

# Improving Safe Sleep Environments for Well Newborns in the Hospital Setting

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## Abstract

**Objective.** Following the “Back to Sleep” campaign, deaths from sudden infant death syndrome (SIDS) were reduced. However, SIDS and sleep-related deaths continue to occur. Studies demonstrate that modeling by health care workers influences parents to place infants supine for sleep. Recently, additional emphasis has been placed on environment. The purpose of this study was to improve sleep position and environment in the hospital. **Methods.** A Plan-Do-Study-Act cycle was initiated. Sleeping infants were observed at baseline. A bundled intervention was implemented; infants were again observed. Parents were surveyed. **Results.** At baseline, 25% (36/144) of sleeping infants were safe; the majority of unsafe sleep was a result of environment. Postintervention, significantly more (58%; 145/249) had safe sleep ( $P < .0001$ ). Most parents planned to use the supine position (95%; 96/101); none planned to cosleep. Many intended to adjust their infants’ home sleep environment. **Conclusion.** Using a multifaceted approach significantly improved infant safe sleep practice in the hospital setting.

## Keywords

safe sleep, infant mortality, SIDS, quality improvement

## Introduction

The 2012 US infant mortality rate is high compared with that of other industrialized nations, at 5.98 per 1000 live births.<sup>1</sup> Sudden infant death syndrome (SIDS) is the third leading cause of infant mortality in the United States, with nearly 2500 infants dying of SIDS annually. However, since the Back-to-Sleep campaign started, the percentage of infants placed on their backs to sleep has increased dramatically. In addition, the overall SIDS rate has declined by more than 50%.<sup>2</sup>

Although SIDS deaths have decreased over the past 20 years, other types of sudden unexpected infant deaths, including accidental suffocation and strangulation, have increased.<sup>2</sup> The reason for this increase is not fully understood. However, advances in death scene investigation, coupled with multidisciplinary child death review programs and stricter adherence to the definition of SIDS may have played a role.<sup>3</sup> These changes led, in part, to the American Academy of Pediatrics (AAP) revising their guidelines in 2011 to further emphasize the sleep environment to reduce the risk of other sleep-related deaths.<sup>4</sup> The guidelines specifically recommend that “healthcare professionals [and] staff in newborn

nurseries . . . endorse the SIDS risk-reduction recommendations from birth.”<sup>4(p. 1031)</sup>

Despite awareness of Back-to-Sleep, some nurses still use side positioning and believe that an infant is at risk for aspiration if placed supine.<sup>5</sup> In addition, when health professionals in the hospital promote supine sleep positioning through teaching and/or modeling behaviors, parents are more likely to choose the supine position.<sup>6,7</sup> Shaefer et al<sup>8</sup> examined infant sleep position and swaddling. However, no identified studies examine the full infant sleep environment in the hospital. Therefore, we sought to assess infant sleep environment and position as well as ways to improve modeling of safe sleep behavior in our hospital.

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## Methods

### *Setting and Study Population*

Wesley Medical Center is a Hospital Corporation of America owned community teaching hospital in Wichita, Kansas. The hospital has a 39-bed neonatal intensive care unit (NICU), a 49-bed Special Care Nursery, and 62 postpartum rooms where well newborns routinely room in with their parents. Average annual deliveries exceed 6000, with more than 5500 well infants born each year. Infants admitted to the NICU and Special Care Nursery were excluded from this study. Infants are admitted to the postpartum unit by a pediatric hospitalist group, an internal medicine-pediatric hospitalist group, a family medicine hospitalist group, and several private community-based physicians. Many of these services are also staffed by pediatric or family medicine residents.

### *Intended Improvement*

Safe sleep practice for infants requires that the infant sleep alone, on his or her back, in a crib. Our aim was to improve our compliance with safe sleep practice to 75% or greater.

### *Ethical Issues*

This project was initiated for process improvement at a single institution and did not involve reviewing protected health information. The initial observation of sleep environments and follow-up parent survey were approved by 2 local institutional review boards (IRBs). These same IRBs determined that the remainder of the project was quality improvement. Any unsafe sleep position or environment identified at the time of observation was corrected by nursing staff.

## Plan-Do-Study-Act Cycle

### *Intended Improvement*

We planned to improve safe sleep for infants in the postpartum areas of the hospital using a bundled intervention approach.

### *Planning the Intervention*

In late 2010, the Director of Women, Infant, and Children's Services recognized the need for safe sleep education of nursing staff. As a result, she contacted the Director of the SIDS Network of Kansas (Christy Schunn; hence SIDS Director) who developed a PowerPoint presentation. All nursing staff in the

postpartum areas of the hospital received the training with a plan to educate new hires quarterly thereafter.

Also in late 2010, the Wesley Pediatric Hospitalists began noticing that the safe sleep environment was modeled poorly in the hospital setting. Observations of large stuffed animals, multiple blankets, and other items, coupled with infants found sleeping in parents' beds or held by sleeping adults led to discussions on how to improve the sleep environment in the hospital. These unsafe sleep conditions continued even following the nurse training. To gain an accurate assessment of newborn safe sleep in the hospital, an observational study was developed.

Although our baseline findings were concerning, several other projects took precedence, so it took several months to improve our performance. In addition, it took time to bring the right players to the table to discuss how to fix the problem. It was evident that one of the first areas to address was development of consistent practice. We realized that a nursing policy would help. At the time, a safe sleep policy was not available in our institution for well newborns. There was an existing safe sleep policy for the special care and intensive care nurseries. We addressed this by first discussing options with the SIDS Director. She recommended "Model Behavior," an example nursing policy produced by First Candle, available free of charge on the internet. We used this resource, the 2011 AAP guidelines, and the special care nursery policy at our institution to develop a nursing policy on safe sleep. The policy was presented to the Pediatric and Newborn Executive Committees and approved by them in January of 2012. The policy was then published in our hospital nursing policy manuals on March 1, 2012.

While the nursing policy was under development, we decided to sit down with nursing staff and the SIDS Director to identify thoughts on how to improve safe sleep for patients. Nursing stated that sharing our baseline data, which indicated that infants were not in safe sleep position and environments, would be eye-opening to staff. Nurses recommended using an educational tool demonstrating safe sleep, such as a poster, in each of the postpartum rooms. They also recommended utilizing a safe sleep video. In addition, teaching safe sleep to parents early in the hospital course, rather than at time of discharge, would allow the nurses to then continue the safe sleep discussion and use teaching moments throughout the rest of the hospitalization.

To carry out the nursing recommendations, the following plan was developed. A nursing manager and staff nurse on one of the postpartum units developed an educational "Policy Poster," including the following: (1) the new safe sleep nursing policy, (2) our baseline data describing the findings of sleep environment and

IF THE BABY IS AWAKE PLEASE STOP AND RETURN TO COMPLETE EVALUATION WHEN ASLEEP			
1. Caregiver(s) present:	Mom	Dad	Other: female/male/both
2. What is the infant's status? <i>Please circle one item</i>			
a. Asleep lying on back in crib	c. Asleep lying on side in crib	e. Asleep held by sleeping adult	g. Sitting in bouncy/carseat
b. Asleep lying on front in crib	d. Asleep held by awake adult	f. Asleep on caregivers bed, not being held	h. Other _____
3. What items are in the crib			
Diapers	Burp Cloths	Medical equipment in use	
Clothes	Suction Bulb	Medical equipment not in use	
Pillow	Extra Blankets	Pacifier	
Wipes Container	Stuffed Animals	Other _____	

**Figure 1.** Data collection form.

If the observer finds the baby in an unsafe position or situation, correct immediately and notify the nurse assigned to the baby of the baby's unsafe sleep environment.

position, (3) a Declaration of Safe Sleep Practice, and (4) a place to sign, indicating that the nurse had read information and agreed to practice safe sleep for her patients.

The hospital offered a system where parents could view videos on infant care. The SIDS Network of Kansas provided a video on infant safe sleep in both English and Spanish to hospitals throughout the state (available at <http://www.sidsks.org/SafeSleepPage.html>). This video was available at our hospital, but viewing was not required. We made viewing of the safe sleep video mandatory for all parents of newborn infants. Nurses ensured that parents watched the video within the first 24 hours of arrival to the newborn unit. The nurses were asked to document this viewing in the medical record.

To demonstrate safe sleep to families, an "Environment Poster" was ordered from the National Institute of Child Health and Human Development (NICHD) showing an infant sleeping on his back, in a bassinet, with no items in the bassinet (available at [http://www.nichd.nih.gov/publications/pubs\\_details.cfm?from=sids&pubs\\_id=5034](http://www.nichd.nih.gov/publications/pubs_details.cfm?from=sids&pubs_id=5034)). These posters were displayed in all postpartum rooms by March 15, 2012. Nurses were asked to use this poster to discuss safe sleep positioning and environment with families. Initial discussions of safe sleep were moved from dismissal training to part of postpartum room orientation.

Nurses were also asked to assess the sleep environment and position of the infant each time they assessed the infant for any reason. If the infant was found in "safe

sleep," the nurse was asked to commend families for following safe sleep recommendations. If the infant's sleep location or position was deemed unsafe, the nurse was asked to use this as a teachable moment and to instruct families again on the importance of safe sleep.

Although the development and implementation of this bundle began in March 2012, nurses were asked to begin these practices by April 1, 2012. The bundle implementation was communicated to nurses through MOX, the hospital nursing e-mail and notification system.

### *Planning the Study of the Intervention*

To gather baseline information, we developed a data collection form. The form was modified slightly throughout data collection to improve accuracy (Figure 1). Baseline data were collected on infants admitted to the Wesley Pediatric Newborn Service only. The baseline data were collected between the hours of 7 AM and 9 AM by 2 Wesley newborn hospitalists, 1 pediatric resident, and 1 medical student. These 4 individuals took turns collecting data over 2-week periods from March 2011 to July 2011 until they had collected data on 201 infants.

We collected postbundle implementation data using the same data collection form. Postbundle data collection occurred on all infants in the postpartum areas of the hospital. The postbundle data were collected manually by 2 staff nurses 3 days weekly from 7 AM to 9 AM.

Data were collected for a 2-month period from March 21, 2012, to May 10, 2012.

We collected parent feedback on the intervention via survey on the day of discharge. All parents of well newborns in the postpartum areas of the hospital were included. The brief survey contained knowledge items, items requesting feedback regarding the safe sleep education and video, intentions for sleep position and environment at home, and demographic information. Surveys were collected from July 2, 2012, to August 17, 2012.

### Methods of Evaluation

Baseline, postbundle and survey data were entered into an Excel spreadsheet on a password-protected computer. The data were analyzed using PAS-W 20.0.

## Results

### Baseline Data

For our baseline, we collected data on 201 infants from the Wesley Pediatric Newborn Service. Of those 201 infants, 144 infants (71.6%) were sleeping. The following statistics pertain to sleeping infants. Of the 144 sleeping infants, 88% (127/144) were in the supine sleep position; however, 82% (118/144) had an unsafe sleep environment, with one or more items in the crib. The most common items in the crib were the suction bulb (81/144; 56%), extra blankets (47/144; 32%), and burp cloths (39/144; 27%). Combining infant safe sleep position and safe sleep environment, 25% of infants were safe (26 infants held by an awake adult and 7 infants sleeping alone, on his or her back in the crib). The remaining 75% of infants were unsafe (48 infants held by a sleeping adult or found sleeping in bed with an adult; 61 infants not sleeping supine and/or had 1 or more items in the crib).

### Postintervention Data

We collected data on 337 infants from all newborn services after the implementation of the bundle described in the methods section above. Of those 337 infants, 249 (73.9%) were sleeping. The following statistics pertain to sleeping infants. Using our criteria for safe sleep (alone, on their back in the crib or held by an awake adult), 58.2% (145/249) had safe sleep. The remaining infants were in an unsafe sleep environment, with 37.3% (93) having unsafe position/location or environment and 4.4% (11) having both unsafe position/location and environment. Only 10.8% (27) had an unsafe

position/location, and the majority of those were on the parents' bed.

Looking only at the environment, the majority (64.7% or 161/249) were safe, with no items in the crib. The remaining 35.3% (88/249) had an unsafe environment:

- 25.3% (63) had 1 item in the crib;;
- 6% (15) had 2;
- 2.8% (7) had 3;
- 0.8% (2) had 4; and
- 0.4% (1) had missing data.

Compared with our baseline observational study where only 25% (36/144) of sleeping infants were safe, the postintervention rate of safe sleep (58%; 145/249) was significantly higher ( $\chi^2 = 40.558$ ;  $P < .0001$ ).

### Analysis: Survey Data

Of the 101 surveys returned and completed, the mothers were between 19 and 42 years of age ( $M = 29$ ;  $SD = 5$ ). The majority of mothers were married (77; 76%), whereas the remainder were members of an unmarried couple (13; 13%), never married (8; 8%), separated/divorced (2; 2%), or did not respond (1; 1%). In terms of education, 5% (5) had some high school, 9% (9) had graduated high school/GED, 33% (33) had attended some college or received an associate's degree, 35% (35) had a bachelor's degree, 18% (18) had graduate education, and 1% (1) chose not to answer. The majority of mothers (78; 77%) and fathers (72; 71%) were white.

Few parents reported not seeing a safe sleep educational poster in the room (4; 4%) or not watching the required ABC's of Safe Sleep video (9; 9%). Of those who watched the video, most (90/92; 98%) stated that the video provided helpful information. In terms of the quality of safe sleep information received while in the hospital, 91% (89) were satisfied, 5% (5) were neutral, 4% (4) were dissatisfied, and 3% (3) chose not to respond.

Regarding safe sleep knowledge, only 5% (5) answered all 6 questions correctly; 32% (32) answered 5, 45% (45) answered 4, 16% (16) answered 3, and 3% (3) answered 2 questions correctly. Question responses are listed in Table 1. Nearly all (96; 95%) planned to place their baby in the supine position to sleep. Three mothers (3%) reported the side position, and 2 (2%) failed to answer. Mothers reported that their babies would sleep in a crib, bassinet, cosleeper next to the adult bed, or some combination of these options. No parent (0%) reported plans to have the baby cosleep in the adult bed or other inappropriate sleep locations. For mothers' report of items in current sleep environment at home and intended changes see Table 2.

**Table 1.** Safe Sleep Knowledge.

Question	Correct Response	n (%) Correct
What are the ABCs of safe sleep?	Alone, Back, Crib	61 (60%)
SIDS is the leading cause of death of infants between 1 month and 1 year of age	True	96 (95%)
After traveling, babies can stay sleeping in their car seat when at home	False	86 (85%)
Smoking during pregnancy increases the risk of low birth weight and preterm birth	True	98 (97%)
When my baby rolls over to his belly I should turn him over to his back	False	17 (17%)
The safest place for babies to sleep is in the same room with parents	True	65 (64%)

**Table 2.** Safe Sleep Environment at Home and Intended Changes.

Item	n (%)	n (%) Intend Change
Firm mattress	4 (4%) Absent	0 of 4 (0%)
Fitted sheet	8 (8%) Absent	3 of 8 (38%)
Blanket	21 (21%) Present	11 of 21 (52%)
Bumper pad	26 (26%) Present	21 of 26 (81%)
Pillow	4 (4%) Present	4 of 4 (100%)
Stuffed toy	9 (9%) Present	9 of 9 (100%)
Large gap	1 (1%) Present	1 of 1 (100%)
Sleep in same room	1 (1%) Not planning	1 of 1 (100%)

## Discussion

Although newborn sleep-related deaths are not expected in the hospital environment, the hospital setting provides an opportunity for health care workers to model risk-reduction behavior. In fact, the hospital may be the primary source of safe sleep information for lower income and African American parents.<sup>9</sup> In the past, some parents have not received proper education on safe sleeping. A 2004 study showed that 75% of nurses surveyed used either the side-lying position or a mixture of side and back positioning, even though 96% of the nurses were aware of the “Back-to-Sleep” guidelines. Nearly half (45%) thought the infant would be at risk for aspiration if only placed on his/her back.<sup>5</sup> A survey of NICU nurses found that only 52% routinely provided discharge instructions that promoted supine sleep positions at home.<sup>10</sup> More recently, Moon et al<sup>11</sup> found that parents who observed health care professionals placing infants in the side or prone position were likely to infer that supine positioning was not important.<sup>11</sup> Parents who observed health care professionals placing items in the crib or allowing items to stay in the crib with a sleeping infant may also infer that a safe sleep environment is not important. Our bundle approach to improving safe sleep education helped increase consistency in teaching between nurses and ensured that safe sleep messages were delivered in the hospital setting.

In addition, we found that safe sleep practice improved in our hospital. The items used in our bundle

are readily available to hospitals, many of which already provide at least some information on safe sleep to parents of newborn infants. As a result, our approach is easily generalizable to other institutions. The majority of parents report receiving at least part of the safe sleep bundle intervention. In addition, parents were receptive to the safe sleep education provided by the hospital, and most found the video helpful. Some parents even reported plans to change or modify their child’s sleep environment at home by adding recommended items, such as a fitted sheet, or removing potentially hazardous items, such as bumpers, blankets, or stuffed animals.

However, the hospital should not be solely responsible for safe sleep education and promotion. To begin, Robida and Moon<sup>12</sup> suggest that health care advice on sleep practices and attitudes toward infant sleep position have significant limitations.<sup>12</sup> This may be especially true for African American parents.<sup>13</sup> In addition, a study by Kaskutas and Graves<sup>14</sup> found that diversity in message sources may be important for inducing incremental social change to maximize risk reduction interventions. Therefore, it is important for health care providers to deliver multiple, varied, and consistent safe sleep messages at all encounters, beginning prenatally and continuing throughout the infant’s first few months of life.

The hospital is the first setting where safe sleep can be modeled with each individual newborn, which may increase the salience of the message to parents. Our approach provides one example of how this might be

achieved by implementing a bundle approach and involving nursing in our performance improvement initiative. Our results show that we were under our goal to improve our compliance with safe sleep practice to 75% or greater, so we certainly have room to improve. Although we have decreased the number of items found in our cribs, we continue to find items that may lead to an unsafe sleep environment for our infants. We focused on changes in nursing practice to allow improved safe sleep environments, and although these changes also affect parents, our next intervention could focus more on the practice of families in providing a safe sleep environment for their newborn infant. We could also consider more system changes to make it easier to keep items out of the crib.

### Limitations

Our study has several limitations: (1) a single population at a single site; (2) a single timeframe during the day for observations; (3) some nurses observed the data collection process, which may have skewed nursing practices (Hawthorne effect); (4) lack of long-term assessment of sustainability; (5) some remaining variability in safe sleep education provided to parents between nurses; (6) inability to attribute observed findings to health care professionals, families, or both; and (7) small sample size for the survey and lack of observational data regarding safe sleep at home.

### Conclusions

We have demonstrated that using a multifaceted approach, we can improve infant safe sleep practice in the hospital setting. Health care professionals should model the safe sleep environment, especially in the hospital setting, and our study provides a low-cost example of how institutions might model safe sleep practice. However, the hospital should be only 1 component in a continuous education system aimed at positively affecting the behavior of parents. Future studies should assess best practices for safe sleep promotion both in the hospital setting and as an integrated part of a medical home system.

### Practice Implications

Our bundled approach to improving safe sleep can easily be replicated in other hospitals. The intervention built on existing evidence and materials that were available at little to no cost through agencies committed to the reduction of infant mortality, including First Candle, the AAP, the NICHD, and locally, the SIDS Network of

Kansas. Other than the nursing policy, none of these materials were developed specifically for the hospital setting. Pediatricians, family physicians, and obstetrical physicians should also consider if any of the materials identified in our bundle could be implemented in their own offices to promote safe sleep in order to reduce infant mortality.

Mothers are more likely to use the supine position if it has been recommended by their physician or health care provider<sup>6,7,13,15,16</sup> and if they received consistent advice from multiple sources.<sup>16</sup> By establishing consistent messaging and promoting safe sleep in the hospital, we found that parents intended to follow safe sleep practices at home. However, competing advice (eg, grandmother and friends) and priorities (eg, exhaustion and going back to work) in the home setting may reduce the chances of safe sleep guidelines being followed. Emphasizing these guidelines in multiple health care settings, we increase the chances that parents will hear about safe sleep and implement those recommendations. In addition, providers can recommend strategies to parents on how to help their baby sleep on its back or address other challenges to safe sleep that may not have been identified before taking the infant home from the hospital. These simple educational processes have the potential to reduce the risk of sleep-related death in infants.

### Declaration of Conflicting Interests

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