

The Vulnerable Infant: Reducing the Risk of Sudden Infant Death Syndrome

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Faculty Disclosure Information

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Acknowledgements

- The Newborn ICU Safe Sleep Program was made possible by the generosity of the Benton Taylor Family Fund for Newborn Medicine and other charitable donors to the St. Louis Children's Hospital Foundation
- Division of Newborn Medicine
- The Newborn ICU Family Readiness Committee
- The Newborn ICU Safe Sleep Committee
- Joan Walsh, RN – Newborn ICU Discharge Coordinator
- Casey Walsh

Learner Objectives

- Define the Triple Risk Model
- Explain risk factors related to SIDS and the sick, preterm and very low birth weight (VLBW) infant
- Discuss implications for supine sleep in the preterm infant with respiratory distress
- Discuss implications for supine sleep in infants with gastro-esophageal reflux
- Identify a comprehensive, collaborative plan of care combining appropriate developmental interventions and safe sleep practices
- Discuss the importance of educating NICU nurses, families and day care providers on the importance of safe sleep

SIDS (Sudden Infant Death Syndrome)

- Phenomenon of unknown cause
- Leading cause of death in the U.S. during infancy beyond the neonatal period
- Definition: *sudden death of an infant under one year of age which remains unexplained after a thorough case investigation, including performance of a complete autopsy, examination of death scene and review of clinical history*
- SIDS victim is seemingly healthy, well-nourished infant between 2-6 months of age, possible minor respiratory or GI infection, but feeds and behaves normally immediately before death with no signs of distress

(AAP, 2005)

2005 AAP Recommendations for Safe Sleep

- Back to sleep
- Firm sleep surface
- Eliminate soft objects from crib
- No smoking during pregnancy
- Avoid second-hand smoke
- Avoid overheating
- Separate but proximate sleep environment
- Pacifier at nap and bedtime
- Avoid commercial positioning devices
- Do not use home monitors to reduce the risk of SIDS
- Tummy time

Independent Risk Factors for SIDS

- Sleep position
 - Prone position 5x more risk, side position 2x more risk
 - Change to prone when infant exclusively slept supine
 - Soft surfaces
 - Bed sharing
- Maternal smoking/second hand smoke
- Overheating
- Late or no prenatal
- Young maternal age
- Preterm/low birth weight
- Male gender – 60% of SIDS victims are male, 40% are female
- Multiple births
- Less than 18 months between births
- Previous SIDS event, risk increases 5x
- African American and American Indian/Alaskan Native infants 2-3 x higher risk than the national average

Incidence

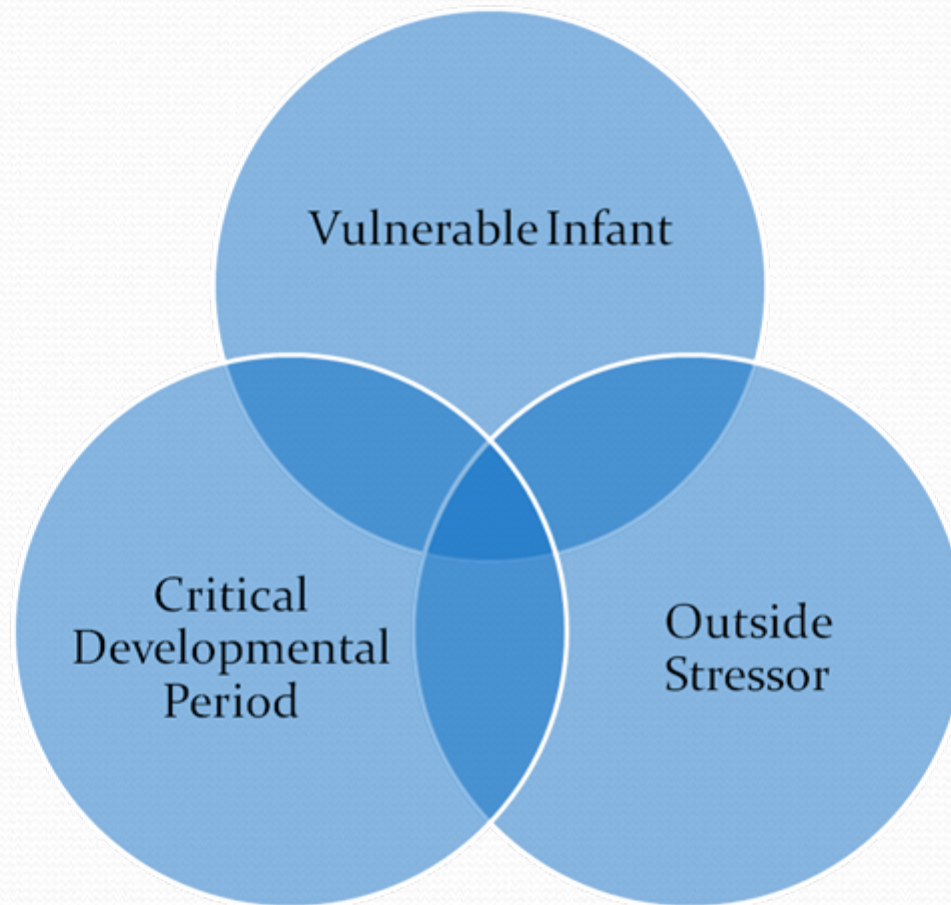
- Rare during the first month of life
- Peaks between 2-4 months of age then decreases; 90% of all SIDS deaths occur before 6 months of age
- Since 1992, a 50% reduction of SIDS
- Even with the decrease in SIDS rates, infant mortality related to SIDS is the leading cause of death for infants 1 month to 1 year; more than 2100 SIDS deaths/year

(First Candle, 2007)

Triple Risk Model

- Vulnerable Infant – underlying defect or abnormality of brain; defects in areas of the brain that control respiration or heart rate; genetics
- Critical development period – rapid growth phases and changes in homeostatic controls during first 6 months of life such as sleep and wake patterns, variations in breathing, heart rate, BP or body temperature
- Exogenous stressors – an already vulnerable infant unable to overcome environmental stressors such as exposure to smoke, overheating, prone position

Triple Risk Model (*Biology of the Neonate*, Filiano, J.J. & Kinney, H.C. 1994)



SIDS and the Preterm/LBW Infant

- The very preterm infant (22-27 wks) died on the average more than 6 weeks later than term
- Preterm infants (28-32 wks) died approximately 2 weeks later than term
- Both prematurity/LBW and side lying carries significant risk individually, but together the risk increases
- Ariagno, et., al., (2006) studied preterm infants 1 month corrected, 1 and 3 months corrected and 3 months
 - Fewer spontaneous arousals in the prone position
 - Decreased number of sleep transitions
 - Decreased heart rate variability during prone sleep
 - Arousal, sleep transitions and increased heart rate variability are protective mechanisms

SIDS and the Preterm/LBW Infant

- Bhat, et., al., (2006) studied 24 infants (14 with BPD) with a median age of 27 weeks post-conceptual age (PCA)
 - Age at time of study of 37 weeks PCA
 - Studied duration of sleep, sleep efficiency, number and type of apneas, arousals, awakenings in both supine and prone
 - Findings indicated very preterm infants before NICU discharge sleep more efficiently with less arousals and with more central apnea in the prone position

Supine Sleep and the Convalescing Preterm Infant with RDS

- Lung volume (FRC) and pulse oximeter saturations in 24-31 week infants still requiring oxygen increased when placed prone
- Cochrane (2007) reviewed 21 studies that confirmed prone positioning as better for oxygenation, ventilation and chest wall stability in preterm, ventilated patients
- Kassim, et., al., (2007) concluded that “prone sleeping did not improve oxygenation in prematurely born infants, 32 weeks PMA or older and with no ongoing respiratory problems”
- Elder, et., al., (2005) studied infant with chronic lung disease (CLD) and concluded that the “supine position appears appropriate for the very preterm infant with CLD going home from the neonatal ICU.”

Supine Sleep and Gastro-Esophageal Reflux (GER)

- Common in preterm infants; may cause esophagitis, respiratory problems, apnea and insufficient growth
- Nasogastric (NG) tubes may be predisposing factor in GER, but no supportive data available
- Tablizo (2007) studies incidence of spitting/aspiration in supine, side-lying and prone positions in over 3000 newborns, 37 weeks or older
 - Findings indicated that placing infants supine did not cause clinical aspiration in healthy newborns

Supine Sleep and GER

- Infants with life-threatening GER events (apnea, bradycardia requiring vigorous interventions) may be placed supine in a supportive sling with the head of bed elevated 30 degrees
- As those infants approach discharge, trial periods of head of bed flat are indicated
- Families need to be taught rationale for positions other than supine and the plan for supine sleep/head of bed flat for discharge

Supine Sleep and GERD

In 2001, the North American Society for Pediatric Gastroenterology and Nutrition states in infants from birth to 12 months of age with GERD, “*the risk of SIDS generally outweighs the potential benefits of prone sleeping.*”

SLCH NICU Discharge Data

- 24-26 weeks ----- 38 to 40 weeks
- 27-29 weeks ----- 36 to 38 weeks
- 30-32 weeks ----- 35 to 37 weeks
- 33-36 weeks ----- 36 to 39 weeks
- 37-41 weeks ----- 38 to 42 weeks
- Since age at discharge is later than previously thought, we have more time to transition the infant to safe sleep
- 3.7 % of our preterm infants in the NICU are discharged on oxygen therapy

Developmental Care and Safe Sleep: They Can Co-Exist!

- Methods of soothing/self-consoling
 - Bendy bumper or blanket rolls
 - Swaddle to maintain flexion, leaving hands free for hand-to-mouth consoling
 - Non-nutritive sucking/nuzzling at breast
 - Kangaroo care
- Head shape
- Sleep
- Flexion/extension of extremities
- Transition to safe sleep prior to discharge – communication and collaboration is the key for the transition process to be completed within one week of discharge

Developmental Care and Safe Sleep

- SLCH Therapy Services recommendations:
 - 32-34 weeks is too young for full implementation of supine sleep
 - For infants >32 weeks, nurses can attempt supine sleep which continuing other positions/devices
- 34-36 weeks PCA is recommended
 - Incubator to crib
 - Untie snuggly/remove gel devices
 - Remove snuggly
 - May continue bendy bumper as indicated for head positioning or flexion of extremities up to day of discharge
- Early-phase, mid-phase and discharge phase of utilizing support with bedside information posted
- If devices are needed after discharge, parents need to be taught how to position the infant safely and in a safe crib

Parent Teaching Strategies

- Recent estimates suggest that former preterm infants comprise 25% of the population at risk for SIDS (Aris, 2006)
- Neonatal nurses recognize non-supine positioning as best for their patients requiring intensive care when they are acutely ill
- Neonatal nurses continue to give parental advice not consistent with national standards
- NICU nurses with appropriate education are better able to model appropriate infant sleep practices and be a greater influence on safe sleep at home
- Safe sleep interventions, parent teaching and education of secondary caregivers could potentially impact SIDS rates among our most vulnerable infants

Sleep Blanket or Sleep Sacks

- Swaddling should be at the level of the shoulders for arms in and hands at midline for hand-mouth consoling
- Swaddling can be at the level of the axilla to leave arms out completely
- Sleep sacks or sleep blankets allow for warmth, swaddling and containment without the need for extra bedding in the crib
- It is not recommended that infants sleep in hats
- At SLCH, we utilize HALO® SleepSack Swaddles™ in the NICU after transition to crib and provide 2 new HALO® SleepSack Swaddles™ for home

Issues Related to Co-Bedding

- 2005 AAP Recommendations
- Maternal bed sharing practices
- Breastfeeding
- Academy of Breast Feeding Medicine Protocol Committee
- LeLeche League International (LLLI)
- International Lactation Consultant Association (ILCA)

Evidence Based Practice

- Policy statements and research studies
 - Source of evidence
 - Review/evaluation by experts of actual policy and associated research
 - Question strengths and limitations of evidence
 - Implementation of recommendations in practice
 - Gather stakeholders
 - Collaborative inquiry
 - Decision making
 - Implementation
 - Identify quality indicators, evaluate, reassess, update
- McCartney, P.R. (2006)

Resources

- U.S. Dept of Health and Human Services, National Institutes of Health, National Institute of Child Health and Human Development www.hhs.gov
- American Academy of Pediatrics (AAP) www.aap.org
- March of Dimes www.marchofdimes.com
- U.S. Consumer Product Safety Commission www.cpsc.org
- American SIDS Institute www.sids.org
- First Candle/SIDS Alliance www.sidsalliance.org
- SIDS Families www.sidsfamilies.com