# Factors Associated With Choice of Infant Sleep Location

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abstract

**OBJECTIVE:** To assess the prevalence of and factors associated with actual recent practice and near-future intention for infant sleep location in a national sample.

**METHODS:** There were 3260 mothers from 32 US hospitals who responded to a survey at infant age 2 to 6 months regarding care practices, including usual and all infant sleep locations in the previous 2 weeks and intended location for the next 2 weeks. Mothers were categorized as (1) having practiced and/or intending to practice exclusive room-sharing without bed-sharing, (2) having practiced anything other than exclusive room-sharing but intending to practice exclusive room-sharing, (3) intending to have the infant sleep in another room; and (4) intending to practice bed-sharing all night or part of the night. Multivariable multinomial logistic regression examined associations between sleep-location category, demographics, feeding method, doctor advice, and theory of planned behavior domains (attitudes, social norms, and perceived control).

**RESULTS:** Fewer than half (45.4%) of the mothers practiced and also intended to practice room-sharing without bed-sharing, and 24.2% intended to practice some bed-sharing. Factors associated with intended bed-sharing included African American race and exclusive breastfeeding; however, the highest likelihood of bed-sharing intent was associated with perceived social norms favoring bed-sharing (adjusted odds ratio [aOR] 5.84; 95% confidence interval [CI] 4.14–8.22) and positive attitudes toward bed-sharing (aOR 190.1; 95% CI 62.4–579.0). Women with a doctor's advice to room-share without bed-sharing intended to practice bed-sharing less (aOR 0.56; 95% CI 0.36–0.85).

**CONCLUSIONS:** Sleep-location practices do not always align with the recommendation to room-share without bed-sharing, and intention does not always correspond with previous practice. Attitudes, perceived social norms, and doctor advice are factors that are amenable to change and should be considered in educational interventions.

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**WHAT'S KNOWN ON THIS SUBJECT:** Despite recommendations to room-share but not bed-share to reduce sleep-related infant deaths, many mothers choose bed-sharing for their infants' sleep location. Little is known about the relationship between actual practice and intention and the associated factors.

**WHAT THIS STUDY ADDS:** Less than half of mothers surveyed both intended to follow and exclusively practiced room-sharing but not bed-sharing. Attitudes, perceived social norms, and doctor advice are factors that are potentially amenable to change and should be considered when designing educational interventions.

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Sudden unexpected infant death (SUID) remains the leading cause of postneonatal infant death in the United States. In 2017, there were 3600 SUIDs, with 1400 (38% or 0.35 in 1000 live births [LBs]) from sudden infant death syndrome, 1300 (36% or 0.33 in 1000 LBs) from an unknown cause, and 900 (26% or 0.25 in 1000 LBs) from accidental suffocation or strangulation in bed.[1] To decrease the risk of SUID, the American Academy of Pediatrics (AAP) recommends room-sharing without bed-sharing[2]; however, many mothers practice bed-sharing and receive considerable variation in advice from pediatricians.[3–5] In the National Infant Sleep Position Study (NISP) between 1993 and 2010, the proportion of mothers reporting they usually bed-shared increased from 6.5% in 1993 to 13.5% in 2010.[3] Mothers were more likely to report usual bed-sharing if they had not finished high school, were not white, had lower income, lived in the West or South, had infants <8 weeks of age, or had preterm infants. Mothers with perceived negative physician attitudes toward bed-sharing were less likely to bed-share. A neutral physician attitude was associated with increased bed-sharing.[3] Although other studies have investigated factors influencing maternal decisions,[4–6] no studies to date have examined maternal intention regarding sleep location and what factors influence intention.

The Study of Attitudes and Factors Effecting Infant Care (SAFE) collected responses prospectively from a nationally representative sample of mothers recruited from 32 birth hospitals.[7–9] The survey was based on the theory of planned behavior (TPB),[10] which hypothesizes that attitudes, subjective social norms, and perceptions about control over behavior impact one's intention, which leads to actual behavior. Our previous work has shown that a mother's decision regarding supine sleep is affected by her attitudes, subjective social norms, perceived control over how the infant sleeps, as well as advice from doctors.[7] We collected information not only about usual sleep location, as in most studies, but also all other locations in which the infants slept. We thus extend our outcome variables beyond what has been done in previous national studies by examining actual practice as well as intention with regard to both usual sleeping location and choice of exclusively room-sharing without bed-sharing. Although intention must precede actual practice, it is not necessarily consistent with actual practice because there may be other obstacles to carrying through with a plan. However, understanding intention is important because it impacts actual behavior and is potentially amenable to change. Our objectives in the current study were to assess the prevalence of and factors associated with actual maternal practices and future intention for infant sleep location.

## METHODS

SAFE enrolled mothers from 32 hospitals between January 2011 and March 2014. The recruitment strategy has been described previously.[8] Briefly, we used a 2-stage, cluster design for obtaining a nationally representative sample of mothers enrolled during the newborn hospital stay. Mothers were eligible for enrollment if they spoke English or Spanish, lived in the United States, and would be caring for their infants by 2 months after delivery. To ensure an adequate sample size for making comparisons across racial and/or ethnic groups, we oversampled for Hispanic and non-Hispanic African American mothers. Institutional review board approval was obtained at all participating institutions.

### Measures

After providing written informed consent, mothers completed an initial survey to collect demographic and contact information. Mothers completed the follow-up survey online or by telephone when their infants were ≥60 days old; nonrespondents received weekly reminders until 180 days of age. All adjusted analyses included infant age.

The TPB describes attitudes, subjective social norms, and perception of behavioral control as collectively contributing to the formation of a behavioral intention. Adhering to TPB constructs, the follow-up survey included questions about infant care practices, including recent actual practice and near-future intention for infant sleep location. As the theory states, "In combination, attitude toward the behavior, subjective norm, and perception of behavioral control lead to the formation of a behavioral intention. As a general rule, the more favorable the attitude and subjective norm, and the greater the perceived control, the stronger should be the person's intention to perform the behavior in question. Finally, given a sufficient degree of actual control over the behavior, people are expected to carry out their intentions when the opportunity arises. Intention is thus assumed to be the immediate antecedent of behavior."[10]

Regarding recent actual practice, mothers were asked about usual and all locations in which their infants slept over the previous 2 weeks. Choices included "alone in own crib or room," "in parent's (or other adult's) room in own crib or bed," "in parent's bed for part of the night," "in parent's (or other adult's) bed for the whole night," "in another child's room in own crib or bed," "in another child's bed for part of the night," or "in another child's bed for the whole night." Mothers were asked to check all applicable locations.

For analysis, sleep locations were characterized on the basis of survey responses as follows: in parent's (or other adult's) room in own crib or bed = practiced room-sharing; in parent's (or other adult or child's) bed for part of the night and/or in parent's (or other adult or child's) bed for the whole night = practiced bed-sharing; and alone in own crib or room and/or in another child's room in own crib or bed = practiced other room.

Using the TPB constructs regarding current intention, mothers were asked to respond to the statements, "Now, over the next 2 weeks, I plan to sleep in the same bed with my infant for part of the night" and "for the whole night." Mothers used a 7-point scale (from 1 [definitely false] to 7 [definitely true]) to indicate their agreement with each statement, with responses >4 being categorized as intending to bed-share with the infant (intended bed-sharing). Mothers were then asked whether they plan to sleep in the same room (not bed) as their infants. Mothers with a response >4 (and who did not intend to bed-share) were categorized as intending to room-share (intended room-sharing). Mothers with a response ≤4 (and who did not intend to bed-share) were categorized as intending to put their infants to sleep in another room (intend other room).

Following the TPB framework, we assessed maternal attitudes, subjective social norms, and perceived control using the same scale. To determine attitudes toward various sleep locations, mothers were asked to rate whether sleeping in the same bed with their infants and sleeping in the same room with the infants (but not in the same bed) would "be healthy for my infant," "be pleasant for my infant," "be pleasant for me," "be good for my infant," "be good for me," "make my infant safer," "make my infant more comfortable," "make me more comfortable," and "keep my infant from choking." For each set of questions, average responses >4 were categorized as positive attitudes toward that sleep location.

Regarding subjective social norms, mothers were asked to respond to the following: "The people who are most important to me think that my infant should sleep (1) alone in his or her own room, (2) in a parent's (or other adult's) room in his or her own bed, (3) in a parent's (or other adult's) bed for part of the night, or (4) in a parent's (or other adult's) bed for the whole night." Responses of >4 were categorized as endorsing the statement as the social norm.

Regarding perceived control, mothers were asked to respond to the following: "Choosing to sleep in the same room with my infant (but not in the same bed) is mostly up to me." Responses of >4 were categorized as having perceived control.

For information on doctor advice, mothers were asked whether their infant's doctor (or health care provider) had given advice about sleep location. Those who received advice from a doctor or health care provider were then given 4 statements about their opinion regarding sleep location: "My infant's doctor (or health care provider) thinks that my infant should sleep: (1) alone in his or her own room, (2) in a parent's (or other adult's) room in his or her own bed, (3) in a parent's (or other adult's) bed for part of the night, or (4) in a parent's (or other adult's) bed for the whole night." Responses >4 were categorized as the doctor endorsing the specific practice. On the basis of these questions, doctor advice was categorized as no advice, consistent with AAP recommendations, or not consistent with recommendations.

## Statistical Analysis

All analyses accounted for the stratified, 2-stage, cluster sample design for both parameter estimates and SEs by using SAS procedures for complex survey designs (SAS Institute, Inc, Cary, NC). Data were weighted to account for sampling probabilities and dropout and to reflect the national joint distributions of maternal age and race and/or ethnicity. As a check on the representativeness of our sample, weighted demographics were compared with the national demographics of mothers who delivered between 2011 and 2013 by using National Center for Health Statistics[9] data (Table 1).

To describe the prevalence of bed-sharing, weighted percentages are given for all sleep locations (Table 2). To describe the demographic associations between sleep locations over the past 2 weeks and intended sleep locations over the next 2 weeks, weighted percentages are given for all combinations of past-2-week locations and intended sleep locations (Table 3). Because in the TPB, intention is assumed to be the immediate antecedent to behavior and is likely amenable to change,[10] on the basis of the data in Table 2, we defined 4 categories of mothers, for whom defining and distinguishing characteristics might serve to inform future intervention efforts to impact maternal intention. With this in mind, we were particularly interested in understanding how mothers who intended to follow the AAP recommendation to room-share without bed-sharing differed from those who intended to either sleep alone in a separate room or bed-share. We also thought it important to understand differences between mothers who both practiced and intended to follow the AAP recommendation and those who whose practice did not match their intention because this included almost 14% of women. We did not separately assess potential subgroups of mothers whose intention was not consistent with the AAP recommendation because such

**TABLE 1** Weighted Demographic Characteristics of SAFE Population ($N$ = 3260)

| | $n$[a] | Weighted, % | US Vital Statistics (2011–2013)[b] |
|---|---|---|---|
| Maternal age, y | | | |
| <20 | 268 | 7.4 | 7.8 |
| 20–29 | 1770 | 52.2 | 51.6 |
| ≥30 | 1222 | 40.4 | 40.6 |
| Maternal education | | | |
| Less than high school | 468 | 12.6 | 17.1 |
| High school or general education diploma | 822 | 23.6 | 25.1 |
| Some college | 1027 | 30.7 | 29.0 |
| College degree or more | 930 | 33.1 | 28.8 |
| Parity | | | |
| 1 | 1200 | 37.8 | 39.7 |
| 2 | 1083 | 33.7 | 31.5 |
| 3+ | 968 | 28.5 | 28.3 |
| Maternal race and/or ethnicity | | | |
| Non-Hispanic white | 1272 | 52.7 | 54.1 |
| Non-Hispanic African American | 809 | 12.7 | 14.8 |
| Hispanic | 899 | 25.8 | 23.0 |
| Other | 279 | 8.8 | 8.0 |
| Infant age at time of survey, wk | | | N/A |
| 8–11 | 2007 | 63.0 | |
| 12–15 | 557 | 17.0 | |
| 16–19 | 317 | 9.3 | |
| ≥20 | 379 | 10.7 | |
| Infant sex | | | |
| Female | 1670 | 49.1 | 48.8 |
| Male | 1586 | 50.9 | 51.2 |
| Infant birth wt, g | | | |
| <2500 | 199 | 5.7 | 8.0 |
| ≥2500 | 3042 | 94.3 | 91.9 |

Adapted from Eisenberg SR, Bair-Merritt MH, Colson ER, Heeren TC, Geller NL, Corwin MJ. Maternal report of advice received for infant care. *Pediatrics*. 2015;136(2). NA, not available or applicable.

[a] Not all numbers add to 3260 because of missing data.

[b] US Vital Statistics data are not applicable to infant age at the time of survey response.

subgroups were of small size and interventions to impact intention would be directed at these women regardless of their actual practice. On the basis of these considerations, mothers were placed into 1 of 4 categories (Table 3): (1) practiced and intend exclusive room-sharing without bed-sharing (practiced and intended room-sharing), (2) practiced other infant sleep location but intended to practice exclusive room-sharing without bed-sharing (practiced other and intended room-sharing), (3) intended infant sleep location was in another room (intend other room), and (4) intended bed-sharing all or part of the night (intend bed-sharing). Multivariable multinomial logistic regression was used to examine associations between demographic factors, attitudes, subjective social norms, perceived control, doctor advice, and the 4 categories.

## RESULTS

The study population, including nonresponders, has been described previously.[7,8,11,12] Of the 3983 enrolled mothers, 3297 (83%) completed the follow-up survey and 3260 (99% of survey completers) responded about usual sleep location (Fig 1). The majority (63%) completed the survey between 8 and 11 weeks infant age (Table 1). After weighting and adjustment for cluster sampling, our sample demographic closely matched 2011–2013 data from the National Center for Health Statistics[13] except that our sample had a lower percentage of women with less than high school education (12.6% vs 17.1%) and a lower percentage of mothers whose infants had birth weight <2500 g (5.7% vs 8.0%). None of the other comparisons were statistically significant.

### Prevalence of Sleep-Location Practices

Table 2 shows weighted percentages for both usual and all sleep locations (any practice that mothers reported doing at least once during the past 2 weeks.) Two-thirds (66.3%) reported that their usual practice aligned with the AAP recommendation of room-sharing, whereas 13.7% usually slept in another room and 19.7% usually bed-shared. However, when queried about all sleep locations, only half of the mothers (50.7%) reported that they actually practiced only room-sharing. Approximately one-third (31.9%) reported actually practicing at least some bed-sharing, whereas 9.9% reported only bed-sharing over the past 2 weeks (Table 2).

### Actual Practice and Near-Future Intention

Table 2 also shows weighted percentages for mothers' actual and intended sleep-location practices. Although 59.0% of all mothers reported that they intended to room-share without bed-sharing, only 45.4% actually practiced room-sharing and then intended to exclusively room-share without bed-sharing. Of the 41% who did not intend to room-share, 16.4% intended for their infants to sleep in another room and 24.2% intended to bed-share for all or part of the night.

Table 3 presents our multivariable analysis of factors associated with the 4 practice and intention categories. Compared with white mothers, Hispanic mothers were less likely to intend to practice room-sharing and had used other sleep locations (15.5% vs 10.2%; adjusted odds ratio [aOR] 0.59; 95% confidence interval [CI] 0.41–0.85). Compared with those who had never been married, mothers who were separated,

**TABLE 2** All Sleep Locations Reported During the Past 2 Weeks by Usual Sleep Location and Intended Sleep Location During the Next 2 Weeks

| | *n* (Weighted % of Overall Sample) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | Exclusive Room-sharing | Other Room, Exclusive | Exclusive Bed-sharing | Room-sharing and Other Room | Room-sharing and Bed-sharing | Other Room and Bed-sharing | Room-sharing, Other Room, and Bed-sharing | Other | Total |
| Usual sleep location in past 2 wk | | | | | | | | | |
| Room-sharing | 1697 (50.7) | — | — | 125 (4.3) | 346 (10.3)[a] | — | 33 (1.0)[b] | — | 2201 (66.3) |
| Other room[b] | — | 292 (10.6) | — | 38 (1.2) | — | 45 (1.5)[a] | 12 (0.4)[a] | — | 387 (13.7) |
| Bed-sharing[c] | — | — | 343 (9.9) | — | 260 (7.8) | 39 (1.2) | 19 (0.7) | — | 661 (19.7)[a] |
| Other location | — | — | — | — | — | — | — | 11 (0.3) | 11 (0.3) |
| Total | 1697 (50.7) | 292 (10.6) | 343 (9.9) | 163 (5.6) | 606 (18.1) | 84 (2.7) | 64 (2.1) | 11 (0.3) | 3260 (100.0) |
| Intended location during next 2 wk | | | | | | | | | |
| Room-sharing | 1507 (45.4) | 28 (0.9) | 26 (0.8) | 104 (3.6) | 240 (7.5) | 9 (0.3) | 15 (0.5) | 6 (0.1) | 1935 (59.0) |
| Other room | 51 (1.6) | 257 (9.6) | 18 (0.7) | 52 (1.8) | 26 (0.7) | 39 (1.3) | 16 (0.5) | 2 (0.1) | 461 (16.4) |
| Bed-sharing | 126 (3.4) | 7 (0.2) | 297 (8.4) | 6 (0.1) | 339 (9.8) | 36 (1.1) | 33 (1.1) | 2 (0.1) | 846 (24.2) |
| No response | 13 (0.3) | 0 | 2 (0.0) | 1 (0.0) | 1 (0.0) | 0 | 0 | 1 (0.0) | 18 (0.4) |
| Total | 1697 (50.7) | 292 (10.6) | 343 (9.9) | 163 (5.6) | 606 (18.1) | 84 (2.7) | 64 (2.1) | 11 (0.3) | 3260 (100.0) |

Room-sharing indicates room-sharing without bed-sharing. —, not applicable.

[a] Included in bed-sharing at least some of the time (usual bed-sharing as well as bed-sharing plus any other location; 19.7 + 10.3 + 1.5 + 0.4 = 31.9 weighted percent).

[b] Usual location, other room includes 348 own room and 39 other child's room but own bed (*n* = 387).

[c] Usual location, bed-sharing includes 388 parent's bed whole night, 265 parent's bed part of the night, 7 other child's bed whole night (includes twins), and 1 other child's bed part of night (*n* = 661).

divorced, or widowed (12.2% vs 17.8%; aOR 2.31; 95% CI 1.10–4.84) were more likely to intend to practice room-sharing but had actually done other practices. Compared with those who exclusively fed their infants formula, mothers who were exclusively breastfeeding were also more likely to have done other practices despite having an intention to room-share (16.4% vs 11.8%; aOR 1.90; 95% CI 1.40–2.58). Of interest, in a subanalysis of just those women who intended to room-share but whose actual practice was bed-sharing (not in another room), those women with a college education versus those with less than high school education were more likely to have practiced bed-sharing despite having an intention to room-share without bed-sharing (aOR 1.36; 95% CI 1.00–1.86), as were those who were breastfeeding versus formula feeding (aOR 1.88; 95% CI 1.35–2.62).

## Intended Other Room

Compared with white mothers, African American (23.6% vs 7.0%; aOR 0.50; 95% CI 0.38–0.67) and Hispanic (23.6% vs 7.3%; aOR 0.41; 95% CI 0.28–0.59) mothers were less likely to intend to have their infants sleep in another room. Similarly, compared with mothers whose infants weighed >2500 g, mothers whose infants weighed <2500 g at birth were also less likely to intend to have their infants sleep in another room (16.7% vs 12.4%; aOR 0.47; 95% CI 0.28–0.78). Compared with mothers who had never been married, those who were married or separated, divorced, or widowed were more likely to intend to use another room (9.1% vs 21.3% [aOR 1.55; 95% CI 1.10–2.19] for married mothers and 9.1% vs 12.4% [aOR 2.03; 95% CI 1.10–3.76] for separated, divorced, or widowed mothers, respectively). Compared with those with less than high school education, those with higher education levels were more likely to intend to use another room (some college: 5.6% vs 15.9% [aOR 1.99; 95% CI 1.38–2.88]; college graduate: 5.6% vs 25.7% [aOR 2.64; 95% CI 1.58–4.40]; graduate school: 5.6% vs 25.5% [aOR 2.27; 95% CI 1.34–3.82]).

## Intend Bed-sharing

Mothers who were more likely to intend to practice bed-sharing for all or part of the night included those of African American compared with white (33.1% vs 17.3%; aOR 1.78; 95% CI 1.33–2.38) or other (17.3% vs 34.1; aOR 1.98; 95% CI 1.34–2.94) race and/or ethnicity, those whose infants were ≥20 weeks old at the time of the survey compared with those whose infants were 8 to 11 weeks old (23.7% vs 26.6%; aOR 1.81; 95% CI 1.28–2.57), and mothers who were separated, divorced, or widowed compared with those who had never been married (aOR 1.87; 95% CI 1.22–2.87). Mothers who completed high school or general education diploma (aOR 1.93; 95% CI 1.27–2.94) versus those with less than high school–equivalent education and those who were exclusively (aOR 2.70; 95% CI 1.76–4.14) or partially (aOR 1.53; 95% CI 1.14–2.04) breastfeeding (versus exclusive formula feeding) were also more likely to intend to bed-share. Of interest, in an analysis of just those mothers who intended to practice bed-sharing but whose actual practice consisted of only room-sharing without bed-sharing, those mothers were more likely to be African American and of other race

**TABLE 3** Associations Between Demographic Characteristics, Norms and Attitudes, and Sleep-Location Practice and Intention Adjusted for Demographic Characteristics, Norms, and Attitudes

| | *N* | Sleep-Location Practice and Intention, Weighted % of Demographic Category | | | | Compared With Practiced and Intended Room-sharing, aOR (95% CI) | | |
|---|---|---|---|---|---|---|---|---|
| | | Practiced and Intended Room-sharing (*N* = 1507) | Practiced Other and Intended Room-sharing (*N* = 428) | Intended Other Room (*N* = 461) | Intended Bed-sharing (*N* = 846) | Practiced Other and Intended Room-sharing | Intended Other Room | Intended Bed-sharing |
| Total | 3242 | 45.6 | 13.6 | 16.4 | 24.4 | — | — | — |
| Infant sex | | | | | | | | |
| Male | 1662 | 45.2 | 13.5 | 16.5 | 24.8 | 1.03 (0.82–1.29) | 1.22 (0.93–1.60) | 1.10 (0.81–1.49) |
| Female | 1576 | 45.9 | 13.8 | 16.4 | 23.9 | Reference | Reference | Reference |
| Maternal race | | | | | | | | |
| White | 1268 | 43.7 | 15.5 | 23.6 | 17.3 | Reference | Reference | Reference |
| African American | 803 | 47.3 | 12.6 | 7.0 | 33.1 | 0.89 (0.56–1.42) | 0.50 (0.38–0.67) | 1.78 (1.33–2.38) |
| Hispanic | 895 | 51.3 | 10.2 | 7.3 | 31.2 | 0.59 (0.41–0.85) | 0.41 (0.28–0.59) | 0.87 (0.60–1.26) |
| Other | 275 | 37.7 | 14.1 | 14.1 | 34.1 | 1.01 (0.67–1.50) | 0.59 (0.33–1.04) | 1.98 (1.34–2.94) |
| Infant age, wk | | | | | | | | |
| 8–11 | 2003 | 45.1 | 14.2 | 17.0 | 23.7 | Reference | Reference | Reference |
| 12–15 | 556 | 48.2 | 10.8 | 13.9 | 27.1 | 0.73 (0.50–1.05) | 0.94 (0.57–1.54) | 0.83 (0.60–1.14) |
| 16–19 | 310 | 46.7 | 13.6 | 18.3 | 21.4 | 0.99 (0.63–1.54) | 1.40 (0.86–2.27) | 0.82 (0.50–1.35) |
| 20+ | 373 | 43.0 | 14.8 | 15.6 | 26.6 | 1.50 (0.97–2.34) | 1.47 (0.78–2.80) | 1.81 (1.28–2.57) |
| Maternal age, y | | | | | | | | |
| 14–19 | 266 | 41.8 | 14.4 | 8.1 | 35.7 | 1.46 (0.80–2.50) | 1.28 (0.61–2.68) | 1.40 (0.69–2.83) |
| 20–24 | 776 | 50.9 | 13.5 | 11.2 | 24.3 | 1.02 (0.70–1.48) | 0.96 (0.62–1.49) | 0.93 (0.61–1.40) |
| 25–29 | 984 | 45.7 | 13.8 | 17.8 | 22.7 | Reference | Reference | Reference |
| 30–34 | 766 | 43.6 | 13.0 | 20.4 | 22.9 | 0.88 (0.57–1.34) | 1.07 (0.76–1.51) | 0.97 (0.71–1.32) |
| 35+ | 450 | 42.3 | 14.2 | 19.2 | 24.3 | 0.89 (0.66–1.35) | 1.00 (0.66–1.53) | 0.79 (0.47–1.33) |
| Marital status | | | | | | | | |
| Never married | 1416 | 50.6 | 12.2 | 9.1 | 28.1 | Reference | Reference | Reference |
| Married | 1644 | 42.4 | 14.3 | 21.3 | 22.0 | 1.28 (0.91–1.81) | 1.55 (1.10–2.19) | 1.11 (0.76–1.62) |
| Separated, divorced, or widowed | 167 | 45.9 | 17.8 | 12.4 | 23.9 | 2.31 (1.10–4.84) | 2.03 (1.10–3.76) | 1.87 (1.22–2.87) |
| Education | | | | | | | | |
| Less than high school | 465 | 47.7 | 9.2 | 5.6 | 37.4 | Reference | Reference | Reference |
| High school or general education diploma | 817 | 52.8 | 12.9 | 9.6 | 24.7 | 1.01 (0.66–1.55) | 1.16 (0.63–2.13) | 1.93 (1.27–2.94) |
| Some college | 1019 | 47.3 | 14.9 | 15.9 | 21.9 | 1.28 (0.93–1.76) | 1.99 (1.38–2.88) | 1.22 (0.77–1.92) |
| College graduate | 621 | 39.5 | 13.5 | 25.7 | 21.3 | 1.06 (0.78–1.44) | 2.64 (1.58–4.40) | 1.16 (0.76–1.76) |
| Graduate school | 307 | 35.6 | 17.4 | 25.5 | 21.6 | 1.34 (0.77–2.34) | 2.27 (1.34–3.82) | 1.20 (0.70–2.06) |
| Parity | | | | | | | | |
| 1 | 1191 | 39.7 | 15.9 | 19.0 | 25.4 | Reference | Reference | Reference |
| 2 | 1078 | 48.2 | 12.7 | 17.7 | 21.4 | 0.76 (0.56–1.03) | 0.85 (0.58–1.24) | 0.82 (0.60–1.12) |
| 3+ | 964 | 50.4 | 11.9 | 11.7 | 26.0 | 0.71 (0.46–1.10) | 0.63 (0.37–1.07) | 0.79 (0.54–1.16) |
| Birth wt, g | | | | | | | | |
| <2500 | 197 | 55.1 | 15.5 | 12.4 | 17.1 | 0.91 (0.56–1.49) | 0.47 (0.28–0.78) | 0.55 (0.29–1.05) |
| 2500+ | 3026 | 45.2 | 13.6 | 16.7 | 24.6 | Reference | Reference | Reference |
| Breastfeeding | | | | | | | | |
| Exclusive breastfeeding | 892 | 35.6 | 16.4 | 17.1 | 30.9 | 1.90 (1.40–2.58) | 1.17 (0.84–1.61) | 2.70 (1.76–4.14) |
| Some breastfeeding | 981 | 44.6 | 13.7 | 15.2 | 26.5 | 1.33 (0.97–1.82) | 0.99 (0.70–1.39) | 1.53 (1.14–2.04) |
| Exclusively formula | 1350 | 53.6 | 11.8 | 16.6 | 18.0 | Reference | Reference | Reference |

**TABLE 3** Continued

| | *N* | Sleep-Location Practice and Intention, Weighted % of Demographic Category | | | | Compared With Practiced and Intended Room-sharing, aOR (95% CI) | | |
|---|---|---|---|---|---|---|---|---|
| | | Practiced and Intended Room-sharing (*N* = 1507) | Practiced Other and Intended Room-sharing (*N* = 428) | Intended Other Room (*N* = 461) | Intended Bed-sharing (*N* = 846) | Practiced Other and Intended Room-sharing | Intended Other Room | Intended Bed-sharing |
| Control | | | | | | | | |
| Up to mother[a] | 2857 | 45.4 | 13.8 | 15.6 | 25.1 | Reference | Reference | Reference |
| Not up to mother | 373 | 46.7 | 12.2 | 22.5 | 18.6 | 0.81 (0.51–1.28) | 0.99 (0.65–1.51) | 0.92 (0.54–1.55) |
| Social norms | | | | | | | | |
| Room-sharing exclusively | 1244 | 71.2 | 13.2 | 3.5 | 12.1 | Reference | Reference | Reference |
| Not bed-sharing | 1185 | 36.4 | 14.7 | 33.9 | 15.0 | 1.69 (1.30–2.20) | 7.73 (4.97–12.03) | 1.71 (1.23–2.39) |
| Bed-sharing | 774 | 18.3 | 12.6 | 7.7 | 61.4 | 2.51 (1.80–3.51) | 6.94 (4.09–11.76) | 5.84 (4.14–8.22) |
| Maternal attitudes | | | | | | | | |
| Positive room-sharing, negative bed-sharing | 1809 | 69.0 | 14.3 | 10.4 | 6.4 | Reference | Reference | Reference |
| Negative room-sharing, negative bed-sharing | 301 | 9.2 | 9.0 | 76.4 | 5.4 | 4.15 (2.31–7.47) | 31.00 (18.15–52.9) | 5.23 (3.13–8.72) |
| Positive room-sharing, positive bed-sharing | 973 | 20.6 | 15.6 | 6.7 | 57.0 | 3.08 (2.18–4.34) | 2.08 (1.43–3.02) | 17.71 (11.89–26.4) |
| Negative room-sharing, positive bed-sharing | 145 | 3.1 | 3.3 | 10.9 | 82.7 | 4.93 (1.11–21.93) | 26.77 (7.17–99.91) | 190.1 (62.4–579.0) |
| Doctor advice: no advice | | | | | | | | |
| Room-sharing | 1498 | 40.6 | 14.3 | 18.7 | 26.5 | Reference | Reference | Reference |
| Exclusively | 733 | 65.3 | 13.0 | 4.7 | 17.0 | 0.81 (0.59–1.10) | 0.77 (0.47–1.26) | 0.56 (0.36–0.85) |
| Other | 985 | 39.3 | 13.1 | 21.5 | 26.1 | 0.98 (0.71–1.36) | 1.38 (0.86–2.22) | 0.89 (0.62–1.28) |

Eighteen mothers who did not respond to the intended location question are excluded from this analysis. —, not applicable.
[a] Comparisons for aORs are within each column.

and/or ethnicity versus white (aOR 1.81 [95% CI 1.03–3.20] and aOR 2.96 [95% CI 1.64–5.35], respectively).

### Impact of Social Norms, Attitudes, Perceived Control, and Doctor Advice

Subjective social norms and attitudes were strongly associated with sleep-location behaviors. Mothers who reported that their social norms supported bed-sharing were much more likely to intend to bed-share compared with those who felt that their social norms supported room-sharing (61.4% vs 12.1%; aOR 5.84; 95% CI 4.14–8.22). Compared with those who had both positive attitudes about room-sharing and negative attitudes about bed-sharing, those who had positive attitudes (eg, more healthy, pleasant, or comfortable for themselves or their infants) about both room-sharing and bed-sharing were more likely to intend to bed-share (6.4% vs 57%; aOR 17.7; 95% CI 11.9–26.4); those with positive attitudes about bed-sharing and negative attitudes about room-sharing were extremely likely to intend to bed-share (6.4% vs 82.7%; aOR 190.1; 95% CI 62.4–579.0). No differences were seen with perceived maternal control. Compared with mothers who did not receive advice about sleep location from a doctor, those who received advice to exclusively room-share were less likely to report intention to bed-share (17.0% vs 26.5%; aOR 0.56; 95% CI 0.36–0.85). Of interest, in an analysis of those who intended to room-share without bed-sharing but whose actual practice included bed-sharing, doctor advice to room-share had no impact (aOR 1.01; 95% CI 0.71–1.45).

## DISCUSSION

In this nationally representative sample of mothers, whereas 59.0% reported that they intended to room-share without bed-sharing, only 45.4% had actually both practiced and then intended to exclusively

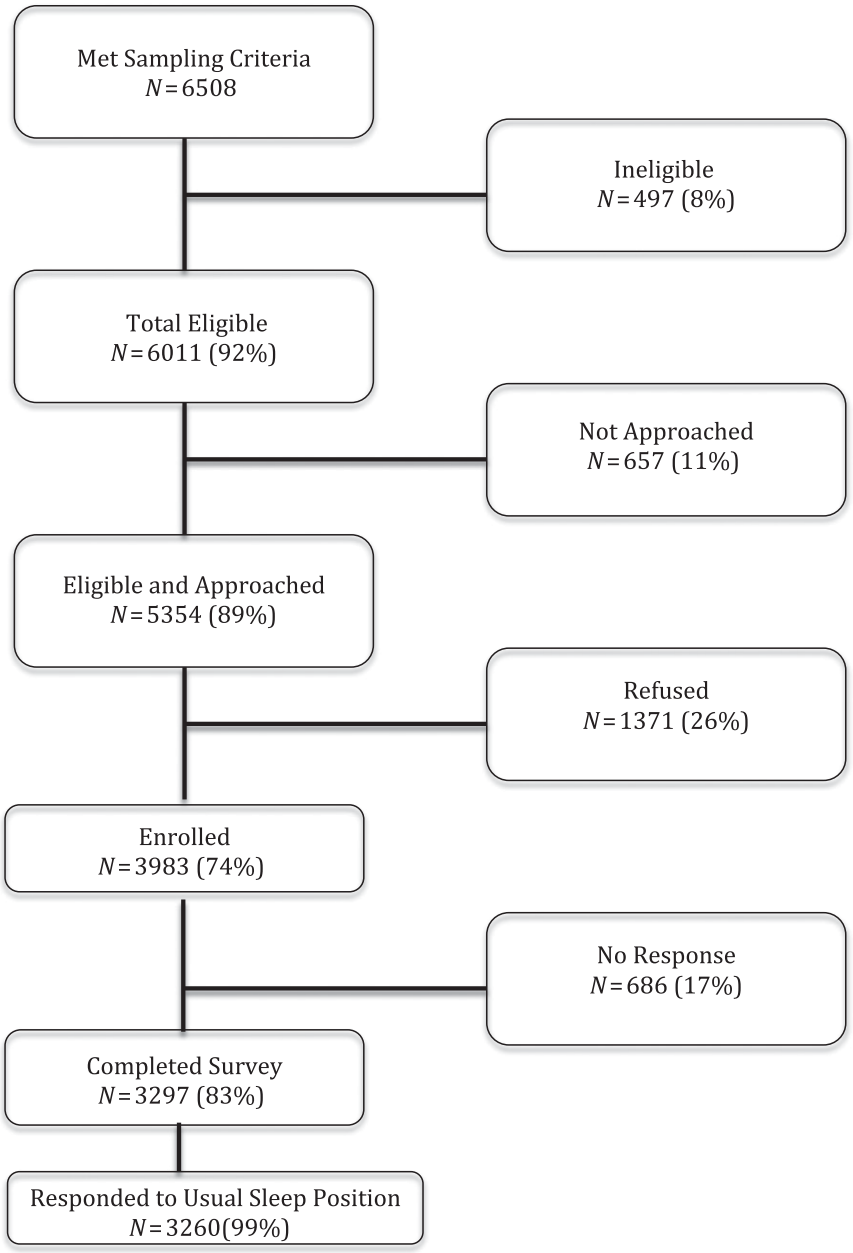


**FIGURE 1**

SAFE enrollment and follow-up. Adapted from Eisenberg SR, Bair-Merritt MH, Colson ER, Heeren TC, Geller NL, Corwin MJ. Maternal report of advice received for infant care. *Pediatrics*. 2015;136(2).

room-share without bed-sharing. We also found that practicing and intending to practice bed-sharing is common, with approximately one-fifth (19.7%) of the participants reporting usually bed-sharing, 31.9% reporting actually practicing at least some bed-sharing in the previous 2 weeks, and ~24.2% of mothers reported intending to bed-share (Table 2).

Women who were African American or of other race and/or ethnicity or of lower education level were more likely to intend to bed-share. Although other studies have not examined intent to bed-share, this higher likelihood of bed-sharing intent in these groups is consistent with national data about reported bed-sharing. Researchers conducting the NISP found that ~40% of African American mothers reported bed-sharing in 2010, and mothers with less education were more likely to usually bed-share.[3] Whereas the NISP found an increased rate of bed-sharing for younger (<20 weeks old) infants, we found that mothers with infants who were older at the time of our survey were more likely to intend to bed-share than those with younger infants. It is possible that this is a temporal trend because more recent studies have shown that the highest risk of sudden infant death syndrome associated with bed-sharing is for infants <3 months old.[14] The relationship between receiving sleep-location advice from a doctor and actual bed-sharing practice has also been reported in the NISP[3] and reported previously in the current study population for advice from multiple sources, including a doctor.[11] Consistent with these previous reports, we found that receiving advice from a doctor to room-share without bed-sharing decreased the likelihood of intention to bed-share; however, among those who intended to room-share without bed-sharing but whose actual practice included bed-sharing, doctor advice to exclusively room-share had no impact. In addition, positive social norms and attitudes toward room-sharing and negative norms and attitudes toward bed-sharing were associated with less intention to bed-share, which is similar to previous findings for supine sleep.[7]

Most surveys of sleep location likely underestimate the prevalence of bed-sharing because parents may interpret questions about sleep location as only referring to location at the beginning of the night, and infants who start out on a separate sleep surface may end up bed-sharing later in the night.[15,16] Qualitative studies suggest that infant feeding, parental fatigue, and infant crying are reasons for this type of bed-sharing, which is often unintended.[4] Unintended bed-sharing may explain

our finding that there is frequent inconsistency between those whose near-future intention is to room-share without bed-sharing but whose actual practice includes bed-sharing.

Other studies have found that breastfeeding was positively associated with more frequent and longer duration of bed-sharing.[17,18] This analysis suggests that bed-sharing for many breastfeeding mothers may be intentional; mothers who exclusively breastfed their infants had intention to bed-share that was >3 times higher than among those who formula fed, and those who partially breastfed had intention to bed-share that was >1.5 times higher. Although some have been concerned that safe-sleep education could decrease breastfeeding rates, we have found previously that receiving advice to both room-share without bed-sharing and to breastfeed did not decrease breastfeeding rates.[11]

We also found that, as in our previous work,[7,11] receiving advice from a doctor to room-share without bed-sharing increased the likelihood of both practicing and intending to exclusively room-share without bed-sharing, reinforcing the importance of advice from health care providers. However, not all providers include guidance around bed-sharing as part of anticipatory guidance, or the advice may be inconsistent with recommendations.[19,20]

Maternal attitudes and social norms had the strongest association with infant sleep locations, particularly with regard to bed-sharing. Mothers who reported perceived social norms supporting bed-sharing and discouraging room-sharing had almost 200 times the odds of intending to bed-share as those whose social norms supporting room-sharing without bed-sharing. Gaydos et al[21] showed that concerns about cultural norms are important in parental decisions about infant sleep. Cultural norms and attitudes are potentially modifiable and should be included in discussions with mothers and in public health interventions to influence behaviors.

Despite expanding on the current understanding of decisions about infant sleep location, the study has limitations. Data from maternal report may be biased toward the desired response; however, it is reassuring that our results are consistent with those found in previous studies, including that women who were African American, with lower education levels, and who were breastfeeding were more likely to intend to bed-share.[3,11] Additionally, mothers with low birth weight infants and those with less than high school education were slightly underrepresented in this sample.

## CONCLUSIONS

Fewer than half of mothers are exclusively practicing and intending to practice AAP-recommended room-sharing without bed-sharing. Actual practice and future intention for sleep location are not always consistent. Attitudes, social norms, and doctor advice are associated with infant sleep location and may be potential targets for educational interventions. Future research could be directed at designing and testing the efficacy of interventions to change attitudes and social norms and enhance the consistency of doctor advice to ultimately change infant sleep practices.


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## ABBREVIATIONS

AAP: American Academy of Pediatrics
aOR: adjusted odds ratio
CI: confidence interval
LB: live birth
NISP: National Infant Sleep Position Study
SAFE: Study of Attitudes and Factors Effecting Infant Care
SUID: sudden unexpected infant death
TPB: theory of planned behavior

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