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Steering the Titanic: One tertiary care children's hospital's experience navigating safe sleep for hospitalized infants

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ABSTRACT

Background: Sudden Unexpected Infant Death (SUID) is the leading cause of death in infants 1 month to 1 year of age in the United States. Despite extensive efforts in research and public education, rates of sleep-related infant death have plateaued since the late-1990s, largely due to unsafe sleep practices and environments.
Local problem: A multidisciplinary team assessed our institution's compliance with its own infant safe sleep policy. Data was collected on infant sleep practices, nurses' knowledge and training on the hospital policy, and teaching practices for parents and caregivers of hospitalized infants. Zero crib environments from our baseline observation met all the American Academy of Pediatrics recommendations for infant safe sleep.
Methods: A comprehensive safe sleep program was implemented in a large pediatric hospital system. The purpose of this quality improvement project was to improve compliance with safe sleep practice from 0% to 80%, documentation of infant sleep position and environment every shift from 0% to 90%, and documentation of caregiver education from 12% to 90% within 24 months.
Interventions: Interventions included revision of hospital policy, staff education, family education, environmental modifications, creation of a safe sleep taskforce, and electronic health record modifications.
Results: Documented compliance with infant safe sleep interventions at the bedside improved from 0% to 88%, while documentation of family safe sleep education improved from 12% to 97% during the study period.
Conclusions: A multifaceted, multidisciplinary approach can lead to significant improvements in infant safe sleep practices and education in a large tertiary care children's hospital system.

Background

Sudden Infant Death Syndrome (SIDS) is defined as the sudden death of an infant <1 year of age, which remains unexplained even after a thorough investigation including performance of a complete autopsy, examination of the death scene, and review of the clinical history (National Institute of Child Health and Human Development, 2017). Sudden Unexpected Infant Death (SUID), which includes deaths that are explained after an investigation and death scene review (such as accidental suffocation or strangulation in bed) or unexplained (such as deaths classified as SIDS), remains the leading cause of death in infants 1 month to 1 year of age in the United States, accounting for about 3400 deaths annually (Centers for Disease Control and Prevention, 2022).

Problem description

Repeated unpublished reports of the Dallas County Child Death Review Team (CDRT) note that infant deaths in an unsafe sleep environment is the leading cause of all child deaths across age groups at 29%, followed by gunshot wounds (26%) and car crashes (11%) (Dallas County CDRT, personal communication, November 14, 2022). Compared with Texas and United States data, Dallas County leads these areas with higher infant death rates overall, with 607.8 infant deaths per 100,000 live births, compared to 522.0 and 524.3 for Texas and the United States, respectively (Centers for Disease Control and Prevention, 2023).

To evaluate the need for the project and intervention, we sought to assess our institution's compliance with its own infant safe sleep policy, including an investigation into infant sleep practices, nurses' knowledge and training on the hospital policy, and teaching practices for parents

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and caregivers of hospitalized infants. In fall 2016, we evaluated 57 inpatient infant sleep environments through unannounced drop-ins in infant hospital rooms on various medical units at Children's Medical Center Dallas, our main campus. In addition, we surveyed 61 inpatient nurses on their knowledge of the hospital infant safe sleep policy and practices while caring for hospitalized infants. The baseline assessment revealed that zero of the crib environments met all the American Academy of Pediatrics (AAP) recommendations for infant safe sleep. The most prevalent violations of safe sleep recommendations were loose blankets and other extraneous items in the crib (present in 100% of the infant sleep environments evaluated) and frequent elevation of the head of bed without a medical indication (46% of cribs evaluated). An example of an unsafe crib environment revealed during our baseline assessment and a contrasting safe crib environment are shown in Fig. 1. Additionally, bedside nurses were frequently unaware of the infant safe sleep hospital policy and had inconsistent practices in educating families.

In 2018, we assembled a multidisciplinary team including nursing leadership, nurse educators, bedside nurses, injury prevention, and a physician leader to coordinate efforts to update the hospital policy, improve nurse education, and overhaul bedside practices at our institution. Our organization has over 7000 infant encounters annually, lending a huge opportunity to model and educate safe sleep practices for this vulnerable population.

Available knowledge

Though the cause of many sleep-related infant deaths remains elusive, environmental factors that place infants at higher risk have been well defined (Moon, 2016). The AAP recommendations for infant safe sleep include supine position for every sleep period, use a firm sleep surface, keep soft objects or loose bedding out of the infant's sleep area, and avoid bed-sharing on any surface (Moon, 2016). Infant sleep behaviors modeled in the hospital setting have been shown to influence subsequent home practices (Blair et al., 2006; Colson et al., 2001; Colson & Joslin, 2002; Fleming & Blair, 2003; Morrison et al., 2023; Raines et al., 2016). However, some studies note that medical professionals including pediatricians, family practitioners, obstetricians, and neonatal intensive care unit (NICU) nurses continue to have misperceptions about the safety of side and prone sleeping, even after the Back to Sleep campaign of the early 1990s (Aris et al., 2006; Bartlow et al., 2016; Fernandes et al., 2020; Moon et al., 2002; Patton et al., 2015). Hospital behaviors and discharge teaching practices are inconsistent and sometimes in direct contraindication to the AAP guidelines (Aris et al., 2006; Bartlow et al., 2016; Moon et al., 2002; Patton et al., 2015).

Adherence to safe sleep practices in the hospital setting has been shown to improve with quality improvement (QI) initiatives. In one such QI study (Kellams et al., 2017), participating maternal units increased the rate of infants observed sleeping on their back by over 90%. Project leaders created a safe sleep QI toolkit that was shared among participating maternity wards and included an education curriculum for staff and parents. In another study led by the AAP in Ohio pediatric hospitals known as the Education and Safe Environment (EASE) QI Project, infant safe sleep positioning in the hospital setting improved from 32.6% to 58.6% (Macklin et al., 2016). Results from the EASE QI study were further disseminated and implemented at Ohio pediatric and birthing hospitals in a follow-up study, leading to improvement in compliance to infant safe sleep practices from 37.0% to 59.6% in pediatric facilities and from 59.3% to 72.5% in birthing centers (Macklin et al., 2019). These studies demonstrate that while QI initiatives can be very helpful in improving practices and education, compliance rates to infant safe sleep guidelines may remain suboptimal despite active efforts even in premiere pediatric institutions.

A systematic review of the literature on interventions to increase adherence to safe sleep recommendations among healthcare professionals, childcare providers, and parents/infant caregivers was published in 2016 (Salm Ward & Balfour, 2016). Of the 29 studies analyzed, most articles reported some degree of success in changing behaviors, but no studies reported complete adherence to recommendations, highlighting the difficulties in effecting and maintaining sweeping behavior change. Most studies targeting healthcare professionals contained multiple interventions, including changing safe sleep policies, providing staff training, posting visual displays depicting safe sleep environments, displaying data on adherence to the safe sleep policy,

Fig. 1. An unsafe infant sleep environment revealed during our baseline assessment in 2016 (left), contrasting with a safe crib environment (right).

incorporating documentation of the sleep environment as part of the nursing care assessment, and/or monitoring compliance through peer review crib audits. The authors rightly point out that while use of multiple strategies and interventions may improve uptake of safe sleep messaging, it becomes nearly impossible to discern the effectiveness of each component.

Specific aims

The global aim of this quality improvement initiative was to reduce the risk of SUID post-discharge by identifying and enforcing safe sleep interventions during the hospital stay. The primary purpose of this project was to improve healthcare professionals' compliance with infant safe sleep practices for all hospitalized infants under 1 year of age from 0% to 80% in 24 months. The secondary purpose of this project was to increase awareness and organization-wide education about safe sleep at a large metropolitan pediatric hospital system for both parents and healthcare staff. A key driver diagram was used to visually display fundamental elements and interventions that were identified as essential to meeting the project aims (Fig. 2).

Methods

Context

This safe sleep program was implemented in a large metropolitan pediatric hospital system with two hospitals covering 562 licensed beds – 490 beds at Children's Medical Center Dallas and 72 beds at Children's Medical Center Plano.

Interventions

Staff education

Preliminary observational audits suggested the organization's safe sleep policy was unclear and inconsistently followed. Significant changes were made to the policy that adopted the recommendations from the 2016 AAP guidelines for infant safe sleep (Moon, 2016). The updated policy was reviewed by bedside staff across the organization and shared during multidisciplinary governance councils such as the Clinical Practice Council and the Clinical Practice Policy Council. Recommended changes and feedback were incorporated into the new policy. For example, exclusions to safe sleep positioning were added to the policy to address specific medical considerations that would exclude a patient from being placed supine for all sleep periods. Examples included infants requiring the use of developmental positioners, infants with respiratory conditions necessitating frequent position changes or head of bed elevation, infants with medical devices or requiring frequent position changes for pressure injury prevention, or infants requiring positioners to support ventilator, respiratory tubing, or other medical devices. Staff were advised to place all infants below age 12 months supine for sleep, remove any blankets, supplies, or other extraneous items from the crib, and keep the head of bed flat unless there was a provider order or medical condition that necessitated deviation from the safe sleep policy. Staff were educated that they could swaddle infants in a

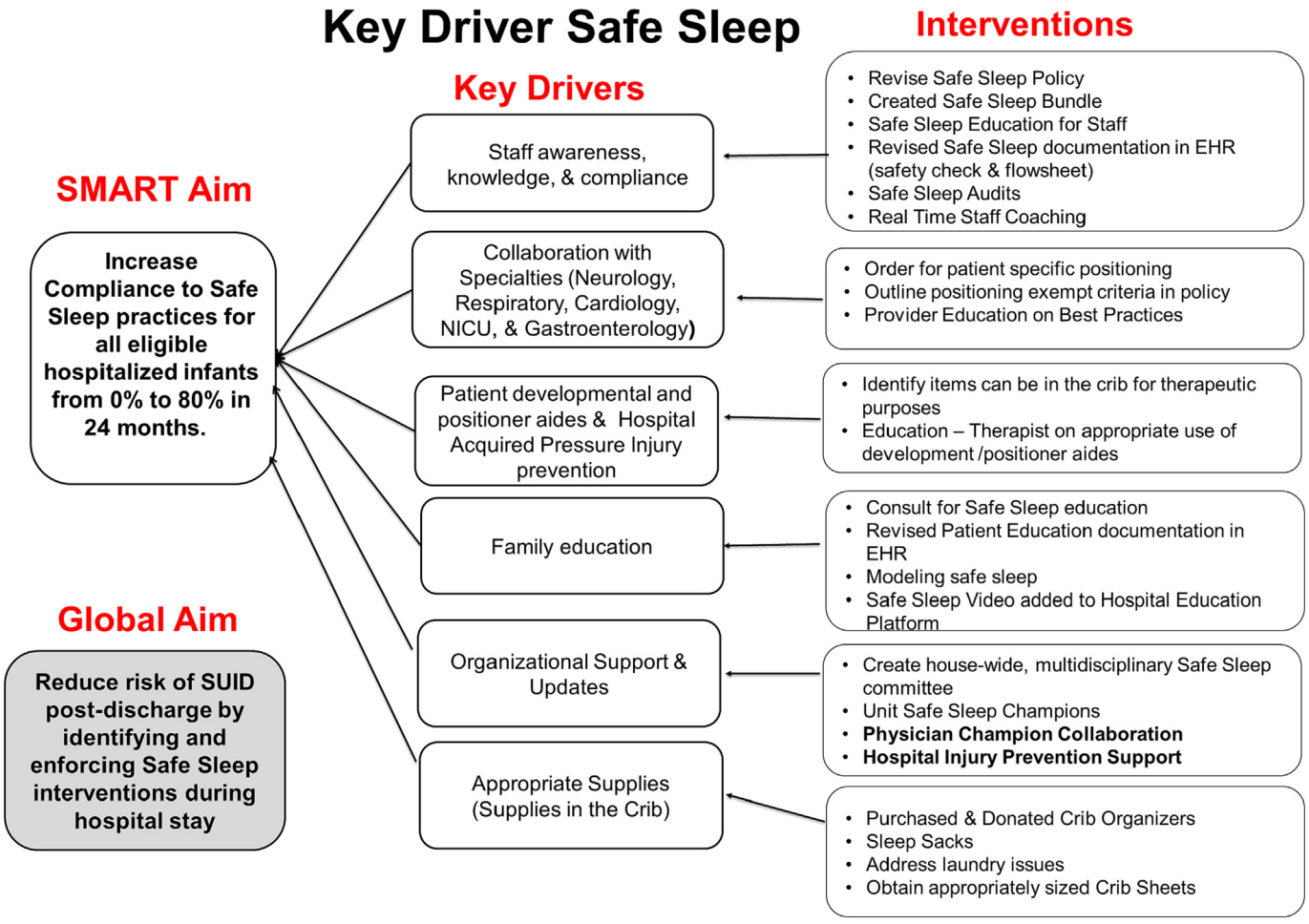

Fig. 2. Safe Sleep Key Driver Diagram. This map was used to plan and execute process improvement.

thin blanket, use no blanket, or use a sleep sack with arms tucked under two months of age or until infants were able to roll. In specific cases where there were special considerations preventing the application of one or more of the safe sleep recommendations, staff were asked to follow as much of the safe sleep policy as possible.

Staff education on the updated policy changes was provided in quick reference guide materials as well as mandatory computer-based training modules. Changes to the policy and staff education were also shared at nursing leadership meetings and emailed directly to leaders.

Parent education

Parent education materials were developed by the Injury Prevention Service and Patient Education Committee. Parent education materials included an infant safe sleep patient education brochure and handout, as well as a safe sleep poster in the room. Parents were educated on the ABCs of safe sleep: babies should sleep alone, on their back, and in a safe space designed for infant sleep like a crib, bassinet, or pack and play (portable crib). Parents were also educated on how best to swaddle infants based on their age and developmental stage, including the importance of having arms free once able to roll. Materials were translated and offered in both English and Spanish. A safe sleep informational video was offered from the Texas Department of Family and Protective Services. Bedside nurses assigned the educational video in the electronic health record (EHR) for families to watch on their personal devices or a tablet in the room using MyChart® for all patients under the age of 12 months. Teaching points that correlated with the video and patient education materials were automatically added to the patient education record in the EHR. Parent education was provided by members of the healthcare team and reinforced by nursing staff. Injury prevention and social work consults were built into the safe sleep policy to reinforce education for parents who struggled with complying with safe sleep practices in the hospital and/or at home.

Additionally, a safe sleep screening assessment was added to the admission patient profile for all patients admitted under age 1. If parents identified financial barriers as the reason the baby does not (or will not) sleep in a safe space designed for infant sleep, a Best Practice Advisory was triggered for social work to provide a pack and play to these families. Sleep sacks were not gifted to families at discharge, but they were made available for purchase at cost in our hospital pharmacy.

Environmental modifications

During the trial phase, sleep sacks were ordered to reduce use of blankets and encourage families and staff to practice safe sleep. Sleep sacks and swaddles were provided for free in limited quantities as part of an In-Hospital Modeling Program (HALO®, n.d.). However, in order for the sleep sacks to be laundered with the rest of the linens, nursing leadership and Environmental Services collaborated to order sleep sacks through the outside laundering company the organization utilizes. This adjustment allowed for linen carts throughout the system to be stocked with sleep sacks in newborn and premature sizes. Since sleep sacks were only used in premature and newborn sizes, they were only used until age 2 months or until infants were developmentally able to roll.

Mesh crib organizers were also ordered on the unit level to provide a convenient storage space outside the crib for items such as diapers, wipes, diaper cream, and toys. These organizers were routinely laundered after the patient was discharged and required specialized laundering. Team members and families used these organizers to ensure no extra items were left in the crib.

Safe sleep taskforce

In 2021, our multidisciplinary team expanded to a system-wide safe sleep taskforce, which, in addition to the core team formed in 2018, includes multiple bedside nurses and patient care technicians who serve as “safe sleep champions” on their respective hospital units to perform audits and to reinforce education and practice. Members of the safe sleep taskforce are asked to perform bedside audits on their respective units to identify compliance to the safe sleep policy using a safety card (Fig. 3). The safe sleep taskforce meets monthly to present compliance data with safe sleep documentation in the EHR and to discuss barriers to implement safe sleep practices in the hospital setting. Bedside audit data is also presented to identify opportunities for improvement.

Study of intervention

Process measures

Process measures were monitored using a monthly report pulled from the EHR, starting in September 2020. Process measure compliance was evaluated using new EHR documentation for safe sleep developed by the taskforce. Nurses were asked to document safe sleep compliance once per shift (twice per 24-hour period). Safe sleep documentation compliance was considered a binary variable, based on whether the EHR assessment was consistently documented once per shift throughout the hospital stay or not.

Parent education on safe sleep was automated in the EHR and assigned to every patient under 12 months old, also starting in September 2020. Parent education compliance was measured as a binary variable, based on whether parent education was documented or not.

Outcome measures

Outcome measures were evaluated using data from bedside audits performed by safe sleep taskforce members, which began in January 2022. Members of the taskforce were asked to complete five audits per month on their respective units, on patients for whom they were not a part of the care team. Patients were randomly selected, and audits were done at the convenience of the taskforce members. On some units with extended length of stays (e.g., NICU), patients may have been audited more than once. The goal of the audits was to standardize practice. Audits included 10 questions to assess compliance to policy using the safe sleep safety card (Fig. 3). Questions included the presence of an education card posted in the room; electronic medical record documentation; sleep positioning; use of tight-fitting sheet or tightly tucked sheet; crib space free of items; patient placed in a sleep sack, thin swaddled blanket, or without a blanket; supine positioning; and head of bed being flat unless there was a provider order or specific medical condition necessitating elevation of the head of the bed.

The safe sleep safety card is an auditing tool based on the Kamishibai Card (K-Card) process (Shea et al., 2019). K-cards are used to promote and sustain compliance to best practices by engaging frontline staff, leaders, and unit champions in conversation about best practice and barriers to compliance to policies or guidelines. These repetitive, nonthreatening cues can lead to compliance and better patient outcomes (Shea et al., 2019). Our organization uses Safety Cards (a type of K-card) to promote bedside compliance and prevent Hospital Acquired Conditions (HACs). The safe sleep safety card (Fig. 3) was created with the same intent. Plan, Do, Study, Act (PDSA) cycles were completed to ensure that the safe sleep safety card process would be a feasible and effective way to evoke change. Visual observations were made to assess the infants' position and crib environment. All questions on the Safety Card required an answer of “Yes” (compliant) for the audit to pass. Monthly audits were shared with each unit, compliance and trends were monitored, and barriers were discussed in monthly meetings (Fig. 4).

Ethical considerations

This project was determined to be a quality improvement project; as such, IRB approval by the authors' institution was not required. Parents who participated in our initial survey and assessment of inpatient sleep environments in 2016 provided written consent. Nurse participation was optional; consent was implied by agreeing to complete our survey. Patient data was not linked to the parent or nurse surveys, thereby

Safe Sleep Safety Card

1. **Is the Head of Bed education card posted?** **YES** or **NO**

Identify RN who is caring for the patient. Ask the nurse to show documentation:

2. Was the safe sleep flowsheet assessment completed at least once per shift in the past 2 completed shifts (Safety Checks) **YES** or **NO**
3. Are there any special considerations that prevent part of the safe sleep bundle?

YES or **NO**

If Yes Check all that apply:

- ☐ Sleeping position
- ☐ Special supplies in bed
- ☐ Head of bed elevated

Go to bedside with nurse and observe:

4. Is patient sleeping in crib or being held by awake parent or volunteer? (Yes, No, or N/A - Baby Awake)
5. Is there a tight-fitting sheet or tightly tucked sheet? **YES** or **NO**
6. Is the crib space free of items, such as pillows, stuffed animals, diapers, and extra blankets? **YES** or **NO**
7. Is patient in a sleep sack, wrapped in one thin swaddled blanket, or without a blanket? **YES** or **NO**
8. Is patient supine in the crib? **YES** or **NO**

   If No, Is the patient able to roll? Yes or No
9. Is HOB flat? **YES** or **NO**

   If No, is there a provider order or allowance per policy? YES or NO
10. Was the audit compliant (**green/yes** or **non-compliant red/no**)?

Fig. 3. Bedside Audit Tool/ Safe Sleep Safety Card. This card is hung at the head of the bed for each hospitalized patient under 12 months of age as a visual reminder to promote compliance with infant safe sleep. Additionally, these same questions are asked during bedside audit process. All 10 questions required a "yes" response in order to pass the audit.

honoring confidentiality and anonymity. Data and signed consents are stored in a locked location in the author's private office.

Results

Safe sleep compliance documentation

Initially, the newly-created documentation of infant sleep position and environment occurred in the musculoskeletal flowsheet row. The initial flowsheet documentation compliance started at 0% and increased to 32% in the last month of Q3 2020. With continued staff training and reports to unit champions and leaders, compliance with documentation continued to hover around 60–70%. Eventually, the documentation was moved to the safety check flowsheet, which is documented every shift by bedside nurses during shift change, and compliance with flowsheet documentation climbed to 90%, meeting our goal (Fig. 5, $n = 15{,}676$ patient records).

A total of 392 bedside audits were collected for this quality improvement project, consisting of 291 routine monthly audits throughout 2022 and 101 infants in our house-wide audit in October 2022. The routine monthly audits were performed on five participating hospital units for which we had safe sleep champions on our taskforce. Our first house-wide audit (prevalence audit) took place at our larger hospital. The purpose of the house-wide audit was to evaluate real-time status and compliance of the whole population at one point in time. It revealed lower compliance with safe sleep positioning and environment than prior monthly audits (Fig. 6), which were performed primarily on units with highly engaged safe sleep champions.

Family education documentation

Prior to adding safe sleep education to the patient education tab in the EHR, safe sleep education was documented as provided to families and caregivers of hospitalized infants only 12% of the time. Nurses would have to remember to load the education to the patient's education tab. Once the education was automatically added to the EHR in 2020, we saw an immediate increase in staff providing education to families 95% of the time, with further improvement to 97% by Q2 of 2022 (Fig. 7, $n = 15{,}676$ patient records).

Discussion

While the United States experienced a dramatic decline in sleep-related infant deaths after the "Back to Sleep" campaign of the early

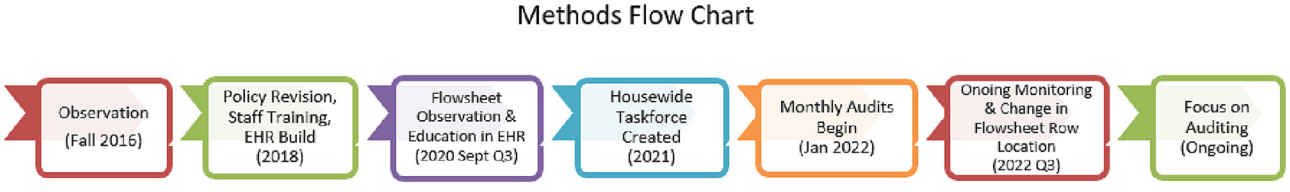

Fig. 4. Methods flow chart detailing the timeline of assessments and interventions.

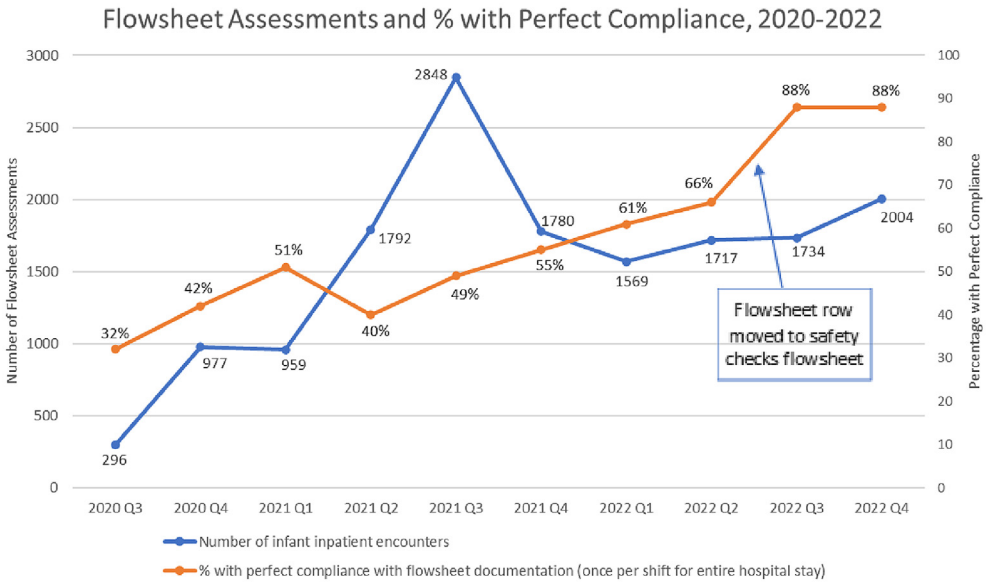

Fig. 5. Number of Flowsheet Assessments and Percentage with Perfect Compliance with Documentation, 2020–2022. Figure reflects percentage of infant inpatient encounters for whom a safe sleep flowsheet was completed once per shift for the entirety of their hospital stay. Note: Work was initiated in the last month of the third quarter of 2020.

1990s, we have unfortunately made no further progress since the late '90s. In fact, the rate of accidental suffocation and strangulation in bed is rising due to unsafe sleep environments (Centers for Disease Control and Prevention, 2022). While the exact etiology of SUID remains elusive in many cases, clear risk factors have been identified, and it is likely that many, if not most, of these tragic deaths are preventable. Several authors have demonstrated that unsafe sleep practices remain common, despite parents' knowledge of the safe sleep recommendations (Caraballo et al., 2016; Chung-Park, 2012; Cole et al., 2021). The most effective form of safe sleep messaging to compel behavior change is a topic of ongoing research and is likely to be different for different demographic and socioeconomic groups.

We demonstrated that a broad, multifaceted approach to improving infant safe sleep practices and education can be successfully implemented in a large, multi-site, tertiary care free-standing children's hospital. We also showed significant improvements in infant safe sleep practices over 24 months of follow up. Though we are not able to prove an associated change in home sleep practices or a decrease in sleep-related infant deaths, prior authors have demonstrated that caregivers tend to model at home the sleep positioning and environment they observe in the hospital setting (Blair et al., 2006; Colson, Bergman, Shapiro, & Leventhal, 2001; Colson & Joslin, 2002; Morrison et al., 2023; Raines, Barlow, Manquen, Povinelli, & Wagner, 2016; Fleming & Blair, 2003).

Large amounts of data were collected at various time points throughout this quality improvement project. This taskforce utilized Plan Do Study Act (PDSA) process to make ongoing practice improvements, ensure compliance, and enhance data collection methods. Practice changes (documentation in EHR) necessitated data collection

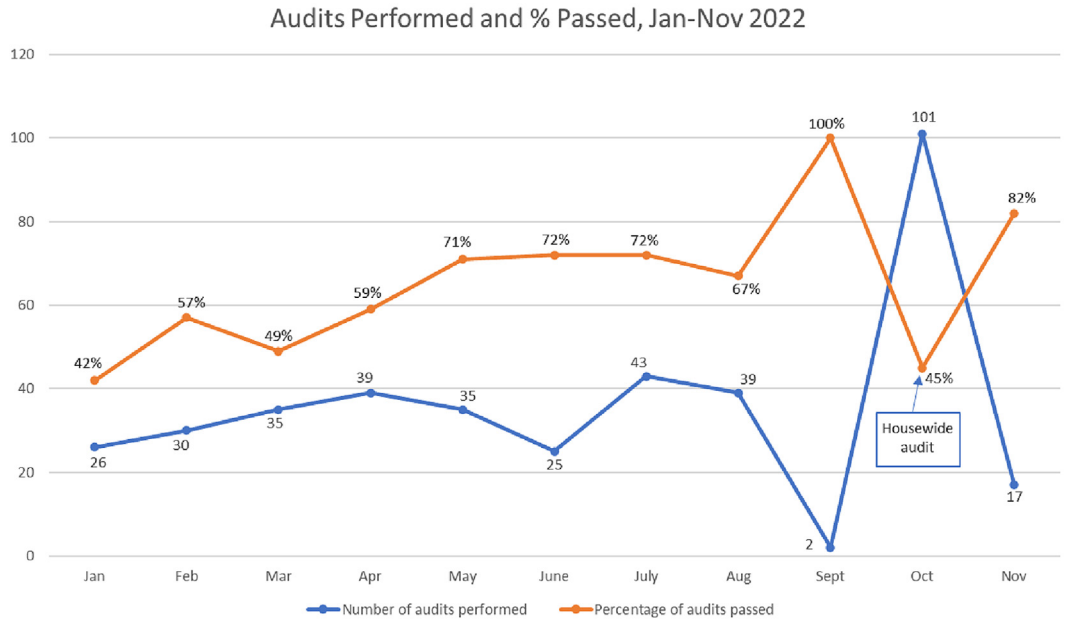

Fig. 6. Number of Audits Performed and Percentage Passed, 2022. All 10 questions on the Safe Sleep Safety Card (Fig. 3) had to be answered "yes" in order for the audit to achieve "pass."

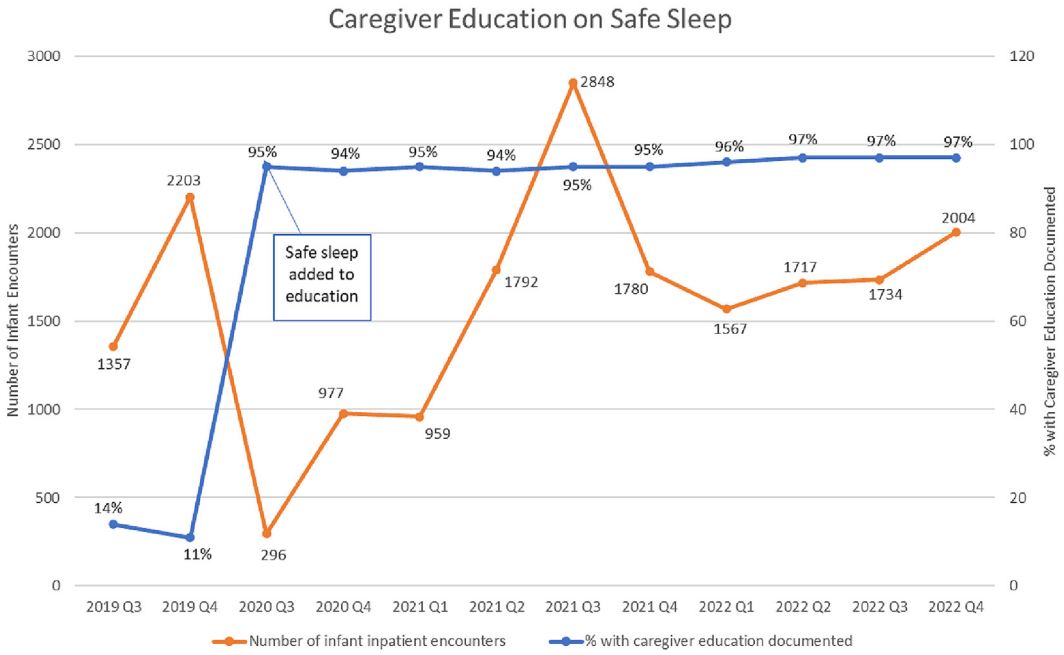

Fig. 7. Percentage of Families Educated on Safe Sleep. After education was added to the EHR, we saw an immediate spike to the mid-90s in the percentage of families/caregivers for whom infant safe sleep education was provided and documented, with sustained success in family education for over 2 years. Note: Work was initiated in the last month of the third quarter of 2020.

amendments resulting in some complexity in how our project outcomes are displayed, trended, and interpreted.

The finding of lower compliance with safe sleep practice in our house-wide audit compared to previous monthly audits (Fig. 6) suggests that our previous audit data showing high rates of compliance with safe sleep may have been skewed by the presence of safe sleep champions on the individual units where the audits were performed. These champions consistently reinforce best practices on their respective units and likely improve outcomes. Another consideration is that some infants who were audited may not have been eligible for safe sleep due to critical condition, presence of positioner aids, or other necessary medical devices. However, the evidence of lower compliance on units without such involved staff highlights the importance of a committed champion on every unit to continuously reinforce safe sleep and achieve sustained success.

Strengths of our study include broad scope of our team including leadership from injury prevention, nursing, child life, education, clinical nurse specialists, therapy services, social work, and a physician champion, as well as our large volume of infant hospital admissions across two sites. The cost of our intervention is minimal, as sleep sacks are provided free in limited quantities by a laundering service and the remainder of our interventions are primarily related to education, policy, and practice change, which, once implemented and incorporated into hospital practice, incur minimal cost.

We believe this work to be of utmost importance to assist families in translating infant safe sleep practices from the hospital to home. The intervention and outcome are sustainable but require frequent ongoing audits, reeducation, and reinforcement to achieve long-term success. We identified champions on individual hospital units to help reinforce safe infant sleep practices on their respective floors with ongoing education of both staff and parents. Revising the hospital policy with one round of education is not adequate to achieve short- or long-term success with safe infant sleep practices. Previous authors have published similar difficulties modifying infant safe sleep behaviors and environments in the hospital setting, reflecting the complexities of widespread institutional change (Heitmann et al., 2017; McMullen et al., 2016; Rowe et al., 2016; Shadman et al., 2016). Though similar quality improvement projects have been able to demonstrate statistically significant improvements in provider knowledge and/or safe sleep practices, post-intervention safe sleep practices among hospitalized infants seem consistently suboptimal, ranging from 12% to 72% among studies reviewed (Frey et al., 2020; Macklin et al., 2016; Rowe et al., 2016; Shadman et al., 2016).

The AAP recommendations for infant safe sleep are straightforward and should be simple to accomplish in the hospital setting. Unfortunately, a variety of barriers prevent optimal adherence. Although we set our goal at 80% adherence with safe sleep practices for the initial stage of this quality improvement project, we hope our continued work achieves eventual 100% compliance. Nonetheless, we acknowledge that SUID deaths in the hospital setting are exceedingly rare, and the assumption that parental education and observation in the hospital translates to home practice may not hold true in many circumstances. The most effective form of safe sleep messaging remains unknown and likely varies between different cultural, personal, and socioeconomic conditions. Without a thorough understanding of the factors that motivate an individual's behaviors at home, effecting changes in home practice remains difficult. Recommendations for future work and study include identification of methods for even higher adherence to safe sleep practices and investigation of how well these practices translate to behavior in patients' homes.

Based on the above improvements to our processes and procedures, our team pursued Cribs for Kids® certification for Safe Sleep Champion Level Gold and earned this designation in November 2022. We became the first major children's hospital in Texas and only the fifth hospital overall in our state to earn this distinction. Additionally, our team leads the North Texas Safe Sleep Taskforce, a collaboration of six local hospitals and several non-profit organizations working together to improve safe sleep practices and education in both hospitals and the community. Through our leadership, two of these hospitals are pursuing Cribs for Kids® Safe Sleep Champion certification as well.

Limitations

Limitations of our work include potential difficulty generalizing our strategies and practices to other institutions, which may have their own unique habits and barriers. Our intervention was tailored to address the

specific challenges of our institution, such as the widespread practice of storing spare linens and supplies at the foot of the infant crib and the routine head-of-bed elevation for all infants, often without a medical indication. Other hospitals and institutions may have different challenges that need to be addressed with different approaches. However, our authors' experience communicating with and working at other pediatric institutions has been that many face similar challenges. An additional limitation was that the auditing process did not differentiate between healthcare staff and parents placing the infant to sleep. This data is difficult to collect using observational audit process but could be helpful to target education. If healthcare staff found infants sleeping in an unsafe environment due to parental behavior, they were asked to correct the unsafe behaviors in real time and use that opportunity to provide further education to parents/caregivers.

Implications for nursing practice

Nurses and other healthcare team members are important role models for parents and caregivers in the hospital setting. They are uniquely positioned to model and promote safe sleep practices in the hospital environment and to help educate parents and caregivers on the importance of continuing safe sleep practices at home. The unit in our institution with the greatest success in implementing recommended safe sleep practices was led by nurse champions. Nurse champions presented infant safe sleep education in unit council and staff meetings. Champions conducted monthly audits and utilized the opportunity to conduct real-time education. Patient care technicians were also included in the unit education as they often perform linen changes and are pivotal members of the team who can make appropriate environmental modifications to keep infants safe.

One of our cardiology nurses reported a code event on the cardiology floor, during which she felt adherence to safe sleep practices significantly impacted the success of the code. The nurse commented that having the crib free of extraneous items and the baby easily accessible for immediate compressions upon loss of pulse likely contributed to a positive outcome for this patient. This case highlights the importance of safe sleep practices not only to reduce risk of SUID but to improve outcomes in severe medical circumstances as well.

Conclusion

While many hospitals that care for infants struggle to implement and maintain consistent infant safe sleep practices, we developed a successful multifaceted approach to effect significant improvement in safe sleep practices, as well as staff and caregiver education, at a large, tertiary care metropolitan pediatric hospital system. We are hopeful that other hospitals may be able to use some or all these strategies to improve infant safe sleep practices at their respective institutions.

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SQUIRE 2.0 guidelines were used to format this QI project manuscript.

CRediT authorship contribution statement

Michelle Caraballo: Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Supervision, Visualization. **Marisa Abbe:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Supervision, Formal analysis, Investigation, Data curation, Visualization, Project administration. **Jerithea Tidwell:** Conceptualization, Methodology, Investigation, Writing – original draft, Writing – review & editing, Visualization. **Hayden Dutton:** Conceptualization, Methodology, Writing – original draft, Writing – review & editing, Supervision, Investigation, Project administration. **Mayra G. Garcia:** Conceptualization, Investigation, Writing – original draft, Writing – review & editing. **Gemmarie Punzalan:** Investigation, Writing – original draft, Writing – review & editing. **Alison Axon:** Investigation, Writing – original draft, Writing – review & editing.

Declaration of Competing Interest

The authors declare no conflicts of interest.

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