

## **Factors That Influence Use of a Home Cardiorespiratory Monitor for Infants: The Collaborative Home Infant Monitoring Evaluation.**

Silvestri JM, Lister G, Corwin MJ, Smok-Pearsall SM, Baird TM, Crowell DH, Cantey-Kiser J, Hunt CE, Tinsley L, Palmer PH, Mendenhall RS, Hoppenbrouwers TT, Neuman MR, Weese-Mayer DE, Willinger M. Arch Pediatr Adolesc Med. 2005 Jan;159(1):18-24.

**Background:** As part of the Collaborative Home Infant Monitoring Evaluation, a home monitor was developed to record breathing, heart rate, other physiologic variables, and the time the monitor was used. **Objective:** To determine the frequency of monitor use, factors that influence use, and validity of a model developed to predict use. **Design:** We developed a model to predict monitor use using multiple linear regression analysis; we then tested the validity of this model to predict adherence for the first week of monitoring and for the subsequent 4-week period (weeks 2-5). **Setting:** Clinical research centers in Chicago, Ill; Cleveland, Ohio; Honolulu, Hawaii; Los Angeles, Calif; and Toledo, Ohio. **Patients** Preterm infants, infants younger than 1 month with a history of autopsy-confirmed sudden infant death syndrome in a sibling, and infants with an idiopathic apparent life-threatening event were divided into 2 cohorts based on enrollment date. **Main Outcome Measure** Mean hours of monitor use per week. **Results:** In cohort 1, the variables available before monitoring were only weakly associated with total hours of monitor use in weeks 2 to 5 (total model  $r(2) = 0.08$ ). However, when hours of monitor use in week 1 were included as a variable to predict monitor use in weeks 2 to 5, the  $r(2)$  increased to 0.64 for hours of monitor use per week. **Conclusions:** Our data show that monitor use in the first week was the most important variable for predicting subsequent monitor use. The study suggests that a major focus of home monitoring should be adherence in the first week, although it remains to be tested whether this adherence can be altered.

**Ethnic differences in neonatal and postneonatal mortality.** Hessol NA, Fuentes-Afflick E. Pediatrics. 2005 Jan;115(1):e44-51.

**Objective:** Ethnic disparities in infant mortality have been consistently documented in the United States, but these disparities are poorly understood. Although the infant mortality rate in the United States has fallen to record low rates, since 1971 the ethnic disparity between black and white infants has remained unchanged or increased. In 2001, the infant mortality rate among black infants was approximately 2.5 times higher than the rate among white and Hispanic infants. The objective of this study was to identify ethnic differences in neonatal and postneonatal mortality as well as the causes and risk factors among infants born in California. **Methods:** Secondary analysis was performed of 1,277,393 singleton infants live-born to black, Latina, and white women from the California linked birth-infant death certificate from 1995 to 1997. The dependent variables were infant death (defined as an infant who died in the first year of life [death <365 days]), neonatal death (death during the first 27 days of life), and postneonatal death (death between 28 and 364 days of life). Cause-specific neonatal and postneonatal infant mortality rates (per 100,000 live births) were calculated for each ethnic group. Chi(2) and exact test statistics were used to compare the distribution of maternal and

infant characteristics and cause-of-death rates by maternal ethnicity. Logistic regression analysis was used to compute odds ratios (ORs) and 95% confidence intervals (CIs) to estimate the relationship between maternal ethnicity, maternal and infant factors, and risk of infant mortality. Results: In both the neonatal and postneonatal periods, black women had higher infant mortality rates than Latina or white women for conditions originating in the perinatal period (including respiratory distress syndrome) and symptoms, signs, and ill-defined conditions (including sudden infant death syndrome). After adjusting for maternal and infant characteristics, there were no significant ethnic differences for neonatal mortality. For postneonatal mortality, black women had a higher risk (OR: 1.25; 95% CI: 1.10-1.42) and Latina women had a lower risk (OR: 0.80; 95% CI: 0.71-0.89) compared with white women after adjusting for maternal and infant factors. In analyses of all ethnic groups combined, as well as ethnic-specific analyses, the strongest predictors of neonatal and postneonatal death were infant birth weight of <2499 g and gestational age of <33 weeks. Conclusions: Causes of infant mortality and risk factors for infant mortality differed by maternal ethnicity, indicating a need to tailor prevention and education efforts, especially during the postneonatal period. To achieve national infant mortality goals, health professionals and policy makers should continue to emphasize the importance of early and continuous prenatal care and develop new strategies to reduce the incidence of low birth weight and premature infants. Ethnic-specific approaches may be needed to further reduce infant mortality rates and achieve our national goal to eliminate ethnic disparities in perinatal outcomes.

**Repeat sudden unexpected and unexplained infant deaths: natural or unnatural?.** R G Carpenter, A Waite, R C Coombs, C Daman-Willems, A McKenzie, J Huber, J L Emery. *Lancet* 2005; 365: 29-35

Background: There have been suggestions that when two or three unexpected unexplained infant deaths occur within a family they are more likely to be unnatural than natural. We aimed to estimate the probability that a second infant death is natural versus unnatural. Methods: The Care of Next Infant programme (CONI) supports parents who have previously had an unexpected and apparently unexplained infant death and is currently available in over 90% of health districts in England, Wales, and Northern Ireland. We studied all deaths in 6373 infants who had completed the CONI programme by December, 1999. After a CONI death, we made detailed enquiries into the previous death and the CONI death, including a family interview, a review of autopsies, and case discussion. Findings 57 (8.9 per 1000) CONI infants died. Nine deaths were inevitable, and 48 were unexpected. 44 families lost one child, and two families lost two children. Of the 46 first CONI deaths, 40 were natural; the other six were probable homicides, five committed by one or both parents (two criminally convicted). The ratio of 40 natural to six unnatural deaths is 6.7 (95% CI 2.8-19.4). Enquiries identified 18 families with two SIDS (sudden infant death syndrome) deaths and two families with probable covert double homicides (ratio 9.0 [2.2 to 80.0]). There were no convictions in 13 incomplete cases. Families with three deaths are reported. Interpretation Repeat unexpected infant deaths are most probably natural.

**Gene-environment interactions: implications for sudden unexpected deaths in infancy.** Hunt CE. Arch Dis Child. 2005 Jan;90(1):48-53.

From the perspective of systems biology, genes and proteins interact to produce complex networks, which in turn interact with the environment to influence every aspect of our biological lives. Recent advances in molecular genetics and the identification of gene polymorphisms in victims of sudden infant death syndrome (SIDS) are helping us better to understand that SIDS, like all other human conditions in health and disease, represents the confluence of specific environmental risk factors interacting in complex ways with specific polymorphisms to yield phenotypes susceptible to sudden and unexpected death in infancy. Failure to consider both genetic and environmental risk factors will impede research progress.

**Sudden infant death syndrome: the expectations of parents.** Gabbi G. J Matern Fetal Neonatal Med. 2004;16 Suppl 2:47-9.

The purpose of this paper was to define the outlook of parents' associations of sudden infant death syndrome (SIDS). Since these groups appear to be the principal recipients of a multifactorial dilemma, their expectations drive not only support teams but also research through fund-raising activities and programming conferences. These points may be summed up as: (1) characterizing the syndrome and generating information useful for decreasing the phenomenon; (2) anticipating parental responses and managing critical incident stresses; (3) helping researchers to describe the population and the scenario of a probable SIDS infant; (4) creating a preventive system; and (5) motivating potential financial supporters.

**Autoptic examination in sudden infant death syndrome and sudden intrauterine unexpected death: proposal of a national law.** Maturri L, Ottaviani G, Lavezzi A. J Matern Fetal Neonatal Med. 2004;16 Suppl 2:43-5.

The autoptic procedures in sudden infant death syndrome (SIDS) and sudden intrauterine unexpected death (SIUD) victims requires an in-depth examination of the autonomic nervous system, central and peripheral, as well as of the cardiac conduction system. In these pathologies, our studies have identified frequent developmental abnormalities in the brain stem, particularly hypoplasia of the arcuate nucleus, and accessory atrioventricular pathways in the cardiac conduction system. The law 'Post-mortem Investigation on the SIDS and of Unexplained Late Fetal Death' designated the Institute of Pathology of Milan University as the National Reference Center. The objectives of this law include, in article 4, widespread informative and preventive campaigns and continuous formation of programs for medical personnel.

**Causes of sudden infant death syndrome from post-mortem examination.** Giordano G. J Matern Fetal Neonatal Med. 2004;16 Suppl 2:41-2.

Sudden infant death syndrome (SIDS) was first defined in the USA as: 'The sudden death of an infant under one year of age which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of the death scene, and review of the clinical history'. More recently, diverse studies have shown that some cases of SIDS can be explained, when an accurate post-mortem examination is performed. The primary objective of the present paper was to delineate possible causes of SIDS as derived from a review of autoptic studies reported in the literature.

**Influence of sleep position experience on ability of prone-sleeping infants to escape from asphyxiating microenvironments by changing head position.**

Paluszynska DA, Harris KA, Thach BT. *Pediatrics*. 2004 Dec;114(6):1634-9.

Objective: Several studies have found that back- or side-sleeping infants who are inexperienced in prone sleeping are at much higher risk for sudden infant death syndrome (SIDS) when they turn to prone or are placed prone for sleep compared with infants who normally sleep prone. Moreover, such inexperienced infants are more likely to be found in the face-down position at death after being placed prone compared with SIDS infants who are experienced in prone sleeping. We hypothesized that lack of experience in prone sleeping is associated with increased difficulty in changing head position to avoid an asphyxiating sleep environment. Methods: We studied 38 healthy infants while they slept prone. Half of these were experienced and half were inexperienced in prone sleeping. To create a mildly asphyxiating microenvironment, we placed infants to sleep prone with their faces covered by soft bedding. We recorded inspired CO<sub>2</sub> (CO<sub>2</sub>I), electrocardiogram, and respiration, and we videotaped head movements. Also, we assessed gross motor development (Denver Development Scale). Results: When sleeping prone, with their faces covered by bedding, all infants experienced mild asphyxia as a result of rebreathing. All aroused and attempted escape from this environment. Infants used 3 stereotyped head-repositioning strategies. The least effective was nuzzling into the bedding with occasional brief head lifts. More effective were head lifts combined with a head turn. Some infants, however, could turn only to 1 side, right or left. Infants who were inexperienced in prone sleeping had less effective protective behaviors than experienced infants. Infant age did not correlate with efficacy of protective behaviors. Infants who were experienced in prone sleep had advanced gross motor development compared with inexperienced infants. Conclusion: Infants who are inexperienced in prone sleeping have decreased ability to escape from asphyxiating sleep environments when placed prone. These observations potentially explain the increased risk associated with prone sleep in infants who are inexperienced. The increased occurrence of the face-down position in such infants is also potentially explained. These findings suggest that airway protective behaviors may be acquired through the mechanism of operant conditioning (learning).