

most recently conducted meta-analysis on SIDS and infant feeding method indicates that the number of SIDS deaths related to formula feeding is likely much higher than in the 2010 study.²

Evidence suggests blanket advice against bed-sharing may be ineffective and may be counterproductive, directly contributing to infant deaths in at least some cases. A survey of nearly 5000 US mothers revealed that sleepy parents are taking nighttime feedings to the sofa to avoid falling asleep with their infants in bed, and large numbers of these parents are unintentionally falling asleep there.⁵ Experts agree that sofas pose a much higher risk for infant death than beds.^{1,3} Parents of 2 SIDS infants described exactly this scenario, unaware that couches are far more dangerous places for infants to sleep than parental beds.³

The conclusions of this flawed study may be used to support the American Academy of Pediatrics' recommendation against all bed-sharing. Instead, public health efforts must address the reality that tired parents must feed their infants at night somewhere, and that sofas are very dangerous for all infants, but especially for those of parents who are smokers or under the influence of alcohol or drugs. Public health messages must also acknowledge that breastfeeding infants and formula feeding infants do not sleep the same way when bed-sharing, and that formula feeding infants have a higher risk of death.

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Risk Factors and a True Cause of SIDS

The article by Colvin et al is yet another example of a study warning of the risks of sudden unexpected infant death (SUID) including sudden infant death syndrome (SIDS) by exposing infants to unsafe sleeping environments such as cosleeping or the presence of toys and other objects in the sleep area. The study analyzed 8207 cases of SUID categorized as SIDS (35% or 2873 cases), accidental suffocation and strangulation in bed (26% or 2196 cases), and as unknown/undetermined (38% or 3130 cases). The authors conclude that the predominant risk factor for younger infants is bed-sharing, whereas for older infants rolling into objects in the sleep area. However, the study has several shortcomings. No distinction is made between different infant death categories, leaving an impression that all infants were perfectly healthy and died as a result of accidents that are preventable. The study does not take into consideration a possibility that these infants harbor an intrinsic biological (genetic/molecular) defect that according to the triple risk model makes them

vulnerable to extrinsic risk factors such as prone sleeping, mild upper respiratory infection, and maternal smoking (other well documented SIDS risk factors).¹ The number of cases of accidental suffocation/strangulation in bed appears extraordinarily high considering that similar studies revealed that such cases accounted for between 2.8% and 12% of SUID.² In addition, the mechanism of suffocation (ie, “rolling over toys and objects”) appears implausible since the actual scene reconstruction studies are often inconclusive in most such cases.³

This and similar recent studies create an impression that the cause of SUID including SIDS has now been identified and a simple solution exists to prevent such death implying that further scientific research into biological underpinning of SIDS is unnecessary. This would be a grave mistake given recent advances in molecular studies suggesting that up to one-third of SIDS cases could be based on demonstrable mutations affecting genes involved in neurotransmission, energy metabolism, autonomic control, response to infection, and duration of cardiac action potential.⁴ Clearly a more balanced approach is required that on 1 hand provides sound advice to parents on safe sleep environment and on the other hand advocates molecular testing and supports robust scientific research into the true causes of SUID and SIDS. *Pediatrics* and the American Academy of Pediatrics should be active participants in promoting these goals.

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In Reply to the Letters From Smith et al and Bartick et al

Thank you for your comments and the opportunity to clarify the purpose and findings of our study. The primary purpose of our study was to “compare differences in the sleep environments for younger (birth through 3 months) and older (ages 3 months to 364 days) infants who experienced sleep-related deaths.”¹

Both letters list variables that were not included in our analysis, including attributes of the adult bed-sharer (eg, use of alcohol, tobacco, and/or sedating substances), whether the infant was unattended, and feeding method. All of these are important considerations. However, the purpose of the study was to determine differences in sleep environments at different ages. There has been no previous evidence to suggest that the attributes of the adult who bed-shares with an infant vary from early infancy to late infancy. Unfortunately, data on postnatal smoke exposure were, in our opinion, not reliable; the proportion of missing data was sufficiently high that we questioned the validity of multiple imputation to account for that. Our data source did not have information on whether the infant was breastfed or formula fed. However, we reanalyzed the data to help

determine if the inclusion of prenatal exposure to maternal tobacco, illicit drugs, heavy alcohol use, or misuse of over-the-counter drugs into the regression models changed our findings for adult bed sleep place and bed-sharing. It did not. After adding those factors to the regression models, deaths in the younger age group were still associated with bed-sharing (odds ratio [OR]: 1.9, 95% confidence interval [CI]: 1.7–2.1, $P < .001$). Deaths in the younger age group also continued to be associated with sleeping in an adult bed (compared with sleeping in a crib, bassinet, or playpen; OR: 1.6, 95% CI: 1.4–1.8, $P < .001$; in that model, prenatal maternal misuse of over-the-counter medications was removed due to Hessian singularities). In those regression models, prenatal maternal tobacco use was associated with bed-sharing (OR: 1.3, 95% CI: 1.1–1.5, $P < .01$) and adult bed sleep place (OR: 1.2, 95% CI: 1.0–1.4, $P < .01$); the other additional factors were not significant.

The authors of both letters discuss the dangers of sofas and recliners. Sofas, recliners, and similar furniture were not included in the “adult bed” category because the risk of an infant sleeping on a sofa is different from that of an infant sleeping on a bed; sofas, recliners, and similar furniture were included in the “other” category. We absolutely agree that sofa sleeping is an extremely hazardous practice for infants. Indeed, we have conducted a separate analysis of infant deaths that occur on sofas and hope to publish that soon. However, we disagree with Bartick et al’s assertion that “the literature clearly reveals that most accidental smothering/entrapment deaths involve sofas, recliners, or chairs.” In the study referenced by Bartick et al, whereas 16% of deaths occurred on sofas, 38% occurred on beds.²

The authors of both letters state concerns that there was not a control group

in this study. For studies involving sudden infant death syndrome (SIDS) and other sleep-related infant deaths, case-control studies have been the gold standard, because it is impossible to conduct randomized controlled trials. We acknowledge that this is not a case-control study. However, all risk factors considered in this study were examined for both study groups, younger and older infants. In addition, because the purpose of this study was to compare differences in risk factors between younger and older infants (and not to compare the degree of risk for any specific factor), our study used the older infant group as the comparison group.

Smith et al assert that SIDS and “smothering” are conflated in our study, that this study “focuses almost exclusively on the ‘other sleep-related causes,’” and that we aggregated “safe and unsafe situations” together. We disagree. SIDS comprised 35% of the study population, whereas 26.8% and 38.2% were attributed to accidental suffocation and strangulation in bed (ASSB) and undetermined, respectively. Ultimately, our goal is to reduce infant mortality, not just from SIDS, but from all sleep-related infant deaths. As the rates of non-SIDS sleep-related infant deaths (including ASSB and Undetermined) continue to rise, there is some degree of diagnostic shifting with regards to these deaths, and most of these deaths occur in hazardous sleep situations, so it is important to identify the factors that may contribute to these preventable deaths, regardless of the “official” cause of death. Furthermore, the primary statistical test conducted in this study examined the odds of having a risk factor present (ie, “safe situation”) compared with not having the risk factor present (ie, “unsafe situation”).

We agree that infants who are breastfed are at lower risk for SIDS and other sleep-related infant deaths than those who are not breastfed, and

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