

Abstracts Presented at the 14th National Advanced Practice Neonatal Nurses

Waikiki Beach, HI, April 19-22, 2017

These are the abstracts for the poster and podium presentations from the recent 14th National Advanced Practice Neonatal Nurses Conference in Waikiki Beach, Hawaii. They represent a broad range of neonatal issues. By sharing this information, we hope to increase awareness of research and innovative programs within the neonatal health care community, and support evidence-based nursing practice. Some abstracts have been edited for publication.

Comparison of Neonates Receiving Nasal Continuous Positive Airway Pressure in Tertiary and Non-Tertiary Centers

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Background: Some Victorian non-tertiary nurseries provide nCPAP to mid/late pre-term and term neonates. State guidelines underpin safe practices and prompt transfer if criteria are not met.

Aim: Compare neonates receiving nCPAP in tertiary and non-tertiary centers, to determine any differences in caseload, management and outcome.

Method: Retrospective data analysis over five years 2010-2014 (6 sites). Preliminary data set (2 sites) of non-tertiary subjects ≥ 32 weeks, ≥ 1500 g receiving nCPAP (via bubble CPAP or ventilator) for respiratory distress within their first 24 hours ($n=73$) were compared with a similar cohort of (randomly selected) inborn neonates at a tertiary center ($n=341$). Analysis conducted using SPSSv22. Main outcome measures: maternal/neonatal demographics; CPAP duration; pneumothorax and nasal trauma rates; enteral feeds during nCPAP; and caffeine.

Results: Non-tertiary subjects were more likely to be singleton males; born via elective caesarean section ($p=.001$); and receive a chest x-ray ($p < .001$). Tertiary subjects were more likely to receive feeds ($p=.03$) and caffeine ($p=.01$). Duration of nCPAP differed between centers ($p < .001$) with tertiary centers using nCPAP more often for short periods of time (< 6 hours). There was no difference with nasal trauma or pneumothorax rates. There was no difference in nursery length of stay for neonates discharged home ($p=.38$).

Conclusions: Preliminary data suggests that there are minor differences in caseload, some variation in management and little difference evident in outcomes.

Developing a Guideline for Transferring Premature Infants from Incubator to an Open Crib in the NICU

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In neonatal intensive care units (NICUs) achieving stable temperature in an open crib is one of the criteria for discharging premature infants. Few studies examined the weaning process of a stable preterm infant and policies and procedures vary between institutions. The purpose of the study was to identify guidelines for successful transfer of stable preterm infants from an incubator to open crib while maintaining thermoregulation within the acceptable axillary temperature between 36.5–37.2 degrees C.

A retrospective chart review was conducted on infants between 23-34 6/7 gestational ages at birth and who were stable at the time of transfer from incubator to open crib from January 2010–December 2015. Stratified data, based on the gestational age at birth, were obtained on mean weight, approximate post menstrual age, and incubator temperature for 725 infants successfully transferred in the NICU.

Regardless of the gestational age at birth, there was no difference on the average weight, gestational age and incubator temperature at the time of a successful transfer. The weight varied from 1,876–1,990 g, gestational age 34.4–35

weeks; and incubator temperature at 26.8–28.8 degree C. The data could be used to develop a preliminary guideline for transferring infants successfully from incubator to open crib.

Differences in Mortality and Serious Morbidity When a Dedicated Neonatal Transport Team Attends Extremely Preterm Births in Non-Tertiary Hospitals

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MURDOCH CHILDREN'S RESEARCH INSTITUTE AND PAEDIATRIC INFANT PERINATAL EMERGENCY RETRIEVAL
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Background: In Victoria, Australia, a dedicated retrieval team (PIPER) attend “outborn” births <29 weeks whenever feasible. The effectiveness of this strategy in reducing serious morbidity and infant mortality has not been investigated.

Method: A prospective study of 23-28 week PIPER retrievals in 2010-2011. Serious morbidity to hospital discharge and infant mortality data were compared for births PIPER attended with those retrieved after birth. Outcome data were analyzed by logistic regression, adjusted for gestational age, birthweight and sex.

Results: 60/92 outborn live births were referred to PIPER. PIPER attended 21/60 (35 percent) births. By one year, 2/21 infants with PIPER present at birth died, compared with 8/39 without PIPER present (aOR 0.36, 95 percent CI 0.05, 2.71, $p=0.32$). There were no significant differences in rates of necrotizing enterocolitis ($p=0.89$), intraventricular hemorrhage ($p=0.77$), periventricular leukomalacia ($p=0.26$), or bronchopulmonary dysplasia ($p=0.43$). Births attended by PIPER had a lower risk of retinopathy of prematurity [ROP], ($p=0.017$) and the combined outcome of death or ROP ($p=0.008$) compared with births without PIPER present.

Conclusion: The presence of a neonatal retrieval team at outborn births <29 weeks was associated with lower rates of ROP and the combined outcome of death or ROP compared with births without PIPER in attendance.

Do Nursing Staff Demographics Influence the Incidence of Burn Out, Compassion Satisfaction and Secondary Traumatic Stress in the Neonatal Intensive Care Setting?

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Background: The nature of the neonatal intensive care setting exposes nursing staff to stressors that can influence their quality of life and levels of professional satisfaction. This component of a broader study sought to explore the relationship between staff demographic characteristics and their potential link to the prevalence of compassion satisfaction, burnout and secondary traumatic stress.

Method: A cross sectional cohort study of 142 nurses working in NICU's in NSW, Australia were surveyed using an online self-report questionnaire that measured quality of life, work stress and perceived social support.

Results: Analysis of the cohort's demographic statistics for group differences showed statistically significant results for: Relationship status (married or single) and full-time employment with higher compassion satisfaction ($p=0.15$ and $p=0.37$). Years of experience increasing burnout and secondary traumatic stress ($p=0.46$, $p=0.49$ and $p=0.28$), whereas higher levels of education lowered levels of burnout and secondary traumatic stress ($p=0.24$, $p=0.18$ and $p=0.0030$). ANOVA demonstrated relationship and experience as predictors of burnout ($p=0.032$ and $p=0.019$) and employment for compassion satisfaction ($p=0.007$).

Conclusions: Understanding the professional quality of life influences linked to staff demographic groups may support managers and educators to positively influence the work environment, identify support for vulnerable groups and positively influence recruitment and retention of staff in the NICU.

Making a U-turn in the NICU: Creating Change to Promote Infant-Driven Feedings and Sustainable Use of Human Milk

Disclosure: This presenter is a consultant for Medela

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Cue-based or Infant Driven Feeding is an important developmental practice in the NICU. Attainment of this process involves a complete change in understanding, procedure, and culture to overcome outdated and previously adopted practice. Education, evidence-based protocols, standardized tools and evaluations, as well as unit competencies are effective tools in leading the charge to create this change.

Our NICU was looking to create a culture change and move to an infant driven model of feeding our compromised infants. In addition, the NICU has been very involved in an incredible journey to embrace human milk for our babies and families. Beginning with an aggressive commitment to pumping, providing colostrum as oral care, and donor milk, we are meeting our goals.

A discussion of culture change and meeting our cue-based and breastfeeding goals will be discussed. New novel nipples were evaluated and tested to discover whether this change in addition to education, practice changes, evaluated algorithms, and standardized assessments would influence our unit's ability to improve outcomes and meet our goals.

Establishing Cut Scores for Two Instruments: Technology vs. Observation

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The purpose was to evaluate sensitivity and specificity and determine cut scores of the Whitney Mercury Strain Gage (WMSG) and a Clinical Bottle Feeding Scale (CBFS). Study questions addressed were (a) what is the lowest score for efficient feeders (specificity) and the highest score for inefficient feeders (sensitivity) on the CBFS; (b) what is the average number of sucking bursts and pause durations on the WMSG for the efficient feeders (specificity) and inefficient feeders (sensitivity); (c) which method had the fewest false negatives; and (d) which instrument had the best overall classification of feeding efficiency? A comparative descriptive design with a convenience sample of 45 preterm infants was used.

CBFS cut scores of 20 or less and 21 or greater were revealed for inefficient and efficient feeders, respectively. WMSG cut scores of 12 or less and 13 or greater were established for the efficient and inefficient feeders on bursts, respectively. WMSG cut scores of 8 seconds or less were revealed for efficient and 9 seconds or greater for inefficient feeders on pause duration. The CBFS had fewer false negatives than the WMSG and best overall classification. Findings suggest that both instruments differentiate between efficient and inefficient feeders.

Improving an ELBW Premie NICU Experience Through a Newly Designed Diaper that Supports Skin Health

Disclosure: The presenters are salaried employees of Pampers - Procter & Gamble

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Extremely low birth weight premature babies (ELBW) have many unique needs. Over 50 percent of NICU nurses (151 nurses interviewed COINN 2016) believe the diapers they use do not properly fit or conform to a preemie's developmentally aligned position, nor support skin health.

A single product, usage survey conducted in four NICUs caring for ELBW babies evaluated a new diaper design optimized for ELBW babies. Sixty diapers were provided for each baby. Nurses completed surveys at the end of their shift to assess preference for the newly designed diaper or the diaper usually used, and evaluated it for several key performance attributes. Surveys were completed for 76 nurse-baby pairs. Overall, 92 percent of nurses preferred the new diaper for ELBW babies compared to the diaper usually used. Further, 95 percent of them would recommend the new diaper to other nurses and 92 percent agreed that this diaper allowed them to provide the best care for a baby of this size. Over 93 percent of nurses indicated the new diaper locked away mess and provided the best environment for micro preemie skin.

Nursing Needs for Preemie Diaper Performance

Disclosure: The presenters are salaried employees of Pampers - Procter & Gamble

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The design and performance of NICU diapers is important to the well-being of preemies. Globally, diapers are the first garment worn by premature babies. Diapering is one of the most common activities conducted by nurses and parents in the NICU (average 6-8 times per day). This study surveyed 151 nurses at the Council of International Neonatal Nurses (August 2016) to understand key diaper performance needs. Results showed nurses (100 percent) felt it was important to be consulted in the design of preemie diapers and that they preferred diapers tested in hospitals (95 percent). Key needs identified for diaper design included flexibility between the legs (99 percent), narrow crotch to fit between legs (96 percent), as soft and gentle as possible (100 percent), and leakage protection (97 percent). Unfortunately preemie diapers available at the time of the survey did not adequately meet all of these needs. Nurses frequently encountered diapers that did not provide the best fit for preemies (76 percent), were too wide between the legs (78 percent), and leaked in the hospital (60 percent).

Skin-to-Skin Contact as Pain Management Intervention During Clustered Painful Procedures in Healthy Full-Term Neonates

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Pain in neonates is substantiated, and its detrimental effects are established. Healthy full-term neonates must undergo several painful procedures (injections, heel-sticks, and circumcisions) before hospital discharge, thus, pain management interventions are essential. One intervention is Skin-to-Skin Contact (SSC). This study aims to test the effect of SSC on physiologic and behavioral pain responses during and after clustered painful procedures in full-term neonates.

This pilot randomized controlled trial included sixteen full-term neonates who were randomly assigned to either the intervention group (being with the mother in SSC before (10-15 minutes), during (heel sticks and injection), and after (20 minutes) the procedures) or the control group (the neonate were in the crib in the nursery before (10-15 minutes), during (heel sticks and injection), and after (20 minutes) the procedures). A pulse oximeter was attached to the neonate's hand or foot to measure Heart Rate and Oxygen Saturation. A video camera was set up to record the whole procedure. Video tapes were viewed and Behavioral States were recorded using Anderson Behavioral State Scoring system. One staff nurse administered all painful procedures.

Descriptive tests will be completed to provide a description of the sample. Repeated measures analysis of variance and t-test will be used to investigate differences in the Heart Rate, Oxygen Saturation, and Behavioral State. The results of this study could provide some evidence on the effectiveness of SSC during clustered painful procedures.

The Effect of Web Camera Technology in the NICU

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Parents with a baby in the NICU face challenges that most parents do not have to experience. Limited visitation ability of the parents due to financial, medical or other reasons can increase parental stress and decrease bonding with their baby (Yeo, et al. 2011). To help alleviate some of the challenges parents face, NICUs have been installing web camera systems as a way for parents to view their baby remotely. The purpose of this project is to assess the effect of the installation of web cameras in the NICU on parents and staff members.

This study applies a descriptive, comparative design to two subjects: The first subject being the parents and the second subject being the staff members (nurses, doctors, respiratory therapist and secretaries). The parents will be surveyed regarding satisfaction, bonding, and anxiety before and after implementation of the web camera system. The staff will be surveyed to measure their feelings related to the web camera system. A survey will be sent to staff prior to the installation of the cameras and resurveyed two months after implementation. The results will be compiled and compared to the baseline.

The Gut-Brain Axis: A Key Relationship in Neonatal Health and Development

Disclosure: This presenter received a research grant from Prolacta Biosciences

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Emerging evidence indicates that a dynamic, reciprocal relationship exists between the nervous system and the gastrointestinal system. A neuroendocrine axis has been delineated between the brain and the gut that is capable of modulating both health and development. This connection is particularly important in the premature infant, in whom brain development is 'plastic' and susceptible to intestinal dysfunction which may be secondary to dietary insufficiency, enterally-derived oxidative stress, and/or intestinal dysbiosis. For example, autism spectrum disorders and a variety of behavioral effects have been linked to early alterations in the intestinal microbiome. Conversely, efferent neural signaling can disrupt intestinal function, causing malabsorption and disrupted homeostasis. We review key events during gut/brain development, critical 'risk nutrients' requisite for optimal brain development and function, as well as evidence highlighting the importance of the gut brain axis. We will also present novel findings which illustrate potential linkages between intestinal inflammation of neuronal cell death. Ultimately, an understanding of the many linkages between brain and gut will help promote clinical practices aimed at promoting optimal development and health of preterm infants.

What are We Telling the Parents of Extremely Preterm Infants?

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Background: Parent counselling and decision-making regarding the management of preterm birth is influenced by information regarding potential infant outcomes provided by clinicians.

Aim: To determine if perinatal clinicians had accurate perceptions of survival and major neurosensory disability rates of extremely preterm infants born in non-tertiary hospitals ("outborn") and tertiary perinatal centers ("inborn").

Method: We surveyed midwives, nurses, obstetricians and neonatologists working in tertiary and non-tertiary maternity hospitals, and the perinatal/neonatal emergency transport services in Victoria, Australia.

Main outcome measures: Estimates of survival rates at 24 and 28 weeks were compared with actual survival rates of a population-based cohort of 24 and 28-weeks infants, born in Victoria in 2001-2009.

Estimates of major neurosensory disability in 24 and 28-week survivors were compared with actual disability rates in 24 and 28-week children born in Victoria averaged over three eras: 1991-1992, 1997 and 2005.

Results: 339/1143 surveys were completed. Overall, respondents underestimated survival and overestimated major neurosensory disability rates in both outborn and inborn 24 and 28-week infants. Outborn infants were perceived to have much worse prospects for survival and for survival with major disability compared with inborn peers.

Conclusion: Many clinicians may be misinforming parents about their child's potential for a favorable outcome.

Building a NICU Evacuation Plan

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Situation: In 2010, we opened our 20 room single patient family NICU in California, near a major fault line and approximately 3 miles from the ocean. We are in a high risk location. However, in 2013 our disaster preparation consisted of; a confusing evacuation map, three evacuation aprons, a few flashlights, and a transport pack.

In October 2012 news of New York Hospital nurses evacuating NICU babies down 9 floors of stairs during a hurricane, put a spotlight on our need to improve our plan. We were not ready to evacuate our vulnerable patients from the 3rd floor NICU.

Intervention: A multidisciplinary team was assembled. Utilizing a Neonatal Network article by Phillips, et al. "Disaster Preparedness; Emergency Planning in the NICU" as a guide, our evacuation plan was developed. Teamwork resulted in the creation of an evacuation policy; purchasing emergency backpacks and filling them with supplies, acquisition of 4 MedSleds and foam inserts, assembly of "Go Kits" with Hospital Incident Command System (HICS) forms and charting forms for RNs and MDs, and revised evacuation map to reflect room numbers and landmarks.

Outcome: Staff is more confident of preparedness with annual skills training and mock evacuation drills.

An NNP-Led Approach to Improving Level II Nursery RN Staff Orientation and Development

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An NNP-led training program for new Level II Nursery RN staff was implemented in a community hospital, with an average of 100 admissions to the Level II Nursery yearly. Due to variable census and minimal acuity, staff typically has limited exposure to higher acuity patients and practice stabilization skills. An NNP-led group performed a baseline assessment of the orientation materials and process, as well as an assessment of the knowledge and comfort levels with varying topics among new staff. An orientation checklist was created, as well as a binder of information. Focused 1:1 sessions were then carried out, and NNPs covered utilized both a didactic conversational approach, as well as hands on skills training. Follow up assessment of the same group of RNs noted improvement in both knowledge and comfort, and the orientation process was improved.

Developing Scholarship in DNP Students

Cheryl A. Riley, DNP, RN, NNP-BC

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This University has a rich history of supporting and encouraging scholarship in our NNP graduate students. Imbedded in the curriculum are assignments to enhance the writing skills of students. This is exemplified by the case study assignment. The guidelines are rigorous and the assignment spans two semesters. Faculty provides feedback at several points to guide and support the students writing journey. A description of the assignment and grading criteria will be discussed as well as lessons learned.

All case studies were accepted with revisions. In collaboration, faculty and students spent the next semester revising and refining the case studies. Students gained an appreciation of how difficult it is to write scholarly articles, navigate permissions, and to work through the revision process.

There were many lessons learned. The assignment now requires the identification of the submitting journal at the beginning in order to write per author guidelines. In addition, once the final draft is complete the students send their manuscript to a peer in the course to provide feedback and editorial suggestions before it is submitted to faculty. While this is a rigorous assignment for both faculty and students the outcomes were beyond our expectations.

Development and Evaluation of a Radiation Safety Program in the NICU

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Advancements in medical care have resulted in births of decreased gestation and higher acuity. With increased acuity comes an increase in diagnostic testing, including radiologic imaging. Although X-rays are necessary, they do not come without risk including the future development of cancers. To decrease radiation exposure in the NICU, a radiation safety program was developed, implemented, and evaluated over a five-year period. This program focused on staff education, which included: evaluating the actual need for radiologic examinations, determining the correct x-ray to be ordered, areas of the body to be exposed, and limiting exposure with proper shielding and positioning. To determine the effectiveness of the program the number of x-rays completed, over a one-year period, was collected prior to, directly after, and five years post intervention. Prior to the radiation safety program the mean number of x-rays completed was 4.2 per patient, directly after implementation the mean decreased to 3.8, and five years post intervention the mean significantly decreased to 1.9 x-rays per patient per hospital stay. Development of a radiation safety program decreases the amount of radiation patients are exposed to during their NICU stay therefore decreasing the risk of developing radiation-induced cancers in the future.

NICU Satellites: Extending the Reach of a Regional Children's Hospital and Utilizing Neonatal Nurses in Specialty Roles to Serve the Community

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RADY CHILDREN'S HOSPITAL SAN DIEGO
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This poster will illustrate the innovative approach to providing care to neonates and their families at outlying hospitals within a community in the form of NICU satellites.

Rady Children's Hospital, San Diego (RCHSD) is a powerhouse of resources for neonatal patients. Typically, a Level IV NICU receives its patient population from delivery centers within the community, county and beyond. These infants are often transferred for a higher level of care and/or surgical services, and from delivery centers that simply do not have a NICU. Since 1999, RCHSD (formerly Children's Hospital, San Diego) has been able to provide neonatal services in the form of a Satellite NICU to many community hospitals without exhausting the resources required of a Level IV NICU.

The poster will demonstrate how the RCHSD Satellite NICU program provides state of the art neonatal care, promotes mother-infant bonding, and limits transports while reducing overhead cost for the host hospitals. It will also present an overview of the advanced practice nursing roles such as Advanced Life Support nurses, Neonatal Nurse Practitioners, and Nursing Leaders, who are able to function autonomously within the Satellite NICU.

Prevent Pain and Organisms from Skin and Catheter Entry

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1. Over the course of 5 years, we tracked invasive procedures (POKES), infection rates, and associated costs, for all NICU patients.
- 2 We tracked POKES using a database, discussed POKE score on rounds every day, including family participation in order to implement increased awareness and accountability.
- 3 We built a case for every POKE and eliminated any POKES that were not obligatory; one practice that changed was to draw admission labs from a placental vein.
4. Our results were astounding, resulting in significant financial savings and pain avoided to our tiny patients.
5. We summarized our results into tables.

Reducing Neonatal IVH Using a Care Bundle: Performance Improvement Project

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Intraventricular hemorrhage (IVH) occurs in 20 to 25 percent of infants born before the 30th week of gestation or weighing <1,500 g at birth. Of this group of infants, approximately 10-15 percent will suffer the more severe grades (III or IV) of IVH. Intraventricular hemorrhage graded at severe (III or IV) is a significant risk factor for adverse developmental and neurocognitive outcomes, particularly, cerebral-palsy. The average cost of treating a severe grade of IVH is estimated at \$53,600 per infant. Evidence in the literature shows that implementing an IVH care bundle that reduces noxious stimuli, promotes gentle handling, maintains neutral thermal environment, and minimizes fluctuations in cerebral flow, most importantly mean arterial pressure (MAP), reduces the incidence of severe IVH, thus leading to improved outcomes, decreased cost of care, and length of hospital stay. Knowing and understanding the prevalence, pathophysiology, and risk factors of IVH, and utilizing a standardized care bundle, the neonatal clinical care team at our Regional Medical Center reduced the incidence of severe grades of IVH by 22 percent in infants <30 weeks and <1,500 g at birth, from 2015 to 2016.

Safe Sleep for Pediatric Inpatients: A Quality Improvement Success Story

Penny Smith, BSN, RNC-NIC

UNIVERSITY OF IOWA STEAD FAMILY CHILDREN'S HOSPITAL
IOWA CITY, IOWA

A multidisciplinary workgroup was organized to evaluate and improve safe sleep practices for infants in all inpatient settings at Stead Family Children's Hospital: Mother-Baby unit, NICU, PICU, and two pediatric units. Data regarding sleep position and objects in the crib of sleeping infants <12 months of age was collected using an observational survey tool. Baseline data revealed many unnecessary objects in cribs of sleeping infants and unsafe sleep positioning was common. Sleep safety practices hospital-wide were inconsistent. Targeted interventions and safe sleep training for staff and parents was initiated in September 2013. Our hospital's safe sleep policy was updated and revised. Products including sleep sacks, bedside storage containers, laminated crib cards, and fitted crib sheets were implemented for all inpatient infants. Follow-up data collected in August 2014, 2015, and 2016 showed significant reduction in the number of infant cribs with unsafe objects, and safe infant sleep positioning remained consistent. March 2016: Our QI project was published in the *Journal for Specialists in Pediatric Nursing*. April 2016: Stead Family Children's Hospital was recognized

by Cribs for Kids® as a National GOLD Certified Safe Sleep Hospital. With annual staff training and ongoing community outreach events, our work to promote and model safe sleep practices continues.

Bilateral Congenital Pseudoarthrosis of the Clavicles in a Newborn

Martha Hemingway, DNP, APRN, NNP-BC

Ram R Kalagiri, MD

Vinayak Govande, MD

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MCLANE CHILDREN'S HOSPITAL, BAYLOR SCOTT & WHITE
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Bilateral congenital pseudoarthrosis of the clavicles is extremely rare. This case discusses: presentation, diagnosis and management in the neonatal period. The importance of the differential diagnosis when clavicular fracture shows no evidence of healing or occurs bilaterally is highlighted in this discussion.

Improving Outcomes Through a Consistent Approach to Noninvasive Ventilation in the Neonate

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Respiratory distress in the newborn is the most common reason for admission to a neonatal care unit. Early implementation of noninvasive ventilation can improve lung volumes and minimize the need for mechanical ventilation. Limited resources in Level II special care nurseries can present significant challenges to staff managing neonates with respiratory compromise. Variations in treatment tactics, lack of in house providers, and gaps in clinical knowledge are barriers to success.

The overall aim of this project was to establish an evidence-based clinical guideline to manage noninvasive ventilation in a 21 bed Level II nursery. An education program identifying lung protective strategies was developed and presented to physicians, respiratory therapists, and nursing personnel. Criteria to identify failure of noninvasive ventilation were established to further guide treatment. Alternative options for providing noninvasive support were introduced to improve patient comfort, minimize skin breakdown, and promote ease in positioning the infant.

Evaluation of the project involved tracking rates of intubation, patient transfers related to respiratory failure, and staff perceptions of the education regarding the guideline. Utilizing a consistent evidence-based approach to respiratory support can minimize lung injury, improve patient safety, and may reduce the need for transfer to a tertiary center.

Early-Onset Sepsis Prevention Algorithm Using Neonatal Sepsis Calculator and Inflammatory Markers to Decrease NICU Admissions

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IRVINE, CALIFORNIA

Suspected early onset sepsis (EOS) caused by maternal chorioamionitis is one of the most common admission diagnoses for term infants to the NICU. The Center for Disease Control and Prevention and the American Academy of Pediatrics recommend initiating antibiotic treatment with a diagnosis of maternal chorioamionitis. While true sepsis is a life-threatening event, there is concern that antibiotics are being administered too liberally to infants. The dilemma is what criteria to consider for admission to the NICU and beginning antibiotic treatment. Recently, a neonatal sepsis calculator has been designed that uses EOS risk factors to develop an individualized infection probability (Pupolo et al., 2013). This has the potential to provide more accurate diagnoses and decrease antibiotic exposure without compromising safety. Using this tool, UC Irvine conducted a retrospective chart review to look at patients admitted for

EOS evaluation to determine the impact that applying the calculator could have on admission rates and antibiotic treatment.

Practice Patterns in Adherence to Neonatal Abstinence Guidelines: A Retrospective Chart Review

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Background and Significance: In-utero narcotic exposure predisposes the infant to withdrawal, known as Neonatal Abstinence Syndrome (NAS). There has been a surge in the number of infants born chemically dependent to opioids, resulting in increased numbers of infants born with NAS. To date there is no accepted standard of care for the treatment of NAS.

Purpose and Goal(s): The purpose of this quality improvement project was to measure the number of deviations from NAS pharmacological management at a single Neonatal Intensive Care Unit (NICU). The goal was to inform practice and to provide an opportunity for improvement through education or guideline modification.

Methodology: A retrospective chart review was conducted. The sample included 50 infants, 34 weeks gestation and greater admitted to the NICU between July 1, 2014 and August 31, 2016, with an ICD 9/10 code for NAS.

Results (or in progress): The number of deviations from the guideline per subject was collected via chart query and quantified using descriptive statistics.

Implications for Future: This project has the potential to decrease length of treatment and hospitalization, as well as improve management of infants with NAS.

Prevention of Unplanned Extubations in the NICU

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Background: Unplanned extubations are the 4th most common adverse event in North American NICUs. Extubations can cause rapid cardiorespiratory deterioration along with airway trauma and subglottic stenosis due to repeated reintubation attempts and VAP. NICU patients are more at risk of unplanned extubations as they routinely have longer intubation periods, a shorter trachea, uncuffed tubes, less routine use of sedation/neuromuscular blockade.

Objective/Methods: The goal of this Process Improvement project was to ultimately reduce the number of unplanned extubations with several targeted interventions. These included a constant reminder of the issue with the "Days Since Last Unplanned Extubation" posted on the wall, staff re-education on taping procedures and necessity of a "Time-Out" anytime there is manipulation of the ETT, and adding a yellow airway alert card at bedside that includes important airway information. In addition, an after action is completed on all unplanned extubations to review the cause and identify if there were any additional measures that could have been taken to prevent the extubation.

Data Collection: Our unplanned extubation rate prior to implementation in October 2015 was 4.8/100 ventilator days. We have continued to collect after action reports and will have follow-up data to share.

The Premie Project: An Interdisciplinary Project to Improve Neurodevelopmental Outcomes in the ELBW

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The Premie Project is a QI project to improve neurodevelopmental outcomes in our patients <28 weeks gestation or <1,500 g. Interdisciplinary teams examined current evidence and implemented guidelines.

Interdisciplinary teams included nurses, physicians, nurse practitioners, respiratory therapists, physical therapists, occupational therapists. Teams were formed based on areas of professional interest and expertise. The initial resuscitation, first 72 hours, respiratory management, blood pressure management, nutrition and developmental care were the primary groups. Additional groups participating included our neurodevelopmental team and periviability counseling stakeholders. Education was provided for each discipline including radiology and echocardiography.

Project successes have shown significant improvement in the incidence of intraventricular hemorrhage in our patients <28 weeks, from 12.8 percent in the year prior to 10.0 percent in first six months of the protocol. The interdisciplinary approach and engagement has helped the team work together in formulating and following guidelines. One challenge noted is in the initial resuscitation; as new staff are trained, ongoing education is needed. The initial project focused primarily on a chronological timeline from antenatal through the first 2 weeks. Next steps will focus on best practices based on current evidence for the <28 week infant after the first 2 weeks of life.

Novel Use of Telemedicine for Neonatal Resuscitation and Transfer: The Tele-Baby Project

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Maintaining high levels of readiness for neonatal resuscitation in settings with low-risk maternity services is challenging. Pediatricians are becoming less comfortable responding to and leading neonatal resuscitations. They cite infrequency of emergencies and delay in arriving on site as the main impediments. There is evidence to support the value of hands-free leadership to help prevent task saturation, as well as the benefits of clear and consistent communication to promote patient safety. An evidence-based practice initiative using telemedicine for neonatal resuscitation can address this problem. The practice change involves the addition of a remote, expert NRP leader in the form of a NICU-based neonatal nurse practitioner via telemedicine technology. Additionally, the NNP can assist in care coordination and transfer of the patient. Implementation includes an assessment of the low-risk maternity unit staff and processes in order to target education for improved team performance and outcomes. Site education consists of NRP review, role clarification, and resuscitation process improvement. Outcomes included decreased time to cooling for HIE patients, decreased time to transfer for patients needing transport to the tertiary unit and improved pediatrician and staff satisfaction. The current Tele-Baby program covers 6 maternity units and provides back-up for upwards of 8,000 deliveries annually.

NICU Nurses and Families Partnering to Provide Family-Centered Developmental Care

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The aim of this EBP project was to determine how implementing the seven neuroprotective core measures of family-centered developmental care will impact the satisfaction of nurses and families through partnering with care as compared to traditional care. Family centered care is grounded in the principle that optimal health outcomes are accomplished when patients' family members participate in an active role to contribute emotional, social and developmental support (American Academy of Pediatrics, 2003).

To accomplish this, nurses needed an understanding of the developmental problems with high risk, premature infants, and the fundamentals of neurosensory growth. They also needed to understand how the intrauterine environment protects the infant from the fluctuation of an unstable extrauterine environment.

The model we used was the Neonatal Integrative Developmental Care Model which included: a healing environment, partnering with families, positioning and handling, minimizing stress and pain, safeguarding sleep, protecting skin and optimizing nutrition (Altimier & Phillips, 2013).

Pre and post surveys were collected from nurses showing an increase in knowledge and benefits. Pre and post Press-Ganey reports along with post discharge phone calls showed families had a strong satisfaction in partnering with family-centered developmental care.

Medically Complex Infants Benefit from Post-Discharge Telemedicine Visits

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Background: Transition from the NICU to home remains challenging for caregivers of medically complex infants. A quality improvement project using telemedicine to improve this transition was implemented in a quaternary NICU.

Objectives: Identify and resolve issues encountered by caregivers in the immediate post discharge period.

Design/Methods: Caregivers of medically complex infants participated in a telemedicine visit with neonatal providers within one week of discharge. Providers reviewed infant health, equipment use, and follow-up with caregivers. Video was used to visualize the infant, home environment, and care practices. After the visit, caregivers completed a satisfaction survey.

Results: 52 visits performed from 5/2015 to 11/2016 evaluated respiratory support, tube feedings, surgical wound sites, and medication administration, identifying 42 clinical issues. 48 percent of telemedicine visits prevented an additional call or visit to a medical provider while 12 percent prompted an earlier medical visit. The median rating for caregiver satisfaction was 94.5 in a post-visit survey. 30 percent and 80 percent, respectively, reported >70 miles and >60 minutes of travel distance and time saved. Barriers were identified.

Conclusions: Post-discharge telemedicine visits with medically complex infants provide caregivers with support during the transition to home.

Getting from There to Here: Implementation of the National Perinatal Association Standards for Psychosocial Support of NICU Parents and Staff in Clinical Practice

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Psychosocial needs along the perinatal continuum have been well-documented in the scientific literature. However, specific guidelines for how to allocate limited psychosocial resources have been limited to date. Recent publication of the NPA's recommendations for psychosocial support of NICU parents is a step toward a more thoughtful, evidence-based approach to addressing this need. Although these recommendations focus on particular aspects of the NICU, they have broader applicability across the perinatal continuum.

This presentation will provide information on the recent NPA recommendations. Within these recommendations are strategies for support of the NICU family and the professionals who care for them. A case example of application of the recommendations in a resource constrained NICU will be offered along with discussion of methods for implementing and sustaining positive change.

Supporting the Bedside Nurse as a Change Agent Implementing Unit-Based Research

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As a CNS of a 40-bed Level III ICN in an academic healthcare center, I work with 90 registered nurses. During the past year, our unit has presented posters and podium abstracts at several national and local conferences. Over the past 24 months the unit has been involved with several nurse driven inter professional quality improvement projects. All of

these projects have improved patient outcomes and staff satisfaction. The ongoing projects include Golden Hour/Icy Bundle, IVH, Antibiotic Stewardship, CLABSI, Nurse-Family Partnership, NAS and an Enteral Feeding Bundle. These projects have led to improved staff education and changes in policies and procedures. Some of these changes have resulted in a 0 percent CLABSI and 0 percent IVH in infants <30 weeks for 1 year on the unit. The nursing staff has also initiated a cuddler program, and oversees a designated room to care for the NAS patients and their families. For nurse engagement to be effective, the following factors need to be involved: good collaboration between nursing and the medical staff, communication between nursing management and the nursing staff, dedicated meeting time, and the strong desire to improve patient outcomes.

Quality Predictors of Parental Satisfaction After Birth of Infants with Life-Limiting Conditions

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Objective: This presentation reports parental satisfaction with care received in the context of a life-limiting fetal diagnosis and subsequent birth.

Study Design: Survey methods were utilized to embed the Quality Indicators and Parental Satisfaction of Perinatal Palliative Care Instrument in a survey: "The Voice of Parents".

Result: The web-based survey had a final sample of n=405 parent responders. Overall, parents reported satisfaction with care (80.2 percent; n=393). Parents satisfied with care reported higher agreement with quality indicator items for all subscales. In total, 17 items from a 41-item instrument revealed the ability to predict higher parental satisfaction when particular QI are reported. The model ascertains the importance of compassion, unhurried provider-patient communication and bereavement interventions.

Conclusion: This study has led to credible insights into parental satisfaction with care given after the birth of an infant with a life-limiting condition. Attendees will have the opportunity to see the importance of delivering quality care and how it interfaces with parental satisfaction. The evidence will allow participants to improve parental experiences in the context of devastating loss and initiate changes in clinical practices to enhance how services are delivered to families.

Future Proofing the Neonatal Nursing Workforce: Undergraduate Engagement

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There is a need to "future-proof" the neonatal nursing workforce in Australia, and indeed internationally, for several reasons: New technology in the neonatal setting has led to an increase in the workload of neonatal nurses who are required to use this technology as well as troubleshoot problems as they arise; an ageing workforce, with recent data revealing the average age of a neonatal nurse is 50.7, with 62.5 percent aged over 50. There is an urgent need to attract nurses into this area, but as with many other specialties, there is very limited exposure to neonatal nursing in undergraduate programs.

Method: A needs analysis survey of undergraduate baccalaureate nursing students demonstrated significant interest in an undergraduate elective course in neonatal nursing with 65 percent of respondents (n=224) indicating that neonatal nursing was the reason they wanted to become a Registered Nurse.

Result: This online undergraduate course attracted over 200 student enrolments and was positively evaluated with a mean score of 4.8 on a 5 point scale.

Conclusion: The overwhelming interest in neonatal nursing as a future career and engagement in undergraduate coursework may assist in meeting the projected shortfall in the neonatal workforce in the coming years.

Neonatal Epinephrine: Reducing Calculating Errors

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Epinephrine calculation errors of low birth weight and very low birth weight infants can significantly affect outcomes in terms of mortality and morbidity. A review of the literature concluded that during neonatal resuscitation epinephrine calculation errors occur when providers rely on memory and lack resources, safety features, and standardized procedures (Benner, et al, 2002; Karlsen, 2006).

A quantitative quasi-experimental replication research study measured the effectiveness and reliability of a researcher-designed, epinephrine reference chart, specific to weights <3 Kg. The sample size of 94 nurses, answered one epinephrine calculation question, requesting the amount to be administered in a given scenario. The experimental group used the Neonatal Epi Chart and the control group relied on memory and calculation.

A Chi Square test resulted in a p-value of <0.0001, suggesting calculation errors were significantly different for subjects utilizing the Neonatal Epi Chart in the experimental group. The difference was quantified with an odds ratio determined those not given the Neonatal Epi Chart were 39.8 times more likely to make an epinephrine calculation error. Utilization of the Neonatal Epi Chart will empower clinical nurses to ensure the delivery of safe patient care and reduce medication errors.

Last Line of Defense? Decreasing Mortality During the Golden Hour

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Neonatal nurses, as patient-care coordinators, mediators, and advocates, serve as the last line of defense in improving outcomes and decreasing mortality during the “Golden Hour.” Initiating timely administration of antibiotics for NICU patients within the first hour of life is a targeted goal by the Joint Commission, White House, CPQCC, IHI, and AHRQ; it is vital in early prevention of antibiotic resistance. The nurse’s clinical responsibility during the “Golden Hour” does not stop at resuscitation, but continues throughout assessments, family education, discharge, and professional development. To improve the time to administration upon admission to the NICU, quality improvement education presented to all nursing staff through an electronic learning module discussed the importance of the nurse’s role in antibiotic stewardship, highlighted changes in evidence-based unit protocols, and emphasized the correct sequence of drawing blood cultures prior to administration of antibiotics within the first hour of admission. Success of the intervention was evaluated by pre- and post-education quiz questions evaluating knowledge acquisition, as well as, time to administration antibiotic audits for patients greater than 36 weeks gestational age admitted to the NICU. Pre-/post-education results and time to administration results evaluated translating evidence-based research into practice. Data collection is in progress.

The Golden Week Program: Caring for Infants Born Less Than 28 Weeks

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For the first time in history, preterm birth has become the number one cause of death in young children. Infants born at gestational ages less than 28 weeks are at highest risk of death and major morbidity. Standardized care has shown to improve care in clinical medicine. Our team took the “Golden Hour” concept, synonymous with the first hour of care

being essential to patient outcome, and created “The Golden Week Program™”. The program was established to focus on this preterm population and is subdivided into first hour after birth, first 72 hours of life, then day of life 4 to 7. Standardized evidence based guidelines were developed for 5 broad clinical categories and 2 non-clinical categories. The clinical categories include respiratory, thermoregulation, nutrition and fluid management, infection and neurologic status. The two non-clinical categories include parent support and team building. Initial focus of outcomes has centered on neurologic status and preliminary data reflects a reduction in rates of severe intraventricular hemorrhage in the first week of life. In the short time since its inception, the “Golden Week Program™” has allowed reduction in variability in clinical team behavior and reduced inconsistencies in care of these extremely low birth weight infants.

Breast Shield Sizing: What NICU Clinicians Need to Know

Disclosure: The presenter is a salaried employee of Medela, Inc.

Irene M. Zoppi, RN, MSN, IBCLC

MEDELA, INC.

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Human milk is the preferred nutrition for infants, especially premature and/or compromised infants. Evidence from research shows that the more exclusive a human milk diet the infant receives over the greatest amount of time contributes to the most protection from prematurity-specific morbidities. Mothers posed with long term pumping face many challenges, most notably improperly fitted breast shields that can have a significant impact on maintaining adequate quantities to meet their infants’ nutritional needs. Bedside NICU clinicians should be aware of the need to ensure proper fitting of breast shield and should demonstrate competence in assisting mothers with breast shield fitting. Improperly fitted breast shields subject mothers to uncomfortable pumping experiences, potential skin injury, and a reduction in milk volumes. The program describes competencies for NICU clinicians who assist pump dependent mothers. It raises the level of consciousness for bedside clinicians regarding the need to ensure proper fitting of breast shields. An overview of human mammary gland and milk duct anatomy affecting milk removal is described. Guidelines for selecting a properly fitted breast shield and videos of correct and incorrectly fitted breast shields are included.

NICU Safe Sleep QI Project: It Takes a Village

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Overview: Sudden Infant Death Syndrome (SIDS) is one of the leading causes of mortality within the first year of life. The American Academy of Pediatrics recommends Safe Sleep Positioning (SSP) to reduce SIDS and sleep related deaths. Parents are 60 percent more likely to sleep their infant utilizing SSP if this was modeled in the hospital. Improving NICU adherence to SSP may reduce sleep related deaths for infants with the highest risk.

Aim: By June 2017, to have 90 percent of NICU and continuing care unit (CCN) infants exhibit safe sleep positioning, defined as supine sleep position, head of bed flat, absence of soft objects, loose blankets and positioners in the crib.

Sample: One hundred percent of NICU patients.

Design: As part of a structured, collaborative quality improvement initiative in Massachusetts, our NICU in Springfield at Baystate Children’s Hospital utilized Plan-Do-Study-Act cycles to implement a SSP change.

Measurement: Weekly bed audits, conducted round-the-clock identify strengths and areas for improvement in clinical practice. Results are shared monthly with entire NICU team.

Outcome: Infants safely positioned for sleep improved from 2.8 percent (August 2015) to 81.5 percent (December 2016).

A Study Protocol to Investigate “Golden Hour” Nursing-Led Multitasking Activities

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Aims: To describe a proposal for the development of study protocol to investigate first hour (“Golden Hour”) practices that focus on the minimization of complications, including: teamwork; the application of evidence based practices; and the consistency of practices across multiple settings within Australia.

Background: The “Golden Hour” is a term derived from adult trauma, emphasizing the notion that the first hour of care is critical to optimal outcomes. In newborn care, what happens in the first hour of life can lead to short and long term consequences, affecting neurodevelopmental outcomes and mortality. Despite a small number of NICUs within Australia, little is known about the consistency of practice within the first hour of birth.

Design/Methods: A mixed methods triangulated convergent design.

In this four phase proposal we plan to 1. Examine nursing led Golden Hour multitasking interventions 2. Develop web based educational material, including interactive scenarios. This educational material will be tested and refined (Phase 3), prior to evaluation and dissemination (Phase 4).

Conclusion: This project aims to review potentially better practices that can be applied during the Golden Hour to ensure optimal outcomes and to facilitate sharing of care maps and measurement tools that can be applied to improve clinician performance.

So We Have the Parents Here...What Do We Do with Them?

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Parents of NICU babies often have a challenging time adjusting to life in the NICU. This podium presentation will seek to show how a 107 bed single family room regional referral center sought to create an innovative program of empowering families through education and engagement. A dynamic group of programs have been established to educate, inform and provide supportive care to families of all backgrounds and financial abilities. This family centered program is set up to meet needs ranging from the very basic such as food and lodging, to providing education and support. The program offers weekly lunch and learn sessions, written and video education as well as providing the opportunity for daily journaling about the infants progress through inclusion during interdisciplinary rounds. Additionally, the program provides opportunities for socialization, relaxation, exercise, as well as opportunities for art therapy. Siblings are encouraged to be a part of the NICU journey through visitation and sibling specific programs. The program recently partnered with the UAB Department of Psychiatry Addiction Recovery Program to provide assessments and referrals for moms in need of rehabilitation as well as providing a weekly support group luncheon for mothers who have infants affected with Neonatal Abstinence Syndrome.

Disaster Preparedness: Neonatal Intensive Care Unit Evacuation Training

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In the last several years, medical centers faced natural disasters that required the emergency evacuation of hospitalized patients, including premature and critically ill neonates. The emergent evacuation of this vulnerable population is reliant on staff and technology for all aspects of care and is considered a high-risk activity. In response, The Joint Commission issued specific requirements for emergency management, known as Standards of Care for Disaster Preparedness and Response. Hospitals were mandated to have a disaster management program in place that addressed emergency preparedness and planning activities. This quality improvement project has improved the processes related to safe and emergent evacuation of neonates, ensuring hospital alignment with recommendations for a comprehensive Emergency Operations Plan. Education and training of neonatal nurses on a department-specific emergency response plan, roles and responsibilities during neonatal evacuation indicated increased knowledge and self-

efficacy. Task force development on the project has become an interprofessional, multi-facility committee which presents findings and proposed solutions on Neonatal Intensive Care Unit disaster preparedness and emergency management issues to medical center and regional disaster preparedness administration.

Navigating Care of the Extremely Low Gestational Age Newborn: Our Journey to Improve Outcomes

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Background/Significance: Infants born <26 weeks have an increased potential risk for morbidity and mortality in the NICU. Enhanced technology has lowered the threshold of viability creating unique challenges for teams caring for extremely low gestational age newborns (ELGAN). The purpose of this initiative was to identify innovative approaches to care with the goal of improving outcomes.

Clinical Practice Innovation: A multidisciplinary team met to create a standard process for care of ELGAN infants including the development of a special set of guidelines, algorithms, and order. They reviewed baseline data, identified gaps and developed a driver diagram as a structure for achieving desired outcomes. Initial improvement strategies occurred in the delivery room focusing on respiratory management, thermoregulation and skin integrity. Additional interventions focused on admission in the NICU and care during the first few weeks of life. The team performed small tests of change including products and processes to improve temperature stability and minimize skin injury.

Outcomes: Admission temperatures for ELGANs have steadily improved. There have been zero instances of compromised skin integrity. Furthermore, evidence suggests that overall death and morbidity and severe IVH have decreased. Unit initiatives continue in order to sustain these gains.
