

## **Sudden Infant Death Syndrome and Breastfeeding: A Selected Annotated Bibliography**

Bajanowski T, Brinkmann B, Mitchell EA, Vennemann MM, Leukel HW, Larsch KP, Beike J; the GeSID Group.

### **Nicotine and cotinine in infants dying from sudden infant death syndrome.**

Int J Legal Med. 2007 Feb 7; [E-pub ahead of print]

The aim of this component of the German Study on Sudden Infant Death was to determine (1) nicotine concentrations in hair (NCH), as a marker of long standing exposure to tobacco, (2) cotinine concentrations in pericardial fluid (CCP) and (3) cotinine concentrations in liquor cerebrospinalis (CCL), the latter measures being markers of recent exposure to tobacco in the last few hours of life. The results obtained were compared with data on parental smoking revealed from interviews. In 100 cases of sudden infant death syndrome, material was taken at autopsy to determine NCH. In 41 cases, NCH and CCP, and in 70 cases, NCH and CCL were determined. Infants of mothers who stated having smoked during pregnancy had higher NCH than infants of non-smoking mothers ( $p = 0.008$ ). Furthermore, there was a weak but statistically significant relationship between NCH's and the daily cigarette consumption of the mother during pregnancy ( $n = 64$ ,  $r = 0.24$ ,  $p = 0.05$ ). In 43% of infants, nicotine could be detected in their hair, although the mothers had said at the interview that they did not smoke during pregnancy. On the other hand, in 33% of infants whose mother stated they had smoked during pregnancy nicotine was not detectable in the infant's hair. CCP's were strongly correlated with CCL's ( $r = 0.62$ ,  $p = 0.0027$ ). For this reason, both parameters were treated as equivalent for the detection of tobacco smoke exposure in the last hours before death. The influence of breast-feeding was evaluated by comparison of the nicotine concentrations in breast fed and non-breast-fed infants from smokers and non-smokers. Fivefold higher nicotine concentrations were determined in non-breast-fed infants of parents who smoked as compared to all other groups. It can be concluded that nicotine intake by passive smoking is much more important than by breast-feeding. We conclude that both interview data and biochemical measures should be sought to understand the true exposure to tobacco smoke.

Full-text at: <http://www.springerlink.com> (not a U.S. Government Website)

Mitchell EA.

### **Recommendations for sudden infant death syndrome prevention: A discussion document.**

Arch Dis Child. 2007 Feb; 92(2):155-9.

This article reviews the evidence for the current UK Department of Health recommendations for prevention of sudden infant death syndrome (SIDS) and suggests other factors that should be considered. The wording of the Department of Health recommendations for SIDS prevention has changed over the past 6 years, but the specific recommendations are largely consistent with the scientific evidence. The emphasis on thermal and illness factors and immunization could be reduced. Bed sharing and sharing the parental bedroom should be given more emphasis. Two major recommendations need to be discussed in greater detail: (1) breast feeding and (2) pacifier use. Meta-analyses or reviews looking at each risk factor or a combination of risk factors are required. Further, it is recommended that a committee is established that reviews the recommendations and publishes the evidence that leads to these recommendations, as is done by the American Academy of Pediatrics Taskforce on Sudden Infant Death Syndrome.

Full-text at: <http://adc.bmj.com> (not a U.S. Government Website)

Baddock SA, Galland BC, Taylor BJ, Bolton DP.

**Sleep arrangements and behavior of bed-sharing families in the home setting.**

Pediatrics. 2007 Jan; 119(1):e200-7.

**Objectives:** We aimed to provide a quantitative analysis of the sleep arrangements and behaviors of bed-sharing families to further understand the risks and benefits as well as the effects of infant age and room temperature on bed-sharing behaviors. **Methods:** Forty infants who regularly bed shared with > or = 1 parent > or = 5 hours per night were recruited. Overnight video of the family and physiological monitoring of the infant was conducted in infants' homes. Infant sleep position, potential for exposure to expired air, head covering and uncovering, breastfeeding, movements, family sleep arrangements, responses to the infant, and interactions were logged. **Results:** All infants slept with their mother. Fathers were included in 18 studies and siblings in 4. Infants usually slept beside the mother, separated from the father/siblings (if present), facing the mother, with head at mothers' breast level, touching, or with mother cradling. Median overnight breastfeeding duration was 40.5 minutes. Mothers commonly faced their infant, but infants were rarely in a position that potentially exposed them to maternal expired air. Fathers were seldom in contact with the infant during sleep. Of the 102 head-covering episodes observed in 22 infants, 80% were because of changes in adult sleep position. Sixty-eight percent of head uncovering was facilitated by the mother; half of these events were prompted by the infant. A 1 degree C increase in room temperature decreased infant head covering by 0.2 hours. **Conclusions:** The mother-infant relationship is of prime importance during bed sharing, whether the father is present or not. The focus around breastfeeding often dictates the sleep position of the infant and mother, though room temperature may also influence this. In colder rooms infants tend to spend more time with their face covered by bedding. Frequent maternal interactions rely on the ability of the mother to arouse with little stimulation. Mothers, perhaps impaired by alcohol, smoking, or overtiredness, may not be able to respond appropriately.

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Thoman EB.

**Co-sleeping, an ancient practice: Issues of the past and present, and possibilities for the future.**

Sleep Med Rev. 2006 Dec; 10(6):407-17. E-pub 2006 Nov 16.

Co-sleeping-infants sharing the mother's sleep space-has prevailed throughout human evolution, and continued over the centuries of western civilization despite controversy and blame of co-sleeping mothers for the deaths of their infants. By the past century, "crib death" was recognized, later identified as Sudden Infant Death Syndrome (SIDS), and generally found to occur more frequently during bed sharing. Pediatricians warned parents of the dangers of SIDS and other risks of bed sharing, and the frequency of bed sharing decreased markedly over the years. However, during recent decades, bed sharing began to increase, though major issues were raised, including: whether bed sharing actually exacerbates or is protective against the occurrence of SIDS, whether the practice facilitates breast feeding, whether bed sharing is beneficial for an infant's development, and other concerns. Dissent may soon be diminished by use of a crib which opens at the mother's bed-side and is becoming a popular approach to mother-and-infant closeness through the night.

Full-text available at: <http://www.sciencedirect.com> (not a U.S. Government Website)

Lahr MB, Rosenberg KD, Lapidus JA.

**Maternal-Infant bedsharing: Risk factors for bedsharing in a population-based survey of new mothers and implications for SIDS risk reduction.**

Matern Child Health J. 2006 Dec 29; [E-pub ahead of print]

Objectives: Maternal-infant bedsharing is a common but controversial practice. Little has been published about who bedshares in the United States. This information would be useful to inform public policy, to guide clinical practice and to help focus research. The objective was to explore the prevalence and determinants of bedsharing in Oregon. Methods: Oregon Pregnancy Risk Assessment Monitoring System (PRAMS) surveys a population-based random sample of women after a live birth. Women were asked if they shared a bed with their infant "always," "almost always," "sometimes" or "never." Results: 1867 women completed the survey in 1998-99 (73.5% weighted response rate). Of the respondents, 20.5% reported bedsharing always, 14.7% almost always, 41.4% sometimes, and 23.4% never. In multivariable logistic regression, Hispanics (adjusted odds ratio [ORa] 1.69, 95% Confidence Interval [CI] 1.17-2.43), blacks (ORa 3.11, 95% CI 2.03-4.76) and Asians/Pacific Islanders (ORa 2.14, 95% CI 1.51-3.03), women who breastfed more than 4 weeks (ORa 2.65, 95% CI 1.72-4.08), had annual family incomes less than \$30,000 (ORa 2.44, 95% CI 1.44-4.15), or were single (ORa 1.55, 95% CI 1.03-2.35) were more likely to bedshare frequently (always or almost always). Among

Hispanic and black women, bedsharing did not vary significantly by income level. Bedsharing black, American Indian/Alaska Native and white infants were much more likely to be exposed to smoking mothers than Hispanic or Asian/Pacific Islander infants ( $p < .0001$ ). Conclusions: Bedsharing is common in Oregon. The women most likely to bedshare are non-white, single, breastfeeding and low-income. Non-economic factors are also important, particularly among blacks and Hispanics. Campaigns to decrease bedsharing by providing cribs may have limited effectiveness if mothers are bedsharing because of cultural norms.

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Hutchison L, Stewart AW, Mitchell E.

**SIDS-protective infant care practices among Auckland, New Zealand mothers.**

N Z Med J. 2006 Dec 15; 119(1247):U2365.

**Aim:** To survey the knowledge and implementation of sudden infant death syndrome (SIDS)-protective infant care practices in mothers of infants aged less than 4 months. **Methods:** A postal survey was carried out of knowledge of SIDS risk factors and infant care practices of 200 mothers with infants aged 6-8 weeks and 3-4 months. **Results:** Mothers who could cite supine sleeping as protective comprised 84%, while 73% knew that smoking was a risk factor. Fewer knew that room sharing, keeping the face clear of bedding, and avoiding bed sharing and overheating are also protective. Fifty-four percent of the infants usually room-share with a parent, while 39% both room-share and sleep in their own bed. Sixteen percent usually co-slept for part or all of the night. Nearly one-third used pacifiers. Mothers who smoked during pregnancy comprised 8%, while 7% had smoked in the last 24 hours. Most infants (97%) had been breastfed at some time. **Conclusions:** Maternal education of the benefits of supine sleeping, not smoking, and breastfeeding appear well understood by these mothers. However, more education is needed about other SIDS-protective behaviours such as keeping the face clear and sleeping the infant in their own bed in the parents' room.

Ostfeld BM, Perl H, Esposito L, Hempstead K, Hinnen R, Sandler A, Pearson PG, Hegyi T.

**Sleep environment, positional, lifestyle, and demographic characteristics associated with bed sharing in sudden infant death syndrome cases: A population-based study.**

Pediatrics. 2006 Nov; 118(5):2051-9.

**Background:** In 2005, the American Academy of Pediatrics Task Force on Sudden Infant Death Syndrome recommended that infants not bed share during sleep. **Objective:** Our goal was to characterize the profile of risk factors associated with bed sharing in sudden infant death syndrome cases. **Design/Methods:** We conducted a population-based retrospective review of sudden infant death syndrome cases in New Jersey (1996-2000) dichotomized by bed-sharing status and compared demographic, lifestyle, bedding-environment, and sleep-position status. **Results:** Bed-sharing status was reported in 239

of 251 cases, with sharing in 39%. Bed-sharing cases had a higher percentage of bedding risks (44.1% vs 24.7%), exposure to bedding risks in infants discovered prone (57.1% vs 28.2%), and lateral sleep placement (28.9% vs 17.8%). The prone position was more common for bed-sharing and non-bed-sharing cases at placement (45.8% and 51.1%, respectively) and discovery (59.0% and 64.4%, respectively). In multivariable logistic-regression analyses, black race, mother <19 years, gravida >2, and maternal smoking were associated with bed sharing. There was a trend toward less breastfeeding in bed-sharing cases (22% vs 35%). In bed-sharing cases, those breastfed were younger than those who were not and somewhat more exposed to bedding risks (64.7% vs 45.1%) but less likely to be placed prone (11.8% vs 52.9%) or have maternal smoking (33% vs 66%). Conclusions: Bed-sharing cases were more likely to have had bedding-environment and sleep-position risks and higher ratios of demographic and lifestyle risk factors. Bed-sharing subjects who breastfed had a risk profile distinct from those who were not breastfed cases. Risk and situational profiles can be used to identify families in greater need of early guidance and to prepare educational content to promote safe sleep.

Full-text available: <http://www.pediatrics.org> (not a U.S. Government website)

Baddock SA, Galland BC, Bolton DP, Williams SM, Taylor BJ.

**Differences in infant and parent behaviors during routine bed sharing compared with cot sleeping in the home setting.**

Pediatrics. 2006 May; 117(5):1599-607.

Objectives: To observe the behavior of infants sleeping in the natural physical environment of home, comparing the 2 different sleep practices of bed sharing and cot sleeping quantifying to factors that have been identified as potential risks or benefits. Methods: Forty routine bed-sharing infants, aged 5-27 weeks were matched for age and season of study with 40 routine cot-sleeping infants. Overnight video and physiologic data of bed-share infants and cot-sleep infants were recorded in the infants' own homes. Sleep time, sleep position, movements, feeding, blanket height, parental checks, and time out of the bed or cot were logged. Results: The total sleep time was similar in both groups (bed-sharing median: 8.6 hours; cot-sleeping median: 8.2 hours). Bed-sharing infants spent most time in the side position (median: 5.7 hours, 66% of sleep time) and most commonly woke at the end of sleep in this position, whereas cot-sleeping infants most commonly slept supine (median: 7.5 hours, 100%) and woke at the end of sleep in the supine position. Prone sleep was uncommon in both groups. Head covering above the eyes occurred in 22 bed-sharing infants and 1 cot-sleeping infant. Five of these bed-sharing infants were head covered at final waking time, but the cot-sleeping infant was not. Bed-sharing parents looked at or touched their infant more often (median: 11 vs 4 times per night) but did not always fully wake to do so. Movement episodes were shorter in the bed-sharing group as was total movement time (37 vs 50 minutes respectively), whereas feeding was 3.7 times more frequent in the bed-sharing group than the cot-sleeping group. Conclusions: Bed-share infants without known risk factors for sudden infant death syndrome (SIDS) experience increased maternal touching and looking, increased breastfeeding, and faster and more frequent maternal responses. This high level

of interaction is unlikely to occur if maternal arousal is impaired, for example, by alcohol or overtiredness. Increased head covering and side sleep position occur during bed-sharing, but whether these factors increase the risk of SIDS, as they do in cot sleeping, requires further investigation.

Full-text available: <http://www.pediatrics.org> (not a U.S. Government website)

Nelson EA, Yu LM, Williams S; International Child Care Practices Study Group Members.

**International Child Care Practices study: Breastfeeding and Pacifier use.**

J Hum Lact. 2005 Aug; 21(3):289-95.

Although the Baby-Friendly Hospital Initiative advises that no pacifiers be given to breastfeeding infants, both breastfeeding and pacifier use may protect against sudden infant death syndrome. The International Child Care Practice Study data set on child care practices associated with sudden infant death syndrome risk from 21 centers in 17 countries was used to describe infant-feeding practices and pacifier use and assess factors associated with breastfeeding. At approximately 3 months of age, rates of breastfeeding only (4%-80%) and pacifier use (12.5%-71%) varied between centers. Pacifier use was negatively associated with breastfeeding, and a dose-response effect was noted. Other negative (multiple birth, smoking by mother) and positive (intention to breastfeed, bed sharing, mothers' education) associations with breastfeeding only were identified. Although causality should not be inferred, these associations are consistent with previous studies. Advice on pacifiers should include potential benefits as well as risks.

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McKenna JJ, McDade T.

**Why babies should never sleep alone: A review of the co-sleeping controversy in relation to SIDS, bedsharing and breast feeding.**

Paediatr Respir Rev. 2005 Jun; 6(2):134-52.

There has been much controversy over whether infants should co-sleep or bedshare with an adult caregiver and over whether such practices increase the risk of SIDS or fatal accident. However, despite opposition from medical authorities or the police, many western parents are increasingly adopting night-time infant care giving patterns that include some co-sleeping, especially by those mothers who choose to breast feed. This review will show that the relationships between infant sleep patterns, infant sleeping arrangements and development both in the short and long term, whether having positive or negative outcomes, is anything but simple and the traditional habit of labeling one sleeping arrangement as being superior to another without an awareness of family, social and ethnic context is not only wrong but possibly harmful. We will show that there are many good reasons to insist that the definitions of different types of co-sleeping and bedsharing be recognized and distinguished. We will examine the conceptual issues related to the biological functions of mother-infant co-sleeping, bedsharing and what

relationship each has to SIDS. At very least, we hope that the studies and data described in this paper, which show that co-sleeping at least in the form of room sharing especially with an actively breast feeding mother saves lives, is a powerful reason why the simplistic, scientifically inaccurate and misleading statement 'never sleep with your baby' needs to be rescinded, wherever and whenever it is published.

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Matturri L, Ottaviani G, Corti G, Lavezzi AM.

**Pathogenesis of early atherosclerotic lesions in infants.**

Pathol Res Pract. 2004; 200(5):403-10.

High serologic lipid levels, infections, and genetic susceptibility have been proposed as possible etiologic factors of initial atherosclerotic lesions of the coronary arteries in infancy. At a recent WHO annual meeting, it was stated that breast milk substitutes cause irreparable damage in infants. This prompted us to verify whether formula feeding and parental cigarette smoking might play a role in the pathogenesis of early atherosclerotic alterations in infancy. The major epicardial coronary arteries from 36 infants dying suddenly and unexpectedly (sudden infant death syndrome) were embedded in paraffin and serially cut for histologic examination. In 67% of the cases, multifocal coronary early atherosclerotic lesions of varying entities were detected. The alterations ranged from focal plaques with mild myointimal thickening to juvenile soft plaques reducing the arterial lumen. A significant correlation was observed between the early atherosclerotic lesions and the risk factors considered. In particular, we noted different morphologic patterns related to formula feeding and cigarette smoking. Baby formula feeding and parental cigarette smoking might have an atherogenic effect on the coronary walls as from the first months of life. The lesions appear to be larger and more diffuse when both these atherogenic factors are present.

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McCoy RC, Hunt CE, Lesko SM, Vezina R. et al.

**Frequency of bed sharing and its relationship to breastfeeding.**

J Dev Behav Pediatr 2004 Jun; 25(3): 141-9.

Bed sharing has been promoted as facilitating breastfeeding but also may increase risks for sudden, unexpected infant deaths. This prospective cohort study was performed to determine the prevalence of adult and infant bed sharing and its association with maternal and infant characteristics. Demographic data were collected from 10,355 infant-mother pairs at birth hospitals in Eastern Massachusetts and Northwest Ohio, and follow-up data were collected at 1, 3, and 6 months by questionnaire. Associations with bed sharing were estimated using odds ratios and 95% confidence intervals from multiple logistic regression models while adjusting for confounding variables. At 1, 3, and 6 months, 22%, 14%, and 13% of infant-mother pairs shared a bed, respectively. On multivariate analysis, race/ethnicity and breastfeeding seemed to have the strongest association with bed

sharing. These factors need to be considered in any comprehensive risk to benefit analysis of bed sharing.

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Chen A, Rogan WJ.

**Breastfeeding and the risk of postneonatal death in the United States.**

Pediatrics, 2004 May; 13(5): e35-9.

Objective: Breastfed infants in the United States have lower rates of morbidity, especially from infectious disease, but there are few contemporary studies in the developed world of the effect of breastfeeding on postneonatal mortality. We evaluated the effect of breastfeeding on postneonatal mortality in United States using 1988 National Maternal and Infant Health Survey (NMIHS) data. Methods: Nationally representative samples of 1204 infants who died between 28 days and 1 year from causes other than congenital anomaly or malignant tumor (cases of postneonatal death) and 7740 children who were still alive at 1 year (controls) were included. We calculated overall and cause-specific odds ratios for ever/never breastfeeding among all children, conducted race and birth weight-specific analyses, and looked for duration-response effects. Results: Overall, children who were ever breastfed had 0.79 (95% confidence interval [CI]: 0.67-0.93) times the risk of never breastfed children for dying in the postneonatal period. Longer breastfeeding was associated with lower risk. Odds ratios by cause of death varied from 0.59 (95% CI: 0.38-0.94) for injuries to 0.84 (95% CI: 0.67-1.05) for sudden infant death syndrome. Conclusions: Breastfeeding is associated with a reduction in risk for postneonatal death. This large data set allowed robust estimates and control of confounding, but the effects of breast milk and breastfeeding cannot be separated completely from other characteristics of the mother and child. Assuming causality, however, promoting breastfeeding has the potential to save or delay approximately 720 postneonatal deaths in the United States each year.

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Horne RS, Parslow PM. et al.

**Comparison of evoked arousability in breast and formula fed infants.**

Arch Dis Child Jan 2004; 89(1): 22-5.

Background: Currently, there is no consistent evidence that breastfeeding reduces the risk for sudden infant death syndrome (SIDS). Arousal from sleep is believed to be an important survival mechanism that may be impaired in victims of SIDS. Previously it has been shown that arousability is impaired by the major risk factors for SIDS such as prone sleeping and maternal smoking. AIMS: To establish whether arousability was altered by method of feeding, and whether breast fed infants would have lower arousal thresholds. Methods: Forty three healthy term infants were studied using daytime polysomnography on three occasions: 2-4 weeks post-term, 2-3 months post-term, and 5-6 months post-term. Multiple measurements of arousal threshold (cm H<sub>2</sub>O) in response to nasal air jet stimulation applied alternately to the nares were made in both active sleep (AS) and quiet

sleep (QS) while infants slept supine. Arousal thresholds and sleep period lengths were compared between formula fed and breast fed infants at each age. Results: Arousal thresholds were not different between breast fed and formula fed infants in QS. However, in AS breast fed infants were significantly more arousable than formula fed infants at 2-3 months of age. There was no difference between groups of infants when sleep period length was compared at any study. Conclusions: Breast fed infants are more easily aroused from AS at 2-3 months of age than formula fed infants. This age coincides with the peak incidence of SIDS.

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Wang B, McVeagh P, Petocz P, Brand-Miller J.

**Brain ganglioside and glycoprotein sialic acid in breastfed compared with formula-fed infants.**

Am J Clin Nutr. 2003 Nov; 78(5):1024-9.

Background: Concentration of sialic acid in brain gangliosides and glycoproteins has been linked to learning ability in animal studies. Human milk is a rich source of sialic acid-containing oligosaccharides and is a potential source of exogenous sialic acid. Objective: The aim of the study was to compare the sialic acid concentration in the brain frontal cortex of breastfed and formula-fed infants. Design: Twenty-five samples of frontal cortex derived from infants who died of sudden infant death syndrome were analyzed. Twelve infants were breastfed, 10 infants were formula-fed, and 1 infant was mixed-fed; the feeding status of the remaining 2 infants was unknown. Ganglioside-bound and protein-bound sialic acid were determined by HPLC. Ganglioside ceramide fatty acids were also analyzed to determine the relation between sialic acid and long-chain polyunsaturated fatty acids. Results: After adjustment for sex with age at death as a covariate, ganglioside-bound and protein-bound sialic acid concentrations were 32% and 22% higher, respectively, in the frontal cortex gray matter of breastfed infants than in that of formula-fed infants ( $P < 0.01$ ). Protein-bound sialic acid increased with age in both groups ( $P = 0.02$ ). In breastfed but not in formula-fed infants, ganglioside-bound sialic acid correlated significantly with ganglioside ceramide docosahexaenoic acid and total n-3 fatty acids. Conclusions: Higher brain ganglioside and glycoprotein sialic acid concentrations in infants fed human milk suggests increased synaptogenesis and differences in neurodevelopment.

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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 May; 111(5 part 2): 1207-1214.

Objective: To examine risk factors for sudden infant death syndrome (SIDS) with the goal of reducing SIDS mortality among blacks, which continues to affect this group at twice the rate of whites. Methods: We analyzed data from a population-based case-control study of 260 SIDS deaths that occurred in Chicago between 1993 and 1996 and an equal number of matched living controls to determine the association between SIDS and factors in the sleep environment and other variables related to infant care. Results: The racial/ethnic composition of the study groups was 75.0% black; 13.1% Hispanic white; and 11.9% non-Hispanic white. Several factors related to the sleep environment during last sleep were associated with higher risk of SIDS: placement in the prone position (unadjusted odds ratio [OR]: 2.4; 95% confidence interval [CI]: 1.7-3.4), soft surface (OR: 5.1; 95% CI: 3.1-8.3), pillow use (OR: 2.5; 95% CI: 1.5-4.2), face and/or head covered with bedding (OR: 2.5; 95% CI: 1.3-4.6), bed sharing overall (OR: 2.7; 95% CI: 1.8-4.2), bed sharing with parent(s) alone (OR: 1.9; 95% CI: 1.2-3.1), and bed sharing in other combinations (OR: 5.4; 95% CI: 2.8-10.2). Pacifier use was associated with decreased risk (unadjusted OR: 0.3; 95% CI: 0.2-0.5), as was breastfeeding either ever (OR: 0.2; 95% CI: 0.1-0.3) or currently (OR: 0.2; 95% CI: 0.1-0.4). In a multivariate model, several factors remained significant: prone sleep position, soft surface, pillow use, bed sharing other than with parent(s) alone, and not using a pacifier. Conclusions: To lower further the SIDS rate among black and other racial/ethnic groups, prone sleeping, the use of soft bedding and pillows, and some types of bed sharing should be reduced.

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Kahn A, Sawaguchi T, Sawaguchi A. et al.

**Sudden Infant Deaths: From Epidemiology to Physiology.**

Forensic Sci Int 2002 Sep 14; 130 ( Suppl 1): S 8-20.

The incidence of sudden infant death syndrome (SIDS) has dropped significantly in most countries following the development of education campaigns on the avoidance of risk factors for SIDS. However, questions have been raised about the physiological mechanism responsible for the effects of these environmental risk factors. Since 1985, a series of prospective, multicentric studies have been developed to address these questions; over 20,000 infants were recorded during one night in a sleep laboratory and among these, 40 infants eventually died of SIDS. In this review, the following methods were employed: sleep recordings and analysis, monitoring procedure, data analysis of sleep stages, cardiorespiratory and oxygen saturation, scoring of arousals, spectral analysis of the heart rate and the determination of arousal thresholds, and statistical analysis and the results including sleep apneas, arousals and heart rate and autonomic controls in both future SIDS victims and normal infants were introduced separately. In addition, the physiological effect of prenatal risk factors (maternal smoking during gestation) and postnatal risk factors (administration of sedative drugs, prone sleeping position, ambient temperature, sleeping with the face covered by a bed sheet, pacifiers and breastfeeding) in normal infants were analyzed. In conclusion, the physiological studies undertaken on the basis of epidemiological findings provide some clues about the physiological mechanisms linked with SIDS. Although the description of the mechanisms

responsible for SIDS is still far from complete, it appears to involve both arousal responses and cardiac autonomic controls during sleep–wake processes.

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Alm B, Wennergren G, Norvenius, SG. et al.

**Breast feeding and the sudden infant death syndrome in Scandinavia, 1992-95.**

Arch Dis Child 2002 Jun; 86(6): 400-402.

**Aims:** To assess the effects of breastfeeding habits on sudden infant death syndrome (SIDS). **Methods:** The analyses are based on data from the Nordic Epidemiological SIDS Study, a case-control study in which parents of SIDS victims in the Scandinavian countries between 1 September 1992 and 31 August 1995 were invited to participate, each with parents of four matched controls. The odds ratios presented were computed by conditional logistic regression analysis. **Results:** After adjustment for smoking during pregnancy, paternal employment, sleeping position, and age of the infant, the adjusted odds ratio (95% CI) was 5.1 (2.3 to 11.2) if the infant was exclusively breast fed for less than four weeks, 3.7 (1.6 to 8.4) for 4-7 weeks, 1.6 (0.7 to 3.6) for 8-11 weeks, and 2.8 (1.2 to 6.8) for 12-15 weeks, with exclusive breast feeding over 16 weeks as the reference. Mixed feeding in the first week post partum did not increase the risk. **Conclusions:** The study is supportive of a weak relation between breastfeeding and SIDS reduction.

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Ryan AS, Wenjun Z, Acosta A.

**Breastfeeding continues to increase into the new millennium.**

Pediatrics 2002 Dec; 110(6): 1103-1109.

**Objective:** To update reported rates of breastfeeding and exclusive breastfeeding through 2001 and to compare rates in 2001 to those from 1996. **Methods:** The Ross Laboratories Mothers Survey (RLMS) is a large, national survey designed to determine patterns of milk feeding during infancy. Questionnaires were mailed each month to a representative sample of mothers when their infant was 1 month of age, 2 months of age, 3 months or age, and so forth. In 1996, approximately 744 000 questionnaires were mailed, and in 2001, 1.4 million questionnaires were mailed. Mothers were asked to recall the type of milk fed to their infant in the hospital, and during each month of age. Two categories of breastfeeding were considered: breastfeeding (human milk or a combination of human milk and formula or cow's milk) and exclusive breastfeeding (only human milk). Rates of breastfeeding and exclusive breastfeeding in the hospital and at 6 months of age were evaluated. **Results:** In 2001, the prevalence of the initiation of breastfeeding and breastfeeding to 6 months of age in the United States reached their highest levels recorded to date, 69.5% and 32.5%, respectively. Comparing rates in 2001 and 1996, increases in the initiation of breastfeeding and continued breastfeeding to 6 months of age were observed across all sociodemographic groups but were greater among groups that

have been historically less likely to breastfeed: women who were black, younger (<20 years of age), no more than high school-educated, primiparous, employed at the time they received the survey, and who participated in the Supplemental Nutrition Program for Women, Infants, and Children (WIC). Breastfeeding in the hospital and at 6 months of age was most common in the Mountain and Pacific states and among women who were white or Hispanic, older, college-educated, and were not enrolled in WIC. Mothers most likely to practice exclusive breastfeeding in the hospital (46.2%) and at 6 months of age (17.2%) had a similar sociodemographic profile as mothers who breastfed their infants. Conclusions: If increases in breastfeeding continue at the current rate (approximately 2% per year), in-hospital breastfeeding in the United States should meet or exceed the Healthy People 2010 goal of 75% for the early postpartum period. However, the Healthy People 2010 goal for continued breastfeeding to 5 to 6 months of age (50%) may not be reached in every subgroup. To ensure that these goals are achieved, educational and promotional strategies for breastfeeding must be continued to support mothers who are young, less educated, and participating in WIC.

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