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Evaluation of Kentucky Nurses' Knowledge and Self-Efficacy Related to Safe Sleep and
Sudden Unexpected Infant Death Risk-Reduction Strategies

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Practice Inquiry Project Introduction

The birth of an infant brings joy and celebration, hopes and dreams. If that infant dies from unexpected means within the first year of life, those hopes and dreams are shattered and there is much sadness and distress. Yet there are deaths that are unexpected, about 3500 each year in the United States (US). Those deaths, known as Sudden Unexpected Infant Death (SUID) include Sudden Infant Death Syndrome (SIDS), accidental suffocation and strangulation in bed, and unknown causes.

The rate of SUID in the US decreased dramatically following the Back to Sleep campaign that began in the early 1990s. However, in the state of Kentucky, the rate of SUID remains high in comparison to the nation. SUID has become the second leading cause of infant mortality in the state. The majority of the SUID deaths in Kentucky involve a modifiable factor in the infant's sleep environment such as body position, location, co-sleeping, and bedding. Smoking and the use of illicit drugs also contribute to Kentucky's SUID rate.

The American Academy of Pediatrics (AAP) has provided recommendations related to providing a safe sleep environment for infants and decreasing the risk of SUID. The AAP has indicated that professionals caring for newborns in perinatal and neonatal units have the responsibility to provide education about and model safe sleep and SUID risk-reduction strategies for parents. Nurses are thus integral to disseminating the safe sleep message thereby contributing to decreasing the rate of SUID.

The focus of this Practice Inquiry Project (PIP) is nurses in Kentucky birthing and children's hospitals and their knowledge and self-efficacy related to safe sleep and SUID risk-reduction strategies. The first manuscript related to the project involves a thorough

review of the literature as it relates to nurses' knowledge of safe sleep recommendations and strategies. The literature is reviewed to determine if there is a need for more education of nurses about safe sleep and if parents are receiving adequate and appropriate information about safe sleep from nurses.

The second manuscript involves an analysis of a proposed state policy targeted to increase access to treatment for pregnant, substance-abusing women. Infants born to such women are at an increased risk for SUID related to maternal substance use during pregnancy and after birth, neonatal abstinence syndrome, and subsequent neglect. Treatment for the women can impact the rate of SUID in a favorable direction. A framework for analyzing the policy is described.

The third manuscript is the PIP itself and describes the actual evaluation of Kentucky nurses in birthing and children's hospitals relative to their knowledge and self-efficacy of safe sleep. The project design, methods, and results are discussed as well as limitations and implications of the project.

Manuscript 1 Abstract

Sudden Unexpected Infant Death (SUID) encompasses sudden infant death syndrome (SIDS), accidental suffocation and strangulation in bed, and unknown causes. A key component in decreasing SUID deaths is educating parents and caretakers about safe sleep as well as modeling safe sleep in the hospital setting (Kentucky Department for Public Health, 2015). The American Academy of Pediatrics (AAP, 2011) has indicated that staff in neonatal intensive care units (NICU) and newborn nurseries should model, implement, teach, and endorse SUID risk-reduction strategies. A review of the literature focusing on education for nurses about safe sleep and SUID risk-reduction strategies is provided.

Manuscript 1

Sudden Unexpected Infant Death – Interventions Impacting Nurses’ Knowledge and Practice: Focused Integrative Literature Review

Sudden Unexpected Infant Death (SUID) claims the lives of about 3500 infants in the United States each year (CDC, 2015). Healthcare professionals, particularly nurses, in newborn nurseries and neonatal intensive care areas are in unique positions to endorse, promote, teach, and model SUID risk-reduction recommendations to new parents in efforts to decrease/prevent SUID. It is thus imperative that nurses have the appropriate knowledge and confidence about SUID and risk-reduction strategies.

Clinical Question

This paper provides an in-depth literature review and appraisal in consideration of the following question: Does a consistent education program for nurses about safe sleep and SUID risk-reduction strategies give nurses the knowledge and confidence to effectively instruct parents and caretakers about SUID?

The Search

Three databases were used for the search of the literature: CINAHL, the Cochrane Library, and PubMed. The search was limited to articles published in English from 2009-2015. Search terms used were: Sudden infant death, sudden infant death and nurses, sudden infant death and programs, sudden infant death and nurses and knowledge, safe sleep, safe sleep and education, safe sleep and nurses, safe sleep practices, safe sleep programs, and safe sleep and nurses and knowledge. Four hundred thirteen records were identified through database searching and six additional records were identified through records included in a review article. Once duplicate records were removed, three

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hundred two records remained and were screened. Of those three hundred records, two hundred fifty-one were excluded. Fifty-one full-text articles were assessed for eligibility. Twenty-eight full-text articles were excluded because they focused more on parents/caregivers and safe sleep practices in the home during the months following newborn discharge from the hospital. They did not include any mention of nurses or nurses impact on parental knowledge about SUID and risk-reduction strategies. That resulted in twenty-three records undergoing review and appraisal.

The Evidence

In 2005 and 2011, the American Academy of Pediatrics (AAP), made recommendations for a safe infant sleeping environment in efforts to decrease the risk and incidence of sudden infant death syndrome (SIDS) and other sleep-related infant deaths. The top ten recommendation included: placing infant supine to sleep, a firm sleep surface, offering the infant a pacifier when put down to sleep, placing infants prone for tummy time when awake, no bed-sharing or co-sleeping, keeping objects and loose bedding out of the sleep space, avoiding infant exposure to smoke, offering the infant a pacifier when put down to sleep, avoiding infant overheating, avoiding commercial devices marketed to decrease the risk of SIDS, avoiding use of cardiorespiratory monitors as a strategy to decrease the risk of SIDS. The AAP (2011) also indicated that staff in neonatal intensive care units (NICUs) and newborn nurseries should model, implement, teach, and endorse SIDS risk-reduction strategies. The recommendations are drawn from a variety of research (AAP, 2005: AAP, 2011). Strength of the evidence for each recommendation is based on the Strength-of-Recommendation Taxonomy (SORT) and assigned letter grades of A, B, or C.

Evidence regarding nurses' knowledge, attitudes, and practices surrounding safe sleep and SUID risk-reduction strategies is found in the literature. Articles reviewed identified the need for targeted education for nurses so those nurses can accurately and confidently model for and teach parents about SUID and risk-reduction strategies. The literature reviewed was reflected in activities involving: educational interventions, focus groups and interviews, surveys and questionnaires, bundled intervention approaches including education, and integrated reviews. This paper will include a brief description of each of these activities and how they affected knowledge and confidence in nurses. The evidence from each of these approaches is provided – see Addendums A and B.

Educational Interventions

The educational interventions involve actual educational activities being put into place for a given group. Abney-Roberts (2015) reports an educational session about safe sleep being given to 150 medical and nursing staff. Observations of infants in cribs pre- and post-education showed a statistically significant change in the infants' crib environments being consistent with safe sleep. While specific p-values were not provided, 18% of the cribs had objects in them post-implementation compared to 92% pre-implementation. Chart audits pre- and post-education were also improved and statistically significant – no values provided.

Online education tools were utilized by Cowan, Pease, and Bennett (2013) and by Young, Higgins, Raven, and Watson (2013). Increased confidence of 2683 health professionals, primarily nurses, in discussing safe sleep information with families resulted – a score of 7-9 of 9 (Cowan, Pease, & Bennett, 2013). A significant increase – 69.5% to 87% - in nurses' knowledge and application to risk factor assessment and

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evidence-based parent advice was also found ((Young, Higgins, Raven, & Watson, 2013).

A two-prong nursing education intervention developed by the study team, involving a web-based learning module and in-person teaching sessions, was used by Hwang, O'Sullivan, Fitzgerald, Melvin, Gorman, and Flascone (2015). There was significant improvement in overall compliance with and adherence to safe sleep practices by nurses following the intervention (25.9 to 79.7%; P-value 0.001). Similarly, either a web-based training or train-the-trainer approach to safe sleep education for 551 newborn nursery nurses was utilized by Price, Hillman, Gardner, Schenk, and Warren (2008). Nursing participants in both training formats reported a statistically significant increase in their intention to use safe sleep strategies and in their comfort with conveying SUID information to new parents. However, participants in the train-the trainer format demonstrated a greater degree of improvement in placing babies in the supine position for sleep than those in the web-based training group ($p = .005$). In-service training and a nurses' questionnaire about safe sleep were used for 665 staff nurses by Shaefer, Harman, Frank, Adkins, and Terhaar (2010). Following training, more nurses felt supine was the safest sleeping position for infants compared to before training. The authors also found that sustainable sleep practices can be effectively established in the hospital setting following education as evidenced by ongoing observations of infants in cribs and nurses providing education to new parents.

Focus Groups/Interviews

Focus groups/interviews involved researchers sitting down with participants and having discussions with them. There were two articles in which focus groups or

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interviews were used to determine facilitators and barriers to modeling and teaching safe sleep (Drake, Colson, & Hauck, 2015), and to determine knowledge and attitudes of parents and health professionals about SUID (Yikilkan et al., 2011). The former held five focus groups of 41 nurses and other staff not described. They found three themes that emerged as facilitators and barriers for safe sleep. Previously held beliefs of families and providers could be either a barrier or facilitator of safe sleep dependent upon the belief. Inconsistent provider messages could be a barrier to safe sleep. External forces such as media that can drive successful messages to providers and families. could be facilitators to safe sleep. Yikilkan et al. (2011) used face-to-face and phone interviews about safe sleep with 150 mothers and 174 nurses respectively. Results of the interviews were dismal; the majority of mothers claimed they had not been advised about safe sleep by health professionals and only a small percentage of health professionals selected a safe sleep position for infants.

Surveys/Questionnaires

Surveys/questionnaires involved pre-determined questions that respondents would answer. There were several articles reflecting the use of surveys or questionnaires. Aris et al. (2006) administered a two-phase questionnaire to NICU nurses. In Phase I, a questionnaire was completed by 157 neonatal nurses, and 95 neonatal nurses completed a questionnaire in Phase II. A major knowledge deficit emerged regarding the appropriate position for safe sleep: there was direct conflict with using the supine position as the safest sleep position for infants after discharge. A 33-item SIDS risk-reduction questionnaire was provided to 200 neonatal staff nurses by Barsman, Dowling, Damato, and Czeck (2015). The staff nurses represented critical neonatal care and step-down or

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transitional care. Inconsistencies were found in beliefs, knowledge, and practices about SUID risk-reduction strategies, with transitional care nurses being more consistent in following SIDS recommendations (65% for transitional care nurses and 49% for critical care nurses).

Three other articles were identified as utilizing questionnaires about safe sleep with nurses. Bullock, Mickey, Green, & Heine (2004) distributed 1500 questionnaires to nurses with 528 returned. Grazel, Phalen, & Polomano (2010) distributed 1080 surveys to nurses with 430 returned. Varghese, Gasalberti, Ahern, & Chang (2015) utilized a convenience sample of 121 adult caregivers of newborns. While nurses could identify SUID risk-reduction strategies, there were inconsistencies in implementing and modeling those strategies in practice. Those inconsistencies involved not placing infants supine to sleep and not removing toys and positioning aids from infant beds. Respondents who had been taught about safe sleep had a significantly higher perception of infant vulnerability to SUID ($p < 0.001$), believed safe sleep behaviors were effective ($p < 0.01$), and had more confidence in modeling and teaching safe sleep strategies ($p < 0.008$) than those who had not been taught about safe sleep.

Surveys about safe sleep were used by two research teams. (Simon-Burrell, 2015; Fowler, Evans, Etchegarary, Ottenbacher, & Arnold, 2013). Simon-Burrell found that nurses were knowledgeable about the AAP safe sleep recommendations and modeled them well. Fowler et al. identified a clear need for better education about SUID risk-reduction measures for both NICU and newborn nursery nurses as evidenced by responses from parents whose infants had been in an NICU or well-baby area. In

comparing the two groups, parents from the NICU had more correct answers to survey questions.

Bundled Intervention Approaches

Bundled interventions involved more than one activity being utilized for subjects. Bundled approaches to educating health professionals about safe sleep and implementing safe sleep strategies were used in four articles (Carrier, 2009; Gelfer, Cameron, Masters, & Kennedy, 2013; Mason, Ahlers-Schmidt, & Schunn, 2013; McMullen, Lipke, & LeMura, 2009). The bundled approaches included educational interventions with visual triggers on infants' beds, audit tools and questionnaire, introduction of safe sleep policies, safe sleep packets and videos for families, and use of sleep sacks for infants. One or more of these interventions were used by each research team.

It was found that a comprehensive SUID program made a measurable difference in nurses' compliance in modeling safe sleep practices and educating parents in the prevention of SUID (McMullen, Lipke, & LeMura, 2009). Mason, Ahlers-Schmidt, & Schunn (2013) and Carrier (2009) had similar findings. Gelfer, Cameron, Masters, & Kennedy (2013) identified what parents observe in the hospital in terms of infant sleep position, items in the infant bed, integrity of linens in the infant bed and swaddling of the infant has a significant effect on what they do at home after discharge.

Integrative Reviews

Integrated reviews involved the analysis of a number of papers about safe sleep. Patton, Stiltner, Wright, and Kantz (2015) and Salm Ward and Balfour (2015) conducted integrative reviews to identify literature aimed at reducing the risk of sleep-related deaths. One of the integrated reviews indicated education on SUID and a safe sleep

environment should be mandated to improve nurses' knowledge and behaviors and decrease ineffective parent education (Patton, Stiltner, Wright, & Kautz, 2015). Salm Ward and Balfour (2015) identified interventions described in the articles had mixed effects on adherence with safe sleep behaviors.

Appraisal of the Evidence

The ultimate outcome described in the reviewed literature was that of safe sleep for infants thus decreasing the risk and incidence of SUID. Given the nature of that outcome, the level of evidence of the reviewed literature was mid-range to low per the Level of Evidence Hierarchy presented by Melnyk and Fineout-Overholt (2015) – see Appendix C footer. However, it would be inhumane, albeit unethical, to conduct controlled trials in which SUID risk-reduction information was given to some health professionals and parents and not to others. Doing so could easily put vulnerable infants at risk and increase infant mortality. Thus, Level 4 to Level 6 evidence is considered the best evidence for this subject.

While the level of evidence was mid-range to low, the quality of the evidence presented in the articles was mostly high per the definitions of the U.S. Preventive Task Force (2014) – see Appendix D footer. The net benefit of the evidence from the articles had moderate (Grade B) to high (Grade A) implications for practice. The evidence either identified interventions that were successful in improving safe sleep knowledge and practice, or identified areas of opportunity for improvement related to safe sleep knowledge and practice. In some way, all evidence supported consistent education programs for nurses about SUID and risk-reduction strategies.

Implications for Practice

This review of the literature surrounding safe sleep for infants presented several implications for nursing practice. One is that education and support for nurses in the provision of safe sleep in the newborn nursery/post-partum areas and NICU should be given. Education should be provided to new nurses as they begin employment in the identified areas, as well as to existing staff. Education given in a variety of formats would be most beneficial to satisfy different learning styles.

Employing visual triggers, such as posters in the area or cards on infants' beds would be helpful in reinforcing safe sleep practices and modeling. Such triggers would serve as reminders to nurses and parents to carry out safe sleep recommendations. Building safe sleep practices and teaching into required documentation in the infants'/mothers' medical records would also be beneficial in reinforcing safe sleep. Documentation serves as a reminder of what is to be completed and validates that which has been completed.

Observations or audits of infants' sleep environments are necessary to establish the level of practice behaviors and adherence to safe sleep strategies. Observations/audits should be conducted regularly on an ongoing basis to evaluate if there is ongoing consistency in practicing safe sleep recommendations and help to indicate when education interventions regarding safe sleep are warranted.

Having parents view a video/DVD on safe sleep and receive direct instruction of the AAP safe sleep recommendations would be important to do. Surveying or interviewing parents of newborns about SUID and safe sleep practices should then be accomplished. Information gleaned would be reflective of what the parents learned from

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the video/DVD and the nurses, and what they learned from nurses' modeling safe sleep. That information would indicate if more education for the nurses is necessary.

Establishing "Safe Sleep Champions" in units would help with nurses' education, audits, parent surveys/interviews, and day-to-day assistance with modeling and teaching safe sleep strategies (NICHD, 2017).

Summary

Nurses are in key positions to influence parents of newborns about safe sleep. Since parents tend to do at home what they see nurses doing in the hospital, it is imperative that nurses in NICUs and newborn nursery/post-partum areas receive education about safe sleep and SUID risk-reduction strategies and practice and model appropriate safe sleep strategies. The literature supports educational interventions for nurses. If that is accomplished, there can be a significant increase in safe sleep environments and a decrease in SUID.

Manuscript 2 Abstract

Maternal substance abuse and Neonatal Abstinence Syndrome are at critical levels both in Kentucky and the United States. These issues increase the risk and incidence of sudden unexplained infant death (SUID). A proposed policy to impact newborn drug dependence per interventions with the pregnant, substance-abusing mothers is described. The Multiple Streams Framework is applied to analyze the policy process and ultimate enactment of the policy following bipartisan legislative support.

Keywords: drug abuse, pregnancy, NAS, newborn drug dependence, policy process, SUID

Manuscript 2

Policy Analysis: Impacting Newborn Drug Dependence in Kentucky

Neonatal abstinence syndrome (NAS) is experienced by newborns whose mothers abused illicit substances, particularly opiates, during pregnancy. It occurs because the substances to which the fetus was exposed in utero and established dependence upon are abruptly discontinued at birth. The newborn thus undergoes drug withdrawal (Kocherlakota, 2014).

Substance abuse during pregnancy and consequent NAS are growing issues in Kentucky and the United States (Patrick et al., 2012; Kentucky Cabinet for Health and Family Services, 2014). According to Wilson and Shiffman (2015), newborns experiencing effects of NAS die after being sent home with mothers struggling to overcome drug addictions. This stems from the work of Kandall, Gaines, Habel, Davidson, and Jessop (1993) who found the sudden unexpected infant death rate (SUID) in drug-exposed infants was 5.83 per 1000 infants compared with 1.39 per 1000 infants who were not drug exposed. From 2010 to 2015, 110 cases (total number of birth cases unknown) were identified in Pennsylvania which babies whose mothers used opioids during pregnancy later died of preventable SUID deaths (Wilson & Shiffman, 2015). Preventable deaths would be those in which the sleep environment and position of the infant promoted safe sleep. Unsafe sleep would be infants place prone or side-lying to sleep, bedsharing or co-sleeping, soft toys and bedding in the sleep environment, or sleeping in other than an infant-specific sleep space. High on various drugs, mothers often bed share and fall asleep on their infants, causing them to asphyxiate. Bedsharing increases the risk of SUID per suffocation and strangulation (Colson et. al., 2013). In a

study by Blair et.al., (2009), of SUID infants, 54% died while bedsharing compared with 20% non-bedsharing infants. There was a significant multivariable interaction between bedsharing and recent use of drugs (31% versus 3%). Of the 110 cases previously noted, more than 40 of the infants suffocated. In other cases, infants died after swallowing toxic doses of methadone, heroin, oxycodone, or other opioids, given to them in efforts to calm their drug withdrawal symptoms.

To impact the incidence of NAS which can, in turn, impact the incidence of SUID, it is necessary to impact substance abuse by pregnant women. The Academy of Pediatrics (2016) recommends the avoidance of illicit drugs to reduce SUID. One means of accomplishing that is for pregnant substance-abusing women (PSAW) to access treatment programs yet there are serious challenges and barriers to such access (Lester & Twomey, 2004). External barriers and obstacles to treatment include a paucity of treatment centers available to pregnant women; lack of transportation; long wait periods for appointments; lack of child care, finances, and health insurance. Having a partner unwilling to seek treatment is also an obstacle. Internal barriers include shame and fear of being judged by care providers, fear of being reported to social services and losing custody of children and public assistance resources, and co-morbid conditions such as depression and anxiety. Intervention by means of a state policy to mandate access for PSAW is a viable option to help overcome obstacles of treatment (U.S. Department of Health and Human Services, 2009). This paper serves to analyze the development process of a policy in Kentucky that increases treatment access for those women. The Multiple Streams Framework by Kingdon (2011) is applied to evaluate that process.

Multiple Streams Framework

How an issue is placed on a political agenda and is eventually translated into public policy is addressed by Kingdon (2011) in terms of three streams. The first stream is the *problem stream*. It encompasses indicators that support existence of a problem. It may reflect research indicating there is a problem, or an issue may be brought to the attention of policymakers by a well-publicized occurrence. It also includes feedback about the problem. The second stream is the *policy stream*. It involves consideration of input from specialists in the area of the problem and presents alternatives to the problem that can be implemented. The third stream is the *political stream*. It looks at the political will or political input into the matter. The national mood surrounding the issue, changes in administration, and political opponents and proponents of an issue are considered in this stream. The policy and political streams highly influence one another and often overlap.

Kingdon (2011) noted that under certain circumstances the three streams come together; this is known as *coupling*. At this time a “window of opportunity” is created and recognition of the problem, an available solution, and the right time for a change in the political climate converge. At this point, policy makers are willing to seriously consider legislation aimed at improving a situation or problem. Kingdon’s Multiple Streams Framework is applied to the enactment of a bill related to drug dependent newborns at a time when NAS is at a high level in Kentucky and is receiving attention both inside and outside of politics.

The Problem Stream

Indicators.

Approximately three infants are born every two hours in the United States with signs of drug withdrawal (Reynolds, 2015). National rates of NAS have tripled since 2000 from 1.2/1000 hospital births in 2000 to 3.39/1000 hospital births in 2009 (Patrick et al., 2012). Data from hospital discharge records in Kentucky indicate the number of NAS cases in the state has increased 15-fold from 2001-2014 (Kentucky Department of Health, 2013; Reynolds, 2015) with an NAS rate of 15/1000 births in 2013. See Figure 1.

The rise in NAS births is congruent with a significant increase in prevalence of mothers dependent upon or using opiates at the time of delivery from 2000-2009 with 5.63 cases of maternal opiate use per 1000 hospital births in 2009 (Patrick et al., 2012). Nearly 4% of pregnant women in the United States use illicit drugs (Kentucky Department for Public Health, (2015). Due to a limited availability of data, it is difficult to estimate the prevalence of substance abuse in Kentucky’s pregnant women.

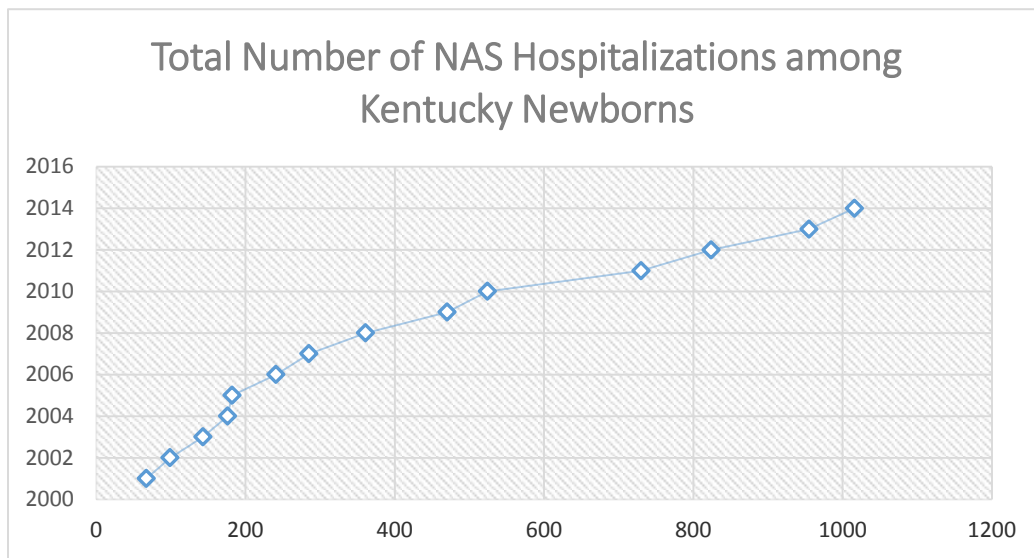


Figure 1: NAS Hospitalizations among Kentucky Newborns

Patrick et al. (2012) cite that state Medicaid programs are the main source of payment for infants with NAS (78.1%) compared to other forms of payment. In Kentucky, 80% of NAS is in Medicaid covered infants. In a period of four years, 2009-2013, the rate of NAS among infants covered by Kentucky Medicaid more than doubled. The average length of stay for NAS babies in Kentucky covered by Medicaid is eight times longer than for healthy newborns (16.6 days versus 2 days) resulting in higher costs per hospital stay (Kentucky Department of Health, 2013).

This is congruent with national data.

Focusing on Dramatic Events.

Opioid analgesics have become the drug of choice among illicit drug users. In the United States, the number of opioid-related deaths more than tripled from 1999-2007. In 2015, Kentucky was one of five states with the highest rates of death due to drug overdose (CDC, 2017). More deaths are caused by opioids and sedatives than all other illicit substances combined (CDC, 2011).

There has been exponential growth in maternal drug use and prenatal exposure resulting in levels of critical concern. In the United States, illicit drug use has reached its highest point in nearly a decade (Wendell, 2013). Thirty percent of the addicted population are women, with a majority of them being of child bearing age – between 15 and 44 years of age. According to Wendell (2013), substance misuse and overdose deaths among women of childbearing age have subsequently become a public health crisis. In Kentucky, the use of drugs during pregnancy is a leading preventable cause of mental, physical, and psychological impairments and problems in infants and children.

A substantial increase in the use of illicit substances among pregnant women is reported in the 2010 National Survey on Drug Use and Health (U.S. Department of

Health and Human Services, 2010). According to the report, the rates of illicit drug use were 16.2% among pregnant women aged 15 to 17, 7.4% among pregnant women 18 to 25, and 1.9% among pregnant women 26-44. Drugs used during pregnancy include cocaine, methamphetamines, marijuana, heroin, and prescription drugs. Figures are considered a low estimate however, as maternal drug use is frequently unreported. Increased drug misuse in pregnancy has led to the incidence of infants born with dependence on drugs to also be significantly increased (U.S. Department of Health and Human Services, 2010).

Feedback.

States other than Kentucky are seeing a significant rise in affected infants as well. Tennessee has had a 10-fold increase in NAS since 1999 with a rate of 0.7 per 1000 live births in 1999 to 8.5 per 1000 live births in 2011. In Florida, there was a more than 3-fold increase in a four-year period from 2.31 in 2007 to 7.52 in 2011. Washington reveals prenatal exposure to opioids increased from 11.5 per 1000 births in 2000 to 24.4 per 1000 births in 2008. In Vermont, 26 per 1000 deliveries involved an infant diagnosed with NAS in 2010, up from 3 per 1000 deliveries in 2002 (Ramakrishnan, 2014).

Massatti et al. (2013) cite there were approximately 5100 NAS hospitalizations in Ohio between 2004 and 2011 causing the rate to increase 6-fold from 1.4 per 1000 live births in 2004 to 8.8 per 1000 live births in 2011. Treating the infants with NAS was associated with over \$70 million in charges in 2011 with Medicaid being the payer for approximately 84% of the NAS hospitalizations.

In response to increased occurrence of NAS, there are now approximately 16 state Perinatal Quality Collaboratives which have initiated NAS demonstration projects

(ACOG, 2014). Those projects include identifying and implementing strategies for best practices associated with medication management of NAS, nursing care and scoring of NAS, and family experience and involvement with infants treated for NAS. Outcomes of the Quality Collaboratives involve improving care for babies with complications due to maternal substance abuse – decreased length of time on medications, decreased hospital length of stays, increased maintenance of the family unit, and improved learning and behavioral metrics for babies who experienced NAS.

The Policy Stream

Alternatives.

Myers (2014) indicates that the social implications of children affected by maternal drug abuse are staggering and that there is agreement that society must respond. Few agree, however, on just what should be done.

The question of how society should deal with the problem of women's substance abuse during pregnancy has been debated by policymakers since the late 1980s (Gutmacher, 2015). Alternatives to addressing the issue can be punitive or treatment-based:

Punitive

- Criminalizing drug abuse during pregnancy
- Maintaining that a woman's substance abuse in pregnancy constitutes criminal child abuse
- Considering prenatal drug exposure as grounds for terminating parental rights because of child abuse/neglect

- Authorizing civil commitment (such as to an inpatient treatment program) of pregnant women who use drugs
- Requiring health care professionals to report or test for prenatal drug exposure
- Requiring health care providers to notify child protective services when the provider cares for an infant affected by illegal substance abuse

Treatment-based

- Place a priority on making drug treatment more readily available to pregnant women – require pregnant women receive priority access to programs
(Guttmacher, 2015)

Input from Specialists.

According to the National Advocates for Pregnant Women (2007) there are a plethora of medical and public health opinions against prosecution and punishment of pregnant women. Among those making those opinions are the American Medical Association, the American Nurses Association, the American Academy of Pediatrics, the American College of Obstetrics and Gynecology, the March of Dimes, and the National Perinatal Association to name a few. Since those groups are not in favor of criminalization of drug abuse in pregnancy, one might assume they would be in favor of solutions involving treatment and recovery of PSAW.

Various bills, both federal and per states, have been introduced or enacted to address maternal substance abuse and NAS. In July of 2014, a bill was introduced into the Senate of the 113th Congress of the United States by Senator Mitch McConnell. Specifically, the bill served, “To facilitate identification and dissemination of evidence-informed recommendations for addressing maternal addiction and NAS and to provide

for studies with respect to NAS” (McConnell, 2014). It was cited as the “Protecting Our Infants Act of 2014”. The bill was not passed. In March 2015, Senator McConnell again introduced a bill into the Senate of the 114th Congress of the United States – “Protecting Our Infants Act of 2015” (McConnell, 2015). Also in March of 2015, a bill was introduced into the House of the 114th Congress of the United States by Representative Katherine Clark. Also entitled “Protecting Our Infants Act of 2015”, the bill serves to combat the rise of prenatal opioid abuse and NAS (Clark, 2015). Because of the bill, the Agency for Healthcare Research and Quality is conducting a study to develop recommendations for preventing and treating prenatal opioid abuse and NAS; the Department of Health and Human Services is developing a strategy to address research and program gaps, which includes determining the most appropriate treatment for pregnant women with opioid use disorders, discerning the most appropriate treatment and management of infants with neonatal abstinence syndrome, and cataloguing the long-term effects of prenatal opioid exposure on children; and the CDC is providing technical assistance to states to improve the availability and quality of data collection and surveillance activities regarding NAS.

In Ohio in January 2014, legislation was passed to better monitor the births of babies dependent on addictive drugs (Smith, 2014). In May 2014, Tennessee became the first state to explicitly criminalize substance abuse during pregnancy; pregnant women can be charged with assault if a child is born addicted to or harmed by her illegal use of narcotics in pregnancy (Chokshi, 2014). In Indiana in January 2015, Senate Bill 408, a bill to encourage improvement in reporting of infant health problems caused by drug addicted mothers, was forwarded to the governor for signing (Brock, 2015).

In Kentucky in February of 2013, a bill was introduced into the House of the Regular Session of the Kentucky Legislature – HB 366. It was related to maternal and child health and, in terms of NAS, established that instances of NAS diagnosed among Kentucky resident births be reported to the Kentucky Department of Public Health (Burch, 2013). It was signed by the governor in April of 2013.

In 2014, an act related to drug dependent newborns was introduced into the Senate of the Regular Session of the Kentucky Legislature – SB 162. It focused more on treatment and concerns of the PSAW. It did not progress past the Senate Judiciary committee (Westerfield, 2014). Also in 2014, another bill was introduced into the Senate of the Regular Session of the Kentucky Legislature and subsequently signed by the governor in April of that year. It requires periodic reporting of public health statistics related to drug dependent newborns (Westerfield, 2014).

During the 2015 Regular Session of the Kentucky Legislature an act, SB 54, relating to drug dependent newborns was re-introduced into the Senate by Senator Whitney Westerfield. The act by Westerfield (2015) reads as follows:

“Create a new section of KRS Chapter 218A to mandate priority access for pregnant women to substance abuse treatment or recovery service programs, prevent discrimination against pregnant women by substance abuse treatment or recovery service providers, and provide practitioners civil immunity for failing to recognize controlled substance abuse by a pregnant patient or referring pregnant patient to substance abuse treatment or recovery services consistent with community standards of care; amend KRS 625.050 to prevent the filing of petition to terminate the parental rights of a pregnant woman who used a controlled substance during pregnancy if she, by the twentieth week of pregnancy, enrolls in and maintains compliance with both a substance abuse treatment or recovery program and prenatal care throughout the remaining term of that pregnancy”.

Criteria for Survival.

Examination of SB 54 is done in terms of the likelihood of the idea, the proposed bill, surviving. Kingdon (2011) indicates that advocates of the proposal must explore the *technical feasibility* of it, determine its details and identify the means by which it would be practically implemented. It is identified within the actual bill that it is substance abuse treatment or recovery providers who receive state funds that will give priority access to pregnant women as long as the provider's services are appropriate. Practical implementation should thus be relatively unencumbered since funding is already appropriated for such centers by the state.

Another criterion for survival is *value acceptability* – how well the policy idea fits with the ideology of the policy specialists (Kingdon, 2011). SB 54 mainly focuses on accessibility to treatment and recovery programs by PSAW and those women being able to retain custody of their infants related to program compliance. The ultimate outcome of the bill is that of NAS being decreased or prevented. Ramakrishnan (2014) indicates that state health agencies can help optimize service delivery and treatment capacity to ensure women have access to needed services. As noted previously, the National Advocates for Pregnant Women (2007) identifies many groups that are not supportive of punishment for pregnant women so would more than likely support legislature pertaining to treatment for women during pregnancy. SB 54 has a humanistic nature and by sheer virtue of that has high survivability potential. The welfare of and equity of care for pregnant women, the prevention of suffering of infants, and the potential to maintain the integrity of the mother-infant dyad are expected to be desires of most constituents.

Public acquiescence refers to specialists in the policy community knowing that their proposals must be acceptable to the public (Kingdon, 2011). SB 54 reflects an ideological concern that affects health and well-being. It engenders emotion and moralistic content that are values of the public. While some degree of the public may have strong opinions regarding pregnant women abusing substances at all, it is believed the majority of the public will acquiesce in regard to the ultimate benefit to infants. The survivability of SB 54 in terms of this criterion is thus high.

The Political Stream

Little, if any, known political controversy surrounded SB 54 during the 2015 Kentucky Legislative Session. Given the increased incidence and prevalence of maternal substance abuse and NAS as described in the Problem Stream discussion, and the proposals of federal and state legislators alike as described in the Policy Stream discussion, it is shown the national mood is one that is ripe for actions toward decreasing maternal substance abuse and NAS. In regard to government in the political stream, there was no turnover of key personnel or questions of jurisdiction impacting SB 54. No known opposition of the bill arose. Similarly, no proponents of the bill, such as the Kentucky Perinatal Association (KPA), were known to have come forward in its support. The current president of the KPA was not aware of the bill (E. Reynolds, personal communication, March 31, 2015), nor was a leading neonatologist who works with NAS infants (H. Bada, personal communication, April 6, 2015).

SB 54 was reported favorably by the Senate Judiciary Committee with a Committee Substitute. It passed the Kentucky Senate with a 37-0 vote and moved on to the House Judiciary Committee where it was reported favorably. On the Kentucky House

floor, an amendment was filed and then the bill was passed in the House with a 98-0 vote. The amendment indicated a woman's parental rights could not be terminated because she used drugs during pregnancy. The amended bill was returned to the Senate; the Senate concurred with the House floor amendment and the bill was passed in the Senate with a 38-0 vote. The bill was then signed by the presiding officers of each legislative branch and delivered to the governor who signed it at the end of March 2015.

The signing of the bill by the governor was the culmination of the wholehearted bipartisan support of an act relating to decreasing the impact of newborn drug dependence. Implementation of the bill has led to an increased number of treatment programs for PSAW and which serve to positively affect the health and well-being of PSAW and newborns alike.

Summary

Abuse of illicit substances by pregnant women and the resulting NAS experienced by their newborns are significant issues both statewide and nationally. Abuse of drugs by mothers puts their infants at an increased risk for SUID. Alternatives for addressing the illicit drug use by pregnant women can be either punitive or treatment-based. Legislation which mandates improved access to treatment programs for PSAW can have favorable impact on the incidence of NAS and the risk of SUID. A multi-armed framework of analysis can be applied to help better understand the legislative process.

Manuscript 3 Abstract

Sudden Unexpected Infant Death (SUID) claims the lives of about 3700 infants in the United States each year (CDC, 2015). SUID is the second leading cause of infant death in Kentucky (KDPH, 2015) where it has a rate almost three times that of the nation. The American Academy of Pediatrics (AAP) has made recommendations to decrease the risk of SUID and indicates hospital professionals, including nurses, have a responsibility to educate and model safe sleep strategies for parents. An evaluation of the knowledge and self-efficacy about safe sleep and SUID risk-reduction strategies of neonatal and perinatal nurses in Kentucky birthing and children's hospitals was accomplished. A prospective, cross-sectional research design was used per an online survey that included an adapted version of the SIDS Risk-Reduction Questionnaire. Seventy-eight nurses throughout the state of Kentucky responded to the survey. Both neonatal and perinatal nurses felt that recommendations for safe sleep made a difference in preventing SUID and they followed a unit/hospital policy regarding SUID regardless of their own beliefs. All nurses included safe sleep strategies in their discharge teaching to parents but perinatal nurses discussed sleep sacks and the effects of smoking less often than neonatal nurses, and both types of nurses did not discuss the use of pacifiers as frequently as other risk-reduction strategies. All nurses were confident in their ability to teach and model safe sleep. Assuring nurses in birthing and children's hospitals receive up-to-date and ongoing education about safe sleep recommendations to share with and model for parents is necessary. An evaluation to determine safe sleep knowledge of a greater number of nurses in the state of Kentucky is warranted.

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Key words: safe sleep, SUID, SIDS, perinatal nurses, neonatal nurses, SIDS Risk-Reduction Questionnaire

Manuscript 3

Evaluation of Kentucky Nurses' Knowledge and Self-Efficacy Related to Safe Sleep and Sudden Unexpected Infant Death Risk Reduction Strategies

Sudden Unexpected Infant Death (SUID) claims the lives of about 3700 infants in the United States each year (CDC, 2015). SUID is the death of an infant less than 1 year of age with most deaths occurring before 6 months of age (NICHD, 2017). SUID occurs suddenly and unexpectedly with no immediate obvious cause.

SUID deaths include sudden infant death syndrome (SIDS), accidental suffocation and strangulation in bed (ASSB), and unknown causes. SIDS is "... the sudden death of an infant less than 1 year of age that cannot be explained after a thorough investigation is conducted, including a complete autopsy, examination of the death scene, and a review of the clinical history" (CDC, 2015). In 2015, about 1600 SUID deaths were attributed to SIDS. ASSB includes suffocation, overlay, wedging, and strangulation. Suffocation is by soft bedding as when a pillow or waterbed covers an infant's nose and mouth; overlay is when another person rolls on top of or against the infant while sleeping; wedging or entrapment is when an infant is wedged between two objects such as a mattress and wall, bed frame, or furniture; and strangulation is when an infant's head and neck become caught between crib railings. In 2015, about 900 SUID deaths were attributed to ASSB. Unknown causes describe those deaths that remain undetermined because one or more parts of the death investigation was not completed. In 2015, about 1200 SUID deaths were attributed to unknown causes (CDC, 2015).

The rate of SUID in the United States was 1.3 per 1000 live births in 1990 and 0.39 per 1000 live births in 2015. Decreases in rates are mainly attributable to the Back

to Sleep campaign of the National Institute of Child Health and Disease (NICHD) and American Academy of Pediatrics (AAP) initiated in 1994 (CDC, 2015).

In Kentucky, SUID deaths are of utmost concern since the rate of SUID in Kentucky is almost three times that of the nation – about 1.1 deaths per 1000 live births (KDPH, 2015). SUID accounts for 24% of infant deaths in Kentucky, second only to prematurity-related conditions. In 2013, there were 83 SUID cases with an increase to 93 in 2014. Preliminary data for 2015 reveals an increase to 98 cases (KDPH, 2016). Ninety-six percent of SUID deaths in 2014 in Kentucky had documentation of at least one sleep-related factor. According to the KDPH (2016), high rates of maternal smoking also increase rates of SUID for infants. An unsafe sleep environment for infants, adult-infant co-sleeping, and parent/caretaker involvement with tobacco and drugs all contribute to such an increased SUID rate (KDPH, 2014).

The AAP made recommendations for a safe infant sleeping environment in efforts to decrease the risk and incidence of SIDS and other sleep-related infant deaths (AAP, 2005; AAP, 2011; AAP, 2016). The top ten recommendations included: placing the infant supine to sleep, a firm sleep surface for the infant, offering the infant a pacifier when put down to sleep, placing infants prone for tummy time when awake, no bed-sharing or co-sleeping, keeping objects and loose bedding out of the sleep space, avoiding infant exposure to smoke, offering the infant a pacifier when put down to sleep, avoiding infant overheating, avoiding commercial devices marketed to decrease the risk of SIDS, and avoiding use of cardiorespiratory monitors as a strategy to decrease the risk of SIDS. The recommendations were drawn from a variety of research. Strength of the

evidence for each recommendation was based on the Strength-of-Recommendation Taxonomy (SORT) and assigned letter grades of A, B, or C (Ebell et. al., 2004).

The AAP (2011) also indicated that staff in neonatal intensive care units (NICU) and newborn nurseries should model, implement, teach, and endorse SUID risk-reduction strategies. Aris et al. (2006) and Mason, Ahlers-Schmidt, and Schunn (2013) came to similar conclusions. Likewise, the KDHP (2014), has indicated that nurses are in a unique position to influence parents/caretakers to make appropriate choices regarding safe sleep for their infants.

Currently in Kentucky, there is no consistent education about SUID for nurses caring for newborns. Moreover, among those nurses, little is known about the extent of SUID knowledge, the accuracy of such SUID knowledge, and their self-efficacy in imparting knowledge to parents. For the purposes of this paper, self-efficacy is defined as confidence and belief in the ability to model and teach safe sleep and SUID risk-reduction strategies to parents.

Conceptual Framework

The conceptual framework for this project is Self-Efficacy Theory developed by Albert Bandura. Bandura (1977) has defined self-efficacy as one's belief in one's ability to succeed in specific situations or accomplish a task. One's sense of self-efficacy can play a major role in how one approaches goals, tasks, and challenges. According to Bandura, individuals employ four sources of information to judge their efficacy. Those four sources are:

- Performance Outcomes: The most important source of self-efficacy is performance outcomes or past experiences. The ability of an individual to

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perform a given task is influenced by experiences. If one has performed a task well in the past, he or she is more likely to feel competent and perform well at a similarly associated task (Bandura, 1982).

- Vicarious Experiences: A person can watch someone in a similar position perform, and then compare his own competence with the other individual's competence (Bandura, 1982).
- Verbal Persuasion: Self-efficacy is also influenced by encouragement and discouragement pertaining to an individual's performance or ability to perform. The credibility of the person providing the feedback also influences self-efficacy (Bandura, 1982).
- Physiological Feedback (emotional arousal): If one is more at ease with the task at hand, they will feel more capable and have higher beliefs of self-efficacy (Bandura, 1982).

Nurses learning content about safe sleep and imparting that information to parents rely heavily on their level of self-efficacy. The more knowledgeable and familiar nurses are with safe sleep and SUID risk-reduction strategies, the higher their beliefs will be that they can accurately and effectively educate and model those strategies for parents. Content which is not as familiar to nurses or makes them feel uncomfortable may not be imparted as readily. Also, if there has been an unpleasant past experience regarding sharing content, that content may not be shared consistently. Thus the assessment of self-efficacy helps to determine the nurse's level of self-efficacy and better determine educational interventions that will increase self-efficacy. In this case, high self-efficacy

related to now nurses believe they can effectively counsel parents about safe sleep and SUID risk reduction strategies is paramount.

Review of the Literature

Evidence regarding nurses' knowledge, attitudes, and practices surrounding safe sleep and SUID risk-reduction strategies is found in the literature. Articles reviewed identified the need for targeted education for nurses so they can accurately and confidently model for and teach parents about SUID and risk-reduction strategies. The literature reviewed was reflected in activities involving: educational interventions, focus groups and interviews, surveys and questionnaires, bundled intervention approaches including education, and integrated reviews.

The educational interventions involve actual educational activities being put into place for a given group. Abney-Roberts (2015) reports an educational session about safe sleep being given to 150 medical and nursing staff. Observations of infants in cribs pre- and post-education showed a statistically significant change in the infants' crib environments being consistent with safe sleep. While specific p-values were not provided, 18% of the cribs had objects in them post-implementation compared to 92% pre-implementation. Chart audits pre- and post-education were also improved and statistically significant – no values provided.

Online education tools were utilized by Cowan, Pease, and Bennett (2013) and by Young, Higgins, Raven, and Watson (2013). Increased confidence of 2683 health professionals, primarily nurses, in discussing safe sleep information with families resulted – a score of 7-9 of 9 (Cowan, Pease, & Bennett, 2013). A significant increase – 69.5% to 87% - in nurses' knowledge and application to risk factor assessment and

evidence-based parent advice was also found ((Young, Higgins, Raven, & Watson, 2013).

A two-prong nursing education intervention developed by the study team, involving a web-based learning module and in-person teaching sessions, was used by Hwang, O'Sullivan, Fitzgerald, Melvin, Gorman, and Flascone (2015). There was significant improvement in overall compliance with and adherence to safe sleep practices by nurses following the intervention (25.9 to 79.7%; P-value 0.001). Similarly, either a web-based training or train-the-trainer approach to safe sleep education for 551 newborn nursery nurses was utilized by Price, Hillman, Gardner, Schenk, and Warren (2008). Nursing participants in both training formats reported a statistically significant increase in their intention to use safe sleep strategies and in their comfort with conveying SUID information to new parents. However, participants in the train-the trainer format demonstrated increased improvement in placing babies in the supine position for sleep than those in the web-based training group ($p = .005$). In-service training and a nurses' questionnaire about safe sleep were used for 665 staff nurses by Shaefer, Harman, Frank, Adkins, and Terhaar (2010). Following training, more nurses felt supine was the safest sleeping position for infants compared to before training. The authors also found that sustainable sleep practices can be effectively established in the hospital setting following education as evidenced by ongoing observations of infants in cribs and nurses providing education to new parents.

Focus Groups/Interviews

Focus groups/interviews involved researchers sitting down with participants and having discussions with them. There were two articles in which focus groups or

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interviews were used to determine facilitators and barriers to modeling and teaching safe sleep (Drake, Colson, & Hauck, 2015), and to determine knowledge and attitudes of parents and health professionals about SUID (Yikilkan et al., 2011). The former held five focus groups of 41 nurses and other staff not described. They found three themes that emerged as facilitators and barriers for safe sleep. Previously held beliefs of families and providers could be either a barrier or facilitator of safe sleep dependent upon the belief. Inconsistent provider messages could be a barrier to safe sleep. External forces such as media that can drive successful messages to providers and families. could be facilitators to safe sleep. Yikilkan et al. (2011) used face-to-face and phone interviews about safe sleep with 150 mothers and 174 nurses respectively. Results of the interviews were dismal; the majority of mothers claimed they had not been advised about safe sleep by health professionals and only a small percentage of health professionals selected a safe sleep position for infants.

Surveys/Questionnaires

Surveys/questionnaires involved pre-determined questions that respondents would answer. There were several articles reflecting the use of surveys or questionnaires. Aris et al. (2006) administered a two-phase questionnaire to NICU nurses. In Phase I, a questionnaire was completed by 157 neonatal nurses, and 95 neonatal nurses completed a questionnaire in Phase II. A major knowledge deficit emerged regarding the appropriate position for safe sleep: there was direct conflict with using the supine position as the safest sleep position for infants after discharge. A 33-item SIDS risk-reduction questionnaire was provided to 200 neonatal staff nurses by Barsman, Dowling, Damato, and Czeck (2015). The staff nurses represented critical neonatal care and step-down or

transitional care. Inconsistencies were found in beliefs, knowledge, and practices about SUID risk-reduction strategies, with transitional care nurses being more consistent in following SIDS recommendations (65% for transitional care nurses and 49% for critical care nurses).

Three other articles were identified as utilizing questionnaires about safe sleep with nurses. Bullock, Mickey, Green, & Heine (2004) distributed 1500 questionnaires to nurses with 528 returned. Grazel, Phalen, & Polomano (2010) distributed 1080 surveys to nurses with 430 returned. Varghese, Gasalberti, Ahern, & Chang (2015) utilized a convenience sample of 121 adult caregivers of newborns. While nurses could identify SUID risk-reduction strategies, there were inconsistencies in implementing and modeling those strategies in practice. Those inconsistencies involved not placing infants supine to sleep and not removing toys and positioning aids from infant beds. Respondents who had been taught about safe sleep had a significantly higher perception of infant vulnerability to SUID ($p < 0.001$), believed safe sleep behaviors were effective ($p < 0.01$), and had more confidence in modeling and teaching safe sleep strategies ($p < 0.008$) than those who had not been taught about safe sleep.

Surveys about safe sleep were used by two research teams. (Simon-Burrell, 2015; Fowler, Evans, Etchegarary, Ottenbacher, & Arnold, 2013). Simon-Burrell found that nurses were knowledgeable about the AAP safe sleep recommendations and modeled them well. Fowler et al. identified a clear need for better education about SUID risk-reduction measures for both NICU and newborn nursery nurses as evidenced by responses from parents whose infants had been in an NICU or well-baby area. In

comparing the two groups, parents from the NICU had more correct answers to survey questions.

Bundled Intervention Approaches

Bundled interventions involved more than one activity being utilized for subjects. Bundled approaches to educating health professionals about safe sleep and implementing safe sleep strategies were used in four articles (Carrier, 2009; Gelfer, Cameron, Masters, & Kennedy, 2013; Mason, Ahlers-Schmidt, & Schunn, 2013; McMullen, Lipke, & LeMura, 2009). The bundled approaches included educational interventions with visual triggers on infants' beds, audit tools and questionnaire, introduction of safe sleep policies, safe sleep packets and videos for families, and use of sleep sacks for infants. One or more of these interventions were used by each research team.

It was found that a comprehensive SUID program made a measurable difference in nurses' compliance in modeling safe sleep practices and educating parents in the prevention of SUID (McMullen, Lipke, & LeMura, 2009). Mason, Ahlers-Schmidt, & Schunn (2013) and Carrier (2009) had similar findings. Gelfer, Cameron, Masters, & Kennedy (2013) identified what parents observe in the hospital in terms of infant sleep position, items in the infant bed, integrity of linens in the infant bed and swaddling of the infant has a significant effect on what they do at home after discharge.

Integrative Reviews

Integrated reviews involved the analysis of a number of papers about safe sleep. Patton, Stiltner, Wright, and Kantz (2015) and Salm Ward and Balfour (2015) conducted integrative reviews to identify literature aimed at reducing the risk of sleep-related deaths. One of the integrated reviews indicated education on SUID and a safe sleep

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environment should be mandated to improve nurses' knowledge and behaviors and decrease ineffective parent education (Patton, Stiltner, Wright, & Kautz, 2015). Salm Ward and Balfour (2015) identified interventions described in the articles had mixed effects on adherence with safe sleep behaviors.

There is a gap in the literature about nurses' self-efficacy regarding knowledge to appropriately teach and model safe sleep for parents. There is also a gap in the literature regarding Kentucky nurses' knowledge of safe sleep and SUID risk-reduction strategies.

Educational Resources in Kentucky

The Kentucky Cabinet for Health and Human Services has created educational resources regarding SUID for health professionals (KDPH, 2015). The Cribs for Kids® National Infant Safe Sleep Initiative also has a toolkit including education regarding SUID available for hospitals and health professionals (Cribs for Kids®, 2017). It is not known if those resources are utilized for nurses in birthing and children's hospitals in Kentucky. Charlie's Kids Foundation (2015) in Kentucky provides resources to increase safe sleep awareness and education, with the goal of reducing the SUID mortality rate. The foundation promotes the educational resources available from Cribs for Kids®. It is also unique because it spreads the safe sleep message by utilizing a children's board book as an educational vehicle. The impact of Charlie's Kids Foundation in the state of Kentucky is unknown.

Purpose of the Study

The purpose of the study was to evaluate nurses caring for newborns in Kentucky birthing/children's hospitals to identify the nurses' knowledge and self-

efficacy in modeling and teaching safe sleep and SUID risk-reduction strategies to parents. Specific objectives were as follows:

1. Assess, per survey, the knowledge and self-efficacy of Kentucky neonatal and perinatal nurses about safe sleep and SUID risk-reduction strategies.
2. Identify, per survey response analysis, if there is a need for education of Kentucky neonatal and perinatal nurses about safe sleep and SUID risk-reduction strategies.

Methods and Design

Method

A prospective, cross-sectional survey design was used for this study. Lead contacts of neonatal and perinatal units at fifty birthing/children's hospitals were approached per email with a survey link to forward to their staff nurses for completion and participation in this study. The names and contact information for the lead contacts at the birthing/children's hospitals were obtained from the Director of Quality and Patient Safety at the Kentucky Hospital Association.

Instrument

A 41-item questionnaire adapted from the SIDS Risk-Reduction Questionnaire used by Barsman et al. (2015) was the instrument used for the study. Permission was obtained to use the questionnaire which had been originally developed by Graze et al. (2010). Content validity was determined for the questionnaire used by Barsman et al. (2015). The items in the questionnaire were in four subscales: demographic, beliefs, knowledge, and practice with some questions having expanded and multiple parts. Multiple choices with single-choice selection or the option to select all choices that apply,

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ranking, frequency selection using a 5-point Likert scale, and short answers reflect the question formats used. Eight questions were added to the questionnaire used by Barsman et al. including questions about parental and smoking status, location of practice in Kentucky, whether a perinatal or neonatal nurse, type of unit employed in (Appendix A).

Sample and Setting

A voluntary sample of neonatal and perinatal nurses was recruited for this study. They were nurses to whom the link to the survey was forwarded by the lead contacts at their respective birthing/children's hospitals. Completion of the survey indicated participation consent. The setting of the project was a place of convenience for the nurses to complete the survey.

Procedure

Institutional review board approval at the University of Kentucky was obtained prior to beginning this study. A waiver of requirement for documentation of informed consent was granted. No identifiable data of participants was sought. Qualtrics Survey Software at the University of Kentucky was used and a survey link was sent to the lead contacts at Kentucky birthing/children's hospitals (Appendix B). Nurses completed the survey and data was automatically uploaded.

Data Analysis

Statistical Analyses were performed using SPSS (Version 24.0, Chicago, Illinois). Responses to survey questions were generated by frequencies and descriptive statistics. Results are represented in graphical presentations.

Results

Respondent Characteristics

Seventy-eight surveys were completed. Fifty-six (73.68%) were completed by neonatal nurses and 20 (26.32%) by perinatal nurses. There was not considerable variation in the age of those completing the survey: 21-29 years – 10.3%, 26-29 years – 14.1%, 30-39 years – 26.9%, 40-49 years – 21.8%, and > 50 years – 26.9%. Most respondents had been a neonatal or perinatal nurse for > 10 years – 50.65% and held a bachelor's degree – 58.97%. Fifty-one (65.38%) respondents practiced in a neonatal ICU, 3 (3.65%) in a neonatal step-down (/transitional unit, 3 (3.65%) in a newborn nursery, and 21 (26.92%) on a mother/baby unit.

Sixty-five (85.53%) respondents were from central Kentucky. It is prudent to note that the newborn centers offering the highest level of care in the state are in central Kentucky. The least number of respondents were from western and southern Kentucky (2, 2.63% and 1, 1.32% respectively). Of the respondents, 53 (67.95%) were parents and 77 (98.72%) were non-smokers. The premise is that parents and those adopting healthy behaviors would be more likely to follow recommendations for safe sleep. Table I displays full demographic characteristics of the study respondents.

Knowledge of Safe Sleep Recommendations

All 78 (100%) respondents claim knowledge of safe sleep recommendations of placing an infant on its back to sleep, the sleep environment being free of soft objects, and avoiding smoke exposure during pregnancy and after birth. The recommendations of transitioning a preterm infant to supine for sleep at 32 weeks post-menstrual age (78.21%), offering a pacifier at naptime and bedtime (70.51%), avoiding commercial

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devices marketed to reduce the risk of SIDS/SUID (74.30%), and avoiding use of commercial cardiorespiratory monitors (46.15%) all reflect an opportunity for improvement in knowledge. A statistically significant difference was present for knowledge of transitioning a preterm infant to supine for sleep at 32 weeks post-menstrual age ($P = .026$), and for offering a pacifier at naptime and bedtime ($P < .001$). There was > 88% knowledge of the remainder of the recommendations for safe sleep, including healthcare providers endorsing SIDS risk-reduction strategies beginning at birth (92.31%). Table 2 displays Kentucky nurses' knowledge of safe sleep recommendations.

Attitudes Regarding Safe Sleep Recommendations

Both neonatal and perinatal nurses (means 4.52 and 4.54) felt risk reduction strategies made a difference in preventing SIDS/SUID. Both also follow unit/hospital policies about SIDS/SUID in lieu of personal beliefs (means 4.44 and 4.54). Neonatal nurses believed slightly less than perinatal nurses that parents would model their safe sleep practices (means 3.91 versus 4.08). Both neonatal and perinatal nurses did not have the attitudes that supine sleep caused a flat or misshapen head (means 2.93, 2.88), caused developmental delays (means 1.65, 1.54), or increased risk of aspiration (means 1.83, 1.75). See Table 3.

Placing Infants in Position Other than Supine

Neonatal and perinatal nurses place a preterm infant prone or side-lying because of risk of aspiration or reflux (means 1.91, 1.87) or if medically indicated (means 1.85, 1.47). Term infants are placed prone or side-lying primarily for the same reasons (means 1.91, 2.00 and 1.80, 1.63). It is of note that it is statistically significant for perinatal

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nurses to allow family preference to influence their positioning of a term infant in prone or side-lying position ($P = .039$). Other reasons both types of infants are placed prone or side-lying are because of infant comfort, traditional nursing practice, and family preference. See Tables 4 and 5.

Practice of Safe Sleep Recommendations

All nurses followed the practices of removing care-giving supplies from cribs/beds, transitioning the infant to supine for sleep, providing written and verbal information to parents about SIDS/SUID, and removing positioning aids and comforters/quilts/blankets from the cribs/beds. Perinatal nurses were less likely to tuck blankets securely around the mattress (mean 4.21 - neonatal versus 2.54 – perinatal; $P < .001$). See Table 6.

Parental Education about Safe Sleep

One hundred percent of nurses include placing an infant supine for sleep when doing discharge teaching. Also included by neonatal nurses greater than 80% of the time and by perinatal nurses greater than 75% of the time when doing discharge teaching is information about toys in the bed, infant overheating, tummy time, sleep location, use of alcohol and illicit drugs, and appropriate bedding. Use of a pacifier is discussed 73.6% of the time by neonatal nurses and just 75% of the time by perinatal nurses. Perinatal nurses discuss the use of sleep sacks 58.3% of the time ($P = .005$) and the effects of second-hand smoke 79.2% of the time ($P = .027$) See Table 7.

Self-Efficacy Regarding Teaching and Modeling Safe Sleep

Seventy-seven nurses (100%) indicated they felt confident to model safe sleep for parents – one did not respond. Seventy-five nurses (97.4%) indicated they felt confident to teach safe sleep for parents – one did not respond. See Table 8.

Learning about Safe Sleep

Seventy-four nurses responded to the question regarding how they would like to receive information about safe sleep and SUID. Written materials were preferred by 17 nurses (22.97%). Unit in-services were preferred by 20 nurses (27.03%). Online means were preferred by 34 nurses (45.95%) and 3 nurses (4.05%) preferred other means not indicated. See Table 9.

Discussion

This is the first known evaluation of Kentucky nurses' knowledge and self-efficacy related to safe sleep and SUID. Results indicate nurses do have knowledge about safe sleep strategies. However, knowledge is lacking about all the 2016 Safe Sleep recommendations, and there are inconsistencies in practice regarding safe sleep and in what is taught to parents upon discharge.

Referencing the 2016 Safe Sleep recommendations, neonatal nurses had greater knowledge than perinatal nurses (86.8% vs. 62.5%) about transitioning a preterm infant to supine at 32 weeks gestation; the difference was statistically significant ($P = .026$). Whereas the 2016 recommendations do include transitioning to supine at 32 weeks, the perinatal nurses are less likely to be in contact with preterm infants so they may not focus upon it. Offering a pacifier at naptime and bedtime had a lower favorable response rate of 70.51% for all nurses. There was a significant difference between neonatal and

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perinatal nurses for this recommendation ($P < .001$). The trend of encouraging breast feeding and the implementation of the Baby Friendly movement, especially in “well baby” areas, may do much to impact the non-use of the pacifier.

There was a lack of knowledge of all nurses regarding avoiding commercial devices marketed to reduce the risk of SUID (74.30%) and avoiding the use of commercial cardiorespiratory monitors (46.15%). Reinforcement of these points is necessary so nurses can counsel parents about those items not needing to be used. Often, if a family has had an infant experience SUID, a cardiorespiratory monitor is requested for subsequent infants despite research indicating the monitors do not prevent SUID, especially if the other recommendations are not followed.

All nurses had favorable attitudes towards safe sleep recommendations and risk-reduction strategies making a difference in preventing SUID (means 4.52 and 4.54), but not all risk-reduction strategies were practiced or taught. The nurses' attitudes indicated they did not believe placing an infant supine would increase the risk of aspiration (mean 1.81), yet both neonatal and perinatal nurses identified they would place term or preterm infants prone or side-lying because of risk of aspiration or reflux (means 1.91, 2.0; means 1.91, 1.87), or if medically indicated. Research has shown that supine positioning does not increase the risk of aspiration or reflux (Tablizo et al., 2007). Perinatal nurses were also more likely than neonatal nurses to allow a family's preference for positioning to influence placing a term infant in a prone position ($P = .039$). Empowering the nurses to resist family influence is necessary. Neonatal and perinatal nurses believed parents would model safe sleep practices they performed (means 3.91 and 4.08). Perinatal nurses, though, were less likely to tuck blankets securely around a mattress (mean 2.54, $P <$

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.001). Having loose, untucked blankets provides the risk of the infant getting the blankets against the face and creating a microenvironment which could lead to asphyxia.

When providing discharge teaching, both neonatal and perinatal nurses were less likely to discuss the recommendation of using a pacifier – possible reasons for this have been previously discussed. Perinatal nurses were also significantly less likely to discuss the use of a sleep sack with parents ($P = .005$). Neonatal nurses may have more exposure to the use of sleep sacks through programs within their hospitals as opposed to smaller hospitals that may not have a program relationship with sleep sack manufacturers. Purchase of sleep sacks in the retail market could still be discussed with parents.

Perinatal nurses were also less likely to discuss the effects of second-hand smoke with parents during discharge teaching ($P = .027$). This is interesting since 98.72% of all nurses responding indicated they were non-smokers, and 100% of those responding knew of the recommendation to avoid smoke exposure during pregnancy and after birth. Parents may present smelling heavily of smoke and some nurses may be hesitant to address the matter, even for the infant's safety. Given that Kentucky has a high rate of smoking and smoking can contribute to SUID, speaking with parents about not exposing infants to smoke is imperative.

Kentucky nurses indicated they were confident regarding teaching (97.4%) and modeling safe sleep recommendations (100%). Other responses to the survey, however, indicate they are not fully knowledgeable of the recommendations and don't always model and teach them appropriately. How nurses are receiving safe sleep education,

when, and by who was not explored in this evaluation. The respondents did indicate they preferred online learning about safe sleep recommendations.

Implications

The results of this evaluation identify the need for information about current safe sleep recommendations to be “hard-wired” for nurses caring for newborns in Kentucky’s birthing and children’s hospitals. All recommendations need to be made fully known to nurses and reinforced to them on a regular basis. Empowering nurses to speak up about safe sleep, even in uncomfortable circumstances, is paramount.

It would be ideal for student nurses to learn about safe sleep strategies within their course work and clinical rotations with newborns. Nurses caring for newborns in their areas of employment should receive education about and learn how to model safe sleep strategies during their orientations. Since SUID is an ongoing issue in Kentucky, it would be prudent for regular review of safe sleep strategies and incidence of SUID in Kentucky as per annual or biannual competencies.

A more formal and extended evaluation of nurses in Kentucky birthing and children’s hospitals is warranted to determine how the nurses are learning about safe sleep and by what means. It would also be important to determine the knowledge and self-efficacy of a greater number of Kentucky nurses caring for newborns.

It would be ideal if a standard curriculum for both initial and ongoing education about safe sleep and SUID risk-reduction strategies could be created and implemented throughout Kentucky’s birthing and children’s hospitals. This could be accomplished as a joint effort between the Kentucky Hospital Association, the Kentucky Cabinet for

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Health and Family Services, and, perhaps, Charlie's Kids Foundation. The curriculum could be provided directly or online.

Since there is a high rate of SUID in Kentucky, involving the legislature or the Kentucky Board of Nursing to mandate education for nurses about it may be warranted. The legislature could mandate education for nurses in birthing and children's hospitals as previously described, and the Board of Nursing could require continuing education requirements surrounding SUID as it currently does for pediatric abusive head trauma and domestic violence.

Limitations

The size of the sample for this study limits generalizability. Few responses from nurses in some areas of Kentucky also limits generalizability. How the sample was obtained, by relying on lead contacts at birthing/children's hospitals to forward the survey link to their staff members, may well have limited the size of the sample as did the volunteer aspect of the potential respondent pool. Those volunteering may have been particularly interested or more familiar with SUID recommendations.

The number of neonatal nurses responding, compared to the number of perinatal nurses responding, is another limitation. Most infants born in Kentucky are discharged from perinatal units rather than neonatal units such that perinatal nurses would have a greater opportunity educate and model safe sleep and SUID risk-reduction strategies than neonatal nurses.

There was no question about if new nurses to perinatal and neonatal units receive education about safe sleep and SUID risk-reduction strategies. There was also no question about the means of delivery of that education if provided.

Reliability of the questionnaire from which the questionnaire for this study was adapted was not determined, nor was the validity of the questionnaire used for this study determined. Since this was the first time the adapted questionnaire was used, reliability for it has not been established.

Conclusion

SUID is a leading cause of infant death in Kentucky, second only to prematurity-related conditions (KDPH, 2015). Many SUID deaths are related to modifiable factors in an infant's sleep environment. Nurses caring for newborns in birthing and children's hospitals are in unique positions to influence parents, through modeling and teaching, about safe sleep and SUID risk-reduction strategies. An evaluation of Kentucky nurses reflects that while the nurses do have knowledge of safe sleep, that knowledge is not thorough nor is it consistently put into practice and discussed with parents. A standard, consistent curriculum about safe sleep for nurses in Kentucky birthing and children's hospitals is warranted. Involvement of the Kentucky Board of Nursing or the state legislature in mandating education about safe sleep should be considered. Decreasing the rate of SUID in Kentucky is of utmost importance and education of nurses about SUID is one strategy to assist in accomplishing that.

Practice Inquiry Project Conclusion

Sudden Unexpected Infant Death (SUID) has been shown to be a contributor to infant mortality in the nation and in Kentucky. It is one contributor for which there are modifiable factors that can decrease or even prevent the incidence of infant death.

Nurses are in a prime position to educate parents about and model safe sleep and SUID risk-reduction strategies with the purpose of having a positive impact on infant mortality.

A complete literature review was conducted to identify nurses' knowledge of safe sleep and how well parents learned about safe sleep from them. Parents cannot carry out safe sleep strategies if they are not aware of them or have been provided inaccurate or incomplete information. The literature pointed to inconsistencies in practice surrounding modeling safe sleep and teaching parents about safe sleep strategies. In some instances, parents were not told anything at all about safe sleep. The literature review supported the need for nurses to have more education to adequately and appropriately counsel parents about safe sleep. There was noted to be a gap in the literature related to confidence of nurses providing safe sleep information to parents.

An analysis of a proposed state policy to increase access to treatment for pregnant, substance-abusing women was completed. Since infants born to those mothers are at increased risk of SUID, this policy was pertinent to review and be included in this project. The Multiple Streams Framework was used to analyze the policy process and involved looking at describing the problem, policy, and political streams or factors that impacted the policy development and its subsequent approval and implementation.

The actual Practice Inquiry Project (PIP) involved distributing a questionnaire via online survey to nurses caring for newborns in Kentucky birthing and children's

hospitals. The project was a prospective, cross-sectional design and there were 78 volunteer respondents. The majority of respondents were from central Kentucky and were neonatal as opposed to perinatal nurses. Results of the survey reflected that while Kentucky nurses were knowledgeable about some aspects of safe sleep recommendations, that knowledge was inconsistent such that there was opportunity for improvement in their level of knowledge. The nurses' practice of safe sleep in terms of modeling and what was taught to parents was also inconsistent. The manner in which nurses themselves learned about safe sleep was not determined nor was the timing of that knowledge in relation to their employment.

It would be prudent to establish a consistent, standard method of education for nurses in Kentucky regarding safe sleep and SUID risk-reduction strategies. That way, all would be receiving and disseminating the same message to parents about safe sleep. Work at the state level, perhaps involving the Kentucky Hospital Association, the Kentucky Cabinet for Health and Family Services, and the Kentucky Board of Nursing may be warranted to assure nurses are prepared to adequately inform parents about safe sleep. The need to decrease the rate of SUID in Kentucky is multi-faceted and will involve a variety of strategies.

TABLE 1. Sociodemographic characteristics of the study sample (N=78)	
Characteristic	N (%)
Age	
21-25 years	8 (10.3)
26-29 years	11 (14.1)
30-39 years	21 (26.9)
40-49 years	17 (21.8)
50 years or older	21 (26.9)
Type of degree held	
Associate	21 (26.92)
Bachelors	46 (58.97)
Masters	9 (11.54)
Doctorate	2 (2.56)
Neonatal or perinatal nurse	
Neonatal	56 (73.68)
Perinatal	20 (26.32)
Years of practice in neonatal or perinatal nursing	
< 1 year	4 (5.19)
1-3 years	13 (16.88)
4-5 years	10 (12.99)
6-10 Ears	11 (14.29)
>10 years	39 (50.65)
No response	1
Type of unit practicing in	
Neonatal ICU	51 (65.38)
Neonatal transitional unit	3 (3.65)
Newborn nursery	3 (3.65)
Mother/Baby	21 (26.92)
Location of practice in Kentucky	
Northern Kentucky	3 (3.95)
Eastern Kentucky	5 (6.58)
Central Kentucky	65 (85.53)
Western Kentucky	2 (2.63)
Southern Kentucky	1 (1.32)
Parent	
Yes	53 (67.95)
No	25 (32.05)
Smoker	
Yes	1 (1.28)
No	77 (98.72)

TABLE 2. Knowledge of safe sleep recommendations among Kentucky nurses (N=78)			
Recommendation	All N (% Yes)	Neonatal N (% Yes)	Perinatal N (% Yes)
“Back to Sleep” for every sleep	78 (100)	54 (100)	24 (100)
Transition preterm infant to supine for sleep by 32 weeks if “medically stable” ($P = .026$)	61 (78.21)	46 (86.8)	15 (62.5)
Room-sharing without bedsharing	72 (92.31)	48 (88.9)	24 (100)
Pregnant women should receive regular prenatal care	74 (94.87)	52 (96.3)	22 (91.7)
Offer a pacifier at naptime and bedtime ($P < .001$)	55 (70.51)	39 (72.7)	16 (66.7)
Keep soft objects out of the crib	78 (100)	54 (100)	24 (100)
Breastfeed or provide breast milk	69 (88.46)	47 (87)	22 (91.7)
Immunize in accordance with recommendations	70 (89.74)	49 (90.7)	21 (87.5)
Supervised, awake tummy time	77 (98.72)	54 (100)	23 (95.8)
Healthcare providers, including those in NICUs and newborn nurseries, should endorse SIDS risk-reduction strategies beginning at birth.	72 (92.31)	48 (90.6)	24 (100)
Avoid smoke exposure during pregnancy and after birth	78 (100%)	54 (100)	24 (100)
Avoid illicit alcohol and illicit drug use during pregnancy and after birth	74 (94.87)	52 (96.3)	22 (91.7)
Avoid overheating infants	74 (94.87)	53 (98.1)	21 (87.5)
Avoid commercial devices marketed to reduce the risk of SIDS/SUID	58 (74.30)	42 (77.8)	16 (66.7)
Avoid use of commercial cardiorespiratory monitors	36 (46.15)	26 (48.1)	10 (41.7)

TABLE 3. Attitudes of Kentucky Nurses About Safe Sleep Recommendations (N=78)			
Attitude	All Mean (SD)	Neonatal Mean (SD)	Perinatal Mean (SD)
Risk reduction recommendations make a difference in preventing SIDS/SUID	4.53 (.751)	4.52 (.963)	4.54 (.884)
Supine sleep causes a flat or misshapen head	2.56 (.975)	2.43 (.964)	2.88 (.947)
Supine sleep causes developmental delays	1.62 (.707)	1.65 (.677)	1.54 (.779)
Supine sleep increases risk of aspiration	1.81 (.689)	1.83 (.700)	1.75 (.676)
Parents will model my SIDS Risk Reduction practices	3.96 (.780)	3.91 (.830)	4.08 (.654)
Regardless of my beliefs, I follow the SIDS Risk Reduction Policy of my unit/hospital	4.47 (.833)	4.44 (.816)	4.54 (.884)

TABLE 4. Reasons for Placing a Preterm Infant in a Prone or Side-Lying Position (N = 78)			
Reason	All Mean (SD)	Neonatal Mean (SD)	Perinatal Mean (SD)
Risk of aspiration/reflux	1.9 (.900)	1.91 (.996)	1.87 (.516)
Infant comfort	2.91 (.911)	2.85 (.859)	3.13 (1.06)
Traditional nursing practice	3.95 (.838)	3.91 (.855)	4.07 (.799)
Medical indication	1.76 (1.141)	1.85 (1.22)	1.47 (.833)
Family preference	4.936 (.674)	5.02 (.642)	4.67 (.724)
Other	5.53 (1.082)	5.45 (1.157)	5.8 (.775)

TABLE 5. Reasons for Placing a Term Infant in a Prone or Side-Lying Position (N = 78)			
Reason	All Mean (SD)	Neonatal Mean (SD)	Perinatal Mean (SD)
Risk of aspiration/reflux	1.94 (.903)	1.91 (.890)	2.00 (.966)
Infant comfort	2.95 (.948)	2.85 (.918)	3.25 (1.000)
Traditional nursing practice	3.90 (.882)	3.87 (.806)	4.00 (1.095)
Medical indication	1.76 (1.18)	1.80 (1.222)	1.63 (1.088)
Family preference ($P = .039$)	4.94 (.708)	5.07 (.533)	4.50 (.966)
Other	5.52 (1.051)	5.50 (1.070)	5.63 (1.025)

TABLE 6. Practices of Safe Sleep Recommendations by Kentucky Nurses (N = 78)			
Practice	All Mean (SD)	Neonatal Mean (SD)	Perinatal Mean (SD)
Tuck blankets securely around mattress (<i>P</i> < .001)	3.68 (1.49)	4.21 (1.194)	2.54 (1.474)
Remove care-giving supplies from crib/bed	4.47 (.680)	4.38 (.713)	4.67 (.565)
Transition the infant to supine for sleep	4.68 (.616)	4.68 (.471)	4.67 (.868)
Provide parents with verbal information about SUID/SIDS	4.60 (.613)	4.57 (.636)	4.67 (.565)
Provide parents with written information about SUID/SIDS	4.34 (.926)	4.26 (.984)	4.50 (.780)
Remove positioning aids from crib/bed	4.23 (.841)	4.17 (.802)	4.38 (.924)
Remove comforter/quilt/ blanket from crib/bed	4.38 (.828)	4.40 (.817)	4.33 (.868)

TABLE 7. Parent Education about Safe Sleep by Kentucky Nurses (N=77)			
Recommendation Discussed	All N (% Yes)	Neonatal N (% Yes)	Perinatal N (% Yes)
Toys in crib	71 (92.2)	49 (94.2)	22 (91.7)
Prevention of overheating	64 (83.1)	46 (86.8)	18 (75)
Back to sleep	77 (100)	53 (100)	24 (100)
Supervised tummy time	67 (87)	48 (90.6)	19 (79.2)
Infant sleep location	73 (94.8)	51 (96.2)	22 (91.7)
Use of a sleep sack (<i>P</i> = .005)	61 (79.2)	47 (88.7)	14 (58.3)
Use of a pacifier	57 (74)	39 (73.6)	18 (75)
Effects of second-hand smoke (<i>P</i> = .027)	70 (90.9)	51 (96.2)	19 (79.2)
Effects of alcohol and other drug use	58 (75.3)	42 (79.2)	16 (66.7)
Appropriate bedding	70 (90.9)	48 (90.6)	22 (91.7)

TABLE 8. Self-Efficacy of Kentucky Nurses Regarding Teaching and Modeling Safe Sleep Recommendations (N=77)	
Mode of providing recommendations	N (% YES)
Confident in ability to accurately teach parents about safe sleep	72 (97.4%)
Confident in ability to appropriately model safe sleep for parents	77 (100%)

TABLE 9. Preferred Method of Kentucky Nurses for Learning about Safe Sleep and SUID Risk-Reduction Strategies (N=74)	
Mode of Learning	N (%)
Written materials	17 (22.97%)
Unit in-service	20 (27.03%)
Online	34 (45.95%)
Other	3 (4.05%)

Appendix A

SUID Risk Reduction Questionnaire

My age is:

- A. 21-25 years
- B. 26-29 years
- C. 30-39 years
- D. 40-49 years
- E. 50 years or older

I have been a practicing nurse for:

- A. Less than 1 year
- B. 1-3 years
- C. 4-5 years
- D. 6-10 years
- E. Greater than 10 years

I am a:

- A. Neonatal nurse
- B. Perinatal nurse

I have been a practicing Neonatal or Perinatal nurse for:

- A. Less than 1 year
- B. 1-3 years
- C. 4-5 years
- D. 6-10 years
- E. Greater than 10 years

The highest nursing degree that I have is:

- A. Diploma
- B. Associate
- C. Bachelors
- D. Masters
- E. Doctorate

I hold a certification in Neonatal or Perinatal nursing:

- A. Yes
- B. No

I am a parent:

- A. Yes
- B. No

I am a smoker:

- A. Yes
- B. No

I live in a smoke-free community:

- A. Yes
- B. No

I work in a smoke-free hospital:

- A. Yes
- B. No

The hospital I work in is located in:

- A. Northern Kentucky
- B. Eastern Kentucky
- C. Central Kentucky
- D. Southern Kentucky
- E. Western Kentucky

I discharge infants from my unit:

- A. Frequently
- B. Infrequently
- C. Never

I am a nurse in a:

- A. Neonatal intensive care unit
- B. Neonatal transitional care unit
- C. Newborn nursery
- D. Mother/Baby unit

I think SIDS Risk-Reduction recommendations make a difference in preventing SIDS/SUID.

strongly disagree	disagree	neutral	agree	strongly agree
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Supine for sleep causes infants to have a flat or misshapen head.

strongly disagree	disagree	neutral	agree	strongly agree
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Supine for sleep causes infants to have developmental delays. strongly disagree neutral agree strongly disagree agree

Supine for sleep puts infants at higher risk for aspiration. strongly disagree neutral agree strongly disagree agree

Parents will model my SIDS Risk reduction practices with their infants. strongly disagree neutral agree strongly disagree agree

Regardless of my personal beliefs, I follow the SIDS Risk Reduction Policy of my unit/hospital. strongly disagree neutral agree strongly disagree agree

The BEST time to implement SIDS Risk Reduction Recommendations is:

- A. When the infant is moved to the transitional care/step-down unit
- B. When parents ask about SIDS Risk Recommendations
- C. When the infant is “medically stable” regardless of gestational age
- D. When the infant is “medically stable” by 32 weeks corrected gestational age

Which of the following are included in the 2016 American Academy of Pediatrics SIDS Risk Reduction Recommendations:

“Back to Sleep” for every sleep. Yes No Unsure

Transition preterm infants to supine Yes No Unsure

for sleep by 32 weeks post-menstrual age

if “medically stable”.

Room-sharing with a parent without bedsharing.	Yes	No	Unsure
Keep soft objects (toys, quilts, etc.) out of the crib.	Yes	No	Unsure
Pregnant women should receive regular prenatal care.	Yes	No	Unsure
Breastfeed or provide breast milk.	Yes	No	Unsure
Offer a pacifier at naptime and bedtime.	Yes	No	Unsure
Immunize in accordance with recommendations.	Yes	No	Unsure
Supervised, awake tummy time.	Yes	No	Unsure
Healthcare providers, including those in NICUs and newborn nurseries, should endorse SIDS risk Reduction Strategies beginning at birth.	Yes	No	Unsure

Base on the 2016 American Academy of Pediatrics policy, which of the following are SIDS Risk Reduction Recommendations:

Avoid smoke exposure during pregnancy and after birth.	Yes	No	Unsure
Avoid alcohol and illicit drug use during pregnancy and after birth.	Yes	No	Unsure
Avoid overheating infant.	Yes	No	Unsure
Avoid commercial devices marketed to reduce the risk of SIDS/SUID.	Yes	No	Unsure
Avoid the use of home cardiorespiratory monitors.	Yes	No	Unsure

For the purposes of the following statements, “medically stable” refers to an infant with (a) stable oxygen and respiratory support needs, (b) stable pattern of apnea and bradycardia, (c) ability to maintain body temperature in an incubator or crib, and (d) ability to tolerate advancing feedings.

I most frequently position **preterm** infants for supine-only sleep:

- A. As soon as the infant is “medically stable’ regardless of gestational age
- B. By 32 weeks post-menstrual age provided the infant is “medically stable”
- C. A few days prior to infant transfer or discharge
- D. I do not usually position preterm infants supine for sleep

I position “transfer-ready” or “discharge-ready” **preterm** infants:

- A. Prone for sleep
- B. Supine for sleep
- C. Side-lying for sleep
- D. In whichever position the infant seems comfortable

If I position “transfer-ready” or “discharge-ready” **preterm** infants in prone or side-lying positions, I do so because of: *(Rank in order with 1 being the most frequent reason and 5 being the least frequent reason):*

- Risk of reflux/aspiration
- Infant comfort
- Traditional nursing practice
- Medical indication
- Family preference
- Other

When I position a preterm infant for prone or side-lying sleep because of a medical indications, that medical indication is:

I position “clinically stable” **term** infants:

- A. Prone for sleep
- B. Supine for sleep
- C. Side-lying for sleep
- D. In whichever position the infant seems comfortable

If I position “transfer-ready” or “discharge-ready” **term** infants in prone or side-lying positions, I do so because of: (*Rank in order with 1 being the most frequent reason and 5 being the least frequent reason*):

- Risk of reflux/aspiration
- Infant comfort
- Traditional nursing practice
- Medical indication
- Family preference
- Other

I use positioning aids/rolls for “medically stable” preterm infants in an open crib.	Never	Rarely	Sometimes	Often	Always
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I use positioning aids/rolls for	Never	Rarely	Sometimes	Often	Always
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“medically stable” term infants

in an open crib.

I place stuffed toys, blankets, or quilts in an infant’s crib/bassinette.

Never Rarely Sometimes Often Always

I follow a unit-specific protocol/policy/guideline for SIDS Risk Reduction Recommendations in preparation for infant discharge:

- A. Yes
- B. No, I don’t agree with my unit’s protocol/policy/guideline
- C. No, my unit does not have a protocol/policy/guideline
- D. No, I don’t know if my unit has a specific protocol/policy/guideline

When I am caring for twins or higher order multiples, I place them in the same incubator or crib to sleep.

- A. Yes, frequently
- B. Yes, infrequently
- C. No

I follow a unit-specific protocol/policy/guideline for co-bedding infants.

- A. Yes
- B. No, I don’t agree with my unit’s protocol/policy/guideline
- C. No, my unit does not have a protocol/policy/guideline
- D. No, I don’t know if my unit has a specific protocol/policy/guideline

I begin SIDS/SUID teaching:

- A. On infant admission
- B. When parents ask
- C. When the baby transitions to supine for sleep
- D. I do not routinely provide SIDS/SUID teaching

I implement the following practices to encourage sleep for “medically stable” infants:

Blanket or other covering over the head of the crib to block light and/or noise.	Yes	No	Sometimes
Rolls/positioning aids	Yes	No	Sometimes
Darken the room with blinds or shades.	Yes	No	Sometimes
Turn lights off.	Yes	No	Sometimes
Reduce traffic or noise in the patient room/area.	Yes	No	Sometimes
Offer a pacifier.	Yes	No	Sometimes
Offer sucrose.	Yes	No	Sometimes
Hold/rock infant.	Yes	No	Sometimes
Play soothing music	Yes	No	Sometimes
Swaddle with a blanket.	Yes	No	Sometimes

I implement the following in my clinical practice:

Tuck blankets securely around the mattress.	Never	Rarely	Sometimes	Often
	Always			
Remove care-giving supplies from crib/bed.	Never	Rarely	Sometimes	Often
	Always			
Transition the infant to supine for sleep.	Never	Rarely	Sometimes	Often
	Always			
Provide parents with verbal information	Never	Rarely	Sometimes	Often
	Always			

about SIDS/SUID.

Provide parents with written information Never Rarely Sometimes Often

about SIDS/SUID. Always

Remove positioning aids from crib/bed. Never Rarely Sometimes Often

Always

Remove comforter/quilt/blanket from crib/bed. Never Rarely Sometimes Often

Always

When I provide discharge teaching, I routinely discuss;

Toys in crib Yes No Sometimes

Prevention of overheating. Yes No Sometimes

Back to sleep. Yes No Sometimes

Supervised tummy time. Yes No Sometimes

Infant sleep location (room and bed). Yes No Sometimes

Use of a sleep sack. Yes No Sometimes

Use of a pacifier. Yes No Sometimes

Effects of second-hand smoke. Yes No Sometimes

Effects of alcohol and other drug use. Yes No Sometimes

Appropriate bedding. Yes No Sometimes

I feel confident in my ability to appropriately model safe sleep for parents and families.

A. Yes

B. No

I feel confident in my ability to accurately teach safe sleep practices to parents and families.

A. Yes

B. No

I have received formal or informal SIDS Risk Reduction education since the release of the 2016 recommendations.

A. Yes

B. No

I would be interested in receiving education concerning the American Academy of Pediatrics'

SIDS Risk Reduction Recommendations via:

A. Written materials

B. In-service on my unit

C. Online

D. Other

Appendix B

Letter to Lead Hospital Contacts

April 7, 2017

To (Name of Contact):

As a Doctor of Nursing Practice (DNP) student at the University of Kentucky, and under the guidance of Debra Anderson, PhD, faculty advisor, I am conducting a research survey of perinatal and neonatal nurses and their knowledge and self-efficacy related to safe sleep and sudden unexpected infant death (SUID) risk-related strategies.

Sudden Unexpected Infant Death continues to be a problem in the nation and in Kentucky despite participation in the national Back to Sleep Campaign of the mid-1990's. The American Academy of Pediatrics (2011) indicates that nurses are in unique positions to teach parents of newborns about SUID and related risk-reduction strategies.

Subsequently, parents may make more appropriate decisions regarding their infants' sleep and sleep environments. It is essential, however, for nurses to have appropriate and accurate knowledge to impart to parents.

To determine the knowledge and confidence of perinatal and neonatal nurses in Kentucky about safe sleep, I am asking that the following link to a REDCap survey about safe sleep and SUID be provided to those nurses who care for newborns and may model/teach about Safe Sleep in mother/baby and neonatal units in your facility:

(LINK to SURVEY)

Although there will not be personal benefit from taking part in this research study, responses may help me understand more about what nurses know about safe sleep and how confident they are in teaching families about safe sleep and SUID risk-reduction strategies, and about whether or not nurses need more education about safe sleep.

I hope to receive completed questionnaires from about 100 nurses at Kentucky birthing/children's hospitals, so answers from your staff are important to me. Of course, they have a choice about whether or not to complete the survey/questionnaire, but if they do participate, they are free to skip any questions or discontinue at any time.

The survey/questionnaire will take about 15-20 minutes to complete. There are no known risks for taking part in this study. Responses to the survey are anonymous which means no names will appear or be used on research documents, or be used in presentations or publications. The research team will not know what information came from who, nor even whether or not a person participated in the study. The research team will not know what facility answers to the survey came from.

Please be aware, while every effort is made to safeguard data once received on our servers via REDCap, given the nature of online surveys, as with anything involving the internet, we can never guarantee the confidentiality of the data while still en route to us.

If you or your staff have questions about the study, please feel free to ask; my contact information is given below. If you have complaints, suggestions, or questions about your rights as a research volunteer, contact the staff in the University of Kentucky Office of Research Integrity at 859-257-9428 or toll-free at 1-866- 400-9428.

Thank you in advance for your assistance with this important project.

It is requested that the survey be completed by May 31, 2017.

Sincerely,

Lisa McGee, MSN, RN, CCNS, CKC

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IRB Approval of 16-0822 Valid from 11/11/16 to 11/10/17

Appendix C – Evidence Table

Citation: Author (s), Date of Publication & Title	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Findings	Level of Evidence	Quality of Evidence: Critical Worth to Practice
*** Abney-Roberts, S. E. (2015). A successful quality improvement project to improve infant safe sleep practice. <i>Journal of Obstetric, Gynecologic, and Neonatal Nursing</i> ; 44 (Supplement 1): S43.									
Abney-Roberts 2015 A Successful Quality Improvement Project to Improve Infant Safe Sleep Practice	None indicated	Process improvement strategy Crib observations and chart audits were done before and after and educational intervention. Pre- and post-tests were given with educational sessions.	Convenience sample of 116 crib observations and 82 chart audits. 150 registered nurses and other health professionals in the Georgia Regents Health System.	Objects in cribs, back to sleep position, avoiding smoke, avoiding co-sleeping – no definitions given.	Comparison of pre- and post-intervention scores.	None indicated.	Statistically significant change in crib observations and chart audit data pre- and post-intervention. Comparison data regarding knowledge pre- and post-intervention were statistically significant for all topics. Posttest scores increased from 6.9% to 32% for all groups of providers.	Level 6	Grade A-B Strength is that educational intervention for healthcare personnel positively impacts safe sleep for infants. Limitation is that intervention included other providers than nurses so impact on nurses not fully clear. No harm if implemented and highly applicable to practice.

Level of Evidence Hierarchy:

- Level 1: Evidence from a systematic review or meta-analysis of all relevant RCTs
- Level 2: Evidence obtained from well-designed RCTs
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American Academy of Pediatrics Task Force on Sudden Infant Death Syndrome. (2011). SIDS and other sleep-related infant deaths: Expansion of recommendations for a safe infant sleeping environment. <i>Pediatrics</i> ; 128(5): 1030-1039.									
American Academy of Pediatrics 2011 SIDS and Other Sleep-Related Infant Deaths: Expansion of Recommendations for a Safe Infant Sleeping Environment	None indicated	No design – Policy statement Review and leveled recommendations taken from case-control studies.	None indicated	None indicated	None indicated	None indicated	Recommendations given regarding infant supine sleeping, a firm sleep surface, room-sharing, avoiding soft objects in sleep area, avoiding smoke exposure, offering a pacifier, avoiding overheating, avoiding cardio-respiratory monitors, receiving immunizations. Healthcare professionals should endorse SUID risk-reduction recommendations from birth.	Level 4	Grade A-B Strength is that recommendations come from leader in Pediatrics and from case-control studies. Limitation is that no randomized control trials have been conducted related to these recommendations. No harm if implemented. Highly feasible for practice.

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Aris, C., Stevens, T. P., Lemura, C., Lipke, B., McMullen, S., Côté-Arsenault, D. & Consenstein, L. (2006). NICU nurses' knowledge and discharge teaching related to infant sleep position and risk of SIDS. <i>Advances in Neonatal Care</i> ; 6(5): 281-294.									
Aris et al. 2006 NICU Nurses' Knowledge and Discharge Teaching Related to Infant Sleep Position and Risk of SIDS.	None indicated	Prospective survey design Questionnaire administered in 2 phases. 49% of questionnaires were returned.	514 Level III and IV NICU nurses in New York and 2 additional states were administered a questionnaire about infant sleep position and parental instruction at discharge.	Infant sleep position and SIDS risks – none defined	None indicated	Statistical analysis performed using STATA version 8.0. Bivariate analysis, Fisher's exact test, & logistic regression models were used.	95% of respondents indicated prone as the best sleep position for preterm infants. 52% advised parents to place their infants supine after NICU discharge. A major knowledge deficit emerged regarding infant sleep position involving indications for placing infants prone to sleep. Neonatal nurses have a great opportunity to educate parents about the risks of SUID and have a responsibility to model strategies to decrease risks.	Level 6	Grade A Strength is that the study broadens understanding of sleep position understanding for nurses in NICUs. Limitation is that newborn nursery nurses were not included. No harm if implications implemented. Highly applicable to practice.

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Barsman, S. G., Dowling, D. A., Damato, E. G., & Czeck, P. (2015). Neonatal nurses' beliefs, knowledge, and practices in relation to sudden infant death syndrome risk-reduction recommendations. <i>Advances in Neonatal Care</i> ; 15(3): 209-219.									
Barsman et. al. 2015 Neonatal Nurses' Beliefs, Knowledge, and Practices in Relation to Sudden Infant Death Syndrome Risk-Reduction Recommendations	None indicated	Prospective descriptive design A 33-item SIDS Risk-Reduction Questionnaire was distributed; 200 distributed and 98 returned.	Convenience sample of neonatal staff nurses working in a NICU and step-down unit	Demographics, beliefs, knowledge, practice – none defined	None indicated	Data were entered, cleaned, and analyzed using IBM SPSS version 2.1. Content analysis was used for short answer responses and data were coded on the basis of themes by 3 researchers.	Inconsistencies were found in beliefs, knowledge, and practices about SIDS risk-reduction strategies between nurses in NICU and step-down environments. The inconsistencies contribute to variability in parental SIDS prevention education by the time of infant discharge to home.	Level 6	Grade B Strengths in that study identifies need for more and consistent education regarding SIDS for neonatal nurses. Limitations in that newborn nursery nurses were not included. No harm if implications implemented. Highly applicable to practice.

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Bullock, L. F., Mickey, K., Green, J., & Heine, A. (2004). Are nurses acting as role models for the prevention of SIDS. <i>MCN, American Journal of Maternal Child Nursing</i> ; 29(3): 173-177.									
Bullock et al. 2004 Are Nurses Acting as Role Models for the Prevention of SIDS.	None indicated	Cross-sectional descriptive design A 24-item investigator-designed questionnaire was developed. 1700 questionnaires distributed and 528 were returned.	Individual nurses working in a hospital and caring for newborns in Missouri were surveyed.	Attitude, knowledge, and practice of SIDS risk-reduction strategies – none specifically defined.	None indicated	Data were analyzed using Statistical Analysis System software. Alpha was set at 0.05 to determine statistical significance. Kruskal-Wallis tests were used.	96% of nurses were aware of AAP recommendations regarding sleep position but 52% thought the lateral sleep position was also recommended. 82% of nurses told parents back and side positions were acceptable. 45% of nurses felt placing an infant supine would increase aspiration. 51% felt sleep positions were not associated with SIDS.	Level 6	Grade A Strength was that knowledge was gained regarding nursing practice related to infant sleep position. Limitation was the procedure used for recruiting staff. No harm if implications implemented. Highly applicable to practice.

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- Level 2: Evidence obtained from well-designed RCTs
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*** Carrier, C. T. (2009, September). Back to sleep: A culture change to improve practice. <i>Newborn & Infant Nursing Reviews</i> ; 9(3): 163-168.									
Carrier 2009 Back to Sleep: A Culture Change to Improve Practice	Quality Improvement Model	Process improvement strategies including PDSA model. Educational intervention and implementation of a "Back to Sleep Progress Wheel"	Newborn intensive care unit level II nursing staff in a large metropolitan tertiary children's hospital.	SIDS prevention techniques emphasizing modeling AAP recommend- ations. Progress wheel defined as a circle with small wedge cut out of top so words could be read underneath. Wheel moved clockwise. Transition to back to sleep written on wheel.	Comparison of pre- and post- education audits.	None indicated.	Pre-education and post- education data results showed a post-education improvement on all indicators. The Progress Wheel served as a positive trigger and reinforced staff knowledge and practice of implementing safe sleep.	Level 6	Grade B Strength was the use of a visual "trigger" aided in reminding staff about practicing safe sleep. Limitation was not knowing if changes were sustained. No harm if intervention implemented. Highly applicable to practice.

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***Cowan, S., Pease, A., & Bennett, S. (2013). Usage and impact of an online education tool for preventing sudden unexpected death in infancy. <i>Journal of Paediatrics and Child Health</i> ; 49: 228-232.									
Cowan et al. 2013 Usage and Impact of an Online Education Tool for Preventing Sudden Unexpected Death in Infancy.	None indicated	Prospective descriptive design 24-slide online presentation about SUID for mainstream health professionals	Health professionals across all sectors of New Zealand 2683 completed online study sessions.	SUID prevalence and variations, SUID risk and protective factors, confidence level to be a safe sleep advocate for babies.	Pre- and post-questions.	Frequencies analysis was performed using IBM SPSS Statistics Version 20. Kruskal-Wallis analysis of variance was employed. Pearson χ^2 tests were used.	64.8% of sessions were completed by people in health care worker roles. For 68.7% of sessions, participants rated increased confidence for discussing safe sleep information with others as 7-9/9.	Level 6	Level A-B Strength was confidence related to talking with others about safe sleep was addressed. Limitation was not just nurses participated so impact on nurse not fully known. No harm if intervention implemented. Highly applicable to practice.

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***Drake, E., Colson, E., & Hauck, F. (2015). Nurses' perception of the facilitators and barriers to the implementation of safe sleep recommendations in the hospital setting. <i>Journal of Obstetric, Gynecological, and Neonatal Nursing</i> ; 44(Supplement 1): S74.									
Drake & Hauck 2015 Nurses' Perception of the Facilitators and Barriers to the Implementation of Safe Sleep Recommendations in the Hospital Inpatient Setting	None indicated	Qualitative Study Five focus groups facilitated by a trained moderator using a script modified in an iterative process.	41 nurses and other staff from a mid-Atlantic hospital.	Facilitators and barriers to modeling and teaching safe sleep recommendations - no definitions given.	Discussions were digitally recorded and transcribed	Data were organized with qualitative software and analyzed with constant comparative techniques.	Three main themes emerged as key facilitators and barriers: <ul style="list-style-type: none"> • Previously held beliefs of families and providers (facilitate and be a barrier) • Inconsistent provider messages (barrier) • External forces can drive the success of messages to providers and families (barrier) 	Level 6	Level A Strength was key themes to consider when developing a program to educate nursing staff were identified. Limitation was size of sample – a larger sample may have identified more facilitators and barriers. No harm if implemented and highly applicable to practice

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Fowler, A. J., Evans, P. W., Etchegaray, J. M., Ottenbacher, A., & Arnold, C. (2013). Safe sleep practices and sudden infant death syndrome risk reduction: NICU and well-baby nursery graduates. <i>Clinical Pediatrics</i> ; 52(11): 1044-1053.									
Fowler et al. 2013 Safe Sleep Practices and Sudden Infant Death Syndrome Risk Reduction: NICU and Well-Baby Nursery Graduates.	None indicated	Prospective Survey Design Survey designed specifically for the study with questions designed to address knowledge and practice of SIDS risk-reduction guidelines. 60 completed surveys were scored.	Caregivers of infants discharged from a NICU or well-baby nursery from a children's hospital in the southern U.S between 1/11 and 7/11 who were followed at the High-Risk Infant or Kids' Place Clinic were surveyed during the 1 st or 2 nd postnatal visit.	Modifiable risk factors for SIDS – sleep environment, sleep position, infant sleep space, room sharing, avoiding smoke, firm sleep surface, offering a pacifier, avoiding overheating.	Survey consisted of 2 sections – a knowledge and practice assessment. 5 practice assessment questions were scored using a Likert-type scale; 2 were scored using a dichotomous scale. Knowledge assessment consisted of true/false statements.	All analyses were performed using SAS. NICU and well-baby study groups were compared on knowledge and practice outcome measures and confounding variables. x ² test and the Student's t-test were used.	When comparing knowledge between the 2 groups, NICU parents had a higher percentage of correct answers. When comparing practice between the 2 groups, NICU parents had more "perfect practice". There is a clear need for better education on SIDS risk reduction measures in both populations. Knowledge of SIDS recommendations of nurses needs to be assessed.	Level 6	Grade A Strength is that parents of both NICU and well-baby nurseries were considered, reflective of the education received by nurses in those respective areas. Limitation is the type of education parents received was not described. No harm if implications implemented. Highly applicable to practice.

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Gelfer, P., Cameron, R., Masters, K., & Kennedy, K. A. (2013). Integrating “back to sleep” recommendations into neonatal ICU practice. <i>Pediatrics</i> ; 131: e1264-1270.									
Gelfer et al. 2013 Integrating “Back to Sleep” Recommendations into Neonatal ICU Practice.	Quality improvement model	An algorithm detailing quality improvement strategies for SIDS risk reduction. Pre-/post-intervention phases. Educational program for nurses. Audit tool to monitor in-hospital compliance and questionnaire to monitor parental compliance post-discharge.	Staff nurses and infants in a large, tertiary care unit in Houston Texas with an average census of 100 infants.	None indicated.	None indicated.	Comparisons between the before and after implementation phases were made by using Fisher’s exact test.	During the project, the rate of supine positioning increased from 39% to 83%; provision of a firm sleep surface increased from 5% to 96%, removal of soft objects from the bed increased from 45% to 75%. It is essential to initiate a safe sleep routine in the hospital. What parents observe in the hospital regarding safe sleep has a significant effect on what they do at home after discharge.	Unable to assign (not a study)	Grade A Strength is that the inter-ventional project resulted in actual improvement and increased knowledge of nurses. Limitation is that implementation was multifaceted so which intervention had the greatest effect could not be determined. No harm if interventions implemented. Highly applicable to practice

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Grazel, R., Gibbons Phalen, A., & Polomano, R. C. (2010). Implementation of the American Academy of Pediatrics recommendations to reduce sudden infant death syndrome risk in neonatal intensive care units – an evaluation of nursing knowledge and practice. <i>Advances in Neonatal Care</i> ; 10(6): 332-342.									
Grazel et al 2010 Implementation of the American Academy of Pediatrics Recommendations to Reduce Sudden Infant Death Syndrome Risk in Neonatal Intensive Care Units – An Evaluation of Nursing Knowledge and Practice	None Indicated	Prospective Survey Design A 14-item questionnaire regarding knowledge of SIDS risk-reduction measures, modeling of safe sleep interventions, and inclusion of SUID risk-reduction in parent education was distributed to nurses in 17 NICUs. 40% of nurses completed the survey.	Convenience sample of 1080 nurses practicing in 17 Level II and Level III NICUs in 2 middle-Atlantic states; NICU bed capacity ranged from 4 to 75.	Knowledge of SUID risk-reduction measures, modeling of safe sleep interventions, inclusion of SUID risk-reduction in parent education	Frequency of a stated practice was marked on a Likert scale. Knowledge and clinical practice items were marked by selecting all applicable choices.	Statistical analyses were performed using SPSS. Frequencies and descriptive statistics were generated to show trends. Logical regression analysis was used.	NICU nurses were able to identify the AAP recommendations for SIDS risk reduction. There were inconsistencies in implementing SUID risk-reductions strategies in clinical practice. Parents mimic nursing behaviors observed in the hospital. 73% of nurses included instruction about SUID in discharge education but not all strategies were discussed.	Level 6	Grade A Strength is the study was consistent with previous research regarding the implementation of SIDS risk-reduction strategies into clinical practice. Limitation is that newborn nurseries were not included. No harm if implications implemented. Highly applicable to practice

Level of Evidence Hierarchy:

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- Level 2: Evidence obtained from well-designed RCTs
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- Level 4: Evidence from well-designed case-control and cohort studies
- Level 5: Evidence from systematic review of descriptive and qualitative evidence
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Quality of Evidence – Critical Worth to Practice

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***Hwang, S. S., O'Sullivan, A., Fitzgerald, E., Melvin, P., Gorman, T., & Fiascone, J. M. (2015). Implementation of safe sleep practices in the neonatal intensive care unit. <i>Journal of Perinatology</i> ; 35: 862-866.									
Hwang et al. 2015 Implementation of Safe Sleep Practices in the Neonatal Intensive Care Unit	None indicated	Prospective descriptive design Education per web-based learning module and in-person teaching sessions. Direct bedside education regarding appropriate SSP. Use of crib cards identifying SSP.	Nurses and medical providers at two level III community hospitals near Boston	Infant positioned supine, head of bed flat, bed free of positioning devices, bed free of dolls and fluffy blankets.	Pre- and post-intervention crib audits.	Descriptive analysis using percentages for categorical variables. Logit link generalized linear models for binomial outcomes. All analyses performed using SAS version 9.3.	There was significant improvement in overall compliance with SSP (25.9 to 79.7%). Adherence to each component of SSP also improved significantly following the intervention.	Level 6	Grade A Strength was educational intervention resulted in significant improvement. Limitation was the period of intervention was brief so not all staff were exposed to it. No harm if interventions implemented. Highly applicable to practice

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Mason, B., Ahlers-Schmidt, C. R., & Schunn, C. (2013). Improving safe sleep environments for well newborns in the hospital setting. <i>Clinical Pediatrics</i> ; 52(10): 969-975.									
Mason et al. 2013 Improving Safe Sleep Environments for Well Newborns in the Hospital Setting.	Quality improvement model	Process improvement strategy utilizing a bundled intervention approach – Plan- Do-Study-Act Baseline and post-bundle implementation data were obtained via a data collection form and survey.	Infants (201 baseline and 337 post- bundle) in a 62-bed postpartum area where newborns room in with their parents. Wesley Medical Center in Wichita, Kansas.	Infant safe sleep environment and position	None indicated	All data were entered into an Excel spreadsheet and were analyzed using PAS-W 20.0.	At baseline, 25% of sleeping infants were safe and 58% were safe post- implementation. The hospital setting provides an opportunity for healthcare workers to model SIDS risk-reduction behavior. The bundle approach to improving safe sleep education helped increase consistency in teaching between nurses and ensured safe sleep messages were delivered in the hospital setting.	Unable to assign (not a study)	Grade A Strength is that the bundle approach can be easily replicated. Limitations are a single population at a single site and continuing variability in safe sleep education between nurses. No harm if interventions implemented. Highly applicable to practice

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***McMullen, S. L., Lipke, B., & LeMura, C. (2009). Sudden infant death syndrome prevention: a model program for NICUs. <i>Neonatal Network</i> ; 28(1): 7-12.									
McMullen et al. 2009 Sudden Infant Death Syndrome Prevention: A Model Program for NICUs.	None indicated	Prospective descriptive design Pre-education survey of nurses' knowledge related to safe sleep. Implementation of SIDS nurse education campaign (online program and educational session), SIDS crib card, safe sleep policy, written discharge instructions for safe sleep, use of sleep sacks when infants in open cribs.	Surveys went to nurses in NICUs throughout the state of New York and two additional states. Educational campaign used with NICU nurses in a Syracuse, NY hospital.	Supine positioning, utilization of sleep sacks, utilization of SIDS crib card. The crib card showed SIDS risk-reduction strategies for parents to see.	Evaluation 6 months post-education and implementation to determine compliance with initiatives.	None indicated	Comprehensive SIDS program had a measurable difference in nurses' compliance in modeling safe sleep practices and educating parents in the prevention of SIDS. At time of evaluation, 98% of infants were asleep supine, 93% in cribs wore sleep sacks, and 88% of cribs had visible SIDS cards.	Level 6	Grade A Strength was that campaign was comprehensive and included more than just education. Limitation was that not all SIDS risk-reduction strategies were included – i.e., head of bed flat, no other objects in bed, use of pacifier, etc. No harm if implemented and highly applicable to practice.

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Patton, C., Stiltner, D., Barnhardt Wright, K., & Kautz, D. D. (2015). Do nurses provide a safe sleep environment for infants in the hospital setting? <i>Advances in Neonatal Care</i> ; 15(1): 8-22.									
Patton et al. 2015 Do Nurses Provide a Safe Sleep Environment for Infants in the Hospital Setting?	None indicated	Integrative review Search of /Google Scholar, CINAHL, PubMed and Cochrane using key words NICU, newborn, SIDS, safe sleep, safe sleep environment, nurse, education, supine sleep, prone sleep, special care nursery, hospital policy for safe sleep, research, premature, knowledge, practice, health care professionals, parents	16 research studies published between 1999 and 2012 Sample sizes ranged from 94 to 5911 nurses or healthcare workers Sample sizes ranged from 199 to 671 parents	Nursing behaviors, nursing knowledge, safe sleep environment, infant sleep position	None indicated	A matrix was developed to assist in analyzing studies to determine if they met inclusion criteria- primary research reports on nursing knowledge and nursing behavior in practice, or on parental knowledge obtained through education and role modeling of nursing staff.	Decisions nurses make in regard to safe sleep can influence parental behavior at home. Nurses understand safe sleep recommendations but do not practice them which leads to ineffective parental education and greater risk for SIDS. Education on SIDS and safe sleep environment should be mandated to improve nurses' knowledge and behaviors and decrease ineffective parent education.	Level 5	Grade A Strength is identification of need to continue to educate nurses in the provision of a safe sleep environment and consistent education to parents. Limitations are that studies included convenience sampling and self-reporting. No harm if implemented and highly applicable to practice.

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***Price, S. K., Hillman, L., Gardner, P., Schenk, K., & Warren C. (2008). Changing hospital newborn nursery practice: Results from a statewide “back to sleep” nurses’ training program. <i>Maternal Child Health Journal</i> ; 12: 363-371.									
Price et al. 2008 Changing Hospital Newborn Nursery Practice: Results from a Statewide “Back to Sleep” Nurses’ Training Program	None indicated	Prospective descriptive design Two training options focusing on “Back to Sleep” and other SIDS risk- reduction strategies. Training was either by Train the Trainer or per a Computer- Based Training option.	515 newborn nursery nurses in Missouri working in hospitals with over 3 births per year.	SIDS knowledge, beliefs, and current infant care behaviors.	Response to a pre- and post- training questionnaire.	Descriptive statistics. Cross- tabulation and chi-square analysis. Independent t- tests. Analysis of variance. All analyses were conducted using SPSS 12.5.	Participants in both training formats reported a statistically significant increase in their intention to utilize supine sleep position. Significant increase in both groups with comfort in conveying SIDS information to new parents.	Level 6	Grade A Strength was that multiple training formats were effective in producing desired outcomes. Limitation was whether outcomes were due to intervention or to recommend- ations in the media and professional literature. No harm if implemented and highly applicable to practice.

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- Level 1: Evidence from a systematic review or meta-analysis of all relevant RCTs
- Level 2: Evidence obtained from well-designed RCTs
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***Salm Ward, T. C. & Balfour, G. M. (2015). Infant safe sleep interventions, 1990-2015: a review. <i>Journal of Community Health</i> ; DOI 10.1007/s10900-015-0060-y.									
Salm Ward & Balfour 2015 Infant Safe Sleep Interventions, 1990-2015: A Review.	None indicated	Systematic review Search of PubMed, CINAHL, PsycINFO, and Google Scholar for articles which described an intervention regarding SUID and reported results.	Articles published between 1990 and 2015. 29 articles were included in the review.	SUID and risk-reduction strategies, education interventions, and changed behaviors regarding safe sleep.	Studies measured outcomes via self-report questionnaires, observational crib audits, pre- and post-tests.	None indicated	Intervention effects were mixed with some studies finding significant increase in intended or reported adherence to some safe sleep behaviors but not others.	Level 5	Level A-B Strength was that the synthesis provided a foundation of evidence for those considering developing safe infant sleep interventions. Limitation was that articles that described creative interventions were not included as they did not meet search criteria. No harm if implemented and highly applicable to practice.

Level of Evidence Hierarchy:

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Shaefer, S. J. M., Herman, S. E., Frank, S. J., Adkins, M., & Terhaar, M. (2010). Translating infant safe sleep evidence into nursing practice. <i>Journal of Obstetric, Gynecologic, and Neonatal Nurses</i> ; 39(6): 618-626.									
Shaefer et al. 2010 Translating Infant Safe Sleep Evidence into Nursing Practice	Quality Improvement Model	Four-year demonstration project Two-phased quality improvement project involving training and pre- /post-evaluation.	635 staff nurses who worked with new mothers and their infants in seven hospitals in three geography- ically diverse urban regions of Michigan from 2004 through 2007	Infant safe sleep, sleep position, knowledge of SIDS risk factors	Safe sleep policy review form, crib audit form, nurses' questionnaire	Qualitative and quantitative analyses SPSS Version 17 analysis Percentages were calculated for audit items Cross-tabular analyses with chi-square were used	Following training, more nurses felt the back was the safest sleeping position. Sustainable infant safe sleep practices can be effectively established in the hospital setting. Safe sleep practices should become part of orientation and an ongoing measure.	Unable to assign (not a study)	Level A Strength is that improvement in knowledge and practice can be established. Limitation is that changes were not tracked over time to identify sustainability. No harm if interventions implemented. Highly applicable to practice

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***Simon-Burrell. (2014). Infant safe sleep: an evaluation of infant safe sleep practices in the hospital setting. <i>Journal of Obstetric, Gynecological, and Neonatal Nursing</i> ; 43(Supplement 1): S79.									
Simon-Burrell 2014 Infant Safe Sleep: An Evaluation of Infant Safe Sleep Practices in the Hospital Setting	None indicated	Qualitative and quantitative descriptive design Structured interviews with mothers, observations of infants in their cribs, Infant Safe Sleep Knowledge Questionnaire given to nurses.	50 mothers, 50 infants, and 41 nurses at Hutzel Women's Hospital in Detroit, MI.	Nurses' knowledge and beliefs about best practices for infant safe sleep. The degree to which the recommendations of the American Academy of Pediatrics (AAP) for infant safe sleep were modeled. Parent education given by nurses.	Evaluation of interviews, crib observations, and questionnaires.	Descriptive statistics. Chi-square analyses. Pearson correlations and analysis of variance.	Nurses were very knowledgeable about the AAP recommendations. Indication that nurses modeled best practices and taught parents about infant safe sleep recommendations.	Level 6	Grade B Strength was that nurses' knowledge and beliefs that impact their practice behavior were studied. Limitation was that strategies used to provide nurses with their knowledge was not indicated. No harm if utilized and highly applicable to practice.

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***Varghese, S., Gaselberti, D., Ahem, K., & Chang J. C. (2015). An analysis of attitude toward infant sleep safety and SIDS risk reduction behavior among caregivers of newborns and infants. <i>Journal of Perinatology</i> : 1-4.									
Varghese et al. 2015 An Analysis of Attitude Toward Infant Sleep Safety and SIDS Risk Reduction Behavior Among Caregivers of Newborns and Infants	None indicated	Prospective descriptive design Researcher-developed questionnaire was distributed to caregivers in the inpatient setting before a newborn's discharge from the hospital.	Convenience sample of 121 participants was obtained from adult caregivers of newborns delivered at Staten Island University Hospital during the time period of January through October 2013.	Attitude toward safe sleep practices based on the AAP recommendations for safe sleep and SIDS reduction.	None indicated	Descriptive statistics. Independent t-tests used to compare differences in scores. Chi-square analyses were used for categorical data. Data were analyzed using Number Cruncher Statistical Systems version 9.	Respondents who had been taught about safe sleep had a significantly higher perception of infant vulnerability to SIDS ($P < 0.001$), believed that safe sleep behaviors are effective ($P < 0.01$), had significantly more confidence in their ability to implement safe sleep behavior ($P < 0.0006$), and had greater recall about staff modeling specific safe sleep behaviors ($P < 0.008$).	Level 6	Grade A-B Strength was outcomes indicated teaching and modeling by healthcare personnel was effective. Limitation was no indication was given regarding type of education healthcare personnel received themselves or gave to caregivers. No harm and applicable to practice.

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***Voos, K. C., Terreros, A., Larimore, P., Leick-Rude, M. K., & Park, Nesha. (2015). Implementing safe sleep practices in a neonatal intensive care unit. <i>Journal of Maternal-Fetal and Neonatal Medicine</i> ; 28(14): 1637-1640.									
Voos et al. 2015 Implementing Safe Sleep Practices in a Neonatal Intensive Care Unit.	None indicated	Prospective descriptive design and process improvement NICU safe sleep policy was revised to include AAP recommendations. Educational sessions provided to staff. Safe sleep packet and video provided to families. Wearable blankets implemented.	NICU staff, infants and parents at a large, tertiary care unit in Kansas City, MO. Average census is 70 infants. There were 250 nurses involved in the education.	Knowledge of safe sleep strategies and infants reflecting safe sleep positioning and practices.	Safe sleep observation checklist. Baseline data and post-education data collected.	None indicated.	At baseline 21% of infants were in a safe sleep environment; post-education compliance increased to 88%.	Level 6	Grade A-B Strength included educational sessions provided directly to staff. Limitation was that interventions were multi-faceted so which one contributed mostly to change not specifically known. No harm if utilized and highly applicable to practice.

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U.S. Preventive Services Task Force. (2014). *Grade Definitions*. Retrieved September 12, 2015 from: <http://www.uspreventivetaskforce.org/Page/Name/grade-definitions>.

Appendix C – Evidence Table

Citation: Author (s), Date of Publication & Title	Conceptual Framework	Design/ Method	Sample/ Setting	Major Variables Studied and Their Definitions	Measurement of Major Variables	Data Analysis	Findings	Level of Evidence	Quality of Evidence: Critical Worth to Practice
***Yilkkan, H., Ünalın, P. C., Cakir, E., Ersu, R. H., Cifcili, S., Akman, M., Uzner, A, & Dagli, E. (2011). Sudden infant death syndrome: how much mothers and health professionals know. <i>Pediatrics International</i> ; 53: 24-28.									
Yilkkan et al. 2011 Sudden Infant Death Syndrome: How Much Mothers and Health Professionals Know	None indicated	Descriptive, cross-sectional study Face-to-face interviews with health professionals and phone interviews with mothers.	174 health professionals in 21 randomly selected Mother & Child Health-Care Centers in Turkey. 150 mothers from those centers.	Knowledge and attitude of parents and health professionals about SIDS and associated risk factors.	None indicated.	Statistical analyses per SPSS 11.0. Descriptive statistics. T-test and Mann-Whitney U-test. X ² test for univariate assessment. Multivariate analysis for dependent variations.	82% of the mothers claimed they had never been advised on sleeping position by the health professionals. Only 17% of health professionals selected supine as the safest sleep position yet 81% of health professionals rated recommendation of sleeping position as absolutely necessary.	Level 6	Grade B-C Strength was mothers expressed what they had (or had not) been taught by health professionals. Limitation was that sample size was limited to a certain center and may not be generalizable. No harm if utilized and highly applicable to practice.

Level of Evidence Hierarchy:

- Level 1: Evidence from a systematic review or meta-analysis of all relevant RCTs
- Level 2: Evidence obtained from well-designed RCTs
- Level 3: Evidence obtained from well-designed controlled trials without randomization
- Level 4: Evidence from well-designed case-control and cohort studies
- Level 5: Evidence from systematic review of descriptive and qualitative evidence
- Level 6: Evidence from single descriptive or qualitative studies
- Level 7: Evidence from the opinion of authorities and/or reports of expert committees

Melnyk, B.M. & Fineout-Overholt, E. (2015). Making the case for evidence-based practice and cultivating a spirit of inquiry. In B. Melnyk and E. Fineout-Overholt, *Evidence-Based Practice in Nursing & Healthcare* (3rd ed.). Philadelphia: Wolters Kluwer.

Quality of Evidence – Critical Worth to Practice

- Grade A: High evidence the net benefit is substantial
- Grade B: Moderate certainty the net benefit is moderate to substantial
- Grade C: At least moderate certainty the net benefit is small
- Grade D: Moderate or high certainty that the service has not net benefit or the harms outweigh the benefits
- Grade I: Current evidence is insufficient to assess the balance of benefits and harms of the service

U.S. Preventive Services Task Force. (2014). *Grade Definitions*. Retrieved September 12, 2015 from: <http://www.uspreventivetaskforce.org/Page/Name/grade-definitions>.

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***Young, J., Higgins, N., Raven, L., & Watson, M. (2013). Supporting nurses and midwives to promote a safe infant sleeping elearning program. <i>Australian Nursing Journal</i> ; 21(2): 41.									
Young et al. 2013 Supporting Nurses and Midwives to Promote a Safe Infant Sleeping eLearning Program	None indicated	Prospective descriptive design Three-module Safe Infant Sleeping eLearning Program.	2244 sample of health professionals, predominant- ly nurses and midwives in Australia.	Knowledge and knowledge application relating to sudden infant death and safe sleeping recommendations	Pre- and post- test evaluation.	Paired and independent t- tests.	Post-test showed significant increase (69.5% to 87%) in knowledge and application to risk factor assessment and evidence based parent advice. The program was sustainable, effective and attractive to a broad health professional group.	Level 6	Level B Strength was that intervention increased knowledge and practice. Limitation was that participants were mixed health professionals so unable to measure impact just on nurses. No harm if utilized and highly applicable to practice.

Level of Evidence Hierarchy:

- Level 1: Evidence from a systematic review or meta-analysis of all relevant RCTs
- Level 2: Evidence obtained from well-designed RCTs
- Level 3: Evidence obtained from well-designed controlled trials without randomization
- Level 4: Evidence from well-designed case-control and cohort studies
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Appendix D – Level of Evidence Synthesis Table

Study Author	Year	Number of Participants	Pertinent Sample Characteristic	Study Design	Intervention	Major Finding
A Successful Quality Improvement Project to Improve Infant Safe Sleep Practice Abney-Roberts	2015	150 nurses 116 crib audits 82 chart audits	Nurses worked with parents of newborns so were in key position to influence safe sleep.	Process improvement strategy	E	ES
NICU Nurses' Knowledge and Discharge Teaching Related to Infant Sleep Position and Risk of SIDS Aris et al.	2006	514 nurses	Nurses were from Level III and IV NICUs so were in key position to influence safe sleep.	Prospective survey design	S	L
Neonatal Nurses' Beliefs, Knowledge, and Practices in Relation to Sudden Infant Death Syndrome Risk-Reduction Recommendations Barsman et al.	2015	98 nurses	Nurses were from a NICU and step-down unit so were in key position to influence safe sleep.	Prospective descriptive design	S	L

Intervention

E = Educational program
B = Bundled approach including education
F = Focus groups or interviews
S = Survey or questionnaire of knowledge/attitude

Major Finding

ES = Education successful in increasing safe sleep knowledge/practice
IC = Increased confidence in teaching safe sleep to parents/families
K = Participants were knowledgeable about safe sleep and practices
L = Participants lacked appropriate or had inconsistent knowledge about safe sleep and practices
N = Negative or no effect on safe sleep knowledge/practice

Appendix D – Level of Evidence Synthesis Table

Study Author	Year	Number of Participants	Pertinent Sample Characteristic	Study Design	Intervention	Major Finding
Are Nurses Acting as Role Models for the Prevention of SIDS. Bullock et al.	2004	528	Nurses cared for newborns so were in key position to influence safe sleep.	Cross-sectional descriptive design	S	L
Back to Sleep: A Culture Change to Improve Practice Carrier	2009	Not indicated	Level II NICU nurses so were in key position to influence safe sleep.	Process improvement strategies including PDSA model.	E	ES
Usage and Impact of an Online Education Tool for Preventing Sudden Unexpected Death in Infancy Cowan et al.	2013	2683	Health professionals including nurses who were in key positions to influence safe sleep.	Prospective descriptive design	E	ES IC
Nurses' Perception of the Facilitators and Barriers to the Implementation of Safe Sleep Recommendations in the Hospital Inpatient Setting Drake & Hauck	2015	41 nurses plus other staff	Nurses worked with newborns so were in key position to influence safe sleep.	Qualitative Study	F	K

Intervention

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Study Author	Year	Number of Participants	Pertinent Sample Characteristic	Study Design	Intervention	Major Finding
Safe Sleep Practices and Sudden Infant Death Syndrome Risk Reduction: NICU and Well-Baby Nursery Graduates Fowler et al.	2013	60	Caregivers who had infants discharged from a NICU or well newborn nursery where nurses would have been key in influencing safe sleep practices.	Prospective survey design	S	K
Integrating “Back to Sleep” Recommendations into Neonatal ICU Practice. Gelfer et al.	2013	Not indicated	Staff nurses who worked with infants so were in key positions to influence safe sleep.	Quality improvement model	E	ES
Implementation of the American Academy of Pediatrics Recommendations to Reduce Sudden Infant Death Syndrome Risk in Neonatal Intensive Care Units – An Evaluation of Nursing Knowledge and Practice Grazel et al.	2010	432	Nurses in NICUs so were in key positions to influence safe sleep.	Prospective survey design	S	L

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Appendix D – Level of Evidence Synthesis Table

Study Author	Year	Number of Participants	Pertinent Sample Characteristic	Study Design	Intervention	Major Finding
Implementation of Safe Sleep Practices in the Neonatal Intensive Care Unit Hwang et al.	2015	Not indicated	Nurses were from Level III nurseries so were in key positions to influence safe sleep.	Prospective descriptive design	E	ES
Improving Safe Sleep Environments for Well Newborns in the Hospital Setting. Mason et al.	2013	538	Infants whose sleep environments were influenced by nurses were observed.	Quality improvement model	B	ES
Sudden Infant Death Syndrome Prevention: A Model Program for NICUs. McMullen et al.	2009	Not indicated	Nurses were from NICUs so were in key positions to influence safe sleep.	Prospective descriptive design	B	ES
Do Nurses Provide a Safe Sleep Environment for Infants in the Hospital Setting? Patton et al	2015	16 research studies	Studies were focused on nurses and safe sleep.	Integrative review	E B S	ES IC K L

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Appendix D – Level of Evidence Synthesis Table

Study Author	Year	Number of Participants	Pertinent Sample Characteristic	Study Design	Intervention	Major Finding
Changing Hospital Newborn Nursery Practice: Results from a Statewide “Back to Sleep” Nurses’ Training Program Price et al	2008	515	Nurses were from newborn nurseries so were in key positions to influence safe sleep.	Prospective descriptive design	E	ES
Infant Safe Sleep Interventions, 1990-2015: A Review. Salm Ward & Balfour	2015	29 research studies	Studies involved an intervention regarding SUID	Systematic Review	E B F S	ES IC K L
Translating Infant Safe Sleep Evidence into Nursing Practice Schaefer et al.	2010	635	Nurses worked with newborns and their parents so were in key positions to influence safe sleep.	Quality improvement model	E B	ES IC
Infant Safe Sleep: An Evaluation of Infant Safe Sleep Practices in the Hospital Setting Simon-Burell	2014	50 mothers 50 infants 41 nurses	Nurses influenced safe sleep; mothers were influenced by nurses.	Qualitative and quantitative descriptive design	F S	K

Intervention

E = Educational program
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Major Finding

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Appendix D – Level of Evidence Synthesis Table

Study Author	Year	Number of Participants	Pertinent Sample Characteristic	Study Design	Intervention	Major Finding
Supporting Nurses and Midwives to Promote a Safe Infant Sleeping eLearning Program Young et al.	2013	2244	Nurses were in key positions to influence safe sleep.	Prospective descriptive design	E	ES K

Intervention

E = Educational program
 B = Bundled approach including education
 F = Focus groups or interviews
 S = Survey or questionnaire of knowledge/attitude

Major Finding

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