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Sudden Infant Death Syndrome and Bed-Sharing in Montana, 2003-2010

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Sudden Infant Death Syndrome (SIDS) is a diagnosis of exclusion: "...the diagnosis of SIDS can be made only if an infant under one year of age has died suddenly and unexpectedly, the onset of the fatal episode was apparently associated with sleep, and a thorough investigation of the case, including performance of a complete autopsy and review of the circumstances of the death and the clinical history, does not provide an explanation of the death. If these criteria are not fulfilled the cases can be termed unclassified sudden infant death (USID) or as sudden unexpected death in infancy (SUDI)."¹ SUID is another synonym for USID or SUDI.

SIDS is the leading cause of post-neonatal infant mortality (between one month and one year of age) in the US, accounting for 22% of deaths in this age group; most SIDS deaths occur between the ages of one and four months.² The cause or causes of SIDS deaths are not known, although transient neurologic, endocrine, respiratory, and cardiovascular dysfunctions have been implicated, as have genetic factors that predispose infants to vulnerability.³ It is generally accepted that these physiologic conditions interact with environmental risk factors or triggers.^{1,4}

Prevention campaigns based on proximate environmental risk factors have been very effective in reducing the national SIDS mortality rate from 1.20 deaths per 1,000 live births in 1992 to 0.50/1,000 in 2008.² The most dramatic reduction was associated with the "Back to Sleep" campaign, followed by eliminating soft crib bedding, avoiding smoking during pregnancy, and protecting infants from second-hand smoke.⁵ Studies of the association between SIDS and bed-sharing with parents have been inconsistent, but there appears to be an elevated risk, especially if mothers smoke.^{4,6} In some cases, it is difficult to determine if bed-sharing contributed to overlaying and suffocation that may have been the true cause of death.⁷

SIDS, SUID, and Bed-Sharing in Montana, 2003-2010

We reviewed all 586 death certificates of infants less than one year of age who died between January 1, 2003 (when the new version of the Montana death certificate was implemented) and December 31, 2010. We identified all infants with an Underlying Cause of Death of *SIDS* (ICD-10 classification R95),⁸ *Other sudden death cause unknown* (R96.0; although this should be applied only to adults, there was one infant with this cause of death recorded), *Other ill-defined and unspecified causes of mortality* (R99, equivalent to SUID), *Accidental suffocation and strangulation in bed* (W75), and *Sequelae of prematurity of 28-36 weeks gestations* (P07.3). In addition, we searched text fields describing contributing causes of death

¹ Bajanowski T et al. 2007. *Forensic Sci International* 165:129-143.

² Heron M. *National vital statistics reports*; vol 60 no 6. Hyattsville, MD: National Center for Health Statistics. 2012

³ Kadhim H. et al. 2010. *Neurosci Lett* 480:122-126; Paterson DS, et al. 2006. *JAMA* 296:2124-2132

⁴ Schnitzer PG et al. 2012. *Am J Publ Health* epub April 19, 2012: e1-19.

⁵ American Academy of Pediatrics Task force on Sudden Infant Death Syndrome. 2005. *Pediatrics* 116:1245-1255;

⁶ Horsley T et al. 2007. *Arch Pediatr Adolesc Med* 161:237-245; Vennemann MM et al. 2012. *J Pediatr* 160:44-48; American Academy of Pediatrics Policy Statement. 2011. *Pediatrics* 128:1030-1039.

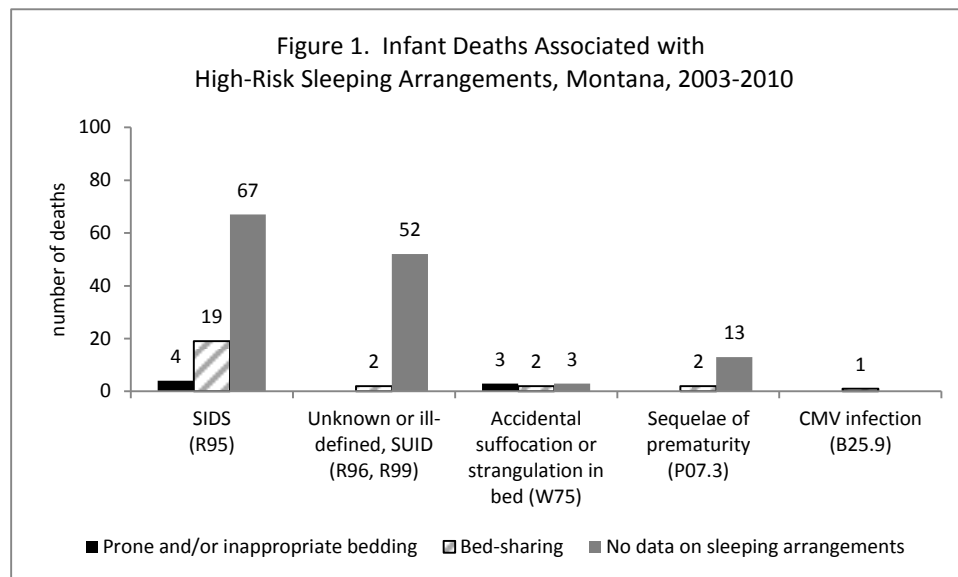
⁷ Weber MA et al. 2012. *J Paediatr Child Health* 48:335-341; Kim SY et al. 2012. *J Forensic Sci*

⁸ 57:364-369 <https://www.cdc.gov/nchs/icd/icd10cm.htm>

and narrative sections for mentions of SIDS and for various descriptions of bed-sharing (including co-sleeping, sleeping with, sleeping between, overlaying, and variations including misspellings). We excluded 143 infants because they did not die of the target causes and there was no mention of sleeping with an adult in the death certificate. This yielded 168 records (29% of all infant deaths) to review manually for evidence of SIDS and other causes of death associated with bed-sharing.

There were 90 SIDS deaths. In addition, there were 53 *Other ill-defined and unspecified causes of mortality* and one *Other sudden death cause unknown*, which we have classified as SUID in this report. Two deaths associated with bed-sharing were identified among eight deaths attributed to *Accidental suffocation and strangulation in bed*. Two deaths associated with bed-sharing were identified among 15 attributed to *Sequelae of prematurity of 28-36 weeks gestation* and one death with a comment about bed-sharing was attributed to cytomegalovirus infection. Among the deaths reviewed, only two infants whose deaths were attributed to SIDS, three whose deaths were attributed to SUID, and one whose death was attributed to accidental suffocation did not have autopsy information available when the death certificate was filed.

Comments about bed-sharing (n=22) or overlaying (n=4) were found in 26 of the 168 relevant death records and were disproportionately associated with SIDS deaths (Figure 1). Certificates for five deaths associated with bed-sharing included comments that the adults were intoxicated. Four certificates for SIDS deaths without mention of bed-sharing contained comments about prone sleeping; sleeping on a soft, thick infant sleeping bag; sleeping on an adult bed between pillows; or sleeping under unsafe conditions (not further described). Three certificates for suffocation deaths had comments about “improper sleeping area” (not further described); “laid down semi-swaddled on side...found face down on a comforter;” and “pulled blanket over face.”



It is impossible to conduct a rigorous epidemiological assessment of the risk of SIDS associated with bed-sharing from death certificates for two reasons. First, ascertainment of bed-sharing from death certificates depends on certifiers writing in comments about sleeping arrangements. *Absence of a comment about bed-sharing does not mean that it did not occur.* A forced-response checkbox system (Yes/No/Unknown) would require certifiers to address the issue rather than leave it to their discretion.

Although there might be many “Unknown” responses, the checkbox system would at least distinguish between “No” and “Unknown,” allowing some statistical analysis. Death certificates that record bed-sharing are almost certainly an under-ascertainment. Montana statutes require autopsies for suspected SIDS deaths and rigorous review of all infant deaths by Fetal, Infant, and Child Mortality Review (FICMR) committees,⁹ which may ascertain additional bed-sharing events.

The second, more critical barrier to rigorous assessment of the risk of SIDS or other causes of infant death associated with bed-sharing is lack of an accurate assessment of the prevalence of bed-sharing in the population as a whole, meaning there is no count of the number of infants who sleep with their parents and do not die. This is the essential piece of information necessary to compute the Relative Risk of mortality associated with bed-sharing. The National Infant Sleep Position Study, a nationwide telephone survey, found that 13% of infants usually slept with an adult in 2000, although the proportion varied substantially by maternal age, race, ethnicity, and income.¹⁰ Among 18 states asking about sleeping arrangements in the CDC’s Pregnancy Risk Assessment Monitoring System (PRAMS) survey in 2008, the prevalence of infants usually sharing a bed ranged from 16% to 48% by state.¹¹

Strict adherence to the formal definition of SIDS might require the reclassification of some deaths to SUID or unintentional suffocation if a death scene investigation finds bed-sharing. For example, the New York City Office of the Chief Medical Examiner does not classify any deaths in which an infant was sharing a bed as SIDS.¹² Regardless of the classification of infant deaths as SIDS, SUID, or suffocation, bed-sharing appears to be a risk factor. Of Montana deaths classified as SIDS, 21% of records contained explicit comments about bed-sharing. Combining SIDS, SUID, and unintentional suffocation, 15% contained comments about bed-sharing.

There have been an average of 11 SIDS deaths in Montana each year since 2003, plus an average of six additional deaths due to SUID or unintentional smothering. The fact that nearly one in six of these deaths were associated with, if not caused by, bed-sharing suggests that bed-sharing might be a preventable risk factor. Recommendations against bed-sharing are controversial, especially among strong advocates of breast-feeding and biocultural anthropologists.¹³ Placing an infant’s crib or bassinet near the mother’s bed facilitates breast-feeding, monitoring, and comforting the infant without the risks that may be associated with sleeping in the same bed. This arrangement is recommended by the American Academy of Pediatrics and the Centers for Disease Control and Prevention.¹⁴

For more information about this report and other Vital Events in Montana,
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(406) 444-1756 or bschwartz@mt.gov

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⁹ Mont. Code Ann. §50-19-4

¹⁰ Willinger M et al. 2003. *Arch Pediatr Adolesc Med*157:43-49.

¹¹ <https://www.cdc.gov/prams/>

¹² Senter L et al. 2011. *Matern Child Health J* 15:242-248.

¹³ <https://www.llli.org/breastfeeding-info/>;

McKenna JJ et al. 2007. *Am J Phys Anthropol* 2007 45(suppl):133-161

¹⁴ American Academy of Pediatrics Policy Statement. 2011. *Pediatrics* 128:1030-1039; <https://www.cdc.gov/SIDS/>