. The task force cannot make a recommendation for or against the use of either bedside sleepers or in-bed sleepers, because there have been no studies examining the association between these products and SIDS or unintentional injury and death, including suffocation.

Only mattresses designed for the specific product should be used. Mattresses should be firm and should maintain their shape even when the fitted sheet designated for that model is used, such that there are no gaps between the mattress and the wall of the crib, bassinet, portable crib, or play yard. Pillows or cushions

should not be used as substitutes for mattresses or in addition to a mattress. Mattress toppers, designed to make the sleep surface softer, should not be used for infants younger than 1 year.

There is no evidence that special crib mattresses and sleep surfaces that claim to reduce the chance of rebreathing carbon dioxide when the infant is in the prone position reduce the risk of SIDS. However, there is no disadvantage to the use of these mattresses if they meet the safety standards as described previously.

Soft materials or objects, such as pillows, quilts, comforters, or sheepskins, even if covered by a sheet, should not be placed under a sleeping infant. If a mattress cover to protect against wetness is used, it should be tightly fitting and thin.

Infants should not be placed for sleep on beds, because of the risk of entrapment and suffocation.^{23,24} In addition, portable bed rails should not be used with infants, because of the risk of entrapment and strangulation.

The infant should sleep in an area free of hazards, such as dangling cords, electric wires, and window-covering cords, because these may present a strangulation risk.

Sitting devices, such as car seats, strollers, swings, infant carriers, and infant slings, are not recommended for routine sleep in the hospital or at home, particularly for young infants.²⁵⁻³⁰ Infants who are younger than 4 months are particularly at risk, because they may assume positions that can create a risk of suffocation or airway obstruction or may not be able to move out of a potentially asphyxiating situation. When infant slings and cloth carriers are used for carrying, it is important to ensure that the infant's head is up and above the fabric, the face is visible, and the nose and mouth are clear of obstructions.³¹ After nursing, the infant should be repositioned

in the sling so that the head is up, is clear of fabric, and is not against the adult's body or the sling. If an infant falls asleep in a sitting device, he or she should be removed from the product and moved to a crib or other appropriate flat surface as soon as is safe and practical. Car seats and similar products are not stable on a crib mattress or other elevated surfaces.³²⁻³⁶ Infants should not be left unattended in car seats and similar products, nor should they be placed or left in car seats and similar products with the straps unbuckled or partially buckled.³⁰

3. Breastfeeding is recommended.

Breastfeeding is associated with a reduced risk of SIDS.³⁷⁻³⁹ Unless contraindicated, mothers should breastfeed exclusively or feed with expressed milk (ie, not offer any formula or other nonhuman milk-based supplements) for 6 months, in alignment with recommendations of the AAP.⁴⁰

The protective effect of breastfeeding increases with exclusivity.³⁹ However, any breastfeeding has been shown to be more protective against SIDS than no breastfeeding.³⁹

4. 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 first 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 SIDS by as much as 50%.^{6,8,41,42} 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.

The infant's crib, portable crib, play yard, or bassinet should be placed in the parents' bedroom until the child's first birthday. Although there is no specific evidence for moving an infant to his or her own room before 1 year of age, the first 6 months are particularly critical, because

the rates of SIDS and other sleep-related deaths, particularly those occurring in bed-sharing situations, are highest in the first 6 months. Placing the crib close to the parents' bed so that the infant is within view and reach can facilitate feeding, comforting, and monitoring of the infant. Room-sharing reduces SIDS risk and removes the possibility of suffocation, strangulation, and entrapment that may occur when the infant is sleeping in the adult bed.

There is insufficient evidence to recommend for or against the use of devices promoted to make bed-sharing "safe." There is no evidence that these devices reduce the risk of SIDS or suffocation or are safe. Some products designed for in-bed use (in-bed sleepers) are currently under study but results are not yet available. Bedside sleepers, which attach to the side of the parental bed and for which the CPSC has published standards,²² may be considered by some parents as an option. There are no CPSC safety standards for in-bed sleepers. The task force cannot make a recommendation for or against the use of either bedside sleepers or in-bed sleepers, because there have been no studies examining the association between these products and SIDS or unintentional injury and death, including suffocation.

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.^{7,43}

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,^{4,6,7,42,43} suffocation through entrapment or wedging between seat cushions, or overlay if another person is also sharing this surface.⁴⁴ 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 AAP 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 back 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^{6,8,42,43,45,46} and infants born preterm and/or with low birth weight,⁴⁷ regardless of parental smoking status. Even for breastfed infants, there is an increased risk of SIDS when bed-sharing if younger than 4 months.⁴⁸ 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.^{6,7,46,49,50}

- Bed-sharing with someone who is impaired in his or her alertness or ability to arouse because of fatigue or use of sedating medications (eg, certain antidepressants, pain medications) or substances (eg, alcohol, illicit drugs).^{8,48,51,52}
- Bed-sharing with anyone who is not the infant's parent, including nonparental caregivers and other children.⁴
- Bed-sharing on a soft surface, such as a waterbed, old mattress, sofa, couch, or armchair.^{4,6,7,42,43}
- Bed-sharing with soft bedding accessories, such as pillows or blankets.^{4,53}
- The safety and benefits of cobedding for twins and higher-order multiples have not been established. It is prudent to provide separate sleep surfaces and avoid cobedding for twins and higher-order multiples in the hospital and at home.⁵⁴

5. Keep soft objects and loose bedding away from the infant's sleep area to reduce the risk of SIDS, suffocation, entrapment, and strangulation.

Soft objects,^{19,20,55-58} such as pillows and pillow-like toys, quilts, comforters, sheepskins, and loose bedding,^{4,7,59-64} such as blankets and nonfitted sheets, can obstruct an infant's nose and mouth. An obstructed airway can pose a risk of suffocation, entrapment, or SIDS.

Infant sleep clothing, such as a wearable blanket, is preferable to blankets and other coverings to keep the infant warm while reducing the chance of head covering or entrapment that could result from blanket use.

Bumper pads or similar products that attach to crib slats or sides were originally intended to prevent injury or death attributable to head entrapment. Cribs manufactured to newer standards have a narrower distance between slats to prevent

head entrapment. Because bumper pads have been implicated as a factor contributing to deaths from suffocation, entrapment, and strangulation^{65,66} and because they are not necessary to prevent head entrapment with new safety standards for crib slats, they are not recommended for infants.^{65,66}

6. Consider offering a pacifier at nap time and bedtime.

Although the mechanism is yet unclear, studies have reported a protective effect of pacifiers on the incidence of SIDS.^{67,68} The protective effect of the pacifier is observed even if the pacifier falls out of the infant's mouth.^{69,70}

The pacifier should be used when placing the infant for sleep. It does not need to be reinserted once the infant falls asleep. If the infant refuses the pacifier, he or she should not be forced to take it. In those cases, parents can try to offer the pacifier again when the infant is a little older.

Because of the risk of strangulation, pacifiers should not be hung around the infant's neck. Pacifiers that attach to infant clothing should not be used with sleeping infants.

Objects, such as stuffed toys and other items that may present a suffocation or choking risk, should not be attached to pacifiers.

For breastfed infants, pacifier introduction should be delayed until breastfeeding is firmly established.⁴⁰ Infants who are not being directly breastfed can begin pacifier use as soon as desired.

There is insufficient evidence that finger sucking is protective against SIDS.

7. Avoid smoke exposure during pregnancy and after birth.

Both maternal smoking during pregnancy and smoke in the infant's environment after birth are major risk factors for SIDS.

Mothers should not smoke during pregnancy or after the infant's birth.⁷¹⁻⁷⁴

There should be no smoking near pregnant women or infants. Encourage families to set strict rules for smoke-free homes and cars and to eliminate secondhand tobacco smoke from all places in which children and other nonsmokers spend time.^{75,76}

The risk of SIDS is particularly high when the infant bed-shares with an adult smoker, even when the adult does not smoke in bed.^{6,7,46,49,50,77}

8. Avoid alcohol and illicit drug use during pregnancy and after birth.

There is an increased risk of SIDS with prenatal and postnatal exposure to alcohol or illicit drug use.

Mothers should avoid alcohol and illicit drugs periconceptionally and during pregnancy.⁷⁸⁻⁸⁵

Parental alcohol and/or illicit drug use in combination with bed-sharing places the infant at particularly high risk of SIDS.^{8,51}

9. Avoid overheating and head covering in infants.

Although studies have shown an increased risk of SIDS with overheating,⁸⁶⁻⁸⁹ the definition of overheating in these studies varies. Therefore, it is difficult to provide specific room temperature guidelines to avoid overheating.

In general, infants should be dressed appropriately for the environment, with no greater than 1 layer more than an adult would wear to be comfortable in that environment.

Parents and caregivers should evaluate the infant for signs of overheating, such as sweating or the infant's chest feeling hot to the touch.

Overbundling and covering of the face and head should be avoided.⁹⁰

There is currently insufficient evidence to recommend the use of a fan as a SIDS risk-reduction strategy.

10. Pregnant women should obtain regular prenatal care.

There is substantial epidemiologic evidence linking a lower risk of SIDS for infants whose mothers obtain

regular prenatal care.⁷¹⁻⁷⁴ Pregnant women should follow guidelines for frequency of prenatal visits.⁹¹

11. Infants should be immunized in accordance with recommendations of the AAP and Centers for Disease Control and Prevention.

There is no evidence that there is a causal relationship between immunizations and SIDS.⁹²⁻⁹⁵ Indeed, recent evidence suggests that vaccination may have a protective effect against SIDS.⁹⁶⁻⁹⁸

12. Avoid the use of commercial devices that are inconsistent with safe sleep recommendations.

Be particularly wary of devices that claim to reduce the risk of SIDS. Examples include, but are not limited to, wedges and positioners and other devices placed in the adult bed for the purpose of positioning or separating the infant from others in the bed. Crib mattresses also have been developed to improve the dispersion of carbon dioxide in the event that the infant ends up in the prone position during sleep. Although data do not support the claim of carbon dioxide dispersion unless there is an active dispersal component,⁹⁹ there is no harm in using these mattresses if they meet standard safety requirements. However, there is no evidence that any of these devices reduce the risk of SIDS. Importantly, the use of products claiming to increase sleep safety does not diminish the importance of following recommended safe sleep practices. Information about a specific product can be found on the CPSC Web site (www.cpsc.gov). The AAP concurs with the US Food and Drug Administration and the CPSC that manufacturers should not claim that a product or device protects against SIDS unless there is scientific evidence to that effect.

13. Do not use home cardiorespiratory monitors as a strategy to reduce the risk of SIDS.

The use of cardiorespiratory monitors has not been documented

to decrease the incidence of SIDS.¹⁰⁰⁻¹⁰³ These devices are sometimes prescribed for use at home to detect apnea or bradycardia and, when pulse oximetry is used, decreases in oxyhemoglobin saturation for infants at risk of these conditions. In addition, routine in-hospital cardiorespiratory monitoring before discharge from the hospital has not been shown to detect infants at risk of SIDS. There are no data that other commercial devices that are designed to monitor infant vital signs reduce the risk of SIDS.

14. Supervised, awake tummy time is recommended to facilitate development and to minimize development of positional plagiocephaly.

Although there are no data to make specific recommendations as to how often and how long it should be undertaken, the task force concurs with the AAP Committee on Practice and Ambulatory Medicine and Section on Neurologic Surgery that “a certain amount of prone positioning, or ‘tummy time,’ while the infant is awake and being observed is recommended to help prevent the development of flattening of the occiput and to facilitate development of the upper shoulder girdle strength necessary for timely attainment of certain motor milestones.”¹⁰⁴

Diagnosis, management, and other prevention strategies for positional plagiocephaly, such as avoidance of excessive time in car seats and changing the infant’s orientation in the crib, are discussed in detail in the AAP clinical report on positional skull deformities.¹⁰⁴

15. There is no evidence to recommend swaddling as a strategy to reduce the risk of SIDS.

Swaddling, or wrapping the infant in a light blanket, is often used as a strategy to calm the infant and encourage the use of the supine position. There is a high risk of death if a swaddled infant is

placed in or rolls to the prone position.^{88,105,106} If infants are swaddled, they should always be placed on the back. Swaddling should be snug around the chest but allow for ample room at the hips and knees to avoid exacerbation of hip dysplasia. When an infant exhibits signs of attempting to roll, swaddling should no longer be used.^{88,105,106} There is no evidence with regard to SIDS risk related to the arms swaddled in or out. These decisions about swaddling should be made on an individual basis, depending on the physiologic needs of the infant.

16. Health care professionals, staff in newborn nurseries and NICUs, and child care providers should endorse and model the SIDS risk-reduction recommendations from birth.¹⁰⁷⁻¹⁰⁹

Staff in NICUs should model and implement all SIDS risk-reduction recommendations as soon as the infant is medically stable and well before anticipated discharge.

Staff in newborn nurseries should model and implement these recommendations beginning at birth and well before anticipated discharge.

All physicians, nurses, and other health care providers should receive education on safe infant sleep. Health care providers should screen for and recommend safe sleep practices at each visit for infants up to 1 year old. Families who do not have a safe sleep space for their infant should be provided with information about low-cost or free cribs or play yards.

Hospitals should ensure that hospital policies are consistent with updated safe sleep recommendations and that infant sleep spaces (bassinets, cribs) meet safe sleep standards.

All state regulatory agencies should require that child care providers receive education on safe infant sleep and implement safe sleep practices. It is preferable that they have written policies.

17. Media and manufacturers should follow safe sleep guidelines in their messaging and advertising.

Media exposures (including movie, television, magazines, newspapers, and Web sites), manufacturer advertisements, and store displays affect individual behavior by influencing beliefs and attitudes.^{107,109} Media and advertising messages contrary to safe sleep recommendations may create misinformation about safe sleep practices.¹¹⁰

18. Continue the “Safe to Sleep” campaign, focusing on ways to reduce the risk of all sleep-related infant deaths, including SIDS, suffocation, and other unintentional deaths. Pediatricians and other primary care providers should actively participate in this campaign.

Public education should continue for all who care for infants, including parents, child care providers, grandparents, foster parents, and babysitters, and should include strategies for overcoming barriers to behavior change.

The campaign should continue to have a special focus on the black and American Indian/Alaskan Native populations because of the higher incidence of SIDS and other sleep-related infant deaths in these groups.

The campaign should specifically include strategies to increase breastfeeding while decreasing bed-sharing, and eliminating tobacco smoke exposure. The campaign should also highlight the circumstances that substantially increase the risk of SIDS or unintentional injury or death while bed-sharing, as listed previously.

These recommendations should be introduced before pregnancy and ideally in secondary school curricula to both males and females and incorporated into courses developed to train teenaged and adult babysitters. The importance

of maternal preconceptional health, infant breastfeeding, and the avoidance of substance use (including alcohol and smoking) should be included in this training.

Safe sleep messages should be reviewed, revised, and reissued at least every 5 years to address the next generation of new parents and products on the market.

19. Continue research and surveillance on the risk factors, causes, and pathophysiologic mechanisms of SIDS and other sleep-related infant deaths, with the ultimate goal of eliminating these deaths altogether.

Education campaigns need to be evaluated, and innovative intervention methods need to be encouraged and funded.

Continued research and improved surveillance on the etiology and pathophysiologic basis of SIDS should be funded.

Standardized protocols for death scene investigations, as per Centers for Disease Control and Prevention protocol, should continue to be implemented. Comprehensive autopsies, including full external and internal examination of all major organs and tissues including the brain; complete radiographs; metabolic testing; and toxicology screening should be performed. Training about how to conduct a comprehensive death scene investigation offered to medical examiners, coroners, death scene investigators, first responders, and law enforcement should continue; and resources to maintain training and conduct of these investigations need to be allocated. In addition, child death reviews, with involvement of pediatricians and other primary care providers, should be supported and funded.

Improved and widespread surveillance of SIDS and SUID cases should be implemented and funded.

Federal and private funding agencies should remain committed to all

aspects of the aforementioned research.

ACKNOWLEDGMENTS

We acknowledge the contributions provided by others to the collection and interpretation of data examined in preparation of this report. We are particularly grateful for the independent biostatistical report submitted by Robert W. Platt, PhD.

LEAD AUTHOR

Rachel Y. Moon, MD, FAAP

TASK FORCE ON SUDDEN INFANT DEATH SYNDROME

Rachel Y. Moon, MD, FAAP, Chairperson

Robert A. Darnall, MD

Lori Feldman-Winter, MD, MPH, FAAP

Michael H. Goodstein, MD, FAAP

Fern R. Hauck, MD, MS

CONSULTANTS

Marian Willinger, PhD – Eunice Kennedy Shriver National Institute for Child Health and Human Development

Carrie K. Shapiro-Mendoza, PhD, MPH – Centers for Disease Control and Prevention

STAFF

James Couto, MA

ABBREVIATIONS

AAP: American Academy of Pediatrics

CPSC: Consumer Product Safety Commission

SIDS: sudden infant death syndrome

SUID: sudden unexpected infant death

REFERENCES

1. Willinger M, James LS, Catz C. Defining the sudden infant death syndrome (SIDS): deliberations of an expert panel convened by the National Institute of Child Health and Human Development. *Pediatr Pathol.* 1991;11(5):677–684
2. Ebell MH, Siwek J, Weiss BD, et al. Strength of recommendation

taxonomy (SORT): a patient-centered approach to grading evidence in the medical literature. *Am Fam Physician.* 2004;69(3):548–556

3. Moon RY; AAP Task Force on Sudden Infant Death Syndrome. SIDS and other sleep-related infant deaths: Evidence base for 2016 updated recommendations for a safe infant sleeping environment. *Pediatrics.* 2016;138(5):e20162940
4. Hauck FR, Herman SM, Donovan M, et al. Sleep environment and the risk of sudden infant death syndrome in an urban population: the Chicago Infant Mortality Study. *Pediatrics.* 2003; 111(5 pt 2):1207–1214
5. Li DK, Petitti DB, Willinger M, et al. Infant sleeping position and the risk of sudden infant death syndrome in California, 1997-2000. *Am J Epidemiol.* 2003;157(5):446–455
6. Blair PS, Fleming PJ, Smith IJ, et al; CESDI SUDI Research Group. Babies sleeping with parents: case-control study of factors influencing the risk of the sudden infant death syndrome. *BMJ.* 1999;319(7223):1457–1461
7. Fleming PJ, Blair PS, Bacon C, et al; Confidential Enquiry into Stillbirths and Deaths Regional Coordinators and Researchers. Environment of infants during sleep and risk of the sudden infant death syndrome: results of 1993-5 case-control study for confidential inquiry into stillbirths and deaths in infancy. *BMJ.* 1996;313(7051):191–195
8. Carpenter RG, Irgens LM, Blair PS, et al. Sudden unexplained infant death in 20 regions in Europe: case control study. *Lancet.* 2004;363(9404):185–191
9. Malloy MH. Trends in postneonatal aspiration deaths and reclassification of sudden infant death syndrome: impact of the “Back to Sleep” program. *Pediatrics.* 2002;109(4):661–665
10. Tablizo MA, Jacinto P, Parsley D, Chen ML, Ramanathan R, Keens TG. Supine sleeping position does not cause clinical aspiration in neonates in hospital newborn nurseries. *Arch Pediatr Adolesc Med.* 2007;161(5):507–510
11. Vandenplas Y, Rudolph CD, Di Lorenzo C, et al; North American Society

- for Pediatric Gastroenterology Hepatology and Nutrition; European Society for Pediatric Gastroenterology Hepatology and Nutrition. Pediatric gastroesophageal reflux clinical practice guidelines: joint recommendations of the North American Society for Pediatric Gastroenterology, Hepatology, and Nutrition (NASPGHAN) and the European Society for Pediatric Gastroenterology, Hepatology, and Nutrition (ESPGHAN). *J Pediatr Gastroenterol Nutr.* 2009;49(4):498–547
12. Tobin JM, McCloud P, Cameron DJ. Posture and gastro-oesophageal reflux: a case for left lateral positioning. *Arch Dis Child.* 1997;76(3):254–258
 13. Malloy MH, Hoffman HJ. Prematurity, sudden infant death syndrome, and age of death. *Pediatrics.* 1995;96(3 pt 1):464–471
 14. Sowter B, Doyle LW, Morley CJ, Altmann A, Halliday J. Is sudden infant death syndrome still more common in very low birthweight infants in the 1990s? *Med J Aust.* 1999;171(8):411–413
 15. Oyen N, Markestad T, Skaerven R, et al. Combined effects of sleeping position and prenatal risk factors in sudden infant death syndrome: the Nordic Epidemiological SIDS Study. *Pediatrics.* 1997;100(4):613–621
 16. American Academy of Pediatrics Committee on Fetus and Newborn. Hospital discharge of the high-risk neonate. *Pediatrics.* 2008;122(5):1119–1126
 17. Winter-Feldman L, Golsmith JP; American Academy of Pediatrics Committee on Fetus and Newborn. Safe sleep and skin-to-skin care in the neonatal period for healthy term newborns. *Pediatrics.* 2016;138(3):e20161889
 18. Colvin JD, Collie-Akers V, Schunn C, Moon RY. Sleep environment risks for younger and older infants. *Pediatrics.* 2014;134(2):e406–e412
 19. Kemp JS, Nelson VE, Thach BT. Physical properties of bedding that may increase risk of sudden infant death syndrome in prone-sleeping infants. *Pediatr Res.* 1994;36(1 pt 1):7–11
 20. Kemp JS, Livne M, White DK, Arfken CL. Softness and potential to cause rebreathing: differences in bedding used by infants at high and low risk for sudden infant death syndrome. *J Pediatr.* 1998;132(2):234–239
 21. US Consumer Product Safety Commission. *Crib Safety Tips: Use Your Crib Safely*, CPSC Document 5030. Washington, DC: US Consumer Product Safety Commission; 2006
 22. US Consumer Product Safety Commission. Safety standard for bedside sleepers. *Fed Reg.* 2014;79(10):2581–2589
 23. Ostfeld BM, Perl H, Esposito L, et al. Sleep environment, positional, lifestyle, and demographic characteristics associated with bed sharing in sudden infant death syndrome cases: a population-based study. *Pediatrics.* 2006;118(5):2051–2059
 24. Scheers NJ, Rutherford GW, Kemp JS. Where should infants sleep? A comparison of risk for suffocation of infants sleeping in cribs, adult beds, and other sleeping locations. *Pediatrics.* 2003;112(4):883–889
 25. Bass JL, Bull M. Oxygen desaturation in term infants in car safety seats. *Pediatrics.* 2002;110(2 pt 1):401–402
 26. Kornhauser Cerar L, Scirica CV, Stucin Gantar I, Osredkar I don'D, Neubauer D, Kinane TB. A comparison of respiratory patterns in healthy term infants placed in car safety seats and beds. *Pediatrics.* 2009;124(3). Available at: www.pediatrics.org/cgi/content/full/124/3/e396
 27. Côté A, Bairam A, Deschenes M, Hatzakis G. Sudden infant deaths in sitting devices. *Arch Dis Child.* 2008;93(5):384–389
 28. Merchant JR, Worwa C, Porter S, Coleman JM, deRegnier RA. Respiratory instability of term and near-term healthy newborn infants in car safety seats. *Pediatrics.* 2001;108(3):647–652
 29. Willett LD, Leuschen MP, Nelson LS, Nelson RM Jr. Risk of hypoventilation in premature infants in car seats. *J Pediatr.* 1986;109(2):245–248
 30. Batra EK, Midgett JD, Moon RY. Hazards associated with sitting and carrying devices for children two years and younger. *J Pediatr.* 2015;167(1):183–187
 31. US Consumer Product Safety Commission. Safety Standard for Sling Carriers. *Fed Reg.* 2014;79(141):42724–42734
 32. Desapriya EB, Joshi P, Subzwari S, Nolan M. Infant injuries from child restraint safety seat misuse at British Columbia Children's Hospital. *Pediatr Int.* 2008;50(5):674–678
 33. Graham CJ, Kittredge D, Stuemky JH. Injuries associated with child safety seat misuse. *Pediatr Emerg Care.* 1992;8(6):351–353
 34. Parikh SN, Wilson L. Hazardous use of car seats outside the car in the United States, 2003-2007. *Pediatrics.* 2010;126(2):352–357
 35. Pollack-Nelson C. Fall and suffocation injuries associated with in-home use of car seats and baby carriers. *Pediatr Emerg Care.* 2000;16(2):77–79
 36. Wickham T, Abrahamson E. Head injuries in infants: the risks of bouncy chairs and car seats. *Arch Dis Child.* 2002;86(3):168–169
 37. Ip S, Chung M, Raman G, Trikalinos TA, Lau J. A summary of the Agency for Healthcare Research and Quality's evidence report on breastfeeding in developed countries. *Breastfeed Med.* 2009;4(suppl 1):S17–S30
 38. Vennemann MM, Bajonowski T, Brinkmann B, et al; GeSID Study Group. Does breastfeeding reduce the risk of sudden infant death syndrome? *Pediatrics.* 2009;123(3). Available at: www.pediatrics.org/cgi/content/full/123/3/e406
 39. Hauck FR, Thompson JM, Tanabe KO, Moon RY, Vennemann MM. Breastfeeding and reduced risk of sudden infant death syndrome: a meta-analysis. *Pediatrics.* 2011;128(1):103–110
 40. Eidelman AI, Schanler RJ; Section on Breastfeeding. Breastfeeding and the use of human milk. *Pediatrics.* 2012;129(3). Available at: www.pediatrics.org/cgi/content/full/129/3/e827
 41. Mitchell EA, Thompson JMD. Co-sleeping increases the risk of SIDS, but sleeping in the parents' bedroom lowers it. In: Rognum TO,

- ed. *Sudden Infant Death Syndrome: New Trends in the Nineties*. Oslo, Norway: Scandinavian University Press; 1995:266–269
42. Tappin D, Ecob R, Brooke H. Bedsharing, roomsharing, and sudden infant death syndrome in Scotland: a case-control study. *J Pediatr*. 2005;147(1):32–37
 43. McGarvey C, McDonnell M, Chong A, O'Regan M, Matthews T. Factors relating to the infant's last sleep environment in sudden infant death syndrome in the Republic of Ireland. *Arch Dis Child*. 2003;88(12):1058–1064
 44. Rechtman LR, Colvin JD, Blair PS, Moon RY. Sofas and infant mortality. *Pediatrics*. 2014;134(5). Available at: www.pediatrics.org/cgi/content/full/134/5/e1293
 45. McGarvey C, McDonnell M, Hamilton K, O'Regan M, Matthews T. An 8 year study of risk factors for SIDS: bed-sharing versus non-bed-sharing. *Arch Dis Child*. 2006;91(4):318–323
 46. Vennemann MM, Hense HW, Bajanowski T, et al. Bed sharing and the risk of sudden infant death syndrome: can we resolve the debate? *J Pediatr*. 2012;160(1):44–48, e42
 47. Blair PS, Platt MW, Smith IJ, Fleming PJ; CESDI SUDI Research Group. Sudden infant death syndrome and sleeping position in pre-term and low birth weight infants: an opportunity for targeted intervention. *Arch Dis Child*. 2006;91(2):101–106
 48. Carpenter R, McGarvey C, Mitchell EA, et al. Bed sharing when parents do not smoke: is there a risk of SIDS? An individual level analysis of five major case-control studies. *BMJ Open*. 2013;3(5):e002299
 49. Arnestad M, Andersen M, Vege A, Rognum TO. Changes in the epidemiological pattern of sudden infant death syndrome in southeast Norway, 1984-1998: implications for future prevention and research. *Arch Dis Child*. 2001;85(2):108–115
 50. Scragg R, Mitchell EA, Taylor BJ, et al; New Zealand Cot Death Study Group. Bed sharing, smoking, and alcohol in the sudden infant death syndrome. *BMJ*. 1993;307(6915):1312–1318
 51. Blair PS, Sidebotham P, Evason-Coombe C, Edmonds M, Heckstall-Smith EM, Fleming P. Hazardous cosleeping environments and risk factors amenable to change: case-control study of SIDS in south west England. *BMJ*. 2009;339:b3666
 52. Blair PS, Sidebotham P, Pease A, Fleming PJ. Bed-sharing in the absence of hazardous circumstances: is there a risk of sudden infant death syndrome? An analysis from two case-control studies conducted in the UK. *PLoS One*. 2014;9(9):e107799
 53. Fu LY, Moon RY, Hauck FR. Bed sharing among black infants and sudden infant death syndrome: interactions with other known risk factors. *Acad Pediatr*. 2010;10(6):376–382
 54. Tomashek KM, Wallman C; American Academy of Pediatrics Committee on Fetus and Newborn. Cobedding twins and higher-order multiples in a hospital setting. *Pediatrics*. 2007;120(6):1359–1366
 55. Chioldini BA, Thach BT. Impaired ventilation in infants sleeping facedown: potential significance for sudden infant death syndrome. *J Pediatr*. 1993;123(5):686–692
 56. Sakai J, Kanetake J, Takahashi S, Kanawaku Y, Funayama M. Gas dispersal potential of bedding as a cause for sudden infant death. *Forensic Sci Int*. 2008;180(2–3):93–97
 57. Patel AL, Harris K, Thach BT. Inspired CO₂(2) and O₂(2) in sleeping infants rebreathing from bedding: relevance for sudden infant death syndrome. *J Appl Physiol (1985)*. 2001;91(6):2537–2545
 58. Kanetake J, Aoki Y, Funayama M. Evaluation of rebreathing potential on bedding for infant use. *Pediatr Int*. 2003;45(3):284–289
 59. Brooke H, Gibson A, Tappin D, Brown H. Case-control study of sudden infant death syndrome in Scotland, 1992-5. *BMJ*. 1997;314(7093):1516–1520
 60. L'Hoir MP, Engelberts AC, van Well GTJ, et al. Risk and preventive factors for cot death in The Netherlands, a low-incidence country. *Eur J Pediatr*. 1998;157(8):681–688
 61. Markestad T, Skadberg B, Hordvik E, Morild I, Irgens LM. Sleeping position and sudden infant death syndrome (SIDS): effect of an intervention programme to avoid prone sleeping. *Acta Paediatr*. 1995;84(4):375–378
 62. Ponsonby A-L, Dwyer T, Couper D, Cochrane J. Association between use of a quilt and sudden infant death syndrome: case-control study. *BMJ*. 1998;316(7126):195–196
 63. Beal SM, Byard RW. Accidental death or sudden infant death syndrome? *J Paediatr Child Health*. 1995;31(4):269–271
 64. Wilson CA, Taylor BJ, Laing RM, Williams SM, Mitchell EA. Clothing and bedding and its relevance to sudden infant death syndrome: further results from the New Zealand Cot Death Study. *J Paediatr Child Health*. 1994;30(6):506–512
 65. Thach BT, Rutherford GW Jr, Harris K. Deaths and injuries attributed to infant crib bumper pads. *J Pediatr*. 2007;151(3):271–274, 274.e1–274.e3
 66. Scheers NJ, Woodard DW, Thach BT. Crib bumpers continue to cause infant deaths: a need for a new preventive approach. *J Pediatr*. 2016;169:93–97, e91
 67. Hauck FR, Omojokun OO, Siadaty MS. Do pacifiers reduce the risk of sudden infant death syndrome? A meta-analysis. *Pediatrics*. 2005;116(5). Available at: www.pediatrics.org/cgi/content/full/116/5/e716
 68. Li DK, Willinger M, Pettiti DB, Odouli R, Liu L, Hoffman HJ. Use of a dummy (pacifier) during sleep and risk of sudden infant death syndrome (SIDS): population-based case-control study. *BMJ*. 2006;332(7532):18–22
 69. Franco P, Scaillet S, Wermenbol V, Valente F, Groswasser J, Kahn A. The influence of a pacifier on infants' arousals from sleep. *J Pediatr*. 2000;136(6):775–779
 70. Weiss PP, Kerbl R. The relatively short duration that a child retains a pacifier in the mouth during sleep: implications for sudden infant death syndrome. *Eur J Pediatr*. 2001;160(1):60–70
 71. Getahun D, Amre D, Rhoads GG, Demissie K. Maternal and obstetric risk factors for sudden infant death syndrome in the United States. *Obstet Gynecol*. 2004;103(4):646–652

72. Kraus JF, Greenland S, Bulterys M. Risk factors for sudden infant death syndrome in the US Collaborative Perinatal Project. *Int J Epidemiol*. 1989;18(1):113–120
73. Paris CA, Remler R, Daling JR. Risk factors for sudden infant death syndrome: changes associated with sleep position recommendations. *J Pediatr*. 2001;139(6):771–777
74. Stewart AJ, Williams SM, Mitchell EA, Taylor BJ, Ford RP, Allen EM. Antenatal and intrapartum factors associated with sudden infant death syndrome in the New Zealand Cot Death Study. *J Paediatr Child Health*. 1995;31(5):473–478
75. Farber HJ, Walley SC, Groner JA, Nelson KE; Section on Tobacco Control. Clinical practice policy to protect children from tobacco, nicotine, and tobacco smoke [policy statement]. *Pediatrics*. 2015;136(5):1008–1017
76. Farber HJ, Groner J, Walley S, Nelson K; Section on Tobacco Control. Protecting children from tobacco, nicotine, and tobacco smoke [technical report]. *Pediatrics*. 2015;136(5). Available at: www.pediatrics.org/cgi/content/full/136/5/e1439
77. Zhang K, Wang X. Maternal smoking and increased risk of sudden infant death syndrome: a meta-analysis. *Leg Med (Tokyo)*. 2013;15(3):115–121
78. Rajegowda BK, Kendall SR, Falciglia H. Sudden unexpected death in infants of narcotic-dependent mothers. *Early Hum Dev*. 1978;2(3):219–225
79. Chavez CJ, Ostrea EM Jr, Stryker JC, Smialek Z. Sudden infant death syndrome among infants of drug-dependent mothers. *J Pediatr*. 1979;95(3):407–409
80. Durand DJ, Espinoza AM, Nickerson BG. Association between prenatal cocaine exposure and sudden infant death syndrome. *J Pediatr*. 1990;117(6):909–911
81. Ward SL, Bautista D, Chan L, et al. Sudden infant death syndrome in infants of substance-abusing mothers. *J Pediatr*. 1990;117(6):876–881
82. Rosen TS, Johnson HL. Drug-addicted mothers, their infants, and SIDS. *Ann N Y Acad Sci*. 1988;533:89–95
83. Kendall SR, Gaines J, Habel L, Davidson G, Jessop D. Relationship of maternal substance abuse to subsequent sudden infant death syndrome in offspring. *J Pediatr*. 1993;123(1):120–126
84. Fares I, McCulloch KM, Raju TN. Intrauterine cocaine exposure and the risk for sudden infant death syndrome: a meta-analysis. *J Perinatol*. 1997;17(3):179–182
85. O'Leary CM, Jacoby PJ, Bartu A, D'Antoine H, Bower C. Maternal alcohol use and sudden infant death syndrome and infant mortality excluding SIDS. *Pediatrics*. 2013;131(3). Available at: www.pediatrics.org/cgi/content/full/131/3/e770
86. Fleming PJ, Gilbert R, Azaz Y, et al. Interaction between bedding and sleeping position in the sudden infant death syndrome: a population based case-control study. *BMJ*. 1990;301(6743):85–89
87. Ponsonby A-L, Dwyer T, Gibbons LE, Cochrane JA, Jones ME, McCall MJ. Thermal environment and sudden infant death syndrome: case-control study. *BMJ*. 1992;304(6822):277–282
88. Ponsonby A-L, Dwyer T, Gibbons LE, Cochrane JA, Wang Y-G. Factors potentiating the risk of sudden infant death syndrome associated with the prone position. *N Engl J Med*. 1993;329(6):377–382
89. Iyasu S, Randall LL, Welty TK, et al. Risk factors for sudden infant death syndrome among northern plains Indians. *JAMA*. 2002;288(21):2717–2723
90. Blair PS, Mitchell EA, Heckstall-Smith EM, Fleming PJ. Head covering—a major modifiable risk factor for sudden infant death syndrome: a systematic review. *Arch Dis Child*. 2008;93(9):778–783
91. American Academy of Pediatrics Committee on Fetus and Newborn; ACOG Committee on Obstetric Practice. *Guidelines for Perinatal Care*. 7th ed. Elk Grove Village, IL: American Academy of Pediatrics; 2012
92. Immunization Safety Review Committee. Stratton K, Almario DA, Wizemann TM, McCormick MC, eds. *Immunization Safety Review: Vaccinations and Sudden Unexpected*
- Death in Infancy*. Washington, DC: National Academies Press; 2003
93. Moro PL, Arana J, Cano M, Lewis P, Shimabukuro TT. Deaths reported to the Vaccine Adverse Event Reporting System, United States, 1997–2013. *Clin Infect Dis*. 2015;61(6):980–987
94. Miller ER, Moro PL, Cano M, Shimabukuro TT. Deaths following vaccination: what does the evidence show? *Vaccine*. 2015;33(29):3288–3292
95. Moro PL, Jankosky C, Menschik D, et al. Adverse events following Haemophilus influenzae type b vaccines in the Vaccine Adverse Event Reporting System, 1990–2013. *J Pediatr*. 2015;166(4):992–997
96. Mitchell EA, Stewart AW, Clements M, Ford RPK; New Zealand Cot Death Study Group. Immunisation and the sudden infant death syndrome. *Arch Dis Child*. 1995;73(6):498–501
97. Jonville-Béra AP, Autret-Leca E, Barbeillon F, Paris-Llado J; French Reference Centers for SIDS. Sudden unexpected death in infants under 3 months of age and vaccination status—a case-control study. *Br J Clin Pharmacol*. 2001;51(3):271–276
98. Fleming PJ, Blair PS, Platt MW, Tripp J, Smith IJ, Golding J. The UK accelerated immunisation programme and sudden unexpected death in infancy: case-control study. *BMJ*. 2001;322(7290):822
99. Carolan PL, Wheeler WB, Ross JD, Kemp RJ. Potential to prevent carbon dioxide rebreathing of commercial products marketed to reduce sudden infant death syndrome risk. *Pediatrics*. 2000;105(4 pt 1):774–779
100. Hodgman JE, Hoppenbrouwers T. Home monitoring for the sudden infant death syndrome: the case against. *Ann N Y Acad Sci*. 1988;533:164–175
101. Ward SL, Keens TG, Chan LS, et al. Sudden infant death syndrome in infants evaluated by apnea programs in California. *Pediatrics*. 1986;77(4):451–458
102. Monod N, Plouin P, Sternberg B, et al. Are polygraphic and cardiopneumographic respiratory patterns useful tools for predicting the risk for sudden infant death syndrome? A 10-year study. *Biol Neonate*. 1986;50(3):147–153

103. Ramanathan R, Corwin MJ, Hunt CE, et al; Collaborative Home Infant Monitoring Evaluation (CHIME) Study Group. Cardiorespiratory events recorded on home monitors: comparison of healthy infants with those at increased risk for SIDS. *JAMA*. 2001;285(17):2199–2207
104. Laughlin J, Luerssen TG, Dias MS; Committee on Practice and Ambulatory Medicine; Section on Neurological Surgery. Prevention and management of positional skull deformities in infants. *Pediatrics*. 2011;128(6):1236–1241
105. van Sleuwen BE, Engelberts AC, Boere-Boonekamp MM, Kuis W, Schulpen TW, L'Hoir MP. Swaddling: a systematic review. *Pediatrics*. 2007;120(4). Available at: www.pediatrics.org/cgi/content/full/120/4/e1097
106. McDonnell E, Moon RY. Infant deaths and injuries associated with wearable blankets, swaddle wraps, and swaddling. *J Pediatr*. 2014;164(5):1152–1156
107. Willinger M, Ko C-W, Hoffman HJ, Kessler RC, Corwin MJ. Factors associated with caregivers' choice of infant sleep position, 1994-1998: the National Infant Sleep Position Study. *JAMA*. 2000;283(16):2135–2142
108. Brenner RA, Simons-Morton BG, Bhaskar B, et al. Prevalence and predictors of the prone sleep position among inner-city infants. *JAMA*. 1998;280(4):341–346
109. Von Kohorn I, Corwin MJ, Rybin DV, Heeren TC, Lister G, Colson ER. Influence of prior advice and beliefs of mothers on infant sleep position. *Arch Pediatr Adolesc Med*. 2010;164(4):363–369
110. Joyner BL, Gill-Bailey C, Moon RY. Infant sleep environments depicted in magazines targeted to women of childbearing age. *Pediatrics*. 2009;124(3):e416–e422

**SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations
for a Safe Infant Sleeping Environment**

TASK FORCE ON SUDDEN INFANT DEATH SYNDROME

Pediatrics; originally published online October 24, 2016;

DOI: 10.1542/peds.2016-2938

Updated Information & Services	including high resolution figures, can be found at: /content/early/2016/10/20/peds.2016-2938.full.html
References	This article cites 104 articles, 44 of which can be accessed free at: /content/early/2016/10/20/peds.2016-2938.full.html#ref-list-1
Citations	This article has been cited by 10 HighWire-hosted articles: /content/early/2016/10/20/peds.2016-2938.full.html#related-urls
Subspecialty Collections	This article, along with others on similar topics, appears in the following collection(s): Fetus/Newborn Infant /cgi/collection/fetus:newborn_infant_sub SIDS /cgi/collection/sids_sub
Permissions & Licensing	Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at: /site/misc/Permissions.xhtml
Reprints	Information about ordering reprints can be found online: /site/misc/reprints.xhtml

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2016 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

SIDS and Other Sleep-Related Infant Deaths: Updated 2016 Recommendations for a Safe Infant Sleeping Environment

TASK FORCE ON SUDDEN INFANT DEATH SYNDROME

Pediatrics; originally published online October 24, 2016;

DOI: 10.1542/peds.2016-2938

The online version of this article, along with updated information and services, is
located on the World Wide Web at:

[/content/early/2016/10/20/peds.2016-2938.full.html](http://content/early/2016/10/20/peds.2016-2938.full.html)

PEDIATRICS is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since 1948. PEDIATRICS is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2016 by the American Academy of Pediatrics. All rights reserved. Print ISSN: 0031-4005. Online ISSN: 1098-4275.

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

