Infant Sleep Position and SIDS

Questions and Answers for Health Care Providers

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
National Institutes of Health
National Institute of Child Health and Human Development

Dear Colleague:

As Director of the National Institute of Child Health and Human Development (NICHD), I am pleased to provide this updated version of *Infant Sleep Position and SIDS: Questions and Answers for Health Care Providers*. This booklet includes information and references that reflect the most recent recommendations from the American Academy of Pediatrics (AAP) Task Force on Sleep Position and Sudden Infant Death Syndrome (SIDS) and scientific research on reducing the risk of SIDS.

Since the NICHD and its partners launched the national *Back to Sleep* campaign in 1994, we have made tremendous progress in helping to reduce the incidence of SIDS. Since 1994, the overall SIDS rate in the United States has declined by more than 50 percent. This is an extraordinary accomplishment, but our job is far from over.

Although the overall rate of SIDS has declined dramatically, African American communities and American Indian/Alaska Native communities continue to be at increased risk. We share a common commitment to safeguarding the health and well-being of our nation's children. Together, we can continue to make a difference, so that our messages reach every parent, every grandparent, and every infant caregiver in every community in the United States.

Each of us has a responsibility to learn more about SIDS and to share what we learn with our families, friends, neighbors, and communities. As a health care provider, you are uniquely positioned to advance this important cause. I encourage you to read this booklet carefully and to discuss its contents with patients who care for infants younger than one year of age.

Thanks for all you have done to educate families and caregivers about reducing the risk of SIDS. Let us continue to work together to help all infants grow into healthy adults.

Sincerely yours,

Duane Alexander, M.D.
Director, NICHD

Healthy babies should be placed on their backs to sleep.

In 2005, the American Academy of Pediatrics (AAP) Task Force on Infant Sleep Position and SIDS (hereafter, the AAP Task Force) issued revised recommendations for reducing the risk of SIDS.[1] Among them was the recommendation that healthy babies be placed on their backs to sleep as the main way to reduce SIDS risk.

The AAP first published this recommendation in 1992,[2] after many research reports showed that babies placed on their stomachs to sleep were at greater risk of dying from SIDS. The AAP confirmed its recommendation in 1994,[3] in 2000,[4] and most recently in 2005.[1]

Along with the AAP and other partners, the NICHD has maintained the *Back to Sleep* campaign since 1994. The Institute has prepared the following answers to commonly asked questions to help educate health care providers about the latest findings of SIDS research and risk-reduction strategies. Please note that some answers are based on expert opinion because current evidence is not sufficient to provide definitive answers.

What advice should health care providers give to parents about the ways to reduce the risk of SIDS?

Health care providers should encourage parents to do the following to reduce the risk of SIDS:

- **Always place your baby on his or her back to sleep—for naps and at night.** The back sleep position is the safest, and every sleep time counts.
- **Place your baby on a firm sleep surface, such as a safety-approved crib mattress, covered by a fitted sheet.*** Never place your baby to sleep on pillows, quilts, sheepskins, and other soft surfaces.
- **Keep soft objects, toys, and loose bedding out of your baby's sleep area.** Don't use pillows, blankets, quilts, sheepskins, or pillow-like crib bumpers in your baby's sleep area, and keep all items away from your baby's face.

- **Do not allow smoking around your baby.** Don't smoke before or after the birth of your baby, and don't let others smoke around your baby.
- **Keep your baby's sleep area close to, but separate from, where you and others sleep.** Your baby should not sleep in a bed or on a couch or armchair with adults or other children, but he or she can sleep in the same room as you. If you bring your baby into bed with you to breastfeed, put him or her back in a separate sleep area, such as a bassinet, crib, cradle, or a bedside co-sleeper (infant bed that attaches to an adult bed) when finished.
- **Think about using a clean, dry pacifier when placing the infant down to sleep, but don't force the baby to take it.** (If you are breastfeeding your baby, wait until your child is one month old or is used to breastfeeding before using a pacifier.)
- **Do not let your baby get overheated during sleep.** Dress your baby in light sleep clothing, and keep the room at a temperature that is comfortable for an adult.
- **Avoid products that claim to reduce the risk of SIDS.** Most of these products have not been tested for effectiveness or safety.
- **Do not use home monitors to reduce the risk of SIDS.** If you have questions about using monitors for other conditions, talk to your health care provider.
- **Reduce the chance that flat spots will develop on your baby's head.** Provide "tummy time" when your baby is awake and someone is watching; change the direction that your baby lies in the crib from one week to the next; and avoid too much time in car seats, carriers, and bouncers.

* For more information on crib safety guidelines, call the Consumer Product Safety Commission at 1–800–638–2772 or visit its Web site at **www.cpsc.gov.** Urge patients who do not have a crib to check with their state health department or local SIDS foundation about a crib donation program.

What sleep position is safest for full-term babies in hospital nurseries?

Healthy babies who are born full-term should be placed on their backs to sleep in hospital nurseries. Research shows that mothers and caregivers use the same sleep position for their babies at home that they see being used at the hospital.[5,6] Therefore, hospital nursery personnel should place babies on their backs to sleep—for naps and at night.

If hospital personnel have concerns about possible choking for the first few hours following birth, they can place infants on their sides, propped up against the side of the bassinet for stability. However, after several hours, the baby should be placed wholly on his or her back to sleep.

Is the side position as effective as the back sleep position in reducing the risk of SIDS?

No, the side position is not considered a safe alternative to sleeping wholly on the back. Studies have found that the side sleep position is unstable and increases the chance that infants will roll onto their stomachs[7]—the sleep position associated with the highest SIDS risk. The AAP Task Force recommends that infants be placed wholly on their backs to sleep—for naps and at night.

Can infants be placed to sleep on their stomachs for naps or for short periods of rest?

Studies show that babies who are used to sleeping on their backs, but who are then placed on their stomachs or sides to sleep, are at significantly higher risk for SIDS.[8] This risk is actually greater—sometimes seven to eight times greater—than that of infants who are always placed on their stomachs or sides to sleep.[9]

Evidence suggests that many secondary caregivers and child care center personnel are not aware of this increased risk.[10,11] Therefore, health care providers, parents, and caregivers need to be very clear in recommending that anyone who cares for a baby—including grandparents, child care providers, and babysitters—knows that babies should be placed on their backs to sleep, and that every sleep time counts.

Are there any circumstances when babies should be placed on their stomachs to sleep?

Healthy babies should be placed on their backs to sleep—for naps and at night.

Babies with certain upper-airway malformations (e.g., Robin syndrome) may have acute airway obstructive episodes relieved by prone positioning[15] and some physicians believe that babies with severe gastroesophageal reflux may benefit from being placed in the stomach position with the head elevated following eating.[1] However, no recent literature supports or refutes the benefits of this therapy.

There may be other infants in whom the risk/benefit balance favors stomach sleeping. Health care providers should consider the potential benefit to the baby when recommending infant sleep position.

If medical personnel determine that the stomach sleep position is necessary because of a medical condition or other concern, health care providers should be sure to advise parents and caregivers to reduce the risk of SIDS in other ways, such as avoiding soft bedding and ensuring that babies do not overheat. For most babies, however, stomach and side sleeping are not advised.[1]

Will babies choke if they regurgitate or throw up while sleeping on their backs?

No, babies automatically swallow or cough up fluid if they throw up while on their backs. This reflex operates to make sure the airway is always open.

There is no evidence that healthy babies placed on their backs are more likely to have serious or fatal choking episodes than those placed on their stomachs.[12,13]

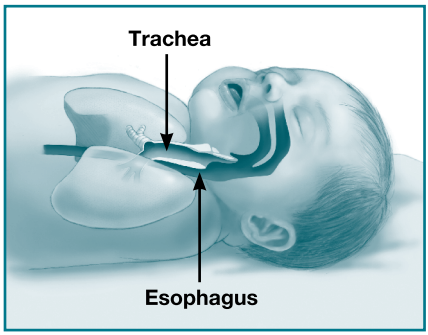

Figure 1

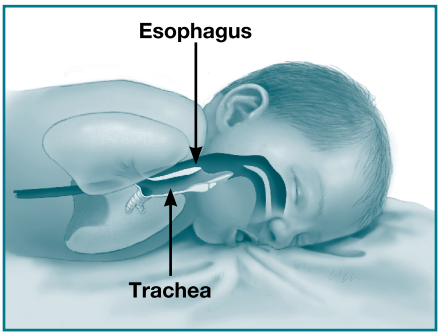

Figure 2

In fact, babies may actually clear secretions better when placed on their backs. When babies are in the back sleep position, the trachea lies on top of the esophagus (see Figure 1). Anything regurgitated or refluxed from the esophagus must work against gravity to be aspirated into the trachea.

Conversely, when babies are in the stomach sleep position, anything regurgitated or refluxed will pool at the opening of the trachea, making it easier for babies to aspirate (see Figure 2). Also, chemosensitive tissue that initiates the reflex is more prominent on the posterior versus anterior pharyngeal wall, thus suggesting an even greater protection when the baby is lying supine. Of the very few reported cases of death due to choking, most of the infants were in the stomach sleep position.

Furthermore, in countries (including the United States) that have seen a major change in infant sleep position—from mainly stomach to mostly back sleeping—the incidence of serious or fatal choking has not increased.[14]

Will electronic cardiorespiratory monitoring prevent SIDS?

The AAP Task Force supports the earlier conclusion of an NIH Consensus Conference that recommended against using home monitors as a strategy to prevent SIDS.[1,16] In the past, health care providers considered the use of cardiorespiratory monitors to reduce risk in certain groups such as siblings born in families who had previously lost a child from SIDS. However, no national consensus deems this practice as necessary or effective. In fact, the Collaborative Home Infant Monitoring Evaluation (CHIME) study, which used specially designed electronic monitors in the home to detect cardiorespiratory events in infants, raised serious questions about the relationship between SIDS and events detected by home monitors.[17] For this reason, home monitors are not recommended as a way to reduce the risk of SIDS.

There may still be circumstances where clinicians will prescribe a home monitor for babies who have already had a life-threatening event or for babies who are considered to be at particularly high risk for airway obstruction, such as those with persistent apnea of prematurity, those with congenital airway malformations, or those who are being positioned prone during sleep for specific medical or surgical reasons.

Should preterm infants be placed on their backs for sleep?

Yes. Recent research has shown that preterm infants are at higher risk for SIDS; therefore, placing preterm infants on their backs for sleep is critically important.[18,19]

Some preterm babies who have active respiratory disease may have improved oxygenation if they are placed on their stomachs. Thus, the stomach sleep position during acute respiratory disease may be appropriate for infants in a highly monitored, inpatient setting. However, epidemiological studies have shown that, when placed on their stomachs to sleep at home, low birth weight or preterm babies may be at higher risk SIDS than babies born full term.

Because preterm babies often remain in the hospital for several days to weeks before discharge, the AAP Task Force recommends that these infants be placed on their backs to sleep as soon as possible after the respiratory condition has stabilized.[18] This practice will allow the parents to become familiar with the position they should use at home.

How often should parents or caregivers check on infants during sleep to make sure they haven't rolled into the stomach position from the back position?

Studies show that, during early infancy, it is unusual for a baby who is placed in the back sleep position to roll onto his or her stomach.[20] However, once infants are more developmentally advanced, they often roll over on their own. In this situation, when infants roll over on their own, there is no evidence that they need to be repositioned.

What advice should health care providers give to parents or caregivers whose infants have difficulty sleeping in the back position?

It is true that some infants who lie on their backs do not sleep as deeply as those who lie on their stomachs. Similarly, infants who are placed on their backs may be fussy or cry. However, the absence of very deep sleep is believed to help protect infants against SIDS.[21, 22]

Compared with infants sleeping on their backs, babies who are placed on their stomachs sleep more deeply, are less reactive to noise, experience less movement, and are less able to be aroused. All of these characteristics are believed to put infants at higher risk of SIDS. Some have found swings or swaddling[23] helps to calm babies, but there are no large studies showing efficacy regarding SIDS risk reduction. Use of a pacifier may also help to calm a baby before sleep and has been associated with decreased SIDS risk.

What advice should health care providers give to parents of babies in child care?

Health care providers should strongly recommend that parents and caregivers be especially diligent about making sure their infants are placed to sleep on their backs, for every sleep time, while in child care. Some of the reasons are given below.

- Studies show a marked increase in SIDS risk associated with unaccustomed sleep position.[16] This risk is actually greater—sometimes seven to eight times greater—than that of infants who are always placed on their stomachs or sides to sleep.[17] So, if parents and caregivers place an infant to sleep on his or her back at home, but child care providers use a different sleep position, the infant is at significantly higher risk for SIDS.
- In the United States, approximately 20 percent of SIDS deaths occur while the infant is in the care of a child care provider.[24] This finding is significant, given that two-thirds of infants younger than 12 months of age are in non-parental child care at least some of the time.[25]

- Many child care deaths are associated with the stomach sleep position, especially when the infant is unaccustomed to being placed in that position.
- Despite *Back to Sleep* and other SIDS awareness campaigns, many child care providers continue to place infants on their stomachs to sleep. Evidence shows that some secondary caregivers, even licensed child care center workers, are either unaware of or are misinformed about the dangers of placing infants to sleep on their stomachs.[18]
- Although child care providers are more likely to use the back sleep position when centers have written sleep policies, licensed child care centers seldom have such policies.[26] Studies have found that education programs for child care providers are effective both in increasing knowledge of safe sleep positions and in promoting the development of written policies on sleep position.[24]

If parents use a blanket, they should place the baby with feet at the end of the crib. The blanket should reach no higher than the baby's chest and should be tucked under the crib mattress to ensure safety.

Based on the evidence, consistency in sleep position is extremely important for reducing SIDS risk. It is crucial that parents and caregivers tell anyone who cares for their baby—including grandparents, child care providers, and babysitters—that the infant should be placed on his or her back to sleep, and that every sleep time counts.

At what age can parents and caregivers stop placing their babies on their backs to sleep?

SIDS is defined as the sudden unexplained death of an infant younger than one year of age.[27] Parents and caregivers should continue to place babies on their backs to sleep throughout the first year of life. Once babies are older than one year, the back sleep position is no longer necessary.

The first six months, when infants are forming their sleeping habits, are probably the most important in terms of the back sleep position and reducing SIDS risk.

What is the best sleep surface for babies?

Parents and caregivers should use a firm sleep surface, such as a safety-approved crib mattress with no more than a thin covering, such as a fitted sheet or rubberized pad, between the infant and the mattress. Babies should not sleep on sofas, armchairs, waterbeds, or an adult mattress.

The *Back to Sleep* campaign sponsors and the U.S. Consumer Product Safety Commission warn against placing any soft, plush, or bulky items (such as pillows, quilts, comforters, pillow-like bumpers, sheepskins, or stuffed toys) in the baby's sleep area. These items could come in contact with the baby's face, which may hinder exposure to oxygen, cause the baby to get overheated, or suffocate the baby—all possible contributors to SIDS.

Does bed sharing reduce the risk of SIDS?

Despite some claims to the contrary, current evidence does not support bed sharing as a protective strategy against SIDS. However, there is substantial evidence that bed sharing under a variety of circumstances significantly increases the risk of SIDS, while conversely, that room sharing without bed sharing reduces the risk of SIDS. Therefore, the AAP Task Force recommends that infants sleep in an area close to, but separate from, where adults sleep.

Bed sharing among infants and family members, particularly among adults and infants, is common in many cultures.[28] Many mothers share a bed with their infants because it makes breastfeeding easier and enhances bonding. Some believe that bed sharing may reduce the risk of SIDS because the parent is nearby to monitor the baby.

On the contrary, evidence is mounting that bed sharing is hazardous. In some situations, bed sharing can compound the SIDS risk posed by other factors. For example, bed sharing is shown to increase SIDS risk[29-36] when:

- The mother smokes, has recently consumed alcohol, or is fatigued;
- The infant is covered by a blanket or quilt; or
- There are multiple bed sharers.

Research has shown that the presence of other children in the bed increases the risk of SIDS more than fivefold.[32,35,37] Bed sharing with young infants—even when mothers do not smoke—also is a risk factor for SIDS.[32,35,37,38]

Based on the most recent research,[39] the AAP Task Force recommends *room sharing,* a situation in which the infant shares a room with the parent but has his or her own crib, bassinet, or bedside co-sleeper (an infant bed that attaches to an adult bed).

If a mother wants to bring her infant into bed with her to feed or comfort, she should put the infant back in a separate sleep area, such as a bassinet, crib, cradle, or co-sleeper, when finished.

Do pacifiers reduce the risk of SIDS?

Yes. Several studies have found that infants who used pacifiers during their last sleep were at significantly lower risk of SIDS, compared with infants who did not use pacifiers.[40] A recent meta-analysis reinforced findings of the protective effect of pacifiers against SIDS.[41] The exact mechanism for this protective effect is unclear, but lowered sleep arousal thresholds is one possible explanation.[42]

The AAP Task Force recommends that, for infants younger than one year of age, parents and caregivers consider using a pacifier when placing the infants down to sleep. Parents and caregivers should offer the pacifier, but not force the infant to take it if she or he refuses it. Pacifiers should be clean and dry and should not be reinserted after the infant is asleep. If a mother is breastfeeding, parents should wait until the infant is one month old or until breastfeeding is established before introducing a pacifier.

Does back sleeping cause positional plagiocephaly or brachycephaly?

Positional plagiocephaly—a flattened or misshapen head—may result when an infant is placed in the same position (usually on the back) for long periods of time. Brachycephaly—a flattening of the back of the skull—may occur along with positional plagiocephaly. The primary causes of positional plagiocephaly and brachycephaly are: too little time spent upright; too little "tummy time" when the baby is awake and supervised; and too much time in car seats, carriers, and bouncers.

Positional plagiocephaly and brachycephaly are usually harmless and often disappear within months after babies start to sit up. There is no evidence to suggest that such flat spots are harmful to infants or that it is associated with any permanent effects on head shape.[1,43]

Most cases of positional plagiocephaly can be prevented (and sometimes corrected) by repositioning,[1,38] which relieves pressure from the back of an infant's head. Techniques for repositioning include:

- Providing "tummy time" when the baby is awake and someone is watching. Tummy time not only helps prevent flat spots, but it also helps strengthen muscles in the baby's head, neck, and shoulders. (See the *Can babies ever be placed on their stomachs?* section of this booklet for more information.)
- Changing the direction that the baby lies in the crib on a regular basis to ensure he or she is not resting on the same part of the head all the time. For example, have the baby's feet point toward one end of the crib for a few days, and then change the position so his or her feet point toward the other end of the crib.
- Avoiding too much time in car seats, carriers, and bouncers while the baby is awake.
- Getting "cuddle time" with the baby by holding him or her upright over one shoulder often during the day.
- Changing the location of the baby's crib in the room so that he or she has to look in different directions to see the door or the window.

Positional plagiocephaly is quite different from craniosynostosis (premature fusion of the sutures of the skull) and congenital muscular torticollis (twisted neck present at birth), and it seldom requires special molding helmets or surgery to correct.[44]

Can babies ever be placed on their stomachs?

Yes. Infants need "tummy time" while they are awake and are being supervised. Spending time on the stomach strengthens muscles in the shoulders and neck that help infants to acquire developmental milestones. It also helps to prevent flat spots on the infant's head. Health care providers should advise parents and caregivers that a certain amount of tummy time is a very important and necessary part of an infant's development. While there has been limited research on the issue of how much tummy time is ideal, the results of one study suggest that more tummy time is associated with better motor development.[40] More research is needed before a specific amount of time can be recommended.

Spread the word!

As a health care provider, you can reach many parents and caregivers with safe sleep messages that can help reduce infants' risk of SIDS. Tell parents, caregivers, and families that babies sleep safer on their backs, that sleep surface matters, and that every sleep time counts. Communities across the nation have made great progress in reducing SIDS! With your help, we can spread these important messages to every community in the nation.

References

1 American Academy of Pediatrics, Task Force on Sudden Infant Death Syndrome. (2005). The changing concept of sudden infant death syndrome: Diagnostic coding shifts, controversies regarding the sleeping environment, and new variables to consider in reducing risk. *Pediatrics, 116* (5), 1245–1255.

2 American Academy of Pediatrics, Task Force on Infant Positioning and SIDS. (1992). Positioning and SIDS. *Pediatrics, 89* (6, part 1), 1120–1126.

3 Kattwinkel, J., Brooks, J., Keenan, M. E., & Malloy, M. (1994). Infant sleep position and sudden infant death syndrome (SIDS) in the United States: Joint commentary from the American Academy of Pediatrics and selected agencies of the federal government. *Pediatrics, 93* (5), 820.

4 American Academy of Pediatrics, Task Force on Infant Sleep Position and Sudden Infant Death Syndrome. (2000). Changing concepts of sudden infant death syndrome: Implications for infant sleeping environment and sleep position. *Pediatrics, 105*, 650–656.

5 Pastore, G., Guala, A., Zaffaroni, M., & Bona, G. (2003). Back to Sleep: Risk factors for SIDS as targets for public health campaigns. *Pediatrics, 109* (4), 453–454.

6 Colson, E. R., & Joslin, S. C. (2002). Changing nursery practice gets inner-city infants in the supine position for sleep. *Archives of Pediatrics & Adolescent Medicine, 156* (7), 717–720.

7 American Academy of Pediatrics, Task Force on Infant Positioning and SIDS. Positioning and SIDS: Update. (1996). *Pediatrics, 98* (6), 1216–1218.

8 Li, D. K., Petitti, D. B., Willinger, M., McMahon, R., Odouli, R., Vu, H., et al. (2003). Infant sleeping position and the risk of sudden infant death syndrome in California, 1997–2000. *American Journal of Epidemiology, 157* (5), 446–455.

9 Mitchell, E. A., Thach, B. T., Thompson, J. M., & Williams, S. (1999). Changing infants' sleep position increases risk of sudden infant death syndrome: New Zealand Cot Death Study. *Archives of Pediatrics & Adolescent Medicine, 153* (11), 1136–1141.

10 Gershon, N. B., & Moon, R. Y. (1997). Infant sleep position in licensed child care centers. *Pediatrics, 100* (1), 75–78.

11 Moon, R. Y., Weese-Mayer, D. E., & Silvestri, J. M. (2003). Nighttime child care: Inadequate sudden infant death syndrome risk factor knowledge, practice, and policies. *Pediatrics, 111*, 795–799.

12 Hunt, C. E., Lesko, S. M., Vezina, R. M., McCoy, R., Corwin, M. J., Mandell, F., et al. (2003.) Infant sleep position and associated health outcomes. *Archives of Pediatrics & Adolescent Medicine, 157* (5), 469–474.

13 Malloy, M. H. (2002). Trends in postneonatal aspiration deaths and reclassification of sudden infant death syndrome: Impact of the "Back to Sleep" program. *Pediatrics, 109* (4), 661–665.

14 National Institute of Child Health and Human Development, National Institutes of Health, DHHS. (2003). *Infant Sleep Position and SIDS: Questions and Answers for Health Care Professionals* (NIH Pub. No. 02–7202), Washington, DC: U.S. Government Printing Office.

15 Kattwinkel, J. (ed.) (2006). *Textbook of Neonatal Resuscitation, 5th Edition*. Elk Grove Village, IL: American Academy of Pediatrics and American Heart Association.

16 National Institutes of Health Consensus Development Conference on Infantile Apnea and Home Monitoring, Sept 29 to Oct 1, 1986. (1987). *Pediatrics, 79,* 292–299.

17 Ramanathan, R., Corwin, M. J., Hunt, C. E., Lister, G., Tinsley, L. R., Baird, T.; et al. Collaborative Home Infant Monitoring Evaluation (CHIME) Study Group. (2001). Cardiorespiratory events recorded on home monitors: Comparison of healthy infants with those at increased risk for SIDS. *Journal of the American Medical Association, 285* (17), 2199–2207.

18 Bhat, R. Y., Hannam, S., Pressler, R., Rafferty, G. F., Peacock, J. L., & Greenough, A. (2006). Effect of prone and supine position on sleep, apneas, and arousal in preterm infants. *Pediatrics, 118* (1), 101–107.

19 Ariagno, R. L., van Liempt, S., & Mirmiran, M. (2006). Fewer spontaneous arousals during prone sleep in preterm infants at 1 and 3 months corrected age. *Journal of Perinatology, 26* (5), 306–312.

20 American Academy of Pediatrics. (2003). *Healthy Child Care America Back to Sleep Campaign.* Retrieved February 12, 2007, from http://www.healthychildcare.org/pdf/bts_factsheet.pdf.

21 Harper, R. M., Kinney, H. C., Fleming, P. J., & Thach, B. T. (2000). Sleep influences on homeostatic functions: Implications for sudden infant death syndrome. *Respiration Physiology, 119* (2–3), 123–132.

22 Kahn, A. (2003). Sudden infant deaths: Stress, arousal, and SIDS. *Early Human Development, 75* (Suppl), 147–166.

23 Gerard, C. M., Harris, K. A., & Thach, B. T. (2002). Physiologic studies on swaddling: An ancient child care practice, which may promote the supine position for infant sleep. *Journal of Pediatrics, 141* (3), 398–404.

24 Moon, R. Y., & Oden, R. P. (2003). Back to sleep: Can we influence child care providers? *Pediatrics, 112* (4), 878–882.

25 Ehrle, J., Adams, G., & Tout, K. (2001). *Who's caring for our youngest children? Child care patterns of infants and toddlers.* Washington, DC: The Urban Institute.

26 Moon, R. Y., Biliter, W. M., & Croskell, S. E. (2001). Examination of state regulations regarding infants and sleep in licensed child care centers and family child care settings. *Pediatrics, 107*, 1029–1036.

27 National Institute of Child Health and Human Development, National Institutes of Health, DHHS. Sudden infant death syndrome (SIDS). (2006). Retrieved May 9, 2007, from http://www.nichd.nih.gov/health/topics/Sudden_Infant_Death_Syndrome.cfm.

28 Willinger, M., Ko, C-W, Hoffman, H. J., Kessler, R. C., & Corwin, M. J. (2003). Trends in infant bed sharing in the United States, 1993–2000: The National Infant Sleep Position Study. *Archives of Pediatrics & Adolescent Medicine, 157*, 43–49.

29 Scragg, R., Mitchell, E. A., & Taylor, B. J. (1993). Bed sharing, smoking and alcohol in the sudden infant death syndrome. *British Medical Journal, 307* (6915), 1312–1318.

30 Kemp, J. S., Livne, M., White, D. K., & Arfken, C. L. (1993). Softness and potential to cause rebreathing: Differences in bedding used by infants at high and low risk for sudden infant death syndrome. *Journal of Pediatrics, 132* (2), 234–239.

31 Ponsonby, A. L., Dwyer, T., Couper, D., & Cochrane, J. (1998). Association between use of a quilt and sudden infant death syndrome: Case-control study. *British Medical Journal*, *316*, 195–196.

32 Blair, P. S., Fleming, P. J., Smith, I. J., Platt, M. W., Young, J., Nadin, P., et al. (1999). Babies sleeping with parents: Case-control study of factors influencing the risk of the sudden infant death syndrome. CESDA SUDI research group. *British Medical Journal, 319* (7223), 1457–1461.

33 Hauck, F. R. Herman, S. M., Donovan, M., Iyasu, S., Moore, C. M., Donoghue, E., et al. (2003). Sleep environment and the risk of sudden infant death syndrome in an urban population: The Chicago Infant Mortality Study. *Pediatrics, 111* (5), 1207–1214.

34 Scheers, N. J., Rutherford, G. W., & Kemp, J. S. (2003). Where should infants sleep? A comparison of risk for suffocation of infants sleeping in cribs, adult beds, and other sleeping locations. *Pediatrics, 112* (4), 883–889.

35 Carpenter, R. G., Irgens, L. M., Blair, P. S., England, P. D., Fleming, P., Huber, J., et al. (2004). Sudden unexplained infant death in 20 regions in Europe: Case control study. *Lancet, 363* (9404), 185–191.

36 Matthews, T., McDonnell, M., McGarvey, C., Loftus, G., & O'Regan, M. (2004). A multivariate "time-based" analysis of SIDS risk factors. *Archives of Disease in Childhood, 89*, 267–271.

37 Tappin, D., Ecob, R., & Brooke, H. (2005). Bedsharing, roomsharing, and sudden infant death syndrome in Scotland: A case-control study. *Journal of Pediatrics, 147* (1), 32–37.

38 Mitchell, E. A., & Thompson, J. M. D. (1995). Co-sleeping increases the risk of SIDS, but sleeping in the parents' bedroom lowers it. In: T. O. (Ed.), *Sudden Infant Death Syndrome: New Trends in the Nineties* (pp. 266–269). Oslo, Norway: Scandinavian University Press.

39 Fleming, P. J., Blair, P. S., Pollard, K., Platt, M. W., Leach, C., Smith, I., et al. (1999). Pacifier use and sudden infant death syndrome: Results from the CESDI/SUDI case control study. *Archives of Disease in Childhood, 81* (2), 112–116.

40 Hauck, F. R., Hauck, O. O., & Siadaty, M. S. (2005). Do pacifiers reduce the risk of sudden infant death syndrome? A meta-analysis. *Pediatrics, 116,* 716–723.

41 Franco, P., Scaillet, S., Wermenbol, V., Valente, F., Groswasser, J., & Kahn, A. (2000). The influence of a pacifier on infants' arousals from sleep. *Journal of Pediatrics, 136* (6), 775–779.

42 Hunt, C. E., & Puczynski, M. S. (1996). Does supine sleeping cause asymmetric heads? *Pediatrics, 98,* 127–129.

43 Persing, J., James, H., Swanson, J., Kattwinkel, J., & American Academy of Pediatrics Committee on Practice and Ambulatory Medicine, Section on Plastic Surgery and Section on Neurological Surgery. (2003). Prevention and management of positional skull deformities in infants. *Pediatrics, 112* (1), 199–202.

44 Monson, R. M., Deitz, J., & Kartin, D. (2003). The relationship between awake positioning and motor performance among infants who slept supine. *Pediatric Physical Therapy, 15,* 196–203.

For more information on SIDS and SIDS risk reduction, contact:

Back to Sleep Campaign
Phone: 1–800–505–CRIB (2742)
Fax: 301–496–7101
Mail: 31 Center Drive, Room 2A32,
Bethesda, MD 20892
Internet: http://www.nichd.nih.gov/SIDS

National Institute of Child Health and Human Development
NIH Pub. No. 07-7202
June 2007