

Are There Long-term Consequences of Room-Sharing During Infancy?

Rachel Y. Moon, MD,^a Fern R. Hauck, MD, MS^b

In November 2016, the American Academy of Pediatrics (AAP) Task Force on sudden infant death syndrome (SIDS) published an updated policy statement¹ with guidelines to reduce the risk of SIDS and other sleep-related deaths. Although there were several changes in the recommendations, the one that got the most attention was the recommendation that room-sharing without bed-sharing should be practiced “ideally for a year, but at least for 6 months.” The previous (2011) policy statement had stated that all of the recommendations should be followed until the infant is 1 year of age.² Many pediatricians and other health care providers have voiced concerns that room-sharing for 6 months or 1 year will result in negative consequences on the quality of parental and child sleep. Up to now, there have been few studies looking at sleep outcomes in room-sharing and solitary sleeping (ie, sleeping in a separate room from the parents) infants. Thus, the article by Paul et al³ in this issue of *Pediatrics*, which describes outcomes in 4-month-old and 9-month-old infants who are room-sharers or solitary sleepers, is a welcome addition to the literature.

Paul et al³ found that at 4 months of age, overnight sleep duration was similar, but the longest single sleep period (indicative of sleep consolidation) for solitary sleepers was 44 minutes longer than that for room-sharing infants. By 9 months of age, there were more differences. Infants who had become solitary sleepers before 4 months of age had longer total sleep and longer single sleep periods

than either those who became solitary sleepers at 4 to 9 months or those who continued to room-share. Clearly these differences are important, particularly to exhausted parents. However, it should be noted that even the 4-month-old room-sharing infants had a mean of ~7 hours as the longest sleep period, compared with 7 hours, 49 minutes for the solitary-sleeping infants. This is well within the normal range for sleep at this age and much longer than the mean. Galland et al,⁴ in a systematic review of normal sleep patterns in infants and children, found that 0- to 5-month-olds had a mean longest sleep period of 5.7 hours. Although the Galland et al⁴ study did not stratify by sleep arrangement, the cohorts would have presumably included both room-sharers and solitary sleepers.

In addition, it is unclear whether early sleep consolidation is a desirable trait in young infants. The ability to arouse is critical physiologically, and a leading hypothesis is that failure to arouse makes an infant vulnerable to SIDS.⁵ Some risk factors, including prone positioning^{6–12} and exposure to tobacco smoke,^{13–18} are associated with higher arousal thresholds, whereas protective factors, including breastfeeding,^{19,20} are associated with lower arousal thresholds. Many parents will place infants prone because they sleep for longer durations and are not as easily awakened,^{21–25} which is explained by the higher arousal threshold. Thus, longer sleep durations in young infants, which Paul et al³ present as being preferable, may be problematic from a physiologic perspective.

FREE

Departments of ^aPediatrics and ^bFamily Medicine, University of Virginia School of Medicine, Charlottesville, Virginia

Opinions expressed in these commentaries are those of the author and not necessarily those of the American Academy of Pediatrics or its Committees.

DOI: <https://doi.org/10.1542/peds.2017-1323>

Accepted for publication Apr 19, 2017

Address correspondence to Rachel Y. Moon, MD, Division of General Pediatrics, University of Virginia, PO Box 800386, Charlottesville, VA 22908. E-mail: rym4z@virginia.edu

PEDIATRICS (ISSN Numbers: Print, 0031-4005; Online, 1098-4275).

Copyright © 2017 by the American Academy of Pediatrics

FINANCIAL DISCLOSURE: The authors have indicated they have no financial relationships relevant to this article to disclose.

FUNDING: No external funding.

POTENTIAL CONFLICT OF INTEREST: The authors have indicated they have no potential conflicts of interest to disclose.

COMPANION PAPER: A companion to this article can be found online at www.pediatrics.org/cgi/doi/10.1542/peds.2017-0122.

To cite: Moon RY and Hauck FR. Are There Long-term Consequences of Room-Sharing During Infancy? *Pediatrics*. 2017;140(1):e20171323

Paul et al³ imply that room-sharing itself may be disruptive and thus not desirable. However, when the data are examined, the significant differences in the groups at 4 months of age are not the number of night awakenings but consistent bedtime routines, early bedtimes, the numbers of night feedings, and being fed back to sleep. Bedtime routines can be difficult for all families to establish, and there may be additional challenges for families who are room-sharing. Perhaps the emphasis should not be on the elimination of room-sharing itself but on providing guidance regarding establishment of bedtime routines. In addition, it is unclear whether the differences in the number of night feedings and being fed back to sleep are associated with the type of feeding rather than the location of sleep. Because breastmilk has a variable macronutrient composition that may fluctuate over a 24-hour period compared with the consistent composition of infant formula,²⁶ feeding patterns are different and may account for more frequent feedings during the night. Additionally, breastfed infants have more rapid gastric emptying,²⁷ which may also account for the more frequent night feedings that are associated with breastfeeding.^{28,29} As pediatricians, we all want to encourage continued breastfeeding, and room-sharing facilitates breastfeeding.³⁰

Paul et al³ also found that there were significantly more reports of bed-sharing and soft bedding use in the middle of the night for the 4-month-old room-sharers. This is clearly worrisome, and it reinforces the need for health care providers to discuss with parents the importance of proactively preparing the adult bed for the possibility of bed-sharing in the middle of the night. The 2016 safe sleep recommendations acknowledge that parents may fall asleep with the infant while feeding, and they recommend that parents remove pillows, blankets, and other soft

bedding from the adult bed if there is a possibility of this occurring.¹

The AAP's room-sharing without bed-sharing recommendation is based on case-control studies in England, New Zealand, and Scotland, which have demonstrated that room-sharing decreases the risk of SIDS compared with solitary sleeping. Blair et al³¹ found an adjusted odds ratio of death of 10.49 (95% confidence interval [CI] 4.26–25.81) for infants who slept in a separate room compared with those who slept in the parents' room. The New Zealand Cot Death study reported an adjusted odds ratio of death for infants who room-shared during the last sleep of 0.35 (95% CI 0.26–0.49) compared with solitary-sleeping infants.³² Tappin et al³³ reported an adjusted odds ratio of 3.26 (95% CI 1.03–10.35) for solitary-sleeping infants compared with room-sharing infants. Although these authors found this reduction in risk to be present only when the parent was a smoker, Blair found this reduction to be present for both smoking and nonsmoking parents (P. Blair, PhD, personal communication, 2016). More recent, unpublished data from the New Zealand Sudden and Unexplained Death in Infancy study show similar protection from room-sharing, with an adjusted odds ratio of 0.36 (95% CI, 0.19–0.71) for room-sharing infants compared with solitary-sleeping infants (E. Mitchell, MBBS, personal communication, 2016). Because none of these studies stratified the risk by infant age in months, it is difficult to determine the optimal end point for room-sharing.

Paul et al³ note that Blair et al³¹ provided a figure comparing usual nighttime sleeping environment by infant age (7–60 days, 61–120 days, and >120 days) for infants who died and control infants. Although a higher percentage of control infants were solitary sleepers after 120 days, no statistical comparisons, including odds ratios, were provided, and therefore,

no firm conclusions regarding the relative risk of specific sleep environments at different ages can be drawn. Additionally, recent analyses of case-control studies^{34,35} and registry databases³⁶ of sudden and unexpected infant deaths emphasize that infant sleep location is particularly critical in the first few months of an infant's life. Ninety percent of sleep-related deaths occur by 6 months of age, and the peak occurs between 1 and 4 months of age. It should be noted that the AAP recommendations are consistent with recommendations from other developed countries; Canada,³⁷ the United Kingdom,³⁸ the Netherlands,³⁹ and New Zealand⁴⁰ recommend room-sharing for 6 months, and Australia⁴¹ recommends room-sharing for 6 to 12 months.

The concerns raised by Paul et al³ regarding the room-sharing recommendation are important, and we recognize that optimal parental rest is desirable. Every policy has consequences, which are often unintended; these consequences can be positive or negative. There have been modifications to policies before as new research was published. Safe sleep policies were modified to include the recommendation for awake, supervised tummy time when data about positional plagiocephaly and concerns about early motor development emerged. We strongly support more research, both about the physiology of infant sleep and arousal for room-sharing infants and about the consequences of room-sharing on parental and child sleep. However, the primary objective of safe sleep recommendations will always be to minimize risk of SIDS and other sleep-related infant deaths.

ABBREVIATIONS

AAP: American Academy of Pediatrics
CI: confidence interval
SIDS: sudden infant death syndrome

REFERENCES

- Moon RY; Task Force on Sudden Infant Death Syndrome. SIDS and other sleep-related infant deaths: updated 2016 recommendations for a safe infant sleeping environment. *Pediatrics*. 2016;138(5):e20162938
- Moon RY; Task Force on Sudden Infant Death Syndrome. SIDS and other sleep-related infant deaths: expansion of recommendations for a safe infant sleeping environment. *Pediatrics*. 2011;128(5):1030–1039
- Paul IM, Hohman EE, Loken E, et al. Mother-infant room-sharing and sleep outcomes in the INSIGHT study. *Pediatrics*. 2017;140(1):e20170122
- Galland BC, Taylor BJ, Elder DE, Herbison P. Normal sleep patterns in infants and children: a systematic review of observational studies. *Sleep Med Rev*. 2012;16(3):213–222
- Harper RM, Kinney HC. Potential mechanisms of failure in the sudden infant death syndrome. *Curr Pediatr Rev*. 2010;6(1):39–47
- Kahn A, Groswasser J, Sottiaux M, Rebuffat E, Franco P, Dramaix M. Prone or supine body position and sleep characteristics in infants. *Pediatrics*. 1993;91(6):1112–1115
- Franco P, Groswasser J, Sottiaux M, Broadfield E, Kahn A. Decreased cardiac responses to auditory stimulation during prone sleep. *Pediatrics*. 1996;97(2):174–178
- Galland BC, Reeves G, Taylor BJ, Bolton DP. Sleep position, autonomic function, and arousal. *Arch Dis Child Fetal Neonatal Ed*. 1998;78(3):F189–F194
- Galland BC, Hayman RM, Taylor BJ, Bolton DP, Sayers RM, Williams SM. Factors affecting heart rate variability and heart rate responses to tilting in infants aged 1 and 3 months. *Pediatr Res*. 2000;48(3):360–368
- Horne RS, Ferens D, Watts AM, et al. The prone sleeping position impairs arousability in term infants. *J Pediatr*. 2001;138(6):811–816
- Horne RS, Bandopadhyay P, Vitkovic J, Cranage SM, Adamson TM. Effects of age and sleeping position on arousal from sleep in preterm infants. *Sleep*. 2002;25(7):746–750
- Kato I, Scaillet S, Groswasser J, et al. Spontaneous arousability in prone and supine position in healthy infants. *Sleep*. 2006;29(6):785–790
- Tirosh E, Libon D, Bader D. The effect of maternal smoking during pregnancy on sleep respiratory and arousal patterns in neonates. *J Perinatol*. 1996;16(6):435–438
- Franco P, Groswasser J, Hassid S, Lanquart JP, Scaillet S, Kahn A. Prenatal exposure to cigarette smoking is associated with a decrease in arousal in infants. *J Pediatr*. 1999;135(1):34–38
- Horne RS, Ferens D, Watts AM, et al. Effects of maternal tobacco smoking, sleeping position, and sleep state on arousal in healthy term infants. *Arch Dis Child Fetal Neonatal Ed*. 2002;87(2):F100–F105
- Lewis KW, Bosque EM. Deficient hypoxia awakening response in infants of smoking mothers: possible relationship to sudden infant death syndrome. *J Pediatr*. 1995;127(5):691–699
- Chang AB, Wilson SJ, Masters IB, et al. Altered arousal response in infants exposed to cigarette smoke. *Arch Dis Child*. 2003;88(1):30–33
- Parslow PM, Cranage SM, Adamson TM, Harding R, Horne RS. Arousal and ventilatory responses to hypoxia in sleeping infants: effects of maternal smoking. *Respir Physiol Neurobiol*. 2004;140(1):77–87
- Franco P, Scaillet S, Wermenbol V, Valente F, Groswasser J, Kahn A. The influence of a pacifier on infants' arousals from sleep. *J Pediatr*. 2000;136(6):775–779
- Horne RS, Parslow PM, Ferens D, Watts AM, Adamson TM. Comparison of evoked arousability in breast and formula fed infants. *Arch Dis Child*. 2004;89(1):22–25
- Oden RP, Joyner BL, Ajao TI, Moon RY. Factors influencing African American mothers' decisions about sleep position: a qualitative study. *J Natl Med Assoc*. 2010;102(10):870–872, 875–880
- Colson ER, McCabe LK, Fox K, et al. Barriers to following the back-to-sleep recommendations: insights from focus groups with inner-city caregivers. *Ambul Pediatr*. 2005;5(6):349–354
- Moon RY, Omron R. Determinants of infant sleep position in an urban population. *Clin Pediatr (Phila)*. 2002;41(8):569–573
- Willinger M, Ko C-W, Hoffman HJ, Kessler RC, Corwin MJ. Factors associated with caregivers' choice of infant sleep position, 1994-1998: the National Infant Sleep Position Study. *JAMA*. 2000;283(16):2135–2142
- Von Kohorn I, Corwin MJ, Rybin DV, Heeren TC, Lister G, Colson ER. Influence of prior advice and beliefs of mothers on infant sleep position. *Arch Pediatr Adolesc Med*. 2010;164(4):363–369
- Khan S, Hepworth AR, Prime DK, Lai CT, Trengove NJ, Hartmann PE. Variation in fat, lactose, and protein composition in breast milk over 24 hours: associations with infant feeding patterns. *J Hum Lact*. 2013;29(1):81–89
- Van Den Driessche M, Peeters K, Marien P, Ghoos Y, Devlieger H, Veereman-Wauters G. Gastric emptying in formula-fed and breast-fed infants measured with the ¹³C-octanoic acid breath test. *J Pediatr Gastroenterol Nutr*. 1999;29(1):46–51
- Galbally M, Lewis AJ, McEgan K, Scalzo K, Islam FA. Breastfeeding and infant sleep patterns: an Australian population study. *J Paediatr Child Health*. 2013;49(2):E147–E152
- Quillin SI. Infant and mother sleep patterns during 4th postpartum week. *Issues Compr Pediatr Nurs*. 1997;20(2):115–123
- Smith LA, Geller NL, Kellams AL, et al. Infant sleep location and breastfeeding practices in the United States, 2011-2014. *Acad Pediatr*. 2016;16(6):540–549
- Blair PS, Fleming PJ, Smith IJ, et al. Babies sleeping with parents: case-control study of factors influencing the risk of the sudden infant death syndrome. CESDI SUDI research group. *BMJ*. 1999;319(7223):1457–1461
- Mitchell EA, Thompson JMD. Co-sleeping increases the risk of SIDS, but sleeping in the parents' bedroom lowers it. In: Rognum TO, ed. *Sudden Infant Death Syndrome*:

- New Trends in the Nineties*. Oslo, Norway: Scandinavian University Press; 1995:266–269
33. Tappin D, Ecob R, Brooke H. Bedsharing, roomsharing, and sudden infant death syndrome in Scotland: a case-control study. *J Pediatr*. 2005;147(1):32–37
 34. Carpenter R, McGarvey C, Mitchell EA, et al. Bed sharing when parents do not smoke: is there a risk of SIDS? An individual level analysis of five major case-control studies. *BMJ Open*. 2013;3(5):e002299
 35. Blair PS, Sidebotham P, Pease A, Fleming PJ. Bed-sharing in the absence of hazardous circumstances: is there a risk of sudden infant death syndrome? An analysis from two case-control studies conducted in the UK. *PLoS One*. 2014;9(9):e107799
 36. Colvin JD, Collie-Akers V, Schunn C, Moon RY. Sleep environment risks for younger and older infants. *Pediatrics*. 2014;134(2). Available at: www.pediatrics.org/cgi/content/full/134/2/e406
 37. Public Health Agency of Canada. Joint statement on safe sleep: preventing sudden infant deaths in Canada. Available at: http://www.phac-aspc.gc.ca/hp-ps/dca-dea/stages-etapes/childhood-enfance_0-2/sids/jsss-ecss-eng.php. Accessed May 11, 2017
 38. The Lullaby Trust. *Sudden Infant Death Syndrome: A Guide for Professionals*. London, England: The Lullaby Trust; 2013
 39. Flinsenberg TW, Ruys JH, Engelberts AC, van Velzen-Mol HW. Revised guideline ‘prevention of cot death’ [in Dutch]. *Ned Tijdschr Geneeskd*. 2008;152(24):1370–1375
 40. New Zealand Ministry of Health. Keeping baby safe in bed: 6 weeks to 6 months. Available at: www.health.govt.nz/your-health/pregnancy-and-kids/first-year/6-weeks-6-months/keeping-baby-safe-bed-6-weeks-6-months. Accessed April 17, 2017
 41. Red Nose, National Scientific Advisory Group (NSAG). Information statement: sleeping with a baby. Available at: <https://rednose.com.au/article/sharing-a-sleep-surface-with-a-baby>. Accessed January 2, 2017

Are There Long-term Consequences of Room-Sharing During Infancy?

Rachel Y. Moon and Fern R. Hauck

Pediatrics originally published online June 5, 2017;

Updated Information & Services

including high resolution figures, can be found at:
<http://pediatrics.aappublications.org/content/early/2017/06/01/peds.2017-1323>

References

This article cites 35 articles, 10 of which you can access for free at:
<http://pediatrics.aappublications.org/content/early/2017/06/01/peds.2017-1323.full#ref-list-1>

Subspecialty Collections

This article, along with others on similar topics, appears in the following collection(s):
Fetus/Newborn Infant
http://classic.pediatrics.aappublications.org/cgi/collection/fetus:newborn_infant_sub
SIDS
http://classic.pediatrics.aappublications.org/cgi/collection/sids_sub

Permissions & Licensing

Information about reproducing this article in parts (figures, tables) or in its entirety can be found online at:
<https://shop.aap.org/licensing-permissions/>

Reprints

Information about ordering reprints can be found online:
<http://classic.pediatrics.aappublications.org/content/reprints>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since . Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2017 by the American Academy of Pediatrics. All rights reserved. Print ISSN:

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™



PEDIATRICS®

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

Are There Long-term Consequences of Room-Sharing During Infancy?

Rachel Y. Moon and Fern R. Hauck

Pediatrics originally published online June 5, 2017;

The online version of this article, along with updated information and services, is located on the World Wide Web at:

<http://pediatrics.aappublications.org/content/early/2017/06/01/peds.2017-1323>

Pediatrics is the official journal of the American Academy of Pediatrics. A monthly publication, it has been published continuously since . Pediatrics is owned, published, and trademarked by the American Academy of Pediatrics, 141 Northwest Point Boulevard, Elk Grove Village, Illinois, 60007. Copyright © 2017 by the American Academy of Pediatrics. All rights reserved. Print ISSN:

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

