

# Exploring Factors Nurses Use When Transitioning Hospitalized Preterm Infants to the Supine Position

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## Abstract

**Objective:** The purpose of the current research was to explore neonatal nurses' opinions and practice regarding the factors surrounding transitioning stable preterm infants to the supine sleep position prior to hospital discharge.

**Methods:** Neonatal nurses were recruited to complete this electronic survey containing 22 multiple-choice and open-ended questions. Nurses were asked to offer their opinion about potential factors that influence their practice in determining when they position preterm infants to the supine sleep position. This electronic survey was distributed on social media, through a professional organization, and one hospital neonatal intensive care unit in the Midwest.

**Primary Results:** Nurses use consistent factors in determining when preterm infants should be transitioned to the supine sleep position, but their opinions vary regarding the influence of these factors. Factors reported by the majority of respondents included respiratory status, corrected gestational age, tolerance of feedings, and the length of time prior to discharge.

**Primary Conclusion:** Nurses must role model adequate transition of hospitalized preterm infants while hospitalized to promote safe sleep after discharge to reduce the risk of sudden infant death syndrome. Nurses did not report compliance with the American Academy of Pediatrics recommendation to transition stable preterm infants by 32 weeks corrected age. Additional research is needed to determine the ideal time to transition stable preterm infants to the supine sleep position prior to discharge.

**Key Words:** Sudden Infant Death Syndrome, Supine Position, Hospitalized Preterm Infant

Supine sleep position (SSP) has been shown to reduce the risk of sudden infant death syndrome (SIDS). However, the rate of supine sleep has plateaued since 2001.<sup>1</sup> After hospital discharge, preterm and full-term infants continue to sleep in non-supine positions increasing the risk of SIDS. In the United States, the prevalence of SSP was reported as 66.5% with those born at the earliest gestation having the lowest rate of SSP after hospital discharge.<sup>2</sup> Additional efforts are needed to promote the SSP after hospital discharge. Transitioning preterm infants prior to hospital discharge may contribute to increasing SSP post-discharge, ultimately further reducing the SIDS rate.

**“After hospital discharge, preterm and full-term infants continue to sleep in non-supine positions increasing the risk of SIDS.”**

More than a decade ago, the American Academy of Pediatrics (AAP) initially recommended stable hospitalized preterm infants begin sleeping primarily in the supine position from at least 32 weeks gestation.<sup>3</sup> The recommendation was reinforced to include the supine position as soon as the preterm infant was medically stable, by 32 weeks corrected age.<sup>4</sup> The AAP Task Force on Safe

Sleep currently endorses hospitalized preterm infants being predominantly in the SSP by 32 weeks.<sup>5</sup> Transitioning stable preterm infants in the hospital is encouraged to increase the likelihood of supine sleep post-discharge. Yet, the timing of when nurses transition preterm infants varies from any time to never.<sup>6,7</sup> In addition, the literature shows infants are not being transitioned to the SSP at the recommended gestation, but much closer to hospital discharge.<sup>8</sup> The reason for the delay in transitioning preterm infants to the SSP is unclear. The purpose of the current research was to explore neonatal nurses' practice and opinions about factors that influence transitioning stable preterm infants to the SSP prior to hospital discharge.

## Methods

A survey was conducted to determine what factors neonatal nurses use to decide when preterm infants are ready to transition to the SSP. The REDCap (Research Electronic Data Capture) survey included demographic questions regarding age, education, experience, and geographic location.<sup>9</sup> The survey contained 22 questions with several multiple-choice questions (with an option to choose other in some cases) as well as several open-ended questions. For example, one of the questions included “Do you transition medically stable preterm infants to the supine position in preparation for hospital discharge?” The response options included “yes,” “no,” and “I have no opinion.” Open-ended questions requested information about the individual practice of transitioning preterm infants to the SSP and how neonatal nurses defined “medically stable” as well as to identify specific factors that impact their practice in regards to transitioning preterm infants (gestational age, weight, respiratory status, oxygen level, amount and mode of feeding, and timing before discharge). Content validity was provided by two nurse practitioners and one doctorally prepared faculty member. Recruitment of neonatal nurses was through (1) an individual social media account (Facebook on July 10, 2018), (2) a group email request to the American Academy of SIDS Prevention Physicians (AASPP) to forward the survey link to neonatal nurses and (3) one level III Midwest hospital obtained an exempt IRB approval for neonatal nurses at the facility to participate. The response rate is unknown due to the nature of social media and internet recruitment.

## Results

A sample of 99 nurses completed surveys representing four countries, United States (94%), India (1%), Australia (4%), and Italy (1%) in five months (between July 11th through December 10, 2018). One respondent opened the survey, but did not respond to any questions; that survey was not included in the data analysis (n=98). The majority of the responses were from the United States with 13 states represented (IL, NY, OH, MI, CA, TX, MO, IN, MT, TN, PA, NJ, VA). The majority of respondents were from IL (n=46, 47%), followed by NY (n=30, 31%). Participants demographics included a wide variety of ages and included vast experience (see table 1). Most of the respondents had a Baccalaureate degree (n=57, 58%), followed by a Master's degree (n=24, 24%), an Associate's degree (n=12, 12%), and Other/Blank (n=5, 5%).

The survey asked respondents to define the term “medically stable” in their own words regarding when preterm infants should transition to the SSP. These responses were analyzed and categorized (see Table 2). The most common written response was when preterm infants are in room air or low flow nasal cannula (n=58, 59%). However, responses varied from when the infant is off a ventilator (n=4, 4%) to when they are ready for hospital dis-

charge (n=5, 5%).

Neonatal nurses reported that infants should be transitioned to the supine position prior to hospital discharge (n=93, 95%) with two respondents having no opinion (n=3, 3%) and two stating infants should not be transitioned prior to hospital discharge (n=2, 2%). When asked if they transition medically stable preterm infants to the supine sleep position prior to hospital discharge in their practice, all responses were affirmative (n=98, 100%). When provided a list of what factors nurses take into consideration when transitioning preterm infants to the SSP, apnea with or without bradycardia (n=71, 72%) was ranked the highest. This factor was followed by corrected gestational age (n=70, 71%), an infant being medically stable (n=69, 70%), and an infant approaching discharge (n=66, 67%). Other factors written in and considered when transitioning to the SSP

were vital signs (n=61, 61%), having an infant in an open crib (n=61, 61%), the ability to maintain an adequate temperature in an open crib (n=56, 56%). About half the respondents consider muscle tone (n=51, 51%) and mode or quantity of feeding (n=50, 50%). Thirty-two percent (n=32) consider the infant's weight a factor in the decision to transition to the SSP (a sum greater than 100% as more than one response was allowed). Regarding the

**Table 1.** Selected Demographics of Survey Sample

Demographics	n	Mean (SD)
Current Age, years	94	42 (13)
Experience as Nurse, years	95	17(13)
Experience as NICU Nurse, years	98	14(12)

SD: standard deviation

**Table 2.** Survey Response to the Definition of “Medically Stable”

Definition	n (%)
No respiratory support/room air or low flow nasal cannula	58(59)
The ability to tolerate feedings (orally or by gavage)	36(37)
No or few mild apnea or bradycardia (none that require stimulation)	33(34)
Stable vital signs	15(15)
Ability to maintain temperature in open crib	12(12)
>34 weeks corrected gestational age	10(10)
Gaining/maintaining weight or growing appropriately	9(9)
No intravenous	8(8)
Ready for discharge	5(5)
Off ventilator	4(4)
No monitors	2(2)
Other (look at the whole baby and evaluate in case-by-case basis, no medical/surgical issues, not at risk for sudden expiration, not septic, not needing more than basic preterm care, no major medical issues, no vomiting in supine position)	11(11)

\*sum is >100 as more than one response was written by respondent

**Table 3.** Gestational Age Preterm Infants Should Transition to the Supine Sleep Position

Gestational Age	n (%)
32	14(14)
33	2(2)
34	34(35)
35	20(20)
36	12(12)
37	1(1)
Missing	15(15)
Total	98(100)

**Table 4.** Minimum Weight Preterm Infants Should be Transitioned to the Supine Sleep Position

Weight (grams)	n (%)
1400	1 (1)
1500	8 (8)
1600	4 (4)
1700	2 (2)
1800	15 (15)
1900	1 (1)
2000	16 (16)
3200	1 (1)
Missing	50 (51)
Total	98(100)

**Table 5.** Respiratory Status at the Time of Transition to the SSP

Respiratory Status	n(%)
Room air	18(18%)
Low flow nasal cannula	14(14%)
In no distress	10(10%)
No apnea, bradycardia, desaturations	9(9%)
No tachypnea	6(6%)
No oxygen or on home oxygen	4(4%)
Nasal cannula, undefined	4(4%)
No airway support/extubated	3(3%)
Continuous positive airway pressure	2(2%)
High flow nasal cannula	2(2%)
Few apnea, bradycardia, desaturations	2(2%)
Minimal oxygen	2(2%)
Nasal cannula or stable tracheostomy	1(1%)
No continuous positive airway pressure, on nasal cannula, undefined	1(1%)
No respiratory support	1(1%)
Missing	19(19%)
Total	98(100%)

2000 grams (n=16, 16%) (see table 4). Responses for when nurses transition stable preterm infants regarding respiratory status included room air (n=18, 18%), followed by low flow nasal cannula (n=14; 14%) (see table 5). The most common amount of oxygen for the stable preterm infant to be transitioned to the supine position was reported as room air (n=25, 25%), followed by 30% oxygen or less (n=8, 8%), 40% oxygen (n=2, 2%), and less than 50% (n=1, 1%). A large percentage of respondents left this open-ended question blank (n=61, 61%). Regarding the factor of feeding, infants are ready to be transitioned to the supine position when they are receiving both gavage and nipple feedings (n=28, 29%), breast or bottle feeding only (n=13, 13%), at least half (or more) of feedings by nipple (n=6, 6%), and gavage feeding only (n=5, 5%), with many missing responses (n=46, 47%). The reported appropriate time to transition before hospital discharge varied with the highest response at one week prior to discharge (n=18, 18%) (See table 6). A large percentage considered it not applicable, or the data was missing (n=41, 42%). Other reported factors reported included when an infant has no evidence of respiratory distress, when preparing for discharge, what the baby looks at as a whole rather than one or two specific factors, when placed into an open crib (n=4, 4%), and one respondent reported that the preterm infant should be positioned supine prior to being placed into an open crib.

**Table 6.** Length of Time Before Discharge Preterm Infants Should be Transitioned to the Supine Sleep Position

Timing	n (%)
24-72 hours	4(4)
1 week	18(18)
2 weeks	14(14)
3-6 weeks	6(6)
As soon as medically stable	6(6)
At 34 or more weeks gestation	2(2)
Varies by infant	7(7)
N/A or missing	41(42)
Total	98(100)

reasons why transitioning preterm infants to the supine position is important, the highest ranked reason was to provide modeling for families (n=56, 57%), to follow safe sleep guidelines (n=38, 39%), to determine if infants are stable and tolerate the position (n=20, 20%), and to acclimate the infant to supine sleep in preparation for discharge (n=18, 18%) (sum is greater than 100% as more than one response was allowed).

In response to the open-ended questions for when nurses transition stable preterm infants in regards to corrected gestational age, weight, respiratory status, amount of oxygen, feeding, and timing of transition to discharge, the responses were categorized and analyzed by each of the listed factors. The responses for when nurses transition a medically stable preterm infant regarding corrected gestational age varied from anytime (n=1) to 37 weeks (n=1), with the most common response being 34 weeks (n=34, 34%), followed by 35 weeks (n=20, 20%). Some responded gestational age was not applicable (n=9, 9%) (See table 3). The most common response to the minimum weight to transition to the SSP was a missing response (n=50, 51%). This response was followed by

## Discussion

The respondents varied in their age, experience, and geographical location. There was representation from four countries, but the majority were from Illinois and New York (78%). There was a high level of education reported with 82% having earned a Bachelor's degree or Master's degree.

When asked to define when preterm infants are medically stable, the most frequent response was when the infant is in room air or on a low flow nasal cannula. Other responses to this open-ended question included preterm infants having no or few apnea and bradycardia, maintaining adequate temperature in an open crib, and stable vital signs. Ten percent (n=10) of the respondents specifically stated greater than 34 weeks corrected gestational age.

There was no consensus among neonatal nurses for when the transition to the SSP should occur in preterm infants. All respondents self-reported they transition medically stable preterm infants to the SSP prior to hospital discharge; however, the timing varied regarding when nurses felt it was appropriate to transition to the SSP. Generally, nurses included many of the same factors to consider when transitioning preterm infants to the supine position, but the influence of these factors varied.

Respiratory status was a factor many reported as important when transitioning preterm infants to the SSP for both the multiple choice and open-ended questions. The majority of the respondents reported that an infant in room air or receiving low flow nasal cannula is medically stable. However, some report that as long as an infant exhibits no signs of respiratory distress, has a normal respiratory rate, and has acceptable oxygen saturation, the infant can be considered medically stable to transition to the SSP. Some reported that when an infant is extubated, they are ready to transition to the supine position. Others report that respiratory status was not applicable to the decision to transition infants to the SSP.

Overall, the most frequent responses by nurses for when preterm infants should be transitioned to the SSP is when they are in room air, at 34 weeks, tolerating feedings via nipple and gavage, and one week prior to hospital discharge. The most frequent response to gestational age was 34 weeks. These responses are conservative and do not offer enough time for the preterm infant to become acclimated to the supine position. The largest number of nurses reported the corrected gestational age to transition to the SSP two full weeks after the AAP recommendation. In addition, 42% of nurses reported that the length of time preterm infants is transitioned prior to discharge is not applicable to their decision to transition a preterm infant supine.

Only 60% of respondents consider an infant being in an open crib as a factor for transitioning an infant to the SSP; however, this is an ideal time to role model appropriate safe sleep in preparation for hospital discharge. If the infant is in an open crib, this provides a preparation period for both infants and their parents to see how the infant tolerates the supine position and role model appropriate safe sleeping routines in preparation for discharge. However, just over half of respondents consider modeling for families when considering transitioning preterm infants to the supine position. Nurses need to understand the influence of role modeling safe sleep prior to hospital discharge.

The limitations of the study include an inability to confirm respondents were all neonatal nurses, the inability to confirm that subjects only took the survey once, and self-reported opinions and practice of supine transition may not be accurate. There was inadequate power to compare nurse's demographics with factors used to transition preterm infants to SSP.

In addition, the survey was developed by the author and has no documented reliability data.

## Conclusion

Factors neonatal nurses reported as important when transitioning to the SSP were consistent and included respiratory status, support, and the occurrence of apnea, bradycardia and desaturations as the most often mentioned. Additional factors reported by more than half the respondents included corrected gestational age, medically stable, approaching discharge, when being placed in an open crib, and muscle tone. Factors reported by half or less of the respondents included feeding and infant weight. The majority of factors were consistent among the respondents; however, the influence and timing of each factor varied and were not compliant with AAP recommendations.

The results indicate that the majority of neonatal nurses do not recognize the importance of transitioning preterm infants in the SSP prior to hospital discharge. Supine positioning is the most important modifiable risk factor for SIDS. The risk of SIDS is highest in those preterm infants born earliest; these infants are in non-supine positions for the longest duration during their neonatal intensive care unit hospitalization. If a preterm infant is born at 24 weeks, that infant could potentially spend almost three months in non-supine positions in the hospital. Transitioning infants to the SSP by 32 weeks corrected gestational age and for several weeks prior to hospital discharge allows both the infant and family time to adapt to this position prior to discharge. Additional education for neonatal nurses regarding the importance of transitioning preterm infants to the SSP well before discharge is an important intervention to role model and promote safe sleep after discharge. Future prospective studies are needed to determine the impact transitioning preterm infants to the SSP has on neonatal outcomes including compliance of supine sleep after hospital discharge and motor development of the preterm infant.

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