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Reference: 1. Data on file. Hampton, NJ: Mallinckrodt Pharmaceuticals.



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INDICATIONS AND USAGE

Treatment of Hypoxic Respiratory Failure

INOmax[®] is indicated to improve oxygenation and reduce the need for extracorporeal membrane oxygenation in term and near-term (>34 weeks) neonates with hypoxic respiratory failure associated with clinical or echocardiographic evidence of pulmonary hypertension in conjunction with ventilator support and other appropriate agents.

CONTRAINDICATIONS

INOmax is contraindicated in neonates dependent on right-to-left shunting of blood.

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Rebound Pulmonary Hypertension Syndrome following Abrupt Discontinuation

Wean from INOmax. Abrupt discontinuation of INOmax may lead to worsening oxygenation and increasing pulmonary artery pressure, i.e., Rebound Pulmonary Hypertension Syndrome. Signs and symptoms of Rebound Pulmonary Hypertension Syndrome include hypoxemia, systemic hypotension, bradycardia, and decreased cardiac output. If Rebound Pulmonary Hypertension occurs, reinstate INOmax therapy immediately.

Hypoxemia from Methemoglobinemia

Nitric oxide combines with hemoglobin to form methemoglobin, which does not transport oxygen. Methemoglobin levels increase with the dose of INOmax; it can take 8 hours or more before steady-state methemoglobin levels are attained. Monitor methemoglobin and adjust the dose of INOmax to optimize oxygenation.

If methemoglobin levels do not resolve with decrease in dose or discontinuation of INOmax, additional therapy may be warranted to treat methemoglobinemia.

Airway Injury from Nitrogen Dioxide

Nitrogen dioxide (NO₂) forms in gas mixtures containing NO and O₂. Nitrogen dioxide may cause airway inflammation and damage to lung tissues.

If there is an unexpected change in NO₂ concentration, or if the NO₂ concentration reaches 3 ppm when measured in the breathing circuit, then the delivery system should be assessed in accordance with the Nitric Oxide Delivery System O&M Manual troubleshooting section, and the NO₂ analyzer should be recalibrated. The dose of INOmax and/or FiO₂ should be adjusted as appropriate.

Worsening Heart Failure

Patients with left ventricular dysfunction treated with INOmax may experience pulmonary edema, increased pulmonary capillary wedge pressure, worsening of left ventricular dysfunction, systemic hypotension, bradycardia and cardiac arrest. Discontinue INOmax while providing symptomatic care.

ADVERSE REACTIONS

Because clinical trials are conducted under widely varying conditions, adverse reaction rates observed in the clinical trials of a drug cannot be directly compared to rates in the clinical trials of another drug and may not reflect the rates observed in practice. The adverse reaction information from the clinical studies does, however, provide a basis for identifying the adverse events that appear to be related to drug use and for approximating rates.

Controlled studies have included 325 patients on INOmax doses of 5 to 80 ppm and 251 patients on placebo. Total mortality in the pooled trials was 11% on placebo and 9% on INOmax, a result adequate to exclude INOmax mortality being more than 40% worse than placebo.

In both the NINOS and CINRGI studies, the duration of hospitalization was similar in INOmax and placebo-treated groups.

From all controlled studies, at least 6 months of follow-up is available for 278 patients who received INOmax and 212 patients who received placebo. Among these patients, there was no evidence of an adverse effect of treatment on the need for rehospitalization, special medical services, pulmonary disease, or neurological sequelae.

In the NINOS study, treatment groups were similar with respect to the incidence and severity of intracranial hemorrhage, Grade IV hemorrhage, periventricular leukomalacia, cerebral infarction, seizures requiring anticonvulsant therapy, pulmonary hemorrhage, or gastrointestinal hemorrhage.

In CINRGI, the only adverse reaction (>2% higher incidence on INOmax than on placebo) was hypotension (14% vs. 11%).

Based upon post-marketing experience, accidental exposure to nitric oxide for inhalation in hospital staff has been associated with chest discomfort, dizziness, dry throat, dyspnea, and headache.

DRUG INTERACTIONS

Nitric Oxide Donor Agents

Nitric oxide donor agents such as prilocaine, sodium nitroprusside and nitroglycerine may increase the risk of developing methemoglobinemia.

OVERDOSAGE

Overdosage with INOmax is manifest by elevations in methemoglobin and pulmonary toxicities associated with inspired NO₂. Elevated NO₂ may cause acute lung injury. Elevations in methemoglobin reduce the oxygen delivery capacity of the circulation. In clinical studies, NO₂ levels >3 ppm or methemoglobin levels >7% were treated by reducing the dose of, or discontinuing, INOmax.

Methemoglobinemia that does not resolve after reduction or discontinuation of therapy can be treated with intravenous vitamin C, intravenous methylene blue, or blood transfusion, based upon the clinical situation.

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Homeward Bound: The Discharge of a Technology-Dependent Infant from the NICU

Valerie Boebel Toly, PhD, RN, CPNP, and Carol M. Musil, PhD, RN, FAAN

Abstract:

Purpose: An estimated 3.1% of infants discharged from the NICU require ongoing life-saving medical technological equipment such as supplemental oxygen and feeding tubes. The study purpose was to examine mothers' psychological well-being (e.g., presence of depressive symptoms, posttraumatic stress disorder symptoms) during the three months following their technology-dependent infant's discharge from the NICU.

Methods: A longitudinal, descriptive study design was employed to examine maternal psychological well-being a three time points; 2-3 weeks prior to discharge, one and three months post-discharge. Convenience sampling was used to recruit 19 mothers of infants dependent on medical technology being discharged from a large Midwest Level 4 NICU in the United States.

Results: The total scores for maternal depressive symptoms and posttraumatic stress disorder (PTSD) symptoms indicated over one third of the mothers were experiencing psychological distress at discharge. Nearly one half were at increased risk for clinical depression and PTSD and warranted referral for mental health assistance one month post-discharge.

Conclusions: A large percentage of study participants reported considerable psychological distress. It is vitally important to perform mental health assessments prior to the discharge of technology-dependent infants prior to discharge and at regular intervals following discharge and refer for mental health assistance as needed. Such finding indicate the critical need to offer enhanced transition services and education as well as assessment of discharge readiness by the interdisciplinary NICU team.

Introduction

Approximately 450,000 infants are born prior to 37 weeks gestation (1) each year in the United States and are typically admitted to a Neonatal Intensive Care Unit (NICU). In addition, infants with complex medical conditions at birth (i.e., genetic disorders, congenital anomalies) or those who are the product of a high-risk pregnancy (multiple gestation births, maternal diabetes, gestational hypertension) are also admitted to the NICU after birth for stabilization as well as for any necessary surgeries and therapies. Some of these infants will continue to have complex healthcare needs upon hospital discharge, with an estimated 3.1% (2) requiring ongoing support from medical technological equipment, including supplemental oxygen, tracheostomies, mechanical ventilation or feeding tubes. (3-5)

A major gap in the neonatal healthcare literature is the lack of research regarding mothers' level of psychological distress in the first three months following the discharge of their technology-dependent infants from the NICU to home. Prior research indicates that mothers of infants in the NICU, specifically mothers whose infants remain dependent on technology at discharge, are at higher risk for psychological distress, compared to mothers of healthy full-term neonates. (6) This incidence of psychological distress includes higher rates of postpartum depression (7-9) and post-traumatic stress disorder (10-14) than mothers of healthy full-term infants. Technology-dependent infants have a considerably longer average length of hospital stay compared to infants who are

not dependent on technology (108.6 days versus 25.7 days) due to the unstable, unpredictable and vacillating nature of the infant's health condition. (2) Thus, it seems likely that mothers of such infants would experience high levels of psychological distress than mothers of infants not requiring such equipment. However, virtually no studies have explored the level of psychological distress experienced by mothers of technology-dependent infants in the first three months following NICU discharge. The purpose of the study was to examine mothers' psychological well-being (e.g., the presence of depressive symptoms, posttraumatic stress disorder symptoms) during the 3-months following their technology-dependent infant's discharge from the NICU so that this knowledge can guide NICU and home-based care of mothers.

"A major gap in the neonatal healthcare literature is the lack of research regarding mothers' level of psychological distress in the first three months following the discharge of their technology-dependent infants from the NICU to home."

Method

Design

A longitudinal, descriptive study design was used to examine maternal psychological well-being following their technology-dependent infant's NICU discharge. This report of longitudinal data was an unreported part of a larger baseline (pre-discharge) research study described elsewhere. (15)

Participants and Setting

Institutional review board approval was obtained prior to initiation of the study. The study participants were mothers (primary female caregiver) at least 18 years old with an infant being discharged from the NICU dependent on medical technology (e.g., mechanical ventilation, tracheostomy, supplemental oxygen, feeding tubes) that would be required for \geq three months. All maternal participants selected were able to read and speak English. Mothers of children with cancer or a terminal diagnosis were excluded from the study due to the potential for experiencing grief reactions. Convenience sampling was used to recruit participants from a large Midwest Level 4 NICU in the United States.

Instruments

Data were collected using four standardized instruments. An investigator-developed enrollment form was used to record demographic characteristics of mothers, and their technology-dependent infants, including the mother's age, education, partner status, race/ethnicity, and family income plus the infant's gestational age, birth weight, and the total length of NICU stay. The EMR was used to obtain specific information about which the mother was uncertain (e.g., the total length of NICU stay). The type of technology required by the infant was assessed using the Technology Dependency Questionnaire, based on the Office of Technology Assessment's (OTA) rubric for technology dependence. (16,17) The 20-item Center for Epidemiological Studies - Depression Scale

(CES-D) was used to measure maternal depressive symptoms ($\alpha = .85$). (18) Higher scores indicate more depressive symptoms. Concurrent validity has been supported by clinician's ratings. (18) A total score of ≥ 16 indicates a high risk of clinical depression. The 14-item Perinatal Posttraumatic Stress Disorder Questionnaire (PPQ) was used to measure posttraumatic stress disorder symptoms ($\alpha = .85$). This instrument includes questions about symptoms related to childbirth and the postnatal period. (10) Higher scores indicate more posttraumatic stress symptoms. Convergent validity has been established by strong correlations between the PPQ and Impact of Events Scale and the Beck Depression Inventory-II. (10,19) A total score of ≥ 19 points indicates clinically significant distress that warrants a mental health referral.

Procedures

NICU nursing staff identified potential research participants. Research staff used an IRB pre-approved script to approach eligible mothers. For the initial data collection (Time 1), face-to-face interviews took place in the NICU in a private place of the mother's choosing. (15) All four instruments were administered at that time. At one month (Time 2) and three months (Time 3) following the infant's discharge, mothers were mailed study questionnaires (CES-D, PPQ) plus a self-addressed, stamped envelope to return them to the study office. The technology dependency questionnaire was administered over the telephone. Each participant received a \$15 gift card following completion of all study questionnaires at each of the three-time points. A mental health resource sheet was given to mothers who scored ≥ 16 on the CES-D and/or ≥ 19 on the PPQ. Any mother with a CES-D score ≥ 23 was screened for suicide risk with a plan to contact the mobile crisis unit if suicide risk was indicated.

Data Management/Analysis

All data were entered into SPSS and cleaned. Descriptive analyses of study variables were conducted to examine frequencies, distribution, measures of central tendency, and dispersion of

scores.

Results

Participants and Demographics

The mothers (N=19) ranged in age from 18 to 41 years (M= 25.63; SD= 6.27). The majority of the mothers had a high school education or less. Approximately one-half of the mothers were African-American. About two-thirds were single, never married. While the household income varied, nearly half earned an income of

“Mothers with elevated depressive symptoms and PTSD symptoms are particularly vulnerable to the considerable stress that accompanies the teaching and preparation necessary for their infant’s discharge from the NICU.”

\leq \$20,000/year. A total of 13 mothers did not follow through with study procedures at various points in time.

Infants' birth weights ranged from 500 to 3765 grams (M= 1546.1; SD= 1151.8); gestational ages ranged from 23 to 39.29 weeks (M= 29.78; SD= 6.43). The total length of NICU stay ranged from 33.9 to 270.9 days (M= 149.7; SD= 68.7). About one-third of the infants were diagnosed with either respiratory failure or respiratory distress, while another one-third had a primary medical diagnosis of prematurity. At Time 1, a majority of the study infants had a feeding tube (i.e., gastrostomy tube, nasogastric tube) and about

Variable	Time Point	N	Range	M	SD
Depressive Symptoms	Time 1	19	2-39	14.53	9.90
Depressive Symptoms	Time 2	12	1-41	16.08	11.06
Depressive Symptoms	Time 3	6	1-21	10.33	7.74
Posttraumatic Stress Disorder Symptoms	Time 1	19	2-37	16.53	12.11
Posttraumatic Stress Disorder Symptoms	Time 2	11	2-50	21.18	14.68
Posttraumatic Stress Disorder Symptoms	Time 3	6	1-24	11.33	8.89

Table 1. Descriptive Statistics of Maternal Depressive Symptoms and Posttraumatic Stress Disorder Symptoms Over Time

half required supplemental nasal oxygen, with 15.8% requiring a tracheostomy and 10.5% requiring mechanical ventilation (Table 1). A majority of infants (63.2%; n=12) required one type of technology; 36.8% (n=7) required ≥ two types of technology. Of the seven infants whose mothers responded at Time 2, 42.9% (n=3) required one type of technology, 42.9% (n=3) required ≥ two types of technology and 14.2% (n=1) no longer required technology. Of the nine infants whose mothers responded at Time 3, 33.33% (n=3) required one type of technology, ≥ two types of technology (n=3) or no longer required technology (n=3), respectively.

Total scores for depressive symptoms on the CES-D were ≥ 16 (the cut score indicating an increased risk for clinical depression) 18 for 42.1% (n=8), 50% (n=6), 33.33% (n=2) of participants at Time 1, Time 2, and Time 3, respectively (Table 2). The PTSD symptoms scores on the PPQ were ≥ 19 – a score that is within the clinical range for reported PTSD (10,19) for 36.8% (n=7), 45.5% (n=5), 16.66% (n=1), of participants at Time 1, Time 2, and Time 3 respectively.

Discussion

The goal of this study was to examine maternal psychological well-being for the first three months following their technology-dependent infant's NICU discharge. A large percentage of mothers in this study reported considerable psychological distress that warranted mental health referrals due to high risk for clinical depression and PTSD immediately prior to discharge (Time 1) (15) as well as one month after discharge from the NICU (Time 2). By three months after discharge (Time 3), however, fewer met the threshold of high risk for these two psychological distress conditions.

While past researchers have examined depressive symptoms (8,9,20,21) and posttraumatic stress disorder symptoms (11) in mothers of high-risk preterm infants prior to NICU discharge, none, to our knowledge, have focused specifically on mothers with technology-dependent infants in the first three months following discharge. (22) In one study, 20% of mothers with early preterm infants had scores indicating risk for clinical depression one month after NICU discharge. (23) This is considerably less than our findings of 50% of mothers at the same time point. Interest-

ingly, more of our infants at Time 3 no longer required technological equipment, which may help to explain these findings.

Clinical Implications

Because a high percentage of mothers of technology-dependent infants discharged home had increased depressive symptoms and PTSD symptoms indicating a high risk for clinical depression and PTSD, it is vitally important to perform a mental health assessment of these mothers prior to discharge using the same or similar measures as used in the study on a consistent basis. Both instruments (CES-D, PPQ) are free, in the public domain, and simple to administer within approximately 5-10 minutes. In addition, it is important to perform an assessment of the prior mental health status of mothers before the birth of this infant that includes questions such as previous challenges with depression, use of anti-depressant medications and previous episodes of postpartum depression. (24) For mothers meeting the high-risk threshold, it is imperative to refer them to mental health resources that are accessible, realistic, and affordable. The NICU team can provide crucial assistance to these vulnerable infants and their mothers by developing a list of resources for mental health support for these mothers within the hospital setting as well as community resources for hospital-based support groups, local support groups, and online support groups. (25)

“A high percentage of mothers of technology-dependent infants discharged home from the NICU have elevated depressive and PTSD symptoms indicating an elevated risk for clinical depression and PTSD.”

Mothers with elevated depressive symptoms and PTSD symptoms are particularly vulnerable to the considerable stress that accompanies the teaching and preparation necessary for their

Type of Technological Equipment	Time 1 (N=19)	Time 2 (N=11)	Time 3 (N=9)
Nasogastric Tube	1	0	0
Gastrostomy Tube	14	6	6
Nasal Oxygen	8	1	1
Tracheostomy	3	2	2
Mechanical Ventilation	2	2	1

Table 2. Type of Medical Technological Equipment Used by the Infants Over Time

infant's discharge from the NICU. Therefore, this group of mothers needs enhanced transition services and education as well as an assessment of discharge readiness. The Neonatal Discharge Assessment Tool, developed as a means to conduct a comprehensive assessment of discharge readiness, can be employed by members of the NICU healthcare team especially for mothers of technology-dependent infants who are at high risk for clinical depression and PTSD. (26)

During the first months following their technology-dependent infant's discharge, mothers must learn to integrate care for their infant with their other family and household responsibilities. (22,27,28) Therefore, it is essential that healthcare providers provide the education and support to facilitate the transition home from the NICU as smooth as possible. Preparing a mother to care for a technology-dependent infant at home safely requires education from an interdisciplinary team of healthcare professionals. Because parents (mothers) are an integral partner in this team, parents need to be included in team discussions and any care decisions. Prior research indicates that the most frequently reported source of stress for mothers during the transition of their infant home from the NICU was their lack of involvement in care and decision making. (29) NICU physicians and nurses play a major role in reminding all providers that mothers should be included and their contributions to decision making noted and appreciated.

“As exciting as it is to prepare to take an infant home from the hospital, mothers of technology-dependent infants often find it to be both a daunting and overwhelming task. Structured, organized discharge teaching with return demonstrations from the mother and one other responsible caregiver is a cornerstone of safe discharge.”

As exciting as it is to prepare to take an infant home from the hospital, mothers of technology-dependent infants often find it to be both a daunting and overwhelming task. Structured, organized discharge teaching with return demonstrations from the mother and one other responsible caregiver is a cornerstone of safe discharge. (3) This preparation for discharge can require weeks of coordinated teamwork depending on the amount of technology the infant will require at home. This preparation includes early discharge teaching for medical technological equipment such as a gastrostomy tube with time to practice feeding the infant as well as routine care of the gastrostomy tube and emergency care in the event the tube becomes dislodged. A previous study found that mothers of preterm infants discharged from the NICU were constantly stressed about using gastrostomy technology without the support of the nurses. (30) In addition, mothers require education regarding how to protect the gastrostomy tube from inquisitive infants (and at times siblings). Further, parents need instruction regarding how to manage everyday family life while still safely meeting the technology-dependent infant's feeding needs via the gastrostomy tube (e.g., the timing of feedings, total amount per 24 hours). Another important topic to address with parents is how to talk to other extended family, friends, or community members about the gastrostomy tube. (31)

Ensuring that parents have a simulated home experience in the hospital prior to discharge home is quite important. Prior to discharge, the mother should independently care for the infant in the hospital for 24 hours, a crucial component of discharging a technology-dependent infant to home. This opportunity gives the mother the ability to see her strengths and be re-evaluated in areas in which she has concerns; subsequent restructuring of the mother's educational needs should follow. Further teaching sessions might be required demonstrating that the mother can independently care for the infant prior to discharge.

Limitations

Two limitations of the study were the small sample size and the high rate of subject attrition. In addition, this study did not measure social support or the amount of home nursing that the infant might have received following discharge from the NICU. Future research should include measures of emotional and instrumental support as well as an assessment of prior maternal psychiatric history (e.g., clinical depression, use of anti-depressant or anxiolytic medications, previous episodes of postpartum depression). Testing of specific hospital-based and home-based interventions to reduce maternal depression and PTSD due to caring for technology-dependent infants are avenues for future research.

Conclusion

A high percentage of mothers of technology-dependent infants discharged home from the NICU have elevated depressive and PTSD symptoms indicating an elevated risk for clinical depression and PTSD. It is important to perform a mental health assessment of these mothers several weeks prior to their infant's discharge using the CED-D and PPQ or a comparable assessment tool as well as a discharge readiness assessment. This mental health assessment should also occur during the NICU follow up visits during the first three months post-discharge as mothers adjust to juggling care for the technology-dependent infant and other household and family responsibilities. The NICU team can provide crucial assistance and education regarding community mental health resources for local and online support groups. Mothers bringing home technology-dependent infants from the NICU for the first



time have already faced considerable stress and trauma related to the uncertain and vacillating health state of the infant. NICU physicians and nurses should be sure mothers receive effective assessment, support, and education not only prior to discharge but also during the immediate months that follow.

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Still a Premie?

Some preemies are born months early, at extremely low birthweights. They fight for each breath and face nearly insurmountable health obstacles.

But that's not every preemie's story.

Born between 34 and 36 weeks' gestation?

STILL A PREMIE

Just like preemies born much earlier, these "late preterm" infants can face:



Jaundice



Feeding issues



Respiratory problems

And their parents, like all parents of preemies, are at **risk for postpartum depression and PTSD.**



Born preterm at a "normal" weight?

STILL A PREMIE

Though these babies look healthy, they can still have complications and require NICU care.

But because some health plans determine coverage based on a preemie's weight, **families of babies that weigh more may face access barriers and unmanageable medical bills.**

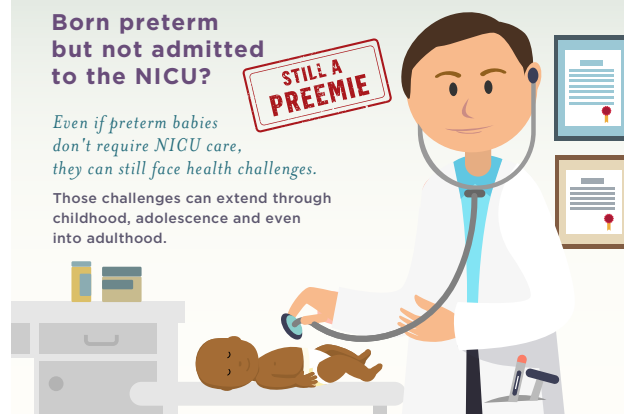


Born preterm but not admitted to the NICU?




STILL A PREMIE

Even if preterm babies don't require NICU care, they can still face health challenges.

Those challenges can extend through childhood, adolescence and even into adulthood.



Some Premies

-  Will spend weeks in the hospital
-  Will have lifelong health problems
-  Are disadvantaged from birth

All Premies

-  Face health risks
-  Deserve appropriate health coverage
-  Need access to proper health care

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Quantifying Glare in Newborn Care Due to Phototherapy Devices

Deepakshyam Krishnaraju, MSc, ME, and
Sivakumar Palaniswamy, MSc, BME

Background

Glare is an optical phenomenon described as the inhibition of an individual's ability to view a scene due to the presence of a disruptive light source. It is an issue prevalent, especially at night, in newborn care due to the neonatal phototherapy devices. Phototherapy is a common treatment for neonatal jaundice in hospitals. Although small in number, the phototherapy devices used in newborn care act as bright sources of light in otherwise dim, ambient light-controlled environments and thus can cause glare. Studies have shown that exposure to the blue light emitted from phototherapy and other devices, described as a high energy visible (HEV) light, can have adverse effects on nearby individuals, such as the alteration of one's circadian rhythm, suppression of melatonin, or sensation of nausea. (1-2) It is, therefore, important to limit the phototherapy light exposure for clinicians to minimize the risk. While glare is, by nature, subjective, there are some quantitative methods to characterize it. These methods apply to both categories of glare: disability and discomfort glare.

“It is, therefore, important to limit the phototherapy light exposure for clinicians to minimize the risk. While glare is, by nature, subjective, there are some quantitative methods to characterize it. These methods apply to both categories of glare: disability and discomfort glare.”

Disability Glare

Disability glare is the loss of retinal image contrast resulting from intra-ocular light scatter in the presence of a bright light source. This type of glare tends to reduce an individual's ability to discern contrast by throwing a veil of light over the field of vision. (3) This effect is more significant near the light source. All disability glare is caused by an imperfection in the optical media (e.g., cornea and lens) causing non-uniform passage of light from the source to an individual's retina.

Disability glare can be experienced in many settings. A common example is an obstruction in an individual's view that can occur while driving on a bright sunny day as a result of the reflection of light off nearby vehicles. There is no gold-standard test for disability glare. An example of a current test for disability glare is reading a vision chart with and without a source of glare - such as a pen torch. Another test

involves a more sophisticated device that projects stimuli directly on to the retina to measure light scattering.

Disability glare can pose a serious risk when the individual experiencing it is not at rest and where the sudden loss, in contrast, affects that individual's navigation or motor skills. In some clinical settings, clinicians turn off the bright phototherapy devices while they assess a patient undergoing phototherapy, to minimize this risk. However, repeated interruptions in treatment can prolong the treatment time for patients.

Discomfort Glare

Discomfort glare is described as “glare which causes discomfort without necessarily impairing the vision of objects.” (4)

The quality of lighting in a room is dependent on the average luminance on the floor and the uniformity of luminance across the room. In a hospital setting, neonatal phototherapy devices contribute to the lighting system of a room. Clinicians practicing in a setting with blue light exposure may experience discomfort glare.

Typically, the subjective evaluation of discomfort glare is performed using the DeBoer scale [5]. The DeBoer scale is a subjective, nine-point scale in which the participant rates glare from Unbearable (1) to Just Noticeable (9) as depicted below.

DB	Classification
9	Just Noticeable
8	...
7	Satisfactory
6	...
5	Just Permissible
4	...
3	Disturbing
2	...
1	Unbearable

Table 1: DeBoer Scale

To make this evaluation quantitative and to understand the influence of four specific factors on discomfort glare, Bullough et al. conducted a series of indoor and outdoor experiments. (6) The four factors are:

- The Illuminance from the source, EL,
- The luminance of the source (LL),
- The Illuminance from the area surrounding the source (Es)
- The Ambient illuminance (EA)

The group determined that discomfort glare is most highly influenced

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by illuminance and went on to develop a model that uses the E_L , E_S , and E_A to quantify disability glare. The model further feeds into the DeBoer rating scale to yield a discomfort glare score, as shown in equation 1 and equation 2. (5)

$$DG = \log(E_L + E_S) + 0.6 \log\left(\frac{E_L}{E_S}\right) - 0.5 \log(E_A)$$

Equation 1: Disability Glare Model

$$DB = 6.6 - 6.4 \log(DG) + 1.4 \log\left(\frac{50,000}{L_L}\right)$$

Equation 2: DeBoer Scale Model

Comparison of Glare Emissions Between Marketed Phototherapy Devices

Methods

For this study, three, currently-marketed phototherapy devices, NeoLight Skylife™, Natus neoBLUE®, and GE Giraffe® Spot PT Lite were evaluated. Two white plane surfaces were oriented perpendicular to the width and length of the phototherapy devices under investigation at a distance of 50 cm from the center of each light source. Each plane was comprised of 23 points for the measurement of luminance and illuminance from the phototherapy devices (Figure 1). These 23 points represent the glare field that an observer would experience adjacent to a phototherapy device.

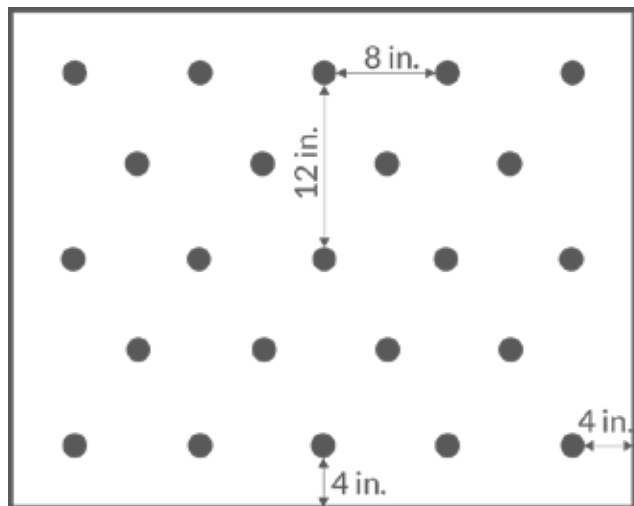


Figure 1: Measurement Grid on Observer Plane

A lux meter was positioned at each of the 23 measurement points and pointed towards the phototherapy device with the help of an attached laser pointer to measure the luminance values (LL). Ambient illuminance without the phototherapy device was also measured from the four corners of each observer plane, and the averaged values were discounted from the corresponding measurements made at the 23 points on each of the two observer planes.

MATLAB was used for data processing, wherein the grid was reconstructed, and the luminance values measured at each of the two observer planes were used to evaluate the corresponding DB scores using Equation 1 and Equation 2. Interpolation was then used to obtain a continuous field of DB scores across each of the two observer planes.

The process was repeated for each of the three phototherapy devices. The process was repeated for each of the three phototherapy devices. The resulting two observer DB score plots were rendered next to the 3D CAD models and are presented in the following section.

Results and Discussion

The following figures represent the glare experienced by an observer 50 cm away from each phototherapy device. The discomfort glare experienced intensifies as the color in the observer planes shift from blue (least discomfort – DB Score 9) to red (most discomfort – DB Score 3).

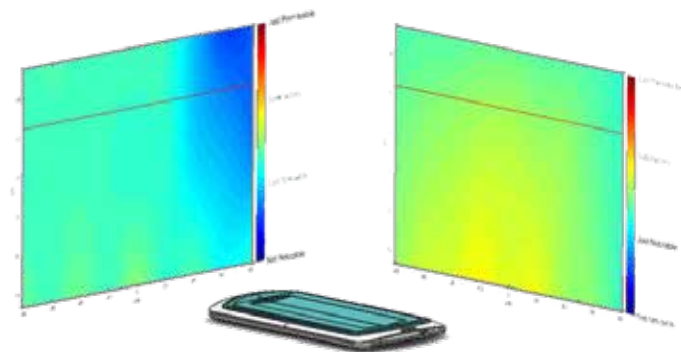


Figure 2: Skylife™ Glare Field

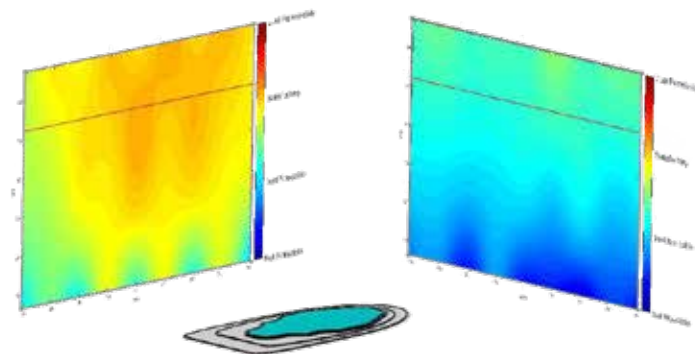


Figure 3: Natus® neoBLUE® Glare Field

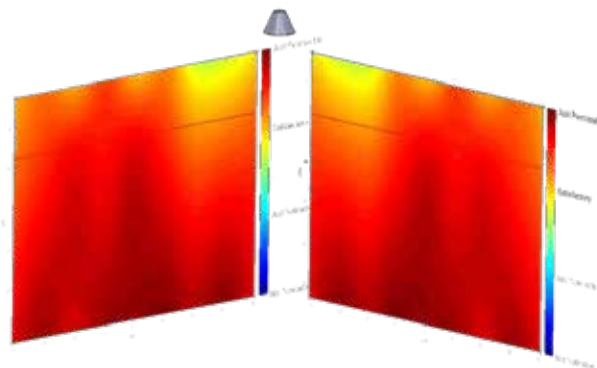


Figure 4: GE Giraffe® Spot PT Lite™ Glare Field

The horizontal red line shown on each of the observer planes indicates the average eye-line for clinicians.

It is evident from these figures that the glare associated with NeoLight Skylife™ is less than that with Natus neoBLUE® and GE Giraffe® Spot PT Lite. The GE Giraffe® Spot PT Lite device had a glare far greater than that of the other two devices. This could be because the –

NeoLight Skylife™ and Natus neoBLUE® devices have a bottom light source that is much closer to the patient than in the GE Giraffe® Spot PT Lite. The bottom light source configuration provides efficient treatment dose delivery while minimizing the stray light emitted.

In addition to the bottom light source configuration, the novel utilization of a 3D light channeling mechanism for the Skylife™ device further reduces its glare score. Overall, the Skylife™ phototherapy device is found to have the lowest glare score while maintaining the highest phototherapy dosage.

“Phototherapy devices emit HEV light. The glare associated with devices which emit HEV light should be minimized to mitigate potential long-term exposure effects for individuals who work near the devices on a routine basis. ”

Conclusion

Phototherapy devices emit HEV light. The glare associated with devices which emit HEV light should be minimized to mitigate potential long-term exposure effects for individuals who work near the devices on a routine basis. It is, therefore, imperative that phototherapy devices - both overhead and under baby units – incorporate inherent design features to minimize the stray treatment light leaking past the intended target, i.e., jaundiced infant, into the treatment room. Due to the potential impact on its clinicians, hospital management must consider glare when purchasing phototherapy devices go- forward. Similar devices should be compared to determine which device minimizes this unwanted effect of light.

The method outlined in this paper can be standardized to evaluate the glare produced by any phototherapy device. In this study, the glare produced by three devices - Natus neoBLUE®, GE Giraffe® Spot PT Lite, and NeoLight Skylife™ - was evaluated with the described method.

Skylife™, due to its 3D light channeling mechanism, demonstrated the least glare for an individual in the vicinity of the device while producing the highest dose of phototherapy in the study and thus is the top-rated device.

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Disclosure: The authors are co-founders of NeoLight LLC and have a financial relationship with NeoLight LLC.

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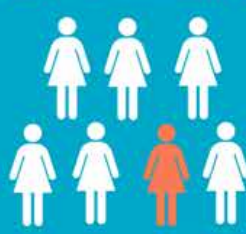
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Respiratory Report: Minimally Invasive Surfactant Therapy (MIST) Questions and Controversies

Rob Graham, R.R.T./N.R.C.P.

I dedicate this column to the late Dr. Andrew (Andy) Shennan, the founder of the perinatal program at Women's College Hospital (now at Sunnybrook Health Sciences Centre). To my teacher, my mentor and the man I owe my career as it is to, thank you. You have earned your place where there are no hospitals and no NICUs, where all the babies do is laugh and giggle and sleep.

Surfactant replacement therapy has been the gold standard for the treatment of respiratory distress syndrome (RDS) for decades. Traditionally infants requiring surfactant have been intubated and surfactant instilled via the endotracheal tube (ETT), and then the infant was manually ventilated via resuscitation bag. In the "good old days" this was done without pre-medication, however rapid sequence induction (RSI) has become the standard of care for intubation in all but the most emergent situations.

Sometime in the mid to late 1990's word out of Germany of a new technique of giving surfactant emerged. Rather than intubating the baby, surfactant was given by performing laryngoscopy and passing a feeding tube (or another suitable catheter) through the vocal cords into the trachea while the baby was receiving CPAP. The surfactant was trickled into the lungs with the baby breathing spontaneously, and no manual ventilation was performed at all.

I gave surfactant this way the first time in the late 1990s. Using a feeding tube I found it fairly easy to perform the procedure, but did note that once the surfactant hit the carina the baby had a propensity to become bradycardic, hence quite a bit of stimulation was required during the procedure, but the end result was a reduction in FiO_2 to 0.21 and additional dosing was not required.

In recent years, MIST or less invasive surfactant administration (LISA) has become all the rage with many centres now routinely using this approach. In the unit I practice in, we have had variable results and have resorted to using a 5Fr umbilical catheter to administer surfactant as safety changes made to feeding tubes make them incompatible with standard syringes, and we found the multi-access catheter (MAC) is too flimsy to facilitate easy placement. As well, atropine is now given prior to the procedure to mitigate vagal response.

That manual ventilation (handbagging) is less than ideal has been known for some time. Even the most experienced clinicians invariably give higher pressure (with attending higher volume) than they think, and it has been surmised that even handbagging to assess ETT placement is a set up for chronic lung disease. (CLD). With that in mind, the concept of delivering surfactant without the risk of barotrauma and volutrauma associated with manual ventilation sounds like a great idea. Who doesn't want to reduce the risk of CLD? However, with RSI being the accepted standard for ETT placement, this raises questions regarding neuroprotection and mitigation of discomfort during laryngoscopy which, of course, must be performed in order to place whatever catheter one uses properly through and below the vocal cords.

Dr. K. Barrington notes that laryngoscopy and intubation have not generally been separately evaluated in studies of physiological responses in the neonate during intubation and that laryngosco-

py itself produces several physiologically undesirable effects.⁽¹⁾ How then, does MIST/LISA compare with the traditional method of surfactant administration? The discomfort of laryngoscopy is still present as are vagal responses, and the risk of cerebral hypertension from the baby coughing and struggling still exist. Given this, one might expect that neurological sequelae might be more prevalent in the former patients. This has certainly been at the forefront of my thoughts on the subject.

"How then, does MIST/LISA compare with the traditional method of surfactant administration? The discomfort of laryngoscopy is still present as are vagal responses, and the risk of cerebral hypertension from the baby coughing and struggling still exist."

There are ways to give surfactant via ETT that do not involve handbagging. Dr. J Pillow (Australia) advocates giving surfactant while the baby is being mechanically ventilated rather than handbagging it in. ⁽²⁾ One must be careful not to contaminate the flow sensor (if present) and adjustments to pressure and inspiratory time must be made to compensate for the higher viscosity of surfactant, but since the pressure is limited by the ventilator the risk of over-distention is reduced. This is my preferred method of giving surfactant to an intubated baby.

This brings us back to the babies receiving MIST/LISA. What evidence do we have to support the safety and efficacy of this new practice? As it turns out, a study out of Germany seems to indicate that the practice is not only safe, outcomes are improved across the board when compared to traditional installation via ETT.

There is a notable exception to these findings: a sub-group prone to focal intestinal perforation (FIP) (those of less than 26 weeks gestational age). Those who remember my column on non-invasive ventilation (NIV) will recall that I do not believe infants of less than 25 weeks gestational age are good candidates for NIV. There may be many reasons for the increase in FIP, but the increased rate was of statistical significance. The authors postulate that, with this subset of patients, the air in the intestines stretches the intestinal membrane such that sheer forces are increased and micro-tears form, similar to what may happen with conventional ventilation and conducting airways producing air leak.

The German study does not mention (as far as I could find) the use of any adjuncts such as atropine to reduce vagal effects. It also does not go into detail regarding the use of RSI for intubation, something that could affect results, but it is a large study with compelling data worth further investigation. ⁽³⁾

"A solution in search of a problem" is a common sentiment among some of my colleagues and I must admit having similar feelings myself. After all, the rate of CLD in our post 27-week group of

infants is low and decreases rapidly to zero by 30 weeks, so the question of how much benefit there is versus how much more discomfort there is for the patient is, I think, valid. In addition, several colleagues have indicated that placing the catheter while maintaining NIV is at best awkward, and at worse far more difficult than intubation, and a quantity of surfactant ends up being swallowed, although smaller volume dosing may reduce this. Still, particularly in units struggling with high CLD rates in their later gestation patients, MIST/LISA may well be an improvement over traditional practice and may improve not just pulmonary outcomes, but others as well.

“There are a few studies in the works. Several units in Canada are investigating the use of a surfactant concentrated to allow for smaller volume dosing. Rather than the standard 5 ml/kg currently used with BLES® (Infasurf® in the U.S.) and Survanta®, the rationale is 2.5 ml/kg might be better tolerated, especially by smaller babies and for the MIST/LISA procedure.”

There are a few studies in the works. Several units in Canada are investigating the use of a surfactant concentrated to allow for smaller volume dosing. Rather than the standard 5 ml/kg currently used with BLES® (Infasurf® in the U.S.) and Survanta®, the rationale is 2.5 ml/kg might be better tolerated, especially by smaller babies and for the MIST/LISA procedure.

While neonatology has a long history of things that we thought

were great (chest physio and dexamethasone come to mind), those struggling with the question of safety and efficacy of MIST/LISA can take some solace in knowing that current evidence suggests the practice appears safe, at least for now. What is needed is further investigation comparing outcomes using routine RSI for intubation and surfactant delivery of atropine and MIST/LISA. As is the case with non-invasive ventilation, I suspect the key to success is in the selection of proper patients.

Another factor to consider in very premature patients being managed with NIV is FiO₂. Until anti-oxidant production and supplementation are established, the premature infant has no protection from free radicals and is therefore very susceptible to oxidative stress. There seems to be great variance in clinical practice when it comes to just how high a safe FiO₂ is. I firmly believe less is best.

This is my seventh submission to Neonatology Today, and I am honoured to share stories, experience, and up and coming practice with you, dear readers. I welcome questions, suggestions, and ideas for future columns.

Be well all, and enjoy the summer!

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- 2 *personal communication*
- 3 <https://www.nature.com/articles/s41598-018-26437-x>

Disclosures: *The author receives compensation from Bunnell Inc for teaching and training users of the LifePulse HFJV in Canada. He is not involved in sales or marketing of the device nor does he receive more than per diem compensation. Also, while the author practices within Sunnybrook H.S.C. this paper should not be construed as Sunnybrook policy per se. This article contains elements considered “off label” as well as maneuvers, which may sometimes be very effective but come with inherent risks. As with any therapy, the risk-benefit ratio must be carefully considered before they are initiated.*

NT



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Omegaven[®]

(fish oil triglycerides) injectable emulsion



Introducing a **Fish Oil** Lipid Emulsion for Pediatrics¹

A source of calories and fatty acids in pediatric patients with parenteral nutrition-associated cholestasis (PNAC)

Patients receiving Omegaven achieved age appropriate growth

Omegaven treated patients experienced improvement in liver function parameters

OMEGAVEN (fish oil triglycerides) injectable emulsion, for intravenous use

BRIEF SUMMARY OF PRESCRIBING INFORMATION

This brief summary does not include all the information needed to use Omegaven safely and effectively. Please see full prescribing information for Omegaven (fish oil triglycerides) injectable emulsion for intravenous use at www.fresenius-kabi.com/us.

INDICATIONS AND USAGE

Omegaven is indicated as a source of calories and fatty acids in pediatric patients with parenteral nutrition-associated cholestasis (PNAC).

Limitations of Use:

Omegaven is not indicated for the prevention of PNAC. It has not been demonstrated that Omegaven prevents PNAC in parenteral nutrition (PN)-dependent patients.

It has not been demonstrated that the clinical outcomes observed in patients treated with Omegaven are a result of the omega-6: omega-3 fatty acid ratio of the product.

DOSAGE AND ADMINISTRATION

Prior to administration, correct severe fluid and electrolyte disorders and measure serum triglycerides to establish a baseline level. Initiate dosing in PN-dependent pediatric patients as soon as direct or conjugated bilirubin levels are 2 mg/dL or greater. The recommended daily dose (and the maximum dose) in pediatric patients is 1 g/kg/day. Administer Omegaven until direct or conjugated bilirubin levels are less than 2 mg/dL or until the patient no longer requires PN.

CONTRAINDICATIONS

Omegaven is contraindicated in patients with known hypersensitivity to fish or egg protein or to any of the active ingredients or excipients, severe hemorrhagic disorders due to a potential effect on platelet aggregation, severe hyperlipidemia or severe disorders of lipid metabolism characterized by hypertriglyceridemia (serum triglyceride concentrations greater than 1,000 mg/dL).

WARNINGS AND PRECAUTIONS

- Risk of Death in Preterm Infants due to Pulmonary Lipid Accumulation: Deaths in preterm infants after infusion of soybean oil-based intravenous lipid emulsions have been reported in medical literature. Autopsy findings in these preterm infants included intravascular lipid accumulation in the lungs. The risk of pulmonary lipid accumulation with Omegaven is unknown. Preterm and small-for-gestational-age infants have poor clearance of intravenous lipid emulsion and increased free fatty acid plasma levels following lipid emulsion infusion. This risk due to poor lipid clearance should be considered when administering intravenous lipid emulsions. Monitor patients receiving Omegaven for signs and symptoms of pleural or pericardial effusion.
- Hypersensitivity Reactions: Omegaven contains fish oil and egg phospholipids, which may cause hypersensitivity reactions. Signs or symptoms of a hypersensitivity reaction may include: tachypnea, dyspnea, hypoxia, bronchospasm, tachycardia, hypotension, cyanosis, vomiting, nausea, headache, sweating, dizziness, altered mentation, flushing, rash, urticaria, erythema, fever, or chills. If a hypersensitivity reaction occurs, stop infusion of Omegaven immediately and initiate appropriate treatment and supportive measures.

ORDERING INFORMATION

Bottle Size	50 mL single-dose glass bottle	100 mL single-dose glass bottle
NDC Code	63323-205-50	63323-205-00
Bottle/ Carton	10	10

FOR MORE INFORMATION ABOUT OMEGAVEN®:

Website: www.OmegavenUSA.com

To Order: 1.888.386.1300

Med Info phone: 1.800.551.7176 (option 4)

Med Info email: nutrition.medinfo.USA@fresenius-kabi.com

- **Risk of Infections:** The risk of infection is increased in patients with malnutrition-associated immunosuppression, long-term use and poor maintenance of intravenous catheters, or immunosuppressive effects of other conditions or concomitant drugs. To decrease the risk of infectious complications, ensure aseptic technique in catheter placement and maintenance, as well as in the preparation and administration of Omegaven. Monitor for signs and symptoms of early infections including fever and chills, laboratory test results that might indicate infection (including leukocytosis and hyperglycemia), and frequently inspect the intravenous catheter insertion site for edema, redness, and discharge.
- **Fat Overload Syndrome:** A reduced or limited ability to metabolize lipids accompanied by prolonged plasma clearance may result in this syndrome, which is characterized by a sudden deterioration in the patient's condition including fever, anemia, leukopenia, thrombocytopenia, coagulation disorders, hyperlipidemia, hepatomegaly, deteriorating liver function, and central nervous system manifestations (e.g., coma).
- **Refeeding Syndrome:** Administering PN to severely malnourished patients may result in refeeding syndrome, which is characterized by the intracellular shift of potassium, phosphorus, and magnesium as the patient becomes anabolic. Thiamine deficiency and fluid retention may also develop. To prevent these complications, closely monitor severely malnourished patients and slowly increase their nutrient intake.
- **Hypertriglyceridemia:** Impaired lipid metabolism with hypertriglyceridemia may occur in conditions such as inherited lipid disorders, obesity, diabetes mellitus, and metabolic syndrome. Serum triglyceride levels greater than 1,000 mg/dL have been associated with an increased risk of pancreatitis. To evaluate the patient's capacity to metabolize and eliminate the infused lipid emulsion, measure serum triglycerides before the start of infusion (baseline value), and regularly throughout treatment. If hypertriglyceridemia (triglycerides greater than 250 mg/dL in neonates and infants or greater than 400 mg/dL in older children) develops, consider stopping the administration of Omegaven for 4 hours and obtain a repeat serum triglyceride level. Resume Omegaven based on new result as indicated.
- **Aluminum Toxicity:** Aluminum may reach toxic levels with prolonged parenteral administration if kidney function is impaired. Preterm infants are particularly at risk because their kidneys are immature, and they require large amounts of calcium and phosphate solutions, which contain aluminum. Patients with impaired kidney function, including preterm infants, who receive parenteral levels of aluminum at greater than 4 to 5 mcg/kg/day accumulate aluminum at levels associated with central nervous system and bone toxicity. Tissue loading may occur at even lower rates of administration.
- **Monitoring and Laboratory Tests:** **Routine Monitoring:** Monitor serum triglycerides, fluid and electrolyte status, blood glucose, liver and kidney function, coagulation parameters, and complete blood count including platelets throughout treatment. **Essential Fatty Acids:** Monitoring patients for laboratory evidence of essential fatty acid deficiency (EFAD) is recommended. Laboratory tests are available to determine serum fatty acid levels. Reference values should be consulted to help determine adequacy of essential fatty acid status.
- **Interference with Laboratory Tests:** The lipids contained in Omegaven may interfere with some laboratory blood tests (e.g., hemoglobin, lactate dehydrogenase, bilirubin, and oxygen saturation) if blood is sampled before lipids have cleared from the bloodstream. Lipids are normally cleared after a period of 5 to 6 hours once the lipid infusion is stopped.

ADVERSE REACTIONS

The most common adverse drug reactions (>15%) are: vomiting, agitation, bradycardia, apnea and viral infection.

Clinical Trials Experience

The safety database for Omegaven reflects exposure in 189 pediatric patients (19 days to 15 years of age) treated for a median of 14 weeks (3 days to 8 years) in two clinical trials. Adverse reactions that occurred in more than 5% of patients who received Omegaven and with a higher incidence than the comparator group are: vomiting, agitation, bradycardia, apnea, viral infection, erythema, rash, abscess, neutropenia, hypertonia and incision site erythema. Patients had a complicated medical and surgical history prior to receiving Omegaven treatment and the mortality was 13%. Underlying clinical conditions prior to the initiation of Omegaven therapy included prematurity, low birth weight, necrotizing enterocolitis, short bowel syndrome, ventilator dependence, coagulopathy, intraventricular hemorrhage, and sepsis. Twelve (6%) Omegaven-treated patients were listed for liver transplantation (1 patient was listed 18 days before treatment, and 11 patients after a median of 42 days [range: 2 days to 8 months]) of

treatment); 9 (5%) received a transplant after a median of 121 days (range: 25 days to 6 months) of treatment, and 3 (2%) were taken off the waiting list because cholestasis resolved.

One hundred thirteen (60%) Omegaven-treated patients reached DBil levels less than 2 mg/dL and AST or ALT levels less than 3 times the upper limit of normal, with median AST and ALT levels for Omegaven-treated patients at 89 and 65 U/L, respectively, by the end of the study.

Median hemoglobin levels and platelet counts for Omegaven-treated patients at baseline were 10.2 g/dL and $173 \times 10^9/L$, and by the end of the study these levels were 10.5 g/dL and $217 \times 10^9/L$, respectively. Adverse reactions associated with bleeding were experienced by 74 (39%) of Omegaven-treated patients.

Median glucose levels at baseline and the end of the study were 86 and 87 mg/dL for Omegaven-treated patients, respectively. Hyperglycemia was experienced by 13 (7%) Omegaven-treated patients.

Median triglyceride levels at baseline and the end of the study were 121 mg/dL and 72 mg/dL for Omegaven-treated patients respectively. Hypertriglyceridemia was experienced by 5 (3%) Omegaven-treated patients.

The triene:tetraene (Mead acid:arachidonic acid) ratio was used to monitor essential fatty acid status in Omegaven-treated patients only in Study 1 (n = 123). The median triene:tetraene ratio was 0.02 (interquartile range: 0.01 to 0.03) at both baseline and the end of the study. Blood samples for analysis may have been drawn while the lipid emulsion was being infused and patients received enteral or oral nutrition.

Postmarketing Experience

The following adverse reaction has been identified with use of Omegaven in another country. Life-threatening hemorrhage following a central venous catheter change was reported in a 9-month-old infant with intestinal failure who received PN with Omegaven as the sole lipid source; he had no prior history of bleeding, coagulopathy, or portal hypertension.

To report SUSPECTED ADVERSE REACTIONS, contact Fresenius Kabi USA, LLC, at 1-800-551-7176, option 5, or FDA at 1-800-FDA-1088 or www.fda.gov/medwatch.

DRUG INTERACTIONS

Prolonged bleeding time has been reported in patients taking antiplatelet agents or anticoagulants and oral omega-3 fatty acids. Periodically monitor bleeding time in patients receiving Omegaven and concomitant antiplatelet agents or anticoagulants.

USE IN SPECIFIC POPULATIONS

- **Pregnancy:** There are no available data on Omegaven use in pregnant women to establish a drug-associated risk of major birth defects, miscarriage, or adverse maternal or fetal outcomes. Animal reproduction studies have not been conducted with fish oil triglycerides. The estimated background risk of major birth defects and miscarriage in the indicated population is unknown. All pregnancies have a background risk of birth defect, loss, or other adverse outcomes. In the US general population, the estimated background risk of major birth defects and miscarriage in clinically recognized pregnancies is 2% to 4% and 15% to 20%, respectively.
- **Lactation:** No data available regarding the presence of fish oil triglycerides from Omegaven in human milk, the effects on the breastfed infant, or the effects on milk production. Lactating women receiving oral omega-3 fatty acids have been shown to have higher levels of omega-3 fatty acids in their milk. The developmental and health benefits of breastfeeding should be considered along with the mother's clinical need for Omegaven, and any potential adverse effects of Omegaven on the breastfed infant.
- **Pediatric Use:** The safety of Omegaven was established in 189 pediatric patients (19 days to 15 years of age). The most common adverse reactions in Omegaven-treated patients were vomiting, agitation, bradycardia, apnea and viral infection.
- **Geriatric Use:** Clinical trials of Omegaven did not include patients 65 years of age and older.

OVERDOSE

In the event of an overdose, fat overload syndrome may occur. Stop the infusion of Omegaven until triglyceride levels have normalized and any symptoms have abated. The effects are usually reversible by stopping the lipid infusion. If medically appropriate, further intervention may be indicated. Lipids are not dialyzable from serum.

REFERENCES:

1. Omegaven Prescribing Information, Fresenius Kabi USA, LLC. 2018.



Fresenius Kabi USA, LLC
Three Corporate Drive,
Lake Zurich, IL 60047
Phone: 1.888.386.1300
www.fresenius-kabi.com/us

NEONATOLOGY TODAY is interested in publishing manuscripts from Neonatologists, Fellows, NNPs and those involved in caring for neonates on case studies, research results, hospital news, meeting announcements, and other pertinent topics.

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INVITATION REQUEST

Featured Conference: Quantum Caring for NICU Clinicians Workshop August 24, 2019 Summerlin Hospital Medical Center, Las Vegas NV

Mary Coughlin MS, NNP, RNC-E

Course Description:

Early life adversity changes biology and impacts an individual's developmental trajectory and quality of life across the lifespan. Physiologic and psychologic morbidities have been described in NICU survivors. As science gains insight into the pathogenesis of these life altering consequences, NICU clinicians are able to integrate effective, evidence-based strategies to mitigate and ameliorate these outcomes.

Maternal separation, unmanaged or under-managed pain and stress, sleep fragmentation / deprivation and other experiences that undermine a sense of safety, security and connectedness in the neonatal intensive care unit elicit a toxic stress response and constitute early life adversities. The eco-bio-developmental framework from the American Academy of Pediatrics highlights opportunities for neonatal and pediatrics clinicians to transform the experience of care in the NICU and beyond.

“The concept of trauma-informed care has biologic relevance in the NICU where infants, families and clinicians are exposed to repeated traumatic stress. Understanding the biology that underpins traumatic stress introduces innovation in primary prevention and earlier intervention.”

The concept of trauma-informed care has biologic relevance in the NICU where infants, families and clinicians are exposed to repeated traumatic stress. Understanding the biology that underpins traumatic stress introduces innovation in primary prevention and earlier intervention. Adopting evidence-based strategies that mitigate and manage the trauma associated with the NICU experience impacts short-term and long-term outcomes for infants, families and clinicians.

This full day workshop introduces the learner to the biology behind psychosocial development and the implications and clinical relevance of a trauma-informed approach to care in the NICU. The faculty have synthesized relevant and practical aspects of a rich and diverse evidence base to provide the learner with tangible and actionable practice strategies that they can implement in their next care encounter.

Disclosure: This program has been awarded 8 continuing education credits for nursing in accordance with 244 CMR 5.04 Massachusetts Board of Registration in Nursing

NT

Needs Assessment:

Upon completion the learner will:

- List the eight stages of psychosocial development
- Identify the psychosocial crisis of stage one
- Explain the relationship between hope and health
- Describe the hope continuum in the NICU
- Identify 3 physiological and 3 psychological health benefits of compassion
- Describe the power of 40 seconds
- Describe the epigenetics of traumatic stress
- List 3 short-term and long-term outcomes associated with traumatic stress
- List the 5 core measures for trauma-informed, age-appropriate care
- Draft a test of change related to one attribute of the core measures for trauma-informed care
- List the 5 things you can do to cultivate courage

Who should attend?

NICU / PICU Nurses
Physicians
Nutritionists / Dieticians
Speech / Language Pathologists
Parents / Family Members
Early Interventionists
Community / Public Health Nurses
Occupational Therapists

Corresponding Author



Mary Coughlin MS, NNP, RNC-E
Founder and Chief Transformation Officer Caring Essentials Collaborative, LLC
Executive Director, Trauma-informed Care Certification, LLC
Boston, MA
Email: mary@caringsentials.net

QUANTUM CARING FOR NICU CLINICIANS

A Trifecta for Excellence in Neonatal Trauma-informed Care

Hope

Courage

Compassion



WHEN: Saturday, August 24th, 2019, 8:30am - 5:00pm PT

WHERE: Summerlin Hospital Medical Center, Las Vegas NV

WHY: What we now know for sure is that the intangible dimensions of the human experience leave an indelible imprint on our psyche, our physiology and our lifelong health and wellness!

"TO THE WORLD YOU MAY BE ONE PERSON, BUT, TO ONE PERSON, YOU MAY BE THE WORLD"

- DR. SEUSS

<https://www.caringessentials.net/quantum-caring-for-clinicians-workshop>

QUANTUM CARING FOR NICU CLINICIANS

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This full day workshop introduces the learner to the biology behind psychosocial development and the implications and clinical relevance of a trauma-informed approach to care in the NICU. The faculty have synthesized relevant and practical aspects of a rich and diverse evidence base to provide the learner with tangible and actionable practice strategies that they can implement in their next care encounter.

Needs Assessment

Early life adversity changes biology and impacts an individual's developmental trajectory and quality of life across the lifespan. Physiologic and psychologic morbidities have been described in NICU survivors. As science gains insight into the pathogenesis of these life altering consequences, NICU clinicians are able to integrate effective, evidence-based strategies to mitigate and ameliorate these outcomes.

Maternal separation, unmanaged or under-managed pain and stress, sleep fragmentation / deprivation and other experiences that undermine a sense of safety, security and connectedness in the neonatal intensive care unit elicit a toxic stress response and constitute early life adversities. The eco-bio-developmental framework from the American Academy of Pediatrics shines a light on the myriad of opportunities neonatal and pediatrics clinicians have to transform the experience of care in the NICU and beyond.

The concept of trauma-informed care has biologic relevance in the NICU where infants, families and clinicians are exposed to repeated traumatic stress. Understanding the biology that underpins traumatic stress introduces innovation in primary prevention and earlier intervention. Adopting evidence-based strategies that mitigate and manage the trauma associated with the NICU experience impacts short-term and long-term outcomes for infants, families and clinicians.

QUANTUM CARING FOR NICU CLINICIANS

Learning Objectives

Upon completion the learner will:

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- List the 5 core measures for trauma-informed, age-appropriate care
- Draft a test of change related to one attribute of the core measures for trauma-informed care
- List the 5 things you can do to cultivate courage

Faculty

SHARON BONIFAZI RNC-NIC

Sharon has been a neonatal nurse for 20 years and has worked in a variety of roles including bedside RN, transport nurse and nurse manager.

She has since spoken on "Hope: Stories from the NICU" at both the ONE Conference and the Science and Soul Conference in Belgium, 2019. Sharon feels that it is her calling to work with nurses and other professionals in the area of Trauma Informed Care and hopes to be an inspiration to the NICU professionals that inspire her on a daily basis.

Faculty

MARY COUGHLIN, MS, NNP, RNC-E

Mary Coughlin is a global leader in neonatal nursing and has pioneered the concept of trauma-informed, neuroprotective care as a biologically relevant paradigm for hospitalized infants, families and professionals.

Ms. Coughlin has over 35 years of nursing experience beginning with her tenure in the US Air Force Nurse Corp and culminating with her current role as Founder and Chief Transformation Officer at Caring Essentials Collaborative, LLC.

Program Overview

MORNING SESSION

0800-0830: Registration, Coffee, Network

0830-0845: Welcome, Introductions, Overview of the Day

0845-0945: Psychosocial Development and Learned Life Virtues

- Erik Erikson's 8 stages of psychosocial development
- Psychosocial crisis associated with each stage
- Life Virtues and their implications for health and wellness

0945-1100: What's Hope got to do with it? The Science Behind the Virtue

- What is hope and why it matters so much
- Hope and the Human Brain
- The Hope Continuum

1100-1215: Compassionomics

- Does Compassion Matter?
- Compassion Drives Revenue and Cuts Costs
- Compassion as an Antidote to Burnout

1215-1300: LUNCH (provided)

AFTERNOON SESSION

1300-1345: The Biological Implications of a Trauma-informed Approach (TIA) in the NICU

- Neurobiology & Epigenetics of Perinatal Trauma
- Autonomic Integrity and Traumatic Stress
- Developmental Trajectory and Risk for Psychopathology in ELBW Survivors

1345-1530: What Trauma-informed Care (TIC) Looks Like in the NICU and Beyond

- The 5 Core Measures for Trauma-informed, Age-appropriate Care
- Clinically Relevant Examples and Evidence-based Strategies Across Each Core Measure Set (Trauma-informed Care Toolkit)
- How to CARE OUT LOUD - Actions Speak Louder than Words

1530-1630: Imperfect Courage - "...choosing courage is the route to impact"

- What is Imperfect Courage?
- 5 Things You Can Do to Cultivate Courage
- Draft Your Courage Prescription

1630-1700: Q&A; Wrap-up; Conferment of Certificates of Attendance

Workshop Tuition = \$125.00

The workshop registration fee includes your course tuition, lunch, an e-syllabus, a trauma-informed care toolkit, 8 continuing education credits, and the opportunity to network with like-minded colleagues and subject matter experts.

THE BRETT TASHMAN FOUNDATION

The Brett Tashman Foundation is a 501©(3) public charity. The mission of the Foundation is to find a cure for Desmoplastic Small Cell Round Tumors (DSRCT). DSRCT is an aggressive pediatric cancer for which there is no cure and no standard treatment. 100 percent of your gift will be used for research. There is no paid staff. To make your gift or for more information, go to "TheBrettTashmanFoundation.org" or phone (909) 981-1530.

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**WE NEED
MORE RESEARCH**

We have valuable data to help us deliver the best NICU care for small and premature babies. But we still need more data to help us optimize care for the rest of our babies who are admitted to the NICU.



Educate. Advocate. Integrate.



From the National Perinatal Association: Grandview's Love Overcomes Tough Beginning to Life

Russell Korando

The National Perinatal Association (NPA) is an interdisciplinary organization that strives to be a leading voice for perinatal care in the United States. Our diverse membership is comprised of healthcare providers, parents & caregivers, educators, and service providers, all driven by their desire to give voice to and support babies and families at risk across the country.

Members of the NPA write a regular peer-reviewed column in Neonatology Today.



Russell Korando is the Sports Editor at Leader Publications. This article originally appeared in the Jefferson County Leader on June 27, 2019. It appears here with permission.

To look at Travis Love today, you wouldn't believe how his life began.

The 19-year-old stands taller than his parents. He's got the lithe build of a state-qualifying track athlete. He graduated from Grandview this spring with a 3.6 grade-point average. He's going to college.

But it almost didn't turn out this way.

His mother underwent an emergency cesarean section operation on May 25, 2000,

a full 10 weeks before her son's expected arrival.

The baby fought for survival for weeks after doctors had given him a 45 percent chance of living through birth.

Love's mother, Kristy, was 23 weeks pregnant and suffering from preeclampsia when she was admitted to Mercy Urgent Care in Kirkwood. Starting at 19 weeks, Kristy and her husband, John, of Lonedell, were bracing themselves for the worst.

The baby was literally killing Kristy. High blood pressure and kidney and liver failure are common symptoms of preeclampsia, and her organs were failing. Travis had to come out.

"The baby was literally killing Kristy. High blood pressure and kidney and liver failure are common symptoms of preeclampsia, and her organs were failing. Travis had to come out."

"My protein was low, at a 1 out of 4, and it got worse. When I started showing signs of liver failure, the doctors decided it was time for the C-section," Kristy said.

At birth, Travis weighed 3 pounds, 3 ounces and struggled with respiratory illness because of the blood pressure medication Kristy was taking during the pregnancy. For the first four days, the Loves were told not to leave Travis' bedside because the odds of his survival were still low.

"After four days he started showing he was a fighter," Kristy said.

For nine heartbreaking days, all Kristy and John could do is look at their new baby, who was on a ventilator in the neonatal

intensive care unit (NICU). Although she couldn't hold Travis, Kristy started recovering quickly now that he was out of her body. Delivering Travis was her cure.

John was working on the assembly line at the Ford Motor Co. plant in Hazelwood when he got a page from Kristy that she was about to have the C-section. He rushed to be by her side when Travis was born. He made it.

"After they pulled him out, they tried to get him to breathe," John said. "It seemed like forever, but it was probably just a few seconds. They rushed him off to NICU to start working on him."

As worried as John was for his newborn son and wife, he also was concerned about their daughter, Jessica, who was 8 at the time.

"I had a daughter waiting for us, a son hanging on for life and wife recovering from a C-section. I was trying to deal with that all at one time," John said. "Dads have to be that rock for their family and they can't be emotional. I still tear up talking about it."

John said waiting to get his hands on Travis for nine days was excruciating. Trying to focus on his job while worrying about his family was hard. Most mornings started at 2:30 a.m. so he could be at the hospital for Travis' feeding and to check on Kristy before he went to work.

Travis steadily improved and finally was embraced by his mother.

"You go to hold this fragile baby and you're scared to move," Kristy said. "But the bonding you get instantly when you have a child, when you hold him skin to skin, is amazing."

John tried to maintain normalcy for Jessica, who's now 27 and lives in Union, by taking her to the lake and keeping her involved with the progress of her brother by letting her visit the hospital whenever she wanted.

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FOUNDATION

The Brett Tashman Foundation is a 501(c)(3) public charity. The mission of the Foundation is to find a cure for Desmoplastic Small Cell Round Tumors (DSRCT). DSRCT is an aggressive pediatric cancer for which there is no cure and no standard treatment. 100 percent of your gift will be used for research. There is no paid staff. To make your gift or for more information, go to TheBrettTashmanFoundation.org or phone (909) 981-1530.

“Nobody could see Travis before she did,” John said about the day he was born. “Jessica gets off the elevator, our whole family was there. I told her, ‘You’ve got a baby brother.’ And she hugged me tighter than she ever had. Making her a priority was a goal we had. Hopefully we did that.”

Travis spent his first 89 days in the hospital. There were setbacks along the way. On July 3, Kristy and John were told one of his

“Travis spent his first 89 days in the hospital. There were setbacks along the way. On July 3, Kristy and John were told one of his lungs collapsed. The doctors were stumped, Kristy said. Travis needed an open lung biopsy. The operation was successful, but again his parents had to watch him struggle alone, separated by glass.”

lungs collapsed. The doctors were stumped, Kristy said. Travis needed an open lung biopsy. The operation was successful, but again his parents had to watch him struggle alone, separated by glass.

“Watching him in NICU stretching his legs trying to push away from the pain was really hard,” John said. “Some days we’d take a step forward and four steps back.”

When Travis was finally released from the hospital, he was sent home on oxygen and a heart monitor. The Loves weren’t in the clear yet.

Travis went through physical therapy, occupational therapy and

developmental therapy. In a good month during that first year, he had 16 doctor appointments. The visits started tapering off after his first birthday.

At Travis’ first orthopedic appointment, Kristy learned her son had a mild form of cerebral palsy. The doctor told her that he wouldn’t need support to walk, but he’d never be a track star. The irony to that prediction is that Travis qualified for the Class 2 state track and field championships in the pole vault in May.

“I knew nothing about track at that point. In our eyes, we had our son. And if that’s what we had to deal with, we were going to get through it,” Kristy said.

John said they were very proactive in making sure they did all they could to get Travis on his feet. As it turned out, maybe the Loves did their job too well.

“We got down on the floor and stretched him and massaged his muscles,” John said.

By the time Travis was 2, his mom and dad were in a state of wonderment as they watched their little boy run everywhere.

“I put an orange vest on him to keep track of him when he was 3 or 4. Or you couldn’t find him,” John said laughing.

Travis was diagnosed with chronic lung disease when he was born and doctors told the Loves he had the lungs of a 70-year-old who had smoked his whole life. Now that Travis has proven his lungs are fully functional as an athlete who has run on relay teams, cleared 11-6 in the pole vault and played football during his senior year, his parents aren’t too concerned about that prognosis.

“All he’s ever done since he could walk is run,” Kristy said. “When he came home from junior high, he told us he wanted to run track at Grandview.”

After Travis was born, Kristy knew she had to help parents and their children who were going through life-and-death struggles and lengthy hospital stays. When Travis was 1, she wanted to talk to other parents and let them know that there’s light at the end of the tunnel. So she started as a volunteer at the same hospital, in which he was born and was a family advocate volunteer for 11 years. For the last seven years, she’s been paid to be with parents at bedside and she’s currently director of operations for the National Perinatal Association.

Kristy said it’s not uncommon for parents of critically ill children to suffer from PTSD, a condition commonly suffered by members of the military who’ve experienced combat.

“It’s not just for moms. It’s for dads, too,” she said. “We celebrate every milestone, holidays, birthdays. We want to celebrate everything during their journey,” she said.

John Love currently works for the Metropolitan Sewer District. When he worked for Ford, he said his medical insurance through the company paid 100 percent of Travis’s medical bills, which amounted to \$1.5 million. After such a rough beginning, it took the Loves some time before they let Travis compete in sports.

“We had worked so hard to keep him in this world, we didn’t want him to get injured. He was very talented at football,” John said.

While the Loves talked Travis’ early days, he sat nearby in the bleachers at Grandview’s stadium wearing dark sunglasses, new cowboy boots and leather belt, perfect-fitting blue jeans and a T-



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Fig 1. Travis Love, center, was born 10 weeks premature. His parents, Kristy and John, never held Love back from competing in athletics despite his doctors' early prognosis.

shirt. He seemed unfazed by his parents' stories.

When it was his turn to talk about how his life had turned out, Travis was humble and respectful of everyone who'd helped him stay alive and thrive. The love for his parents was obvious.

"Whether it's been through sports, or anything else, they've always been by my side," he said. "Everything I've learned is from my parents guiding me."

Competing in sports helped Travis broaden his feelings for his teammates.

"I like the support everybody has for each other. When someone from another team helps you onto your feet and tells you to keep

going, it shows you they care about you and not just about winning," he said.

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What you need to know about RSV

RSV stands for **Respiratory Syncytial Virus**

RSV is a **Really Serious Virus**

WHEN IS RSV SEASON?

Typically RSV season runs from November - March. But it can begin as early as July in Florida and end as late as April in the West.

Protect babies and families this RSV season
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National Perinatal Association

Consult the CDC's RSV Census Regional Trends to learn more www.cdc.gov/atsdr/census/rsv-surveillance.html

www.nationalperinatal.org

At the Class 2 District 2 track and field meet in May, Love finished fourth in the 300-meter hurdles in 45.29 seconds and ran a leg on the Eagles' 4x100 and 4x200 relay teams that qualified for sectionals. Love didn't make the state cut in the hurdles or relays but joined fellow seniors Noah Richardson and Quentin Geist to reach the state championships in Jefferson City. Richardson finished fourth in the triple jump in 43-0 and won Grandview's only medal. Love was 12th in the pole vault.

"My freshman year, I tried the pole vault and it was fun. It's an adrenaline rush," Love said. "(His parents) never held me back from doing anything. They would tell me about both sides of a sport.

"If I'd had the nerve to get on a bigger pole before state, I could have jumped higher. But that scared me. When I plant, I'm not used to being in the air that long."

Love played wide receiver and defensive back on the Eagles' football team last fall.

"I always wanted to play football because you can hit somebody and not get in trouble," he said. "Getting hit – I was like, 'OK, this is real.' Every once in awhile you get hit pretty good but you get up and keep going."

When Travis leaves for State Technical College of Missouri in Linn in August, the Loves will officially be empty-nesters. Travis will study power sports technology and will work on engines for diesel tractors, four-wheelers, boats, chain saws and other small engines. Because Linn is an hour and a half from home, he'll get to visit his parents on the weekends, but won't be able to commute. John and Kristy said they're prepared.

"He's my shadow and always has been," John said. "Whether it's cutting wood, fishing or hunting, he's always been by my side. He's spreading his wings and growing. It will be harder on me than him."

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Fellow's Column: Persistent Respiratory Distress in A Preterm Newborn

Chukwudi Ejiofor, MD, MPH, Ibukun Sonaike, MD, MPH, and Ricardo Mora, MD

Dr Ejiofor is a pediatric resident at Woodhull Medical and Mental Health Center located in Brooklyn, NY. He has an MPH with concentration in Maternal and Child Health. He will be starting his fellowship training in Neonatal-Perinatal Medicine in July 2019

“Congenital tracheal web is a rare upper airway malformation. It is characterized by a layer of tissue, which can vary in its thickness, draped across the tracheal lumen causing incomplete obstruction. (1) This condition usually goes undiagnosed or misdiagnosed from infancy to as late as adulthood. The estimated incidence is 1:10000 live births. (4)”

Introduction:

Congenital tracheal web is a rare upper airway malformation. It is characterized by a layer of tissue, which can vary in its thickness, draped across the tracheal lumen causing incomplete obstruction. (1) This condition usually goes undiagnosed or misdiagnosed from infancy to as late as adulthood. The estimated incidence is 1:10000 live births. (4)

We report a case of a preterm newborn with persistent respiratory distress and repeated episodes of apneas, bradycardias, and desaturations, diagnosed with congenital tracheal web.

Case Report:

A 27-week-old male newborn was delivered to a 26-year-old gravida 6 mother, with a significant past medical history of pre-gestational diabetes mellitus on metformin, and anxiety and depression on Lexapro. Her obstetric history is significant for fetal loss of a 20-week-old pregnancy and short cervix. During this pregnancy, she had ten antenatal visits. She took only prenatal vitamins, iron, Lexapro and metformin. She denied alcohol or illicit drug use. Prenatal labs were normal, and the quad screen was low risk.

Prenatal ultrasounds showed normal fetus and a shortened cervix. She was followed closely during the pregnancy with serial cervical length measurements. Cervical cerclage was placed at 19 weeks gestation age (GA), and vaginal progesterone was also started. Mother received two doses of Betamethasone at 25 weeks GA.

Mother went into labor at 27 weeks GA and delivered a male infant vaginally. There was thick meconium with a nuchal cord. The newborn received positive pressure ventilation for poor respiratory effort and bradycardia. He was then intubated, stabilized, and transferred to NICU. APGARs were 5 and 7 at 1 and 5 minutes. Birth weight was 1060g.

In the NICU, he was placed on SIMV, surfactant was administered, and blood was sent for laboratory investigations. He was started on fluids and antibiotics via central lines. Chest x-ray done showed signs of respiratory distress syndrome. He was also started on prophylactic phototherapy. Initial resuscitation and NICU management were uneventful.

He was extubated on day of life (DOL) 4. However, there was difficulty weaning him off non-invasive ventilation (NIV) support. Over the next three weeks, he was alternated between SiPAP and nCPAP/HFNC with little improvement in respiratory distress during weaning intervals. On DOL 27 he had to be re-intubated due to frequent episodes of apneas, bradycardias, and desaturations. He was extubated again on DOL 32 with similar difficulty weaning off NIV due to persistent respiratory distress during multiple attempted weans.

Evaluations done for possible etiologies were normal. Blood cultures done were negative, there were no electrolyte abnormalities, echocardiography showed a PDA with no significant shunt and no PPHN. Head ultrasound showed grade 1 Intra-ventricular hemorrhage, which resolved on follow-up imaging. Newborn screening was normal.

Due to an inability to wean off respiratory support by DOL 43, a



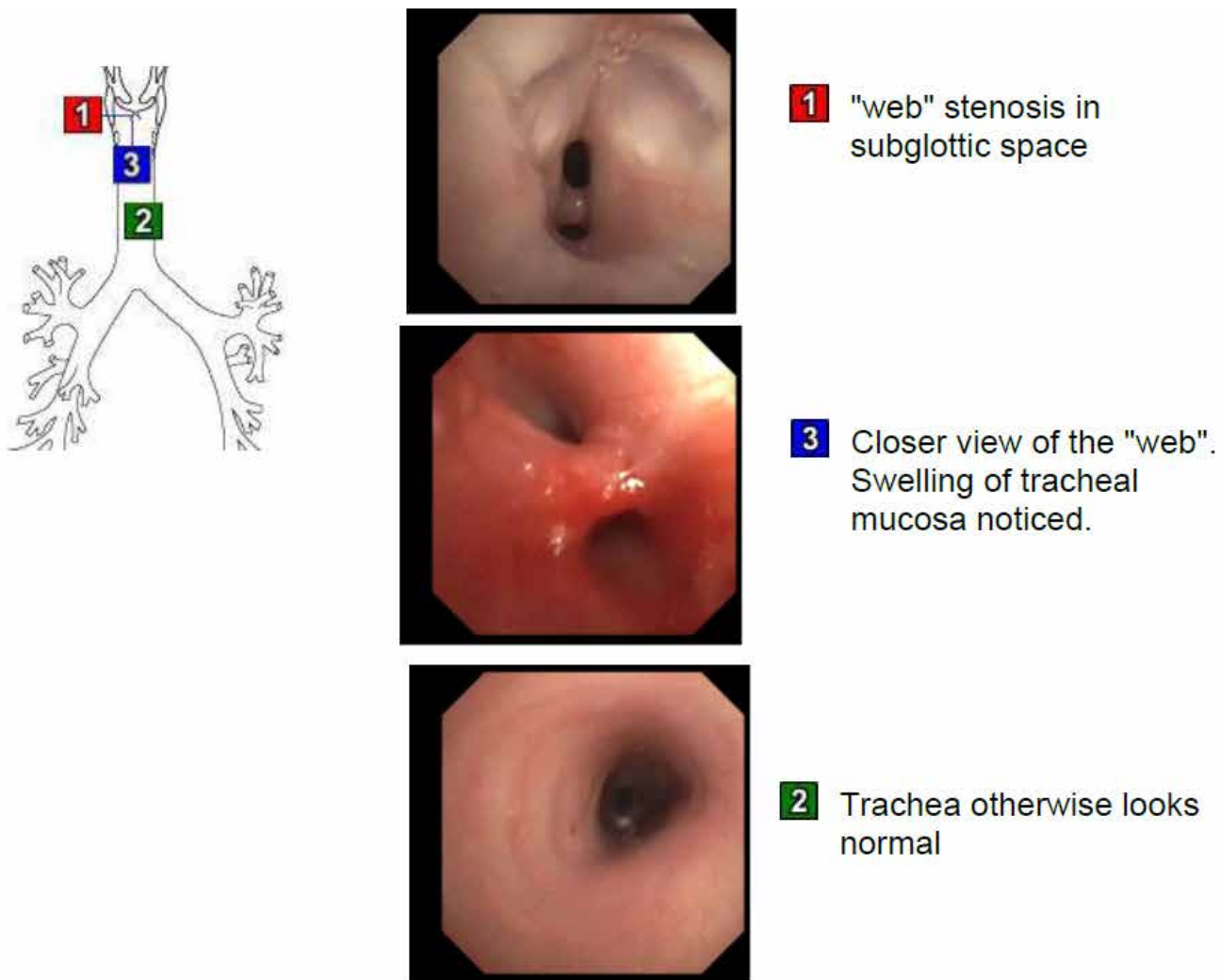


Figure 1 . Bronchoscopy

diagnosis of chronic lung disease was made, and he was commenced on diuretics with little improvement in his respiratory status. By DOL 73, he developed new onset wheezing. He was transferred to a tertiary center for further evaluation.

At the tertiary facility, chest computed tomography was negative for vascular anomalies of the great vessels (vascular ring or pulmonary sling), echocardiography showed moderate PDA with a left to right shunt and no PPHN. Bronchoscopy done revealed subglottic stenosis with tracheal webbing (Figure 1).

Following the diagnosis, he underwent rigid bronchoscopy with dilation of the tracheal web and stenosis. There were no acute complications following the procedure. He, however, developed stridor and respiratory distress days following the procedure, due to tracheal stenosis. He was intubated for 1 week and was

able to be weaned to NIV and then room air after extubation without any issues. He developed some residual tracheal stenosis following full recovery from the subglottic stenosis and web dilation. He was discharged home 4 weeks post-op on therapy to manage his chronic lung disease and hypertension, which he developed during his NICU course.

Over the next year, he was hospitalized several times for respiratory failure secondary to acute bronchiolitis. He was intubated once and needed nCPAP, HFNC or BiPAP on multiple occasions during his hospitalizations.

Discussion:

Congenital tracheal web is an intrinsic luminal malformation usually with normal surrounding cartilage. It is characterized by a layer of tissue, which can vary in its thickness, draped across the tracheal lumen causing incomplete obstruction. (1)

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This malformation may arise following unequal separation of the primordium when it differentiates into the esophagus and trachea during fetal development. (1,2) It is usually an isolated condition.

As a rare condition with a prevalence of 1 in 10000 live births and having varying degrees of symptomatology and severity in its presentation, it may go undiagnosed or misdiagnosed from infancy to as late as adulthood. (1,4)

In symptomatic newborns, the presentation may vary depending on the location of the lesion, degree of obstruction and/or other associated comorbidities in the newborn period. It may present as stridor, dyspnea, wheezing, persistent respiratory distress, recurrent respiratory infections, and respiratory failure. (1,2) While evaluating infants with this varying presentation, it is important to rule out other possible etiologies when the usual suspects are eliminated. This includes tracheal stenosis, laryngeal stenosis, pulmonary artery sling, or vascular ring.

Although a rare anomaly, multiple cases have been reported across all age groups either diagnosed incidentally or following the management of respiratory symptoms, which were refractory to all therapies administered.

Yin & Zhang in 2010², described a case of a 47-day-old female infant who after birth had a poor appetite, choking episodes with drinking milk and slow weight gain. Following workup for extended and severe cough, she was eventually diagnosed as a congenital tracheal web using coronal CT reconstruction and bronchoscopy.

Legasto et al. in 2004¹ described a 9-year-old female who had a history of wheezing, chronic cough, shortness of breath with exertion, recurrent pneumonia, and multiple hospitalizations since 18 months of age. She was treated aggressively with inhaled corticosteroids, bronchodilators, and leukotriene inhibitors with no improvement. Family history was significant for parental asthma and allergies. Pulmonary function test showed flow obstruction, which was suggestive of the tracheal lesion. Spiral CT scan with sagittal and coronal reconstruction showed a web-like structure obstructing approximately 60% of the airway lumen proximal to the carina.

“Computed tomography is the appropriate first step in investigating patients with symptoms suggestive of tracheal web. CT reconstruction can help identify the presence, location, and severity of the obstruction. (1,2) ”

Another report by Al Badaai & Nguyen in 2008³ described a case of a 16-year-old female with a past medical history of resolved laryngomalacia diagnosed at age 3.5 month and asthma diagnosed soon after managed with bronchodilators and steroids. She had multiple admissions for asthma exacerbations and pneumonia. A congenital tracheal web was identified using bronchoscopy following multiple unsuccessful attempts at endotracheal intubation in the operating room in preparation for hemithyroidectomy for a hyperfunctioning thyroid nodule.

Computed tomography is the appropriate first step in investigating patients with symptoms suggestive of tracheal web. CT reconstruction can help identify the presence, location, and severity of the obstruction. (1,2) It could also help rule out some other possible etiologies of tracheal stenosis. Bronchoscopy is the gold standard for confirmation of diagnosis, and may also be used therapeutically. Tracheal web may be easily torn by applying pressure using the bronchoscope. However, with increasing age and thickness of the web, balloon expansion, laser or surgical dissection will be indicated. (1)

Conclusion:

In conclusion, we have discussed the case of a preterm newborn with persistent respiratory distress and episodes of apneas, bradycardia, and desaturations, diagnosed with a very rare congenital tracheal anomaly. Congenital tracheal web, although rare, should be considered in newborns with persistent respiratory symptoms with difficulty weaning off respiratory support and development of new respiratory symptoms.

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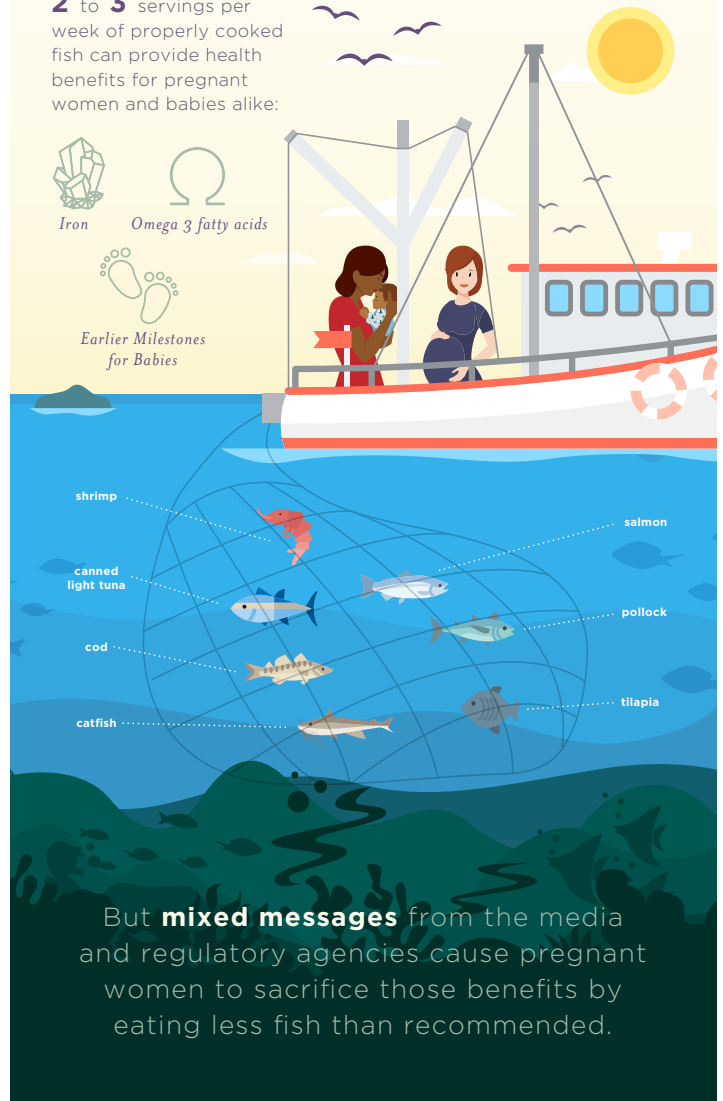
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“Got Milk?” May Be a Life-or-Death Question for Premies

Amanda Conschaffer
Alliance for Patient Access (AfPA) Government Affairs Team

The Alliance for Patient Access (allianceforpatientaccess.org), founded in 2006, is a national network of physicians dedicated to ensuring patient access to approved therapies and appropriate clinical care. AfPA accomplishes this mission by recruiting, training and mobilizing policy-minded physicians to be effective advocates for patient access. AfPA is organized as a non-profit 501(c)(4) corporation and headed by an independent board of directors. Its physician leadership is supported by policy advocacy management and public affairs consultants. In 2012, AfPA established the Institute for Patient Access (IfPA), a related 501(c)(3) non-profit corporation. In keeping with its mission to promote a better understanding of the benefits of the physician-patient relationship in the provision of quality healthcare, IfPA sponsors policy research and educational programming.



Protecting premature infants from a deadly intestinal disease, [new research](#) suggests, may boil down to a surprising combination: milk and bacteria. (1)

According to a new study, breastmilk provides a vital antibody that binds to bacteria in a premature infant's gut. Premies with higher amounts of bacteria bonded to the antibody from their mothers' milk are less likely to develop NEC, or necrotizing enterocolitis. And that's no small feat. The intestinal disease can cause distended abdomen, infection, low blood pressure and shock. [About 15% of infants who develop NEC die](#), and those who survive can face long-term health challenges. (2)

While researchers already knew that breastmilk [helps keep NEC at bay](#), this research begins to explain how. (3) The findings also reaffirm a growing tome of research on the benefits of breastmilk for premature infants.

But for health care providers and new parents, knowing that breastmilk can protect a premie isn't necessarily enough. Access to milk can be complicated. Direct breastfeeding may not be possible with fragile premies, and mothers who want to express breastmilk may not be able to produce milk – or may not have ac-

cess to a hospital-grade pump.

Donor milk is an important alternative, as a [lead researcher](#) on the study noted. (4) But [getting donor milk](#) isn't always easy either. Not all hospitals house a donor milk bank or can provide access to one. (5) Cost can also be a prohibitive factor – both for hospitals that aren't reimbursed for donor milk and for mothers whose health plans won't cover the expense.

“The research makes this much clear: Whether from a premie’s mother or from a donor, breast milk has the potential to reduce intestinal complications and even save infants’ lives. Moving forward, policymakers and health insurers would be wise to look closely at the question of whether premature infants ‘got milk.’ ”



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The research makes this much clear: Whether from a preemie's mother or from a donor, breast milk has the potential to reduce intestinal complications and even save infants' lives. Moving forward, policymakers and health insurers would be wise to look closely at the question of whether premature infants "got milk."

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Still a Preemie?

Some preemies are born months early, at extremely low birthweights. They fight for each breath and face nearly insurmountable health obstacles.

But that's not every preemie's story.

Born between 34 and 36 weeks' gestation?

STILL A PREEMIE

Just like preemies born much earlier, these "late preterm" infants can face:

Jaundice Feeding issues Respiratory problems

And their parents, like all parents of preemies, are at risk for postpartum depression and PTSD.

Born preterm at a "normal" weight?

STILL A PREEMIE

Though these babies look healthy, they can still have complications and require NICU care.

But because some health plans determine coverage based on a preemie's weight, families of babies that weigh more may face access barriers and unmanageable medical bills.

Born preterm but not admitted to the NICU?

STILL A PREEMIE

Even if preterm babies don't require NICU care, they can still face health challenges.

Those challenges can extend through childhood, adolescence and even into adulthood.

Some Preemies

Will spend weeks in the hospital
 Will have lifelong

All Preemies

Face health risks
 Require appropriate

Drew's Movement

Arthur Kanowitz, MD, FACEP

INTRODUCTION

Drew Hughes' death inspired a movement. Drew died when his life-sustaining breathing tube was unintentionally removed, starving his brain of critical oxygen. Drew's patient safety event, known as unplanned extubation, is common and costly and occurs in adults, pediatrics, and neonates. Inspired by the story of Drew's tragic death, a coalition has been formed, involving twenty organizations including major professional medical societies, as well as patient safety and quality improvement organizations, all with the common goal of increasing awareness and prevention efforts to eliminate the preventable harm, deaths, and unnecessary health-care costs associated with unplanned extubation.



Drew's Story

He was young. He was intelligent. He was loved by all. He had a very promising life in front of him. Yet, he died. Needlessly. A preventable death, not from his head injury, but from the complications of the medical treatment that was supposed to sustain his life.

On the evening of June 28, 2013, Drew was skateboarding with his friends, as he did most summer evenings. But this evening, Drew fell, hitting his head. He was taken to the hospital by ambulance. When he arrived, he was awake and alert. He looked fine. But the doctor found a small abnormality on CT Scan. So, for Drew's safety, the decision was made to transfer him to the level I trauma center. A breathing tube was placed in the ED for his safety

during the long transport to the trauma center.

However, in the ambulance, Drew's tube was accidentally removed (extubated). Although the crew replaced the tube, they placed it in his esophagus, and they did not recognize its malposition. His condition quickly worsened. His oxygen levels fell. His heart rate slowed. So, the ambulance diverted to the nearest hospital. But it was too late. Drew had already suffered an anoxic brain injury. And he died. He died a preventable death from the complications of airway management.

"In neonates, unplanned extubation increases the average length of stay from 9 to 51 days. (8) This increased length of stay contributes to the average cost of neonatal unplanned extubation, which is \$36,000. (9) The 80,000 incidents of UE result in wasted healthcare costs of \$2.9 Billion."

Unplanned extubation is very common

Drew's death is tragic. But it is not an isolated event. The unintended removal of a patient's life-sustaining breathing tube, unplanned extubation (UE), occurs in over 121,000 adult patients yearly in the US and more than 80,000 neonates yearly in the US. (1,2,3,4) Lucas da Silva's comprehensive review of fifty articles in the literature involving more 60,000 patients revealed that 7.3% of intubated adult ICU patients experience unplanned extubation. (1) His comprehensive review of fifteen articles in the neonatal literature revealed that 18.2% of intubated neonatal ICU patients ex-

Unplanned Extubation is Common

Adult Literature Review; Da Silva et al ¹ Anesth Analg. 2012

<u>50</u>	<u>7.3%</u>	<u>0.5% - 35.8%</u>
Studies	UE Rate	Range of UE Rates

NICU Literature Review; Da Silva et al ² Resp Care. 2013

<u>15</u>	<u>18.2%</u>	<u>1.0% - 80.8%</u>
Studies	UE Rate	Range of UE Rates

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**Does your hospital track unplanned extubation?
Do you know what the rate of UE is in your hospital?
Not knowing does not mean it does not occur.
And not knowing is NOT acceptable, when the potential outcome is preventable death.**

perience an unplanned extubation. (2) However, more important than the average is the range of unplanned extubation amongst study institutions. In adult ICUs the range was 0.5% - 35.8%. In neonates, the range was 1.0% to 80.8%. This indicates that there is a very large variance in hospitals' ability to prevent unplanned extubation. It also shows that there is a very large opportunity for improvement.

“In the neonatal world, however, unplanned extubation is well recognized, and there are widespread efforts to minimize the risk of unplanned extubation.”

Unplanned Extubation is not only common, but it is also costly.

In adults, unplanned extubation increases the average length of stay from 9 to 18 days. (8) This increased length of stay contributes to the average cost of an adult unplanned extubation, which is \$40,000. (6,7) The 121,000 incidents of UE result in wasted healthcare costs of \$4.9 Billion.

In neonates, unplanned extubation increases the average length of stay from 9 to 51 days. This increased length of stay contributes to the average cost of neonatal unplanned extubation, which is \$36,000. (9) The 80,000 incidents of UE result in wasted healthcare costs of \$2.9 Billion.

More important than the dollar cost of UE is the loss of life. There are 33,000 deaths yearly associated with UE in adults. (10) The literature does not define relative mortality rates in NICU patients.

However, one life lost from a preventable complication like UE is too many.

Although the literature clearly shows that unplanned extubation is common and costly, the gravity of this problem, at least in the adult world, is uncommonly recognized. Unfortunately, unplanned extubation is thought of simply as a “cost of doing business.” Many institutions do not track unplanned extubation. It is not a key performance measure. And most major electronic health records do not even include the main data field for differentiating when extubation is planned versus unplanned. In the neonatal world, however, unplanned extubation is well recognized, and there are widespread efforts to minimize the risk of unplanned extubation.

The Movement to Increase Awareness and Prevention of Unplanned Extubation

Drew’s story has inspired a movement to increase awareness and prevention of this tragic complication of airway management. A coalition of multispecialty professional medical societies, patient safety and quality improvement organizations led by the Society for Airway Management and the Patient Safety Movement Foundation, has launched a national campaign to reduce the incidence of preventable death from unplanned extubation through increasing awareness, a toolbox of quality improvement best practices for hospitals and support of research and innovation.

Unplanned Extubation is Costly	
ADULTS	
(9 to 18 days)⁵	\$4.9 Billion^{6,7}
Increased ICU Length of Stay	Unnecessary U.S. Healthcare Costs
NEONATES	
(9 to 51 days)⁸	\$2.9 Billion⁹
Increased ICU Length of Stay	Unnecessary U.S. Healthcare Costs





The Unplanned Extubation Awareness and Prevention Initiative involves efforts to increase awareness of the problem and to provide tools that hospitals can use to take inventory and then initiate programs to work toward zero preventable deaths and harm from unplanned extubation.

Because unplanned extubation is currently not a CMS mandatory key performance measure, many hospitals do not track it as a metric. However, unplanned extubation is on the radar of CMS and likely will become a key performance measure in the future. Therefore, it is important to begin quality improvement efforts now, before it becomes a potential drain on hospitals' finances.

The coalition has developed the roadmap and the tools necessary to decrease the incidence of preventable harm and death from UE.

There are three things every hospital should do to move toward zero preventable harm:

1. **Take inventory.** Do an assessment. Determine what your hospital's rate of unplanned extubation is. Once you know what your rate of UE is, then determine where it falls on the performance range. The farther to the right that your rate falls on the performance range, the larger the opportunity for improvement. Know where you fall. Set goals for improvement.
2. **You must obtain the support of your C-Suite executives.** They must commit to empowering your quality and safety teams to elevate UE to the status of a key performance measure and provide the resources necessary for this critical quality improvement measure.
3. **Develop a Quality Improvement Initiative.** Use the Model

for Improvement to develop tracking and prevention measures that will move you toward ZERO preventable harm and death. Tools for tracking and best practices for eliminating UE can be downloaded from the Patient Safety Movement Foundation (www.patientsafetymovement.org) or the Airway Safety Movement (www.airwaysafetymovement.org). These tools include a core data set and a set of Actionable Patient Safety Solutions.

Please commit to the coalition:

Get your hospital to take aim at eliminating unplanned extubation.

Drew died a preventable death from the complications of airway management. However, he has inspired a large community of airway safety experts to take on this problem. Together the coalition is working to ensure that another preventable death, like Drew's, never happens again.

Help us make Drew's death meaningful. Take action now. Get your hospital involved.

MAKE A COMMITMENT.

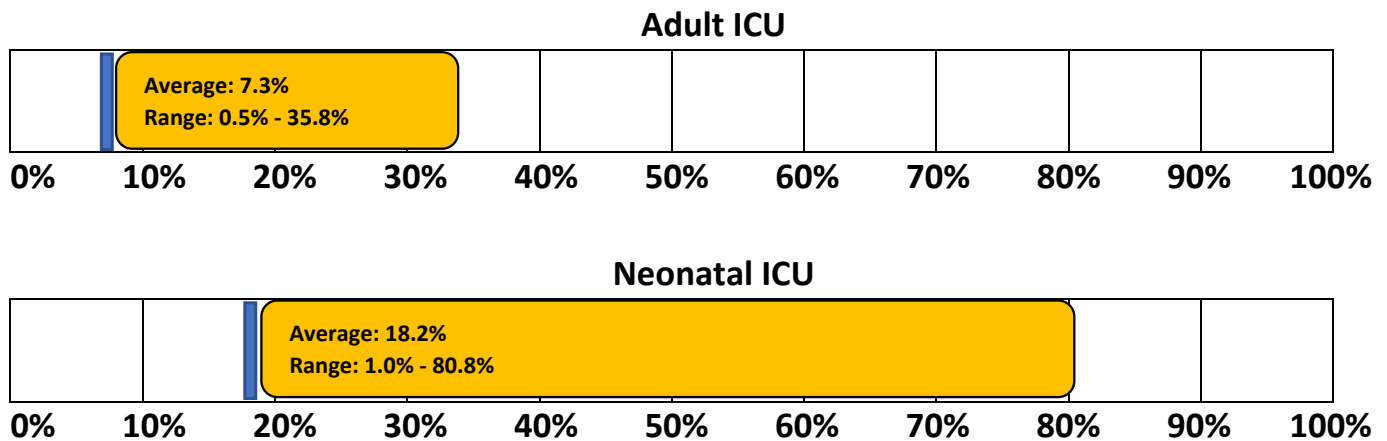
Contact:
 Dr. Arthur Kanowitz, Airway safety Movement: akanowitz@airwaysafetymovement.org
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 Ariana Longley, Patient Safety Movement Foundation: ariana.longley@patientsafetymovement.org

UE Prevention Plan for Hospitals

Three Things Hospitals Should Do

1. Do an assessment. Identify your opportunities for improvement.

Know what your hospital's rate of UE is and where it falls on the performance range.



2. Leadership must commit.

Your c-suite executives must commit to empowering their quality and safety teams to elevate UE to a key performance measure status.

3. Use the Model for Improvement

Use the Model for Improvement and institute best practices to facilitate moving towards your goal of ZERO PREVENTABLE DEATHS.

AIM: Zero Preventable Deaths

MEASURES: UE Core Data Set*

CHANGES: PSMF's Actionable Patient Safety Solution (APSS 8B - UE)*

*Download the Core Data Set and APSS 8B: www.airwaysafetymovement.org

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Disclosure: Dr Kanowitz is the founder and chairman of Securisyn Medical. Securisyn Medical is a startup airway safety medical device company dedicated to eliminating the complications of airway management. He has an airway stabilization system (www.securisyn.com) that is under FDA 510k review but no products currently on the market. He is the founder of the Airway Safety Movement (www.airwaysafetymovement.org), the chair of the Patient Safety Movement Airway Safety Workgroup and the co-chair of the Society for Airway Management Special Projects II Committee that developed the Unplanned Extubation Awareness and Prevention Initiative.

NT

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Survey Says: RSV

RESPIRATORY SYNCYTIAL VIRUS, or RSV, is a dangerous virus that can lead to:

- Hospitalization
- Lifelong health complications
- Death

for infants and young children

ACCORDING TO A NATIONAL SURVEY, Specialty Health Care Providers say:

- 80% They treat RSV as a priority, "often" or "always" evaluating their patients
- 77% RSV is the "most serious and dangerous" illness for children under four
- 77% Barriers to access and denials from insurance companies limit patients' ability to get preventive RSV treatment

But Parents are Unprepared.

- 18% Only 18% know "a lot" about RSV
- 22% Only 22% consider themselves "very well" prepared to prevent RSV

GET THE FACTS
 ON FISH CONSUMPTION
 FOR PREGNANT
 WOMEN, INFANTS,
 AND NURSING MOMS.

NCfIH National Coalition
 for Infant Health
Protecting Access for Premature Infants through Age Two

LEARN MORE >

RSV EDUCATION & AWARENESS CAN HELP
 After parents learned more about RSV, they were:

- 65% "More concerned" about their child contracting the disease
- 67% Likely to ask their doctor about RSV

NCfIH National Coalition
 for Infant Health
Protecting Access for Premature Infants through Age Two

Learn More about RSV at
www.infanthealth.org/RSV

Postpartum Revolution

@ANGELINASPICER



OPIOIDS and NAS

When reporting on mothers, babies, and substance use

LANGUAGE MATTERS



I am not an addict.

I was exposed to substances in utero. I am not addicted. Addiction is a set of behaviors associated with having a Substance Use Disorder (SUD).



I was exposed to opioids.

While I was in the womb my mother and I shared a blood supply. I was exposed to the medications and substances she used. I may have become physiologically dependent on some of those substances.



NAS is a temporary and treatable condition.

There are evidence-based pharmacological and non-pharmacological treatments for Neonatal Abstinence Syndrome.



My mother may have a SUD.

She might be receiving Medication-Assisted Treatment (MAT). My NAS may be a side effect of her appropriate medical care. It is not evidence of abuse or mistreatment.

My potential is limitless.

I am so much more than my NAS diagnosis. My drug exposure will not determine my long-term outcomes. But how you treat me will. When you invest in my family's health and wellbeing by supporting Medicaid and Early Childhood Education you can expect that I will do as well as any of my peers!



Learn more about Neonatal Abstinence Syndrome at www.nationalperinatal.org



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Patient Safety Movement Foundation
2019 Midyear Planning Meeting

INVITATION REQUEST

Compiled and Reviewed by Mitchell Goldstein, MD Editor in Chief

New Study Uses Masimo SedLine® Brain Function Monitoring to Assess the Prevalence of Isoelectric EEG Events in Infants and Young Children Undergoing General Anesthesia

Sedline can be used to monitor for isoelectric EEG events in young pediatric patients undergoing general anesthesia.

Irvine, California – June 24, 2019

Masimo (NASDAQ: MASI) announced today that in a study recently published in *Anesthesia & Analgesia*, researchers investigated the incidence of isoelectric electroencephalogram (EEG) events in infants and young children undergoing scheduled surgery requiring general anesthesia.(1) To assess the prevalence of these events, the researchers used Masimo SedLine® brain function monitoring, available on the Root® Patient Monitoring and Connectivity Platform, which uses four leads and bilateral data acquisition to process frontal EEG signals. Because a subset of patients was also monitored with 10-channel EEG, the researchers were able to evaluate SedLine's accuracy and utility in such a scenario.

Masimo Root® with SedLine®

Dr. Ian Yuan and colleagues at the Children's Hospital of Philadelphia, the University of Pennsylvania, and Drexel University sought to evaluate the incidence of isoelectric EEG events in pediatric patients because anesthetic doses may be "greater than needed for surgery" in some infants and young children and isoelectric EEG events are associated with deep anesthesia (and in adults undergoing cardiac surgery, with "a higher incidence of postoperative delirium"). They evaluated 51 patients from 0 to 37 months old scheduled for surgery requiring general anesthesia (excluding cardiac, intracranial, and emergency cases). Anesthesia was maintained with sevoflurane or propofol infusion.

Noting that "Conventional 10- to 24-channel EEG is impractical for pediatric anesthesia as it is labor intensive and requires special training in both performance and interpretation," the researchers chose to record EEG for the duration of anesthesia using Masimo SedLine. To evaluate whether isoelectric events were general-

ized beyond the frontal cortex, they also recorded simultaneous data using 10-electrode EEG (Natus Xltek) for 10 patients (2-10 months old). Isoelectric events were defined as EEG with amplitude $<20 \mu\text{V}$ for ≥ 2 seconds.

The researchers found that isoelectric events occurred in 63% of patients (95% confidence interval of 49% – 76%), representing 0% – 2.2% of total anesthetic time. A pediatric electroencephalographer compared the EEG recordings for 9 of the 10 patients monitored with both SedLine and 10-channel EEG and found that isoelectric events observed with SedLine were also observed across all channels with 10-channel EEG, noting "The Matlab program identified 47 isoelectric events from the SedLine EEG, and all events were confirmed by the electroencephalographer." Dr. Yuan commented, "We were surprised by how prevalent iso-

neo



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CALL FOR ABSTRACTS

The 33rd Annual Gravens Conference on the Environment of Care
for High Risk Newborns

March 4-7, 2020

Abstract due date is October 28, 2019. Late Abstracts will not be accepted.

The Gravens Conference is dedicated to providing a forum for the continuing education of NICU professionals. In particular, the conference focuses on the science of fetal and infant development, developmental care practices, NICU design, family support programs, and the influential role the NICU environment has on the neurodevelopment of the infant, and the well-being of families and staff.

The conference committee invites you to submit an abstract for a variety of presentation options: oral abstract session (20-ish minutes), workshop session (75 minutes), or poster presentation, regarding NICU design, the study of creative approaches to developmental and environmental issues of the NICU, care practices and/or programs to assist staff, parents and families. This conference offers an opportunity to share your work and experiences with colleagues.

The theme for the 2020 conference is *Biophysiology of Human Interaction*. However, the abstracts may be on any applicable NICU topic.

Abstracts should include the following sections, as applicable.

1. Abstract Title
2. Authors' names, degree(s), and institution
3. Background and Purpose: problem statement or hypothesis as appropriate
What is the hypothesis, or what is the problem you are trying to solve, or what is your scientific question? Why is it important? State this in one or two sentences
4. Budget and Resources: cost of program and materials as appropriate
5. Program, Materials, or Methodology: also include any barriers to implementation and how they have been overcome
What methods did you use to solve or research the problem? How did you collect your data? How big was your sample size? What were the main outcome measurements? This will probably be the longest part of your abstract.
6. Impact or Results: major accomplishment of program/materials; qualitative and quantitative data*; evidence-based results. *If providing data, it must exist; "data to be obtained by conference date" is no longer acceptable.
7. Bibliography: for oral presentations, at least 3 related references that support the program
8. Learner Objectives: 2-3

In the body of the email, please list the following:

1. Title of the abstract
2. Author's name, degree(s), credentials, and position title
3. Author's email address
4. Name of institution, city, and state. City and country if outside the US.
5. If the contact person is someone other than the author, please note that in the body of the email
6. Presentation preference: a) oral abstract session, b) workshop session, c) poster only, or d) no preference. (Please spell it out rather than provide just a lower case letter.)

Length of abstract: 1000 words maximum

Format: WORD, preference is Arial 12 pt, but font choice is optional.

Send abstract as an email attachment to Bobbi Rose at brose@health.usf.edu

You will get a reply within a day or two that the abstract was received. If you do not hear back, please call Bobbi Rose at (813) 974-6158, or send another email. Decisions by the abstract review committee for oral considerations are expected by early December 2019. Notification will be by email. **The conference does not provide any support for abstract presenters, regardless of presentation outcome. Abstract presenters must register to attend the conference.**

electric EEG occurred in healthy infants and young children undergoing routine general anesthesia, regardless of anesthetic technique. The Masimo SedLine EEG could be applied quickly without interfering with anesthesia care and could accurately record EEG in infants and young children in the operating room, suggesting it could be used to adjust anesthesia dosing."

Study co-author Dr. C. Dean Kurth added, "Pediatric anesthesiologists often unknowingly administer more sevoflurane or propofol anesthesia to infants and young children than their brain requires to produce anesthesia."

Regarding the use of SedLine, the researchers concluded, "Although the SedLine EEG monitors only frontal cortex, the 10-electrode EEG showed that the isoelectric events were generalized to the parietal, temporal, and occipital cortices as well, suggesting that the SedLine EEG could be used to monitor anesthetic-related isoelectric events." They continued, "EEG monitoring may enable dose titration to optimize the anesthetic depth and minimize periods of isoelectricity. Our results suggest that portable 4-channel EEG monitors are feasible for this purpose." With SedLine, periods of isoelectricity, or burst suppression, are easily visible on the Density Spectral Array (DSA), a color-coded display of processed EEG power, as black bars.

SedLine and Next Generation SedLine have received FDA clearance for use on adult patients. Next Generation SedLine has received CE marking for use on pediatric patients (one year old and above).

About Masimo

Masimo (NASDAQ: MASI) is a global medical technology company that develops and produces a wide array of industry-leading monitoring technologies, including innovative measurements, sensors, patient moni-

tors, and automation and connectivity solutions. Our mission is to improve patient outcomes and reduce the cost of care. Masimo SET® Measure-through Motion and Low Perfusion™ pulse oximetry, introduced in 1995, has been shown in over 100 independent and objective studies to outperform other pulse oximetry technologies.² Masimo SET® has also been shown to help clinicians reduce severe retinopathy of prematurity in neonates,³ improve CCHD screening in newborns,⁴ and, when used for continuous monitoring with Masimo Patient SafetyNet™ in post-surgical wards, reduce rapid response team activations, ICU transfers, and costs.⁵⁻⁷ Masimo SET® is estimated to be used on more than 100 million patients in leading hospitals and other healthcare settings around the world,⁸ and is the primary pulse oximetry at 9 of the top 10 hospitals listed in the 2018-19 U.S. News and World Report Best Hospitals Honor Roll.⁹ Masimo continues to refine SET® and in 2018, announced that SpO₂ accuracy on RD SET™ sensors during conditions of motion has been significantly improved, providing clinicians with even greater confidence that the SpO₂ values they rely on accurately reflect a patient's physiological status. In 2005, Masimo introduced rainbow® Pulse CO-Oximetry technology, allowing noninvasive and continuous monitoring of blood constituents that previously could only be measured invasively, including total hemoglobin (SpHb®), oxygen content (SpOC™), carboxyhemoglobin (SpCO®), methemoglobin (SpMet®), Pleth Variability Index (PVi®), RPVi™ (rainbow® PVi), and Oxygen Reserve Index (ORi™). In 2013, Masimo introduced the Root® Patient Monitoring and Connectivity Platform, built from the ground up to be as flexible and expandable as possible to facilitate the addition of other Masimo and third-party monitoring technologies; key Masimo additions include Next Generation SedLine® Brain Function Monitoring, O3® Regional Oximetry, and ISA™ Capnography with NomoLine® sampling lines. Masimo's

family of continuous and spot-check monitoring Pulse CO-Oximeters® includes devices designed for use in a variety of clinical and non-clinical scenarios, including tetherless, wearable technology, such as Radius-7® and Radius™ PPG, portable devices like Rad-67™, fingertip pulse oximeters like MightySat® Rx, and devices available for use both in the hospital and at home, such as Rad-97™. Masimo hospital automation and connectivity solutions are centered around the Iris® platform, and include Iris Gateway™, Patient SafetyNet, Replica™, Halo ION™, UniView™, and Doctella™. Additional information about Masimo and its products may be found at www.masimo.com. Published clinical studies on Masimo products can be found at www.masimo.com/evidence/featured-studies/feature/.

ORi and RPVi have not received FDA 510(k) clearance and are not available for sale in the United States.

The use of the trademark Patient SafetyNet is under license from University HealthSystem Consortium.

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1. Yuan I, Landis W, Topjian A, Abend N, Lang S, Huh J, Kirschen M, Mensinger J, Zhang B, and Kurth C. Prevalence of Isoelectric Electroencephalography Events in Infants and Young Children Undergoing General Anesthesia. *Anesth Analg*. 2019. DOI: 10.1213/ANE.0000000000004221
2. Published clinical studies on pulse oximetry and the benefits of Masimo SET® can be found on our website at <http://www.masimo.com>. Comparative studies include independent and objective studies which are comprised of abstracts presented at scientific meetings and peer-reviewed journal articles.
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Forward-Looking Statements

This press release includes forward-looking statements as defined in Section 27A of the Securities Act of 1933 and Section 21E of the Securities Exchange Act of 1934, in connection with the Private Securities Litigation Reform Act of 1995. These forward-looking statements include, among others, statements regarding the potential effectiveness of Masimo SedLine®. These forward-looking statements are based on current expectations about future events affecting us and are subject to risks and uncertainties, all of which are difficult to predict and many of which are beyond our control and could cause our actual results to differ materially and adversely from those expressed in our forward-looking statements as a result of various risk factors, including, but not limited to: risks related to our assumptions regarding the repeatability of clinical results; risks related to our belief that Masimo's unique noninvasive measurement technologies, including Masimo SedLine, contribute to positive clinical outcomes and patient safety; as well as other factors discussed in the "Risk Factors" section of our most recent reports filed with the Securities and Ex-

change Commission ("SEC"), which may be obtained for free at the SEC's website at www.sec.gov. Although we believe that the expectations reflected in our forward-looking statements are reasonable, we do not know whether our expectations will prove correct. All forward-looking statements included in this press release are expressly qualified in their entirety by the foregoing cautionary statements. You are cautioned not to place undue reliance on these forward-looking statements, which speak only as of today's date. We do not undertake any obligation to update, amend or clarify these statements or the "Risk Factors" contained in our most recent reports filed with the SEC, whether as a result of new information, future events or otherwise, except as may be required under the applicable securities laws.

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NT

American Academy of Pediatrics, Section on Advancement in Therapeutics and Technology

Released: Thursday 12/13/2018 12:32 PM, updated Saturday 3/16/2019 08:38

The American Academy of Pediatrics' Section on Advances in Therapeutics and Technology (SOATT) invites you to join our ranks! SOATT creates a unique community of pediatric professionals who share a passion for optimizing the discovery, development and approval of high quality, evidence-based medical and surgical breakthroughs that will improve the health of children. You will receive many important benefits:

- Connect with other AAP members who share your interests in improving effective drug therapies and devices in children.
- Receive the SOATT newsletter containing AAP and Section news.
- Access the Section's Website and Collaboration page – with current happenings and opportunities to get involved.
- Network with other pediatricians, pharmacists, and other health care providers to be stronger advocates for children.
- Invitation for special programming by the Section at the AAP's National Conference.
- Access to and ability to submit research abstracts related to advancing child health through innovations in pediatric drugs, devices, research, clinical trials and information technology; abstracts are published in Pediatrics.

AAP members can join SOATT for free. To activate your SOATT membership as an AAP member, please complete a short application at <http://membership.aap.org/Application/AddSectionChapterCouncil>.

The Section also accepts affiliate members (those holding masters or doctoral degrees or the equivalent in pharmacy or other health science concentrations



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that contribute toward the discovery and advancement of pediatrics and who do not otherwise qualify for membership in the AAP). Membership application for affiliates: <http://shop.aap.org/aap-membership/> then click on "Other Allied Health Providers" at the bottom of the page.

Thank you for all that you do on behalf of children. If you have any questions, please feel free to contact:

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Dedicated to the Health of All Children

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The American Academy of Pediatrics is an organization of 67,000 primary care pediatricians, pediatric medical subspecialists and pediatric surgical specialists dedicated to the health, safety and well-being of infants, children, adolescents and young adults. For more information, visit www.aap.org. Reporters can access the meeting program and other relevant meeting information through the AAP meeting website at <http://www.aapexperience.org/>

NT

FDA expands approval of treatment for cystic fibrosis to include patients ages 6 and older

The approval of a treatment for younger pediatric patients, still no indication for under 6 years of age.

For Immediate Release: June 21, 2019

The U.S. Food and Drug Administration today expanded the indication for Symdeko (a combination of tezacaftor/ivacaftor) tablets for treatment of pediatric patients ages 6 years and older with cystic fibrosis who have certain genetic mutations. Last year, the FDA approved Symdeko to treat patients ages 12 and older who had the same specific genetic mutations.

"Decades ago, patients with cystic fibrosis were generally expected to live until 10 years of age, with few surviving into their teenage years. Since then, wide-ranging research on the disease resulted in more treatments for this debilitating disease that have extended life expectancy and improved quality of life for patients, but there is still no cure," said Banu Karimi-Shah, M.D., acting deputy director of the Division of Pulmonary, Allergy, and Rheumatology Products in the FDA's Center for Drug Evaluation and Research. "Based

on their individual genetic makeup, individuals may respond differently to certain drugs, so it is important to provide a variety of options. Today's approval of Symdeko for children as young as 6 years old provides an important treatment option for younger patients, and also provides more context on the safety and dosing specific to this population. The FDA remains committed to advancing novel treatment options for areas of unmet patient need, particularly in diseases impacting children."

Cystic fibrosis is a serious genetic disorder that results in the formation of thick mucus that builds up in the lungs, digestive tract and other parts of the body. It leads to severe respiratory and digestive problems as well as other complications such as infections and diabetes. Cystic fibrosis is caused by a defective protein that results from mutations in the cystic fibrosis transmembrane conductance regulator (CFTR) gene. There are approximately 2,000 known mutations of the CFTR gene. Symdeko is used to treat patients who have two copies of the most common type of mutation – F508del mutation – or who have at least one of



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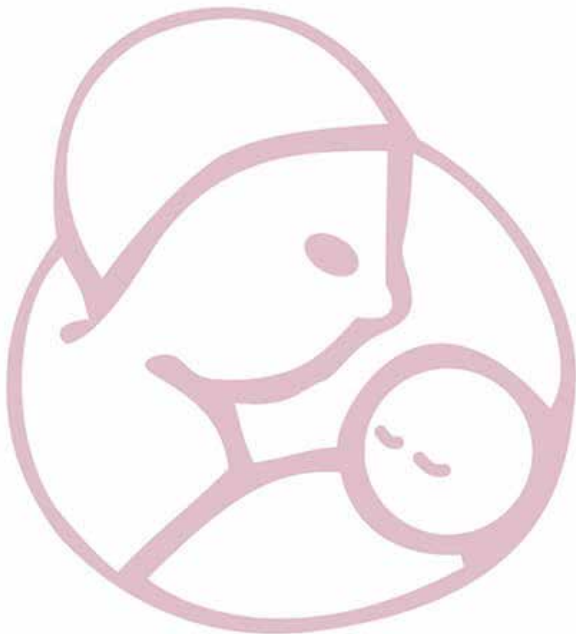
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PAC/LAC's core values for improving maternal and child health have remained constant for over 30 years – a promise to lead, advocate and consult with others.

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Providing guidance to healthcare professionals, hospitals and healthcare systems, stimulating higher levels of excellence and improving outcomes for mothers and babies.

Advocacy

Providing a voice for healthcare professionals and healthcare systems to improve public policy and state legislation on issues that impact the maternal, child and adolescent population.

Consultation

Providing and promoting dialogue among healthcare professionals with the expectation of shared excellence in the systems that care for women and children.

the mutations in the CFTR gene that is responsive to the active ingredients in Symdeko based on in vitro data and/or clinical evidence. Patients with cystic fibrosis and their caregivers should speak with a health care professional and have tests performed to understand which gene mutations patients have and whether Symdeko is likely to work for them.

The efficacy of Symdeko in patients with cystic fibrosis age 12 years and older was evaluated in three Phase 3, double blind, placebo-controlled trials, which demonstrated improvements in lung function and other key measures of the disease, including a reduction in exacerbations (a worsening of symptoms requiring treatment). The efficacy in patients ages 6 to 12 was extrapolated from patients age 12 years and older, with additional support from data in patients age 6 to 12 years.

The safety of Symdeko to treat cystic fibrosis patients age 6 to less than 12 years was supported by data from a study that included a 24-week, open-label treatment period with 70 cystic fibrosis patients ages 6 to less than 12, and had similar observations of safety to clinical trials in ages 12 and older. Symdeko should always be taken with food that contains fat and never in combination with certain antibiotics, seizure medicines, St. John's wort, or food containing grapefruit or Seville oranges, as indicated on the label. The prescribing information for Symdeko includes warnings related to elevated enzymes in the liver (transaminases) in people taking Symdeko, for those who use inducers for another liver enzyme called Cytochrome P450 3A4 (CYP3A), and for the risk of cataracts in pediatric patients. Patients and their caregivers should speak with a health care professional about these risks and any medicines they take before starting Symdeko. The most common side effects include headache, nausea, sinus congestion and dizziness.

The safety and efficacy of Symdeko in patients with cystic fibrosis younger than 6 years of age have not been studied.

The FDA granted this application Priority Review. The approval of Symdeko was granted to Vertex Pharmaceuticals Incorporated.

The FDA, an agency within the U.S. Department of Health and Human Services, protects the public health by assuring the safety, effectiveness, and security of human and veterinary drugs, vaccines and other biological products for human use, and medical devices. The agency also is responsible for the safety and security of our nation's food supply, cosmetics, dietary supplements, products that give off electronic radiation, and for regulating tobacco products..

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Inquiries

Media:
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301-796-2969

Consumer:
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NT

Statement on steps to make health care professional and patient labeling information for prescription medications consistent and clear

FDA endorses new labeling requirements for prescription labeling.

For Immediate Release:
July 1, 2019

Statement From:
Acting

Commissioner of Food and Drugs - Food and Drug Administration
Norman E. "Ned" Sharpless MD
Director - Center for Drug Evaluation and Research
Janet Woodcock M.D.

The FDA is committed to making sure that health care professionals and patients have up-to-date, accurate and actionable information about prescription medications so that informed treatment decisions can be made. We recognize that the choice of which medication to use, if any, for a particular patient is often a complex decision. These decisions involve a number of factors, such as assessing the progression of the disease or condition; looking at the other medications being taken; evaluating the ability of the patient to follow treatment regimens and instructions to help ensure safe use of a medication; and sometimes, assessing the risk of abuse and dependence of a medication for a particular patient.

As such, we continually work to help ensure that FDA-approved medication and biological product labeling (often referred to as the "package insert" or Prescribing Information) provides clear, complete information so that health care professionals have the essential information needed to make informed decisions and to facilitate safe and effective use of a medication.

One area of patient counseling that is incredibly important within a discussion about a product's benefits and risks is the potential for abuse and the development of a physical dependence to a prescription drug. This is relevant in the context of prescription opioids for treating pain, but it's important for patients to understand that other drugs can be habit-forming as well – for example, certain medications used to treat insomnia and some medications used to treat attention deficit hyperactivity disorder. We've taken many steps to ensure that patients and health care professionals have clear information on a drug's abuse and dependence potential, so they can make informed treatment decisions. This is one of the key factors in our evalua-



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– Advances in Therapeutics and Technology**

March 24-28, 2020; Snowbird, UT

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tion of a drug's benefits and risks when we're considering approval and remains part of our ongoing monitoring once a drug is approved. In fact, we've taken steps when evidence makes the FDA concerned that the abuse of a drug may result in its benefits no longer outweighing its risks – like when the agency requested removal of the prescription opioid, Opana ER, based on postmarketing data that demonstrated a significant shift in the route of abuse of Opana ER from nasal to injection following the product's reformulation, in addition to evidence that injection of the product had been associated with a serious outbreak of HIV and hepatitis C, as well as cases of a serious blood disorder (thrombotic microangiopathy).

Today, we're taking another step in this area and announcing new draft guidance, Drug Abuse and Dependence Section of Labeling for Human Prescription Drug and Biological Products - Content and Format. The recommendations in this draft guidance, when finalized, will represent our current thinking on the content and format of this section for prescription medications that are scheduled under the Controlled Substances Act (CSA) as well as for prescription medications not


scheduled under the CSA for which there is important information to convey to health care professionals related to abuse and dependence.

Our goal is that this guidance will help ensure that information in product labeling on abuse, misuse, addiction, physical dependence and tolerance is clear, concise, useful and informative. Details about a product's abuse-deterrent properties should also be presented in this section, when applicable. Additionally, the draft guidance provides recommendations on how to present information about applicable drug products in a consistent manner where possible within, and across, drug and therapeutic classes to inform decisions and facilitate the safe and effective use of medications.

This draft guidance reinforces these principles by recommending, for example, that terminology used in the Drug Abuse and Dependence section – such as abuse, misuse, addiction, physical dependence and tolerance – be defined in labeling to ensure common understanding. Because these terms are commonly confused or misinterpreted, the FDA has included recommended defini-

tions for the purposes of labeling. The draft guidance clarifies, for example, that a person who takes a friend's prescription opioid medication to relieve tooth pain is misusing the medication; if that person takes a friend's opioid to get a euphoric high, that use represents abuse of the medication.

In another example of our work specific to opioid medication labeling and dependence, recently the FDA announced required changes to the prescribing information for all opioid analgesics to provide additional information to health care professionals on how to safely decrease the treatment dose in patients who are physically dependent on opioids. The FDA remains focused on striking the right balance between reducing the rate of opioid use disorder by decreasing excessive exposure to opioids through rational prescribing, while still enabling appropriate access to treatment for patients living with pain. We are also committed to making sure that patients who use opioids take them correctly, and, if opioid treatment is no longer needed, that patients and their health care providers know how to discontinue the medication safely.



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We're also issuing a second draft guidance today, Instructions for Use — Patient Labeling for Human Prescription Drug and Biological Products and Drug-Device and Biologic-Device Combination Products — Content and Format, which relates to how the drug or biologic is used. The Instructions for Use (IFU) is a type of labeling for patients who use products that have complicated or detailed patient-use instructions. Importantly, an IFU provides detailed, action-oriented, step-by-step written and visual instructions in a patient-friendly manner to guide the patient on how to use a prescription medication product. It typically includes instructions on preparation, administration, handling, storage and disposal. The recommendations in this draft guidance are intended to promote development of consistent content and format across IFUs to help ensure that patients receive clear, concise information that is easily understood to facilitate the safe and effective use of such products.

Additionally, as part of our ongoing efforts in labeling development, the FDA recently issued other draft guidances that provide clarity and recommendations on how best to draft specific sections of labeling. For example, we issued a draft guidance to assist applicants in developing the Indications and Usage section of product labeling for products approved under the accelerated approval pathway. We also issued a final guidance to assist applicants in determining the appropriate placement and content of pediatric labeling information to help ensure that information on use of prescription medications in pediatric populations - whether positive, negative or inconclusive - is consistently written and appropriately placed in labeling so that the information is clear and accessible.

These actions aim to enhance the safe and effective use of prescription medication and biological products to optimize patient care

and keep Americans healthy. We hope the two draft guidances being announced today will assist companies in creating labeling that is clear, concise, useful and informative, and, to the extent possible, consistent in content and format within and across drug and therapeutic classes. We encourage the public to comment on these draft guidances and will consider all comments as the agency works to finalize them.

The FDA, an agency within the U.S. Department of Health and Human Services, protects the public health by assuring the safety, effectiveness, and security of human and veterinary drugs, vaccines and other biological products for human use, and medical devices. The agency also is responsible for the safety and security of our nation's food supply, cosmetics, dietary supplements, products that give off electronic radiation, and for regulating tobacco products.

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NT

Statement from Child Health and Consumer Advocacy Groups Supporting the Safe Cribs Act

AAP supports the Safe Crib Act

6/13//2019

ITASCA, IL – "As leading child health and consumer advocacy organizations, we are proud to support H.R.3170 and S.1816, the Safe Cribs Act. For almost a decade our organizations have warned parents against using crib bumper pads and supported state and local actions to ban their sale. This legislation would help prevent more families from experiencing the tragedy of losing a child to crib bumper pads by banning their manufacture, import, and sale altogether.

"Crib bumper pads are dangerous. Dozens of deaths have been attributed to positional asphyxia or suffocation involving these products. But they still appear on store shelves where new parents or grandparents assume they are safe – in fact many assume they are a safety product – and end up making their child's sleep space dangerous. The safest sleeping environment for infants is always on their back, on a separate, flat and firm sleep surface without any bumpers or bedding.

"Together, we urge Congress to advance the Safe Cribs Act without delay and thank Representative Jan Schakowsky (D-Ill.) and Senator Tammy Duckworth (D-Ill.) for their leadership on this safety issue and many others. We also call on the U.S. Consumer Product Safety Commission to immediately call on retailers and manufacturers to stop selling bumper pads, as they did for a similar product, infant sleep positioners. There is no question: crib bumper pads are dangerous, and have no place in a safe sleep environment or on store shelves."

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Benzodiazepine Use with Opioids Intensifies Neonatal Abstinence Syndrome

Neonatal abstinence is worsened by use of benzodiazepine class medications

Released: 1-July--2019 10:05 AM EDT-
Source Newsroom: Vanderbilt University Medical Center

Newswise — Babies born after being exposed to both opioids and benzodiazepines before birth are more likely to have severe drug withdrawal, requiring medications like morphine for treatment, compared to infants exposed to opioids alone, according to a Vanderbilt University Medical Center study published in Hospital Pediatrics.

Benzodiazepines are a class of psychoactive drugs, including Xanax and Ativan, commonly prescribed for anxiety and other conditions.

The new findings shed light on which factors complicate and intensify signs of neonatal abstinence syndrome (NAS), which can occur when babies are chronically exposed to opioids before birth. People with substance use disorders often report taking a combination of substances. For example, many people report use of opioids as well as alcohol, benzodiazepines, and other prescribed or non-prescribed substances.

The study shows concurrent benzodiazepine exposure impacts the severity of NAS more so than other legal or illicit substances, said Lauren Sanlorenzo, MD, MPH, assistant professor of Pediatrics, neonatologist at Monroe Carell Jr. Children's Hospital at Vanderbilt and first author of the study.

Infants with NAS and exposed to benzodiazepines were more than 50% likelier to require the use of medications to treat symptoms than infants not exposed.

“Our findings reflect the reality that many women who use opioids also use benzodiazepines, which now we know has real implications for the baby, who is more likely to have severe incidence of disease. If we focus just on opioids, we can overlook other medications that can be risky to both the mother and infant,” said Sanlorenzo.

Researchers conducted a statewide analysis of medical records from 112,029 mother and baby pairs who were covered under Tennessee's Medicaid program, TennCare, from 2009 to 2011. There were 822 confirmed cases of NAS, of which 72.7% required pharmacological treatment.

The disease severity link to benzodiazepines is important for all providers who treat and care for women before and during pregnancy as well as those who deliver and treat babies. For pregnant women, taking a benzodiazepine like Xanax along with an opioid can increase risk of an overdose.

Researchers used a combination of data, filled prescriptions, medical history and toxicology testing to gather information about both legal and illegal substances used. While the researchers found that benzodiazepine use increased NAS severity, other substances, including marijuana, cocaine, methamphetamines, tobacco and antidepressants, did not increase the syndrome's severity.

Vanderbilt Center for Child Health Policy researchers have shown previously that one consequence of the nation's opioid crisis has been a sharp increase in the number of newborns who show signs of withdrawal from opioids. From 2000 to 2014, the rate of NAS rose from 1.2 cases per 1,000 hospital births to 8 cases per 1,000 births. In 2014, the average was one infant born every 15 minutes in the U.S. with NAS.

“Even though benzodiazepines are often left out of the conversation about substance use, the number of prescriptions written for benzodiazepines has tripled in the U.S. in recent years. Long-term use

of benzodiazepines, which are designed for short-term treatment of anxiety, with an opioid in pregnancy can be risky for moms and babies. Reducing the use of this particular combination may be beneficial to mothers and may reduce risk of severe withdrawal in infants,” said Stephen Patrick, MD, MPH, MS, director of the Vanderbilt Center for Child Health Policy and senior author of the paper.

This research was supported by the National Institute on Drug Abuse of the National Institutes of Health (NIH) under awards K23DA038720 (Patrick) and R01DA045729 (Patrick), the National Institute of Child Health and Human Development under award 5T32HD060554-08 (Cooper), and the John and Leslie Hooper Neonatal-Perinatal Medicine Endowment Fund.###

NT

Cognoa Receives FDA Breakthrough Designations for Autism Diagnostic and Digital Therapeutic Devices

Company announces first digital therapeutic device and precision health platform to support the developmental and behavioral health of children

Released: February 06, 2019 09:04 ET |
Source: Cognoa

PALO ALTO, Calif., Feb. 06, 2019 (GLOBE NEWSWIRE) -- Cognoa, a company at the forefront of digital behavioral health for children, today announces it has received Breakthrough Device designations from the U.S. Food and Drug Administration (FDA) for its lead products, the first digital diagnostic and digital therapeutic devices for autism. These products are the foundation of Cognoa's precision health platform designed to support earlier identification and treatment of pediatric behavioral health conditions. Today, most children in the US who receive an autism diagnosis, and subsequent treatments, do so after the age when interventions have the greatest opportunity to impact the lifetime trajectory of the child.

“The greatest opportunity within behavioral health is helping children,” said Brent Vaughan, CEO and co-founder of Cognoa, Inc. “We believe AI-based precision health can empower parents and their pediatricians to act on early concerns that are highly predictive of developmental delays, like autism, with potentially life-changing results for children and their families. We are thankful that the FDA recognizes the critical need for innovative solutions to help address these challenges. We look forward to working closely with them to further our clinical studies and support our development.”

The [FDA Breakthrough Device Program](#) is intended to help patients receive more timely access to breakthrough technologies that have the potential to provide more effective treatment or diagnosis for life-threatening or irreversibly debilitating diseases or conditions. Under the program, the FDA will provide Cognoa with priority review and interactive communication regarding device development and clinical trial protocols, through to commercialization decisions.

“It hurts to see people suffer because they aren’t receiving timely help,” said Dr. Sharief Taraman, M.D., Chief Medical Officer of Cognoa, Inc. “Families experience long delays. Up to three years can pass from the time parents first express a concern and an autism diagnosis. This is precious time lost. Even when a diagnosis is received, the cost and availability of therapy can create further barriers to treatment. We are working towards a future where parents are more empowered to help their children progress, clinicians are better equipped and care is more cost-effective for payers.”

Cognoa’s digital precision health platform applies machine learning and predictive analytics to parental inputs and diagnostic data and responses to therapeutics to create more personalized care. By combining diagnostics and therapeutics into a single platform, clinicians will be empowered to come to accurate diagnostic and therapeutic decisions faster and modify treatments in more informed ways. The company’s therapeutic developments leverage five years of work in diagnostics

data science and machine learning in the behavioral health domain.

About Cognoa ASD Diagnostic Device

The average age of ASD diagnosis has remained unchanged for more than 15 years at over four years old, falling after the window of brain plasticity that is critical to maximizing treatment outcomes. Cognoa’s ASD Diagnostic Device in development is designed to help healthcare professionals render a diagnosis of ASD in children ages 18-72 months who are at risk for developmental delays.

About Cognoa ASD Therapeutic Device

Improving socialization in children with ASD addresses a core deficit of autism. Cognoa’s first digital therapeutic device is designed to improve social skills and responsiveness of children with ASD. It is intended for use outside of the clinician’s office to supplement existing therapies and give patients timely and convenient access to care, with the potential to reduce waitlists and meet the needs of an increasing population.

Save the Date: March 4-7, 2020

Call for Abstracts: Due Monday, October 28, 2019



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About Cognoa, Inc.

Cognoa is developing AI-based digital diagnostics and personalized therapies that are designed to make earlier diagnoses and effective treatments available to more children to improve outcomes and lower behavioral healthcare costs. When more physicians are empowered to identify behavioral conditions and developmental delays earlier, more children can benefit from treatments at a younger age when there is the greatest potential for improved lifelong outcomes. Cognoa currently provides the Cognoa Child Development app via partnerships with employers, payers and ABA therapy centers to empower parents and caregivers to better support their children's unique behavioral health and growth. Cognoa intends to seek FDA review and clearance that will allow the company to support its diagnostic and therapeutic claims with robust clinical data. For more information, visit <https://www.cognoa.com/>.

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Uproar PR for Cognoa

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Babies are just tiny adults, right? So ... half?




Infants need drugs tested and approved just for them.




Family Centered Care is trendy, but are providers really meeting parents needs in the NICU?

Consider the following:

Surveys show hospital support groups are being widely underutilized by parents.



And only 10% of NICUs surveyed connect parents with non-hospital support.



Graham's Foundation, the global support organization for parents going through the journey of prematurity, set out to find the missing piece that would ensure all parents have real access to the support they need.

See what they found by emailing info@grahamsfoundation.org to request a free copy of the 2017 whitepaper, "Reaching Premie Parents Today" (*Heather McKinnis, Director, Premie Parent Mentor Program, Graham's Foundation*).

You may be surprised to see what NICUs are doing right and where their efforts are clearly falling short.

Graham's Foundation empowers parents of premature babies through support, advocacy and research to improve outcomes for their preemies and themselves.



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<http://paclac.org/advances-in-care-conference/>

Physician, Nursing, and Respiratory Care Continuing education hours will be provided.

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Call for Abstracts – Deadline December 15, 2019

Abstract submission: As are currently being accepted. Download the Abstract Guidelines from the website.

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Medicolegal Forum: Can You Be Held Liable for a Patient You've Never Seen? Recent Minnesota Supreme Court Decision says 'Yes'

Jonathan Fanaroff MD, JD and Gilbert Martin, MD

You're on call in the NICU and receive a phone call from an outside hospital from a pediatrician asking advice about a baby. After receiving some basic information, you give advice and go back to caring for the babies in your unit. Can you be held liable for the advice you just gave for a patient you have never seen or examined?

“Can you be held liable for the advice you just gave for a patient you have never seen or examined?”

The existence of a physician-patient relationship has traditionally been a prerequisite to the filing of a medical malpractice lawsuit. It shows that there was a 'duty' towards the patient in whom there has been alleged wrongdoing. A recent decision by the Minnesota Supreme Court, however, has drawn attention for its ruling that a physician may be liable for malpractice even without a physician-patient relationship. The case involved an adult, and the ruling only applies in Minnesota, but all Neonatologists should be aware of the case since State Supreme Court opinions may influence courts in other States. The facts of the case, Warren v. Dinter, have been obtained from the court opinion.

Facts

Susan Warren, a 54-year old woman, living in Minnesota, presented to a clinic complaining of abdominal pain, fever, chills, and other symptoms. The nurse practitioner, Sherry Simon, who saw her ordered labs that were concerning to her for infection. She called a nearby hospital to arrange admission and spoke to the hospitalist, Dr. Richard Dinter, who did not have access to any of the lab values. There is some dispute over what Dr. Dinter was told; The NP stated that he told her Ms. Warren did not need to be admitted to the hospital while he says he responded “to what end[?]” The end result was that Ms. Warren was sent home with a scheduled follow up appointment. She was found dead in her home by her son three days later, who then sued the Dr. Dinter and the hospital he was working at for malpractice in his care and treatment of his mother. The nurse practitioner and her collaborating physician were also sued and paid a settlement.

The defense asked for the court to dismiss the lawsuit on the basis that Dr. Dinter had no duty of care towards Ms. Warren since a physician-patient relationship had not been established. The call from NP Simon was merely for his “thoughts as a hospitalist,” and his responses were given to her as a “professional courtesy.” The trial court agreed that no doctor-patient relationship was created through the “informal conversation between medical colleagues.” The son appealed this decision, and the Minnesota Court of Appeals agreed with the lower court that there was no duty as there was no physician-patient relationship. The case was then appealed to the Minnesota Supreme Court, which reversed the two lower court decisions on April 17, 2019.

Ruling

The key ruling of the Court was that “A physician-patient relationship is not a necessary element of a claim for professional negligence. A physician owes a duty of care to a third party when the physician acts in a professional capacity, and it is reasonably foreseeable that the third party will rely on the physician's acts and be harmed by a breach of the standard of care.”

Applied to this case, the Court found that even though Dr. Dinter had never met Ms. Warren, he “knew, or should have known, that a breach of the applicable standard of care could result in serious harm.” The Court did not find Dr. Dinter liable, but the case was sent back to the trial court where it has not yet gone to trial.

Implications

The American Medical Association, working with the Minnesota Medical Association (MMA) and Minnesota Hospital Association, had written to the Court in what is known as an *amicus brief* arguing that holding Dr. Dinter liable would ultimately harm patients by inhibiting informal consultation and collaboration. The Court disagreed, stating that the interaction, in this case, was neither a ‘curbside consultation’ nor ‘professional courtesy.’

“The impact of this decision is unclear as it is relatively recent, but it certainly will have consequences for neonatologists practicing in Minnesota and other states that adopt or have adopted the “foreseeability of harm” standard.”

The impact of this decision is unclear as it is relatively recent, but it certainly will have consequences for neonatologists practicing in Minnesota and other states that adopt or have adopted the “foreseeability of harm” standard. Foreseeability deals with the fact that if something is foreseeable, it is probably predictable. In order to prove that negligence caused the injury, the plaintiff must prove that the harm that was caused was foreseeable. Foreseeability is not always a simple doctrine. For example, after a car accident, the injured driver's arm develops an infection and needs to be amputated. The driver causing the accident can be held liable even though the amputation was not a foreseeable outcome after a broken bone.



We as neonatologists are often consulted from an outside source regarding a patient. The information you provide may be relied upon by the outside physician, and your name could appear in the chart. A perfect example of verbiage in the electronic medical record might involve the following: I requested an opinion from Dr. X regarding the criteria for total body cooling for baby Y. He/she responded that cooling did not meet criteria. Your name and “so-called advice” will be highlighted in the chart.

“If you are contacted about a patient that you have never met, be careful about the advice provided, especially when it will be relied on in the care of that patient. This is especially true if you are also in the role of a ‘gatekeeper,’ potentially impacting the disposition of that patient.”

If you are contacted about a patient that you have never met, be careful about the advice provided, especially when it will be relied on in the care of that patient. This is especially true if you are also in the role of a ‘gatekeeper,’ potentially impacting the disposition of that patient.

It is sometimes best to respond in “generalizations” rather than with specifics regarding the care of a patient who you have never established a relationship. Oftentimes, words and advice are taken out of context and do not reflect the actual conversations regarding the patient.

References:

1. *The Minnesota Supreme Court decision can be found at <https://law.justia.com/cases/minnesota/supreme-court/2019/a17-0555.html>*
2. *The Minnesota Medical Association article on the ruling can be found at <https://www.mnmed.org/news-and-publications/News/MN-Supreme-Court-Rules-Physician-Patient-Relations>*

The authors have no conflicts of interests to disclose.

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Disclaimer:

This column does not give specific legal advice, but rather is intended to provide general information on medicolegal issues. As always, it is important to recognize that laws vary state-to-state and legal decisions are dependent on the particular facts at hand. It is important to consult a qualified attorney for legal issues affecting your practice.

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Survey Says: RSV

RESPIRATORY SYNCYTIAL VIRUS, or RSV, is a dangerous virus that can lead to:

- Hospitalization
 - Lifelong health complications
 - Death
- for infants and young children



ACCORDING TO A NATIONAL SURVEY, Specialty Health Care Providers say:

- 80% They treat RSV as a priority, "often" or "always" evaluating their patients
- 77% RSV is the "most serious and dangerous" illness for children under four
- 77% Barriers to access and denials from insurance companies limit patients' ability to get preventive RSV treatment



But Parents are Unprepared.

- 18% Only 18% know "a lot" about RSV
- 22% Only 22% consider themselves "very well" prepared to prevent RSV



RSV EDUCATION & AWARENESS CAN HELP

After parents learned more about RSV, they were:

- 65% "More concerned" about their child contracting the disease
- 67% Likely to ask their doctor about RSV



NCJIH National Coalition for Infant Health

Learn More about RSV at www.infanthealth.org/RSV

Why PREMATURE INFANTS Need Access to an EXCLUSIVE HUMAN MILK DIET



In the United States, more than **1 IN 10 BABIES ARE BORN PREMATURE.** Very low birthweight babies are born severely premature, weighing less than 1,250 grams.

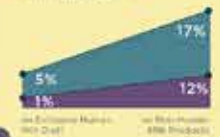


VERY LOW BIRTHWEIGHT BABIES are at risk for Necrotizing Enterocolitis (NEC), which:

- Damages intestinal tissue
- Causes distended abdomen, infection, low blood pressure and shock
- Threatens infants' lives

NEC occurrence increases when a preemie consumes non-human milk products.

When that happens:



HOW TO HELP PREVENT NEC: EXCLUSIVE HUMAN MILK DIET

What is an Exclusive Human Milk Diet?



Why is An Exclusive Human Milk Diet important?

An Exclusive Human Milk Diet gives vulnerable infants the best chance to be healthy and reduces the risk of NEC and other complications.

When a very low birthweight baby can access an EXCLUSIVE HUMAN MILK DIET:

- Mortality is reduced by 76%
- Feeding intolerance decreases
- Chances of NEC are reduced by 77%

HUMAN MILK = MEDICINE

NEC is a life-threatening condition that can occur in premature babies. It is caused by bacteria in the gut that feed on the milk. If you have a premature baby, you need to be careful. Talk to your care team about your baby's specific human milk needs and request support to find your healthy, your baby.

LEARN MORE >



NCJIH National Coalition for Infant Health

1. American Academy of Pediatrics. (2013). Necrotizing enterocolitis. *Pediatrics*, 132(5), e132-139.
 2. American Academy of Pediatrics. (2013). Necrotizing enterocolitis. *Pediatrics*, 132(5), e132-139.
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The Genetics Corner: Frequently Asked Questions, Part I: About Copy number variants (CNV), Variants of Uncertain Significance (VUS) in Chromosome Microarrays (CMA)

Robin Clark, MD

Chromosome microarray (CMA) has become a first-tier test in the evaluation of newborns with congenital anomalies, who do not have a clear diagnosis. It is used by neonatologists and geneticists alike. Microarrays have proven their effectiveness by improving the diagnostic yield and changing the clinical management of newborns who have congenital anomalies. This two-part series of frequently asked questions will help the neonatologist interpret microarrays with more confidence and efficacy. Next month's FAQs focus on CNVs that are associated with congenital heart defects, both the isolated and the syndromic varieties.

What are CNVs?

CNVs or copy number variants refer to variants in the normal amount of chromosomal material. These are losses (microdeletions) or gains (microduplications) of chromosomal material that are usually longer than 500 bases in size but much smaller CNVs may be reported if they involve critical regions.

How common are CNVs in the general population?

CNVs are common and universal. CNVs account for most of the genetic diversity in human populations. Each of us has on average >1000 CNVs of >450 base pairs compared to a reference population. A chromosome microarray test detects reportable CNVs in 2-4% of the general population. CNVs may be familial (inherited) or de novo (sporadic), common or rare, recurrent and well described in the medical reports or unique ("novel"), without other examples in the published literature.

How are CNVs reported and classified?

Here is an example: arr[hg19] 16p13.1
1p12.3(15,324,775-18,242,713)x1

In this example, a 2.9 Mb deletion in the short arm of chromosome 16 starts at 16p13.11 (proximal breakpoint) and ends at 16p12.3 (distal breakpoint). The result designates the human genome map that was used to map these coordinates: arr[hg19]. This is followed by the chromosome number (1-22, X, Y), arm (p or q), band and sub-bands that is affected. Next, within the set of parenthe-

ses, 2 long strings of numbers are marked off, in sets of 3s, by commas, and separated by a dash. These two numbers represent the nucleic acid coordinates for the starting and stopping points of the variant region. Subtract the smaller number from the larger number and you get the number of bases involved in the CNV, which describes its size (18.2 million -15.3 million = 2.9 million). The copy number follows: "x1" for a deletion, "x3" for a duplication. The genomic size of a CNV is expressed as Kb or Kilobases (1Kb=1000 base pairs) or Mb or Megabases (1Mb=1000 Kilobases or a million base pairs).

"Following the guidelines established by the American College of Medical Genetics and Genomics, genetic laboratories classify CNVs using 5 options: pathogenic, likely pathogenic, variant of uncertain significance (VUS), likely benign and benign."

Following the guidelines established by the American College of Medical Genetics and Genomics, genetic laboratories classify CNVs using 5 options: pathogenic, likely pathogenic, variant of uncertain significance (VUS), likely benign and benign. Unfortunately, not all laboratories use the same standards to "call" variants and discrepancies in how labs classify CNVs are not uncommon. CNVs can be reclassified as more data becomes available.

What can be done to interpret a VUS on a microarray?

VUSs are commonly reported on microarray tests. These are usually either novel variants that have not been seen in a reference population or they are regions of variation with incomplete data, making interpretation difficult and limited. VUSs cannot be considered disease-causing but neither can they be ignored. The lab may offer parental testing for the VUS (sometimes, at no charge). A de novo VUS, or one that is inherited from a similarly affected parent, is more likely to be significant. A VUS that is inherited from an unaffected parent, is less likely to be significant. You can ask the lab to reinterpret a VUS after more family data has been collected or after a suitable period (usually a year or more) has elapsed in case new data has been added to the reference databases.

Can a familial CNV be pathogenic if the carrier parent is unaffected?

Some familial CNVs are disease-relevant but incompletely penetrant: meaning that some individuals in the family with the CNV express an abnormal phenotype while others with the same CNV do not, possibly because of the effects of other modifying environmental or genetic factors. Such CNVs may be considered VUSs

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because of the lack of consistent correlation with a phenotype or defect but they are in fact important risk factors. The increased prevalence of a VUS in the disease population compared to the unaffected or general population is a measure of the relative risk it may confer. In some cases, a deletion can “unmask” a heterozygous pathogenic variant on the intact homolog. This can cause expression of an autosomal recessive phenotype in the patient who has both a deletion and a genetic variant that affect both copies of the gene in question. Recognizing how these CNVs contribute to risk can improve the interpretation of VUSs in patients with congenital anomalies in general, and congenital heart defects (CHDs) in particular.

“Recognizing how these CNVs contribute to risk can improve the interpretation of VUSs in patients with congenital anomalies in general, and congenital heart defects (CHDs) in particular.”

Are some CNVs better tolerated than others?

In general, microduplications are better tolerated and are less likely to be disease-causing than microdeletions. A microdeletion that causes haploinsufficiency of dosage-sensitive genes is more likely to cause disease.

Smaller CNVs and microdeletions or duplications that are not gene-rich are less likely to be disease-causing. Conversely, as the size and number of CNVs increase, so do their chance of clinical relevance. Large CNVs, 3 Mb or greater, are almost always pathogenic.

What resources offer more information on the significance of a CNV?

A clinical geneticist is your best resource but a timely consultation may not be available for every patient who needs one. It is a good

idea to be familiar with a few useful resources that are readily available. Most microarray reports include a list of disease-related genes involved in the CNV. The clinician can review this list for the presence of genes that are relevant to the patient’s phenotype. Here are a few resources:

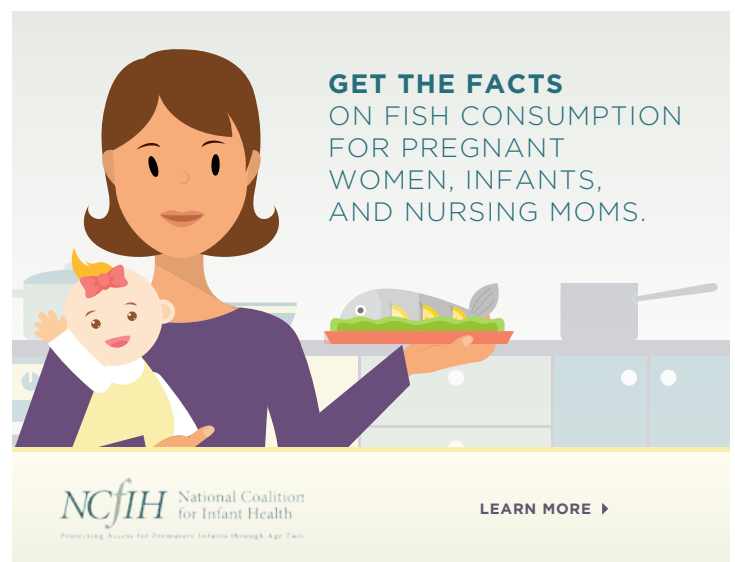
The online database, OMIM, Online Mendelian Inheritance in Man, is provides information about disease-associated genes: <https://www.omim.org/>

DECIPHER is a database of patients with CNVs that includes their phenotypic features: <https://decipher.sanger.ac.uk/>

UNIQUE is a resource for patient educational materials and informative booklets (some in languages other than English) on rare chromosome variants: <https://www.rarechromo.org/>

Practical applications:

1. Use chromosome analysis as the preferred first test when aneuploidy or a structural chromosome anomaly is suspected. Conventional chromosome analysis is appropriate when:
 - a. Down syndrome, another autosomal trisomy or Turner syndrome is suspected.
 - b. Multiple miscarriages or infertility is present in the family history.
2. Microarray testing is the most appropriate first line test for all other children with congenital anomalies, including heart defects.
 - a. The background rate of CNVs in the general population is 2-4%.
 - b. Patients with apparently isolated, nonsyndromic CHDs have an increased rate of both de novo and familial CNVs of 4-10%.
 - c. The diagnostic yield is higher in CHD patients with extra-cardiac anomalies, 15-20%.
3. Only CNVs that are classified as pathogenic or likely pathogenic in the microarray report are considered to be responsible for the CHD.
 - a. VUSs (variants of uncertain significance) should not be



- considered causative until more information is available to change their classification.
- Request parental studies to further characterize a VUS as de novo or familial.
 - Request laboratory reinterpretation of a VUS classification to resolve its status over time (usually one year or more after test report).

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How to Care for a Baby with NAS



Use the Right Words

I was exposed to substances in utero. I am not an addict. And my mother may or may not have a Substance Use Disorder (SUD).



Treat Us as a Dyad

Mothers and babies need each other. Help my mom and me bond. Whenever possible, provide my care alongside her and teach her how to meet my needs.



Support Rooming-In

Babies like me do best in a calm, quiet, dimly-lit room where we can be close to our caregivers.



Promote Kangaroo Care

Skin-to-skin care helps me stabilize and self-regulate. It helps relieve the autonomic symptoms associated with withdrawal and promotes bonding.



Try Non-Pharmacological Care

Help me self-soothe. Swaddle me snugly in a flexed position that reminds me of the womb. Offer me a pacifier to suck on. Protect my sleep by "clustering" my care.



Support Breastfeeding

Breast milk is important to my gastrointestinal health and breastfeeding is recommended when moms are HIV-negative and receiving medically-supervised care. Help my mother reach her pumping and breastfeeding goals.



Treat My Symptoms

If I am experiencing withdrawal symptoms that make it hard for me to eat, sleep, and be soothed, create a care plan to help me wean comfortably.

Learn more about Neonatal Abstinence Syndrome at www.nationalperinatal.org



Perinatal Substance Use

5 ways you can improve care during pregnancy and beyond

Pregnancy presents unique opportunities for patients to make positive changes in their substance use. When you become an informed provider you empower patients to make those changes.



Educate Yourself

Learn more about the pharmacology of substance use. Promote evidence-based care by communicating with patients in a way that separates fact from fiction. Understand the cycles of sobriety and relapse so that you can help patients plan for their recovery. Advise on the risks associated with polysubstance use.



Use the Right Words

Know the difference between substance use, substance misuse, and Substance Use Disorders (SUDs). Recognize that substance use is stigmatized and that stigma is a barrier to seeking care. Reject language that shames. Embrace the principles of Harm Reduction as a way to support any positive change.



Screen Every Patient

Talking about substance use should be a routine part of everyone's medical care. Get comfortable discussing it. Ask questions and listen to what your patients have to say. You may be the first person to ever ask.



Get Trained to Offer MAT

Medication-Assisted Treatment is the Standard of Care during pregnancy, but there are not enough providers. Contact SAMHSA to become an OTP*. Make naloxone available to all your patients who use opioids.

*opioid treatment program



End the Stigma and Criminalization of Drug Use

Embrace people who use substances. Meet them where they are. Abide by your medical ethics. Practice beneficence. Promote public health. Advocate for decriminalization.

Your Advocacy Matters

Learn more at www.nationalperinatal.org



TOP 10



RECOMMENDATIONS FOR THE PSYCHOSOCIAL SUPPORT OF NICU PARENTS

Essential evidence-based practices that can transform the health and well being of NICU families and staff

based on the National Perinatal Association's Interdisciplinary Recommendations for Psychosocial Support of NICU Parents

1 PROMOTE PARTICIPATION

Honor parents' role as primary caregiver. Actively welcome parents to participate during rounds and shift changes. Remove any barriers to 24/7 parental involvement and avoid unnecessary separation of parents from their infants.



2 LEAD IN DEVELOPMENTAL CARE

Teach parents how to read their baby's cues. Harness your staff's knowledge, skills, and experience to mentor families in the principles of neuroprotection & developmental care and to promote attachment.



3 FACILITATE PEER SUPPORT

Invest in your own NICU Parent Support program with dedicated staff. Involve veteran NICU parents. Partner with established parent-to-parent support organizations in your community to provide continuity of care.



4 ADDRESS MENTAL HEALTH

Prioritize mental health by building a team of social workers and psychologists who are available to meet with and support families. Provide appropriate therapeutic interventions. Consult with staff on trauma-informed care - as well as the critical importance of self-care.



5 SCREEN EARLY AND OFTEN

Establish trusting and therapeutic relationships with parents by meeting with them within 72 hours of admission. Follow up during the first week with a screening for common maternal & paternal risk factors. Provide anticipatory guidance that can help normalize NICU distress and timely interventions when needed. Re-screen prior to discharge.



6 OFFER PALLIATIVE & BEREAVEMENT CARE

Support families and NICU staff as they grieve. Stay current with best practices in palliative care and bereavement support. Build relationships with service providers in your community.

7 PLAN FOR THE TRANSITION HOME

Set families up for success by providing comprehensive pre-discharge education and support. Create an expert NICU discharge team that works with parents to find specialists, connect with service providers, schedule follow-up appointments, order necessary medical supplies, and fill Rx.



8 FOLLOW UP

Re-connect with families post-discharge. Make follow-up calls. Facilitate in-home visits with community-based service providers, including Early Intervention. Partner with professionals and paraprofessionals who can screen families for emotional distress and provide timely therapeutic interventions and supports.

9 SUPPORT NICU CARE GIVERS

Provide comprehensive staff education and support on how to best meet families' psychosocial needs, as well as their own. Acknowledge and address feelings that lead to "burnout."

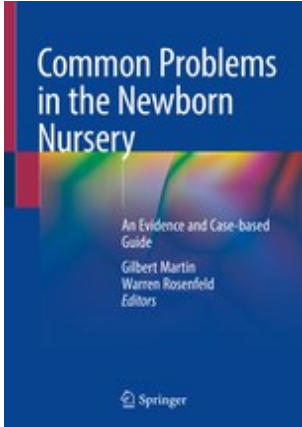


10 HELP US HEAL

Welcome the pastoral care team into your NICU to serve families & staff.

SUPPORT4NICUPARENTS.ORG

Editors: **Martin**, Gilbert, **Rosenfeld**, Warren (Eds.)



Common Problems in the Newborn Nursery An Evidence and Case-based Guide

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- Utilizes a case-based approach

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Written by experts in their fields, each chapter begins with a clinical case presentation, followed by a discussion of potential treatment and management decisions and various differential diagnosis. Correct responses will then be explained and supported by evidence-based literature, teaching readers how to make decisions concerning diagnosis encountered on a daily basis.

While this guide is directed towards health care providers such as pediatricians, primary care physicians, and nurse practitioners who treat newborns, this book will also serve as a useful resource for anyone interested in working with this vulnerable patient population, from nursing and medical students, to nurses and residents in pediatrics or family practice.

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Infants Aren't the Only Ones Hurt by Respiratory Syncytial Virus (RSV)

Susan Hepworth and Mitchell Goldstein, MD



The National Coalition for Infant Health is a collaborative of more than 180 professional, clinical, community health, and family support organizations focused on improving the lives of premature infants through age two and their families. NCfIH's mission is to promote lifelong clinical, health, education, and supportive services needed by premature infants and their families. NCfIH prioritizes safety of this vulnerable population and access to approved therapies.

A seasonal respiratory virus that threatens the lives of infants also can have a ripple effect on caregivers, families and workplaces, a new data analysis demonstrates.

Respiratory syncytial virus, or RSV, typically strikes between October and March with cold-like symptoms that can turn deadly for

infants, especially those born prematurely. In fact, RSV bronchiolitis is the leading cause of infant hospitalization in the United States. But a new analysis of data from the SENTINEL 1 study shows the disease also has secondary effects on infants' caregivers.

“Respiratory syncytial virus, or RSV, typically strikes between October and March with cold-like symptoms that can turn deadly for infants, especially those born prematurely. In fact, RSV bronchiolitis is the leading cause of infant hospitalization in the United States.”

In addition to the agony of watching their infant struggle, caregivers of infants with RSV reported:

Stress. Caregivers reported a stress level of 5.8 on a scale of one to seven, with seven being “very stressful.” A month after their infant’s hospital discharge, caregivers still reported stress.



Reduced productivity. Mothers (91%) and fathers (81%) both reported reduced productivity as a result of having their child hospitalized for RSV. And 73% of mothers and 58% of fathers reported absenteeism from work, while 64% of both mothers and fathers reported "presenteeism" – being at work but being unable to fulfill work responsibilities.

Emotional impact. In open-ended questions, caregivers of hospitalized infants with RSV reported emotional impact as one of the major experiences related to their child's disease. Fear, worry and stress were recurrent themes.

As one of the paper's researchers, Pia Pannaraj, MD, MPH, explained, "This study provides insight into the burdens these families face, from the terror of watching a baby struggle to breathe to the devastation of being fired from a job because of the time off needed to be by their baby's side in the hospital. As physicians, we need to be cognizant of the impact of a disease like this not only on the patient but across the family unit."

Published in [Clinical Pediatrics](#), the analysis considered data from 43 hospitals across the United States for infants who were born prematurely between 29 and 35 weeks gestation. (1) The infants, who were younger than 12 months old, had not received preventive treatment for RSV before they contracted, and were hospitalized with, the virus.

"Though research reveals RSV's impact to be far reaching, access to preventive medicine, palivizumab, continues to be a challenge for the families of premature infants."

Though research reveals RSV's impact to be far reaching, access to preventive medicine, palivizumab, continues to be a challenge for the families of premature infants. [Policy](#) from the American Academy of Pediatrics Committee on Infectious Diseases suggested in 2014 that the treatment was not needed for infants born after 29 weeks gestation. (2) Although the Food and Drug Administration indication is significantly broader than the AAP policy, many health plans and state Medicaid systems subsequently adjusted their coverage policies, limiting access for [most preterm infants](#). (3) The National Perinatal Association 2018 Respiratory Syncytial Virus (RSV) Prevention Clinical Practice Guidelines are more in line with the FDA indication and provide recommendations that cover those who are most at risk. (4)

As this latest research demonstrates, RSV's impact is broader than many realized. If policymakers hope to narrow the virus' effect on both infants and their caregivers, they might start by expanding access to preventive treatment.

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National Coalition for Infant Health Values (SANE)

Safety. Premature infants are born vulnerable. Products, treatments and related public policies should prioritize these fragile infants' safety.

Access. Budget-driven health care policies should not preclude premature infants' access to preventative or necessary therapies.

Nutrition. Proper nutrition and full access to health care keep premature infants healthy after discharge from the NICU.

Equality. Prematurity and related vulnerabilities disproportionately impact minority and economically disadvantaged families. Restrictions on care and treatment should not worsen inherent disparities.

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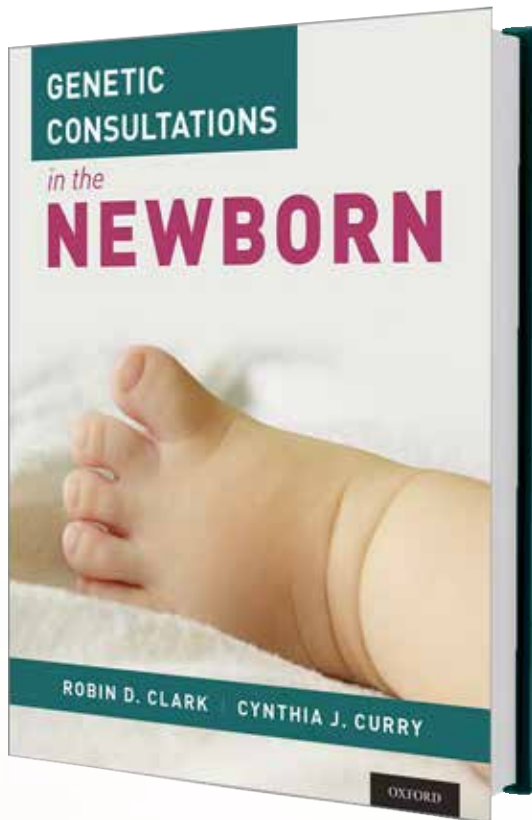
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OXFORD

RSV AWARENESS:

A National Poll of Parents & Health Care Providers

Respiratory syncytial virus, or RSV, is far from the common cold. It can lead to hospitalization, lifelong health complications or even death for infants and young children. **In fact, it is the leading cause of hospitalization in children younger than one.**

Yet a national poll of parents and specialty health care providers reveals a startling divide in attitudes toward the virus. While both groups acknowledge RSV as a significant concern, the two populations vary widely in their reported ability to meet RSV's threat head-on. Health care providers vigilantly

monitor for the virus, which they report seeing regularly in their practices. Parents, however, feel unequipped to protect their young children.

Meanwhile, specialty health care providers overwhelmingly report that health plan rules and insurance denials block vulnerable infants' access to preventive RSV treatment. Such barriers can put unprepared parents at a double disadvantage. The survey does suggest, however, that education can embolden parents to seek more information about RSV and take steps to protect their children.

KEY FINDINGS

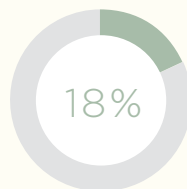
Preparedness

Parents of children age four and under report that understanding of RSV is lacking. That leaves them less than fully prepared to prevent their young children from catching the virus.

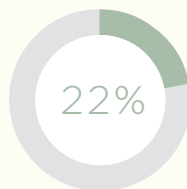
Specialty health care providers reiterated these concerns; 70% agreed that parents of their patients have a low awareness of RSV. Meanwhile, specialty health care providers themselves actively monitor for RSV. They reported that:

PARENTS

Only 18% said parents know “a lot” about RSV, reflecting an awareness level that’s roughly half that of the flu

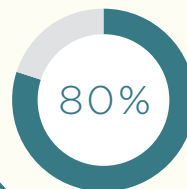


Only 22% of parents consider themselves “very well prepared” to prevent RSV.

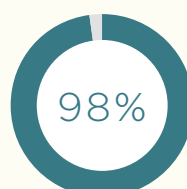


SPECIALTY HEALTH CARE PROVIDERS

They treat RSV as a priority, “often” or “always” evaluating their patients (80% doctors; 78% nurses)



During RSV season, they are especially vigilant about monitoring patients for symptoms or risk factors for RSV (98%).



Monthly Clinical Pearl: Resilience: Maintaining Your Professional Energy Level

Joseph R. Hageman, MD.

You know the feeling! When you are in your office, and your Chairperson calls you to talk about a new idea for a project, which turns out to be more than just an idea, just when you have gotten out from under your notes, billing, and are just off service. And it turns out that he/she would like you to organize the new quality improvement committee, for example. Oh, and how are things going with your research projects? Have you submitted your abstracts for pediatric academic society, yet? What about your idea for the workshop? BTW, I have a great opportunity for you to write a review article or a chapter. And were you thinking about promotion? I am only looking out for your career.

You know they really are looking out for you and your professional life. Then the pager/phone goes off, and you have another patient who you need to see in the emergency department who is going to be admitted, and you are the attending.

How do you once again, rise to the challenge? You are a dedicated physician, right? You care about providing the best care for your patients and their families. Your personal AND the professional expectation is that you will always be ready and be at the “top of your game.”

“What is resilience, really? What strategies can you use to bounce back, especially when you are feeling mentally and physically exhausted? ”

What is resilience, really? What strategies can you use to bounce back, especially when you are feeling mentally and physically exhausted?

Jensen and colleagues present a study about building physician resilience, which I found really helpful in trying to define and clarify what resilience is (1). They concluded that “resilience is a dynamic, evolving process of positive attitudes and effective strategies” (1). They summarized four main aspects of physician resilience: 1) attitudes and perspectives, 2) balance and prioritization, 3) practice management style, and supportive relations (1). The major categories of each of these aspects are summarized in the Table. I think this is a practical guideline that may be used at regular intervals to survey your “resilience status” in your practice and for you personally.

Moreover, if when you review the table, you find there are areas, for example, maintaining interest, that you are having some doubts, ask yourself “Is this just relative lack of interest just related to the type of clinical problem I am dealing with?” For example, we all have clinical areas that we find much more interesting than others...or that we have a special interest in. When I was a fellow in neonatology, I really enjoyed sitting at the bedside and

caring for newborns with persistent pulmonary hypertension of the newborn as their management and clinical course might change from minute to minute (2,3,4). On the other hand, when I was on the pediatric floor as a hospitalist, there were issues related to the social status of a patient and their family that I found important but less exciting. However, if you begin to feel that you are losing your interest and enthusiasm for caring for patients in general than it is important, to be honest with yourself and find someone who you can talk with, as this is a sign of compassion fatigue/burnout (5).

Sometimes, when you are feeling tired or overwhelmed or extra stressed, these feelings or apparent changes in attitude are just temporary. All of us can have “bad days.” It is important to take a couple of minutes, which I usually did after the infant, child or adolescent was finally stable, and take a breath, sit in your office or a quiet room, and relax your mind. I learned mindful meditation and guided imagery in 2007 from David Victorson, a psychologist who offered Evanston Hospital employees “in-services” at 4:30 pm on Tuesdays. This was at the time when I was working on trying to resume clinical practice after having to take time off with a chorioathetoid movement disorder, depression, and chronic pain.. David was terrific, kind and very supportive to whoever came to the auditorium. Boy, do I wish I had learned this about 27 years before this time. The principles come from work by Jon Kabat-Zinn, Ph.D. who pioneered the principle of living in the moment... just enjoying simple things in that moment and letting all of your thoughts move through your mind (6,7). In the introduction in his book, he states “mindfulness is awareness, cultivated by paying attention in a sustained and particular way: on purpose, in the present moment, and non judgmentally” (6).

My early attempts at mindful meditation started with David’s sessions as he was really good at guiding us as we learned to



breathe through our nose, attention to our breath, sitting in a relaxed position. It was challenging to be able to genuinely focus and let all of the thoughts going through your mind, especially when things are not going well for you in your professional life. He encouraged just taking a few minutes each day to do mindful meditation but to be consistent in our practice. In a more recent project for pediatric residents, which was organized by Dr. Mallory Taylor with assistance from Dr. Melanie Brown and yours truly, she used the Headspace® app as a tool to help the residents learn mindful meditation (9).

More recently, mindful meditation has become automatic for me. In times of stress, with chronic pain as I spend the day at 3/10 on the pain scale, when I have a couple of minutes in the office or at home. It helps me with my nightly sleep routine, not that I am no longer on call all the time. My guided imagery involves visualizing my home and neighborhood in Evanston. I will pay attention to my breathing when my wife Sally and I are walking with our dog, Stella in our neighborhood.

Other activities that help me maintain my energy level and resilience include reading, especially biographies of writers I respect and admire like Charles Dickens, Mark Twain, Harper Lee, and Stephen King. Now that I am doing a lot of writing, I like to read about writer's routines and learn how they maintained their productivity. I enjoy making small contributions to the literature and doing a lot of editing for Pediatric Annals, Neonatology Today, and helping the nurses, neonatal nurse practitioners, residents, fellows, and faculty with publications.

Regular exercise in the form of walking, treadmill, stationary bike, stretching, yoga, and swimming really help with the chronic pain, mostly neuropathic, and help keep my mind clear...and generate new ideas.

A good night's sleep, now that I am no longer on call, makes a big difference as well. I do keep a small yellow pad near my bed to write down thoughts and ideas.

Having a son who is now a Tier X Personal trainer at Equinox, as well as a nutrition counselor is very helpful as well. Patrick makes good suggestions for exercise and diet. In this month's issue of Pediatric Annals, Dr. Hilary McClafferty is our Guest Editor and one of her authors, Dr. Maria Mascarenhas wrote an excellent article about the Mediterranean diet, and its anti-inflammatory attributes (10). Hilary's introduction to Integrative Pediatrics provides our readers with some basic principles that we can all use in our practice as well as in our personal lives (11). Dr. Melanie Brown also contributed an excellent article about strategies for dealing with stress and anxiety, and building resilience in children, which I actually found very helpful (12).

If you need a hobby or diversion from your very busy professional activities, there are a variety of things you can involve yourself with including being a collector. I have been collecting old books, especially Dickens for about 40 years and really enjoy it. I also collect baseball cards. But whatever you decide to do, it helps to have an activity to take your mind off of all of your professional responsibilities.

Table: Aspects of Physician Resilience

Attitudes and Perspectives	<ul style="list-style-type: none"> • Valuing the physician role • Maintaining interest • Developing self-awareness • Accepting personal limitations
Balance and Prioritization	<ul style="list-style-type: none"> • Setting limits • Effect approaches to continuing professional development • Honoring the self
Practice Management Style	<ul style="list-style-type: none"> • Sound business management • Having good staff • Using effective practice arrangements
Supportive Relations	<ul style="list-style-type: none"> • Positive personal relationships • Effective professional relationships • Good communication

Another piece of sage advice came from Dr. Mickey Caplan, who had to let me go from my position at NorthShore University HealthSystem in Evanston in 2007 when I couldn't make it back to practice. He told me that I need to take care of myself as my top priority as I will be no good to anyone else if I don't take care of myself. Then I should care for my family, then, my career. In medicine, it is tough to sort out what our top priority is, as it may change from day to day when you are caring for a critically ill infant, child, or adolescent. But as you see in the table, included in the list is "honoring the self," having positive personal and professional relationships, and developing self-awareness.

"But as you see in the table, included in the list is "honoring the self," having positive personal and professional relationships, and developing self-awareness."

Maintaining your professional energy level and your resilience is a dynamic, ongoing, and challenging process for all of us.

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- 88% They treat RSV as a priority, "often" or "always" evaluating their patients
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But Parents are Unprepared.

- 18% Only 18% know "a lot" about RSV
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Abstracts from the 32nd Annual Gravens Conference on the Environment of Care for High Risk Newborns, in collaboration with the March of Dimes

Robert White, MD



The abstracts from the the 32nd Annual Gravens Conference are presented below:

Poster Abstracts Table of Contents:

Gravens2019-1	Online Video-based Supplement for APIB and NIDCAP Education
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Gravens2019-6	A comparison of NICU nurses' stress and the quality of their work environment in an open-ward and a new unit of both pods and single-family rooms
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Gravens2019-9	Comparison of breastmilk production from mothers of premature and mature NICU's babies during the first week in our NICU
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Gravens2019-1 Online Video-based Supplement for APIB and NIDCAP Education

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Aims: There have been repeated requests by neonatal caregivers for enhanced educational materials to help neonatal caregivers learn and refine neurodevelopmental, brain-protective caregiving techniques. The Edmonton NIDCAP Training Centre Canada has created an on-line video library as a first step in responding to this need.

Video offers several advantages over verbal/written communication and education, and has been shown to improve technical and non-technical neonatal resuscitation skills I. The presentation of large amounts of information in a limited amount of space and time, simplifying complex/abstract concepts, demonstrating how concepts/subjects in motion relate to one another, engaging audience attention and retention of information are enhanced II; all these are educational goals of neurodevelopmentally based training programs such as NIDCAP.

Our experience of video-supplemented education concurs with these findings. Our goals were to a) create this tool, b) present this work at conferences and workshops for feedback from neonatal caregivers, and c) invite collaboration to expand this preliminary work.

Methods: Parents and staff providing care to NICU Infants (N=36), at the Stollery Children's Hospital in Edmonton, Canada, gave written consent for videotaping of caregiving interventions. A variety of caregiving procedures, (clinical examinations including APIB's, diaper changes, needle sticks, procedures, etc.) were captured on video. Videos reviewed by JMT and AN were categorized according to Synactive Subsystems, (for NIDCAP section) III and Systems, Packages or Summary Scales (for APIB section) IV. Many video clips raised questions related to NIDCAP observations and/or APIB examination / scoring and were placed in a separate section, 'Platform for Debate'. Videos in the Platform for Debate section were linked to feedback forms to facilitate e-mail communication with ENTCC, so that viewers can offer their per-

spectives and insights. All videos were uploaded to a password protected database and website.

Results/Findings: Video captured more detail of caregiving procedures than transcription onto NIDCAP observation sheets. Similarly, video of APIB exams led to more detailed scoring, than the scoring based on examiner's memory. The videos often provided a different view of the infant, compared to that of the observer, thus affording a more complete record of the infant's behavioral patterns. A sample of the educational videos can be viewed by the Abstract Review Committee, at <https://stollerynicu.wixsite.com/snapshots>. We have provided this link as these visuals are our "Results"; the website will be demonstrated "live" during our presentation. We invite discussion and feedback about the user-friendliness and utility of this resource and the possibilities of forming a Working Group to expand this work.

Conclusion and Further Plans:

We will continue to record and upload videos, and welcome others to submit videos for inclusion in this online learning resource. We anticipate that this resource will be used by NIDCAP and APIB practitioners and neonatal caregivers to supplement learning in the area of neurodevelopmental, brain-protective caregiving in the NICU. We hope that the "Platform for Debate" section will serve as a forum for collaborative discussion about the complexities of neurobehavioral observation. We hope that the online communication channel of this resource will enhance the skills of all who strive to provide, individualized neurobehavioral brain-protective care for infants in their nurseries.

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Gravens2019-3

Combatting Compassion Fatigue with Resilience in Neonatal Intensive Care Unit Nurses

Erin Bergmann RN, MSN, CNL

Ohio Health Riverside Methodist Hospital/Nationwide Children's Hospital-Neonatal Intensive Care Unit

Background and Purpose

The purpose of this project was to combat and prevent compassion fatigue (CF) in Neonatal Intensive Care Unit (NICU) nurses in a particular microsystem by offering an interactive, educational seminar focused on four evidence-based, realistic techniques for building resilience.

Design/Methods

Discussion with the chaplain of the NICU revealed that CF was a current problem with the nursing staff. An evidence-based literature search was conducted to fully understand this phenomenon and to determine its effects on nurses' health, the hospital units, and the patients. To combat this issue, an interactive, educational seminar was held at Nationwide Children's Hospital main campus in Columbus, Ohio to thirty-seven NICU nurses from various NICUs in the area at the Annual Neonatal Retreat in September of 2017. A comprehensive overview on compassion fatigue was provided and four evidence-based, realistic techniques for building resilience were explained with rationale for utilization and demonstrated to the nurses. These techniques are square breathing, the Relaxation Response, meditation, and exercise. A pre-presentation survey was conducted to determine nurses' previous knowledge of compassion fatigue, past/current experiences with signs and symptoms, and current coping methods in use, if any. A post-presentation survey was then utilized to determine the likelihood that nurses will use the techniques for building resilience as well as the effectiveness of the educational seminar. Badge buddies with the techniques for building resilience were given to the nurses, too, to serve as a reminder.

This educational seminar was then presented at a Strategic Partnership meeting at Ohio Health Riverside Methodist Hospital/Nationwide Children's Hospital NICU in February of 2018. Thirty-seven NICU nurses were in attendance, and five of these nurses had previously attended the seminar at the Annual Neonatal Retreat in September. A post-presentation survey was conducted four months post-seminar to determine which, if any, of the techniques for building resilience were being utilized and which, if any, were found to be effective in preventing/combating compassion fatigue.

Results/Significance

Compassion fatigue has a significant impact on NICU nurses, the hospital unit, as well as the patients and families involved. NICU nurses are often exposed to a high-stress environment with significant traumatic events and eventually, they may be unable to cope or recover. This is when an insidious onset of CF occurs (Berger, Polivka, Smoot, & Owens, 2015). Pre-presentation survey results found that several symptoms of compassion fatigue were prevalent among the NICU nurses. For example, 62% have often felt "on edge," 59% felt anxious, 68% felt sad, 81% felt overwhelmed, and 91% lost sleep due to the effects that their role as a healthcare provider has on their physical and emotional state.

Nurses affected often leave their jobs due to the tremendous burden associated. If unaddressed, nurses affected are more likely to deliver poor quality health care, make more medical errors and often neglect bringing empathy to the bedside. Post-presentation survey results revealed that 100% of the NICU nurses answered that they had learned something new about compassion fatigue, and 100% of the NICU nurses answered that they had experienced this before in their nursing career.

Compassion and empathy are core values of nursing (Ledoux, 2015). These values provide nurses with the stamina, hopefulness, soulfulness, and passion in the face of the illness and despair that their patients and families experience. NICU nurses provide care and compassion to the families and infants that they care for and are considered their partners during their healthcare journeys, causing them to be at higher risk for developing compassion fatigue. The importance of recognizing signs and symptoms and preventing and/or combatting compassion fatigue as quickly as possible cannot be understated. Resilience has been shown to be a protective factor against CF and may be used to combat signs and symptoms (Parry, 2017). Post-second seminar survey results revealed that 100% of the NICU nurses utilized at least one of the techniques for building resilience, and all four were found to be effective in preventing/combating compassion fatigue. Ultimately, the seminar was effective in teaching tools that can be used to optimize nurses' personal health and well-being so that they are able to provide safe, high quality patient care.

Conclusion/Implications for Practice

Education on compassion fatigue is essential for all NICU nurses and nurses on units where it may be likely to occur. Resilience may contribute to improved health of nurses, hospital unit quality and morale, as well as quality and safety of patient care. Best patient outcomes may be achieved when cared for by resilient nurses.

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out.

Learner Objectives

1. Learn about the phenomenon of compassion fatigue, signs and symptoms, and associated consequences.
2. Learn and practice four evidence-based, realistic techniques for building resilience in order to prevent and/or combat compassion fatigue.
3. Develop a strong appreciation for the importance of self-care, building resilience within oneself, and gain inspiration to lead by example!

Gravens2019-6

A comparison of NICU nurses' stress and the quality of their work environment in an open-ward and a new unit of both pods and single-family rooms

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Background and Purpose:

The architectural design of a Neonatal Intensive Care Unit (NICU) may affect the physical and psychological health of newborns, their parents, and nursing staff. (1) Open wards (OW) or bays contain many incubators in one large space which enables nurses to readily monitor fragile newborns. A pod design (i.e., 4 to 10 incubators in one space) can offer more control than an OW over environmental factors that may affect the well-being of infants, staff and parents. Single family rooms (SFRs) may allow greater control over the environment and greater privacy.

Few systematic studies examine how design relates to the well-being of nurses (2-4), and the quality of existing studies is often weak. Recent studies suggest some drawbacks of SFRs for both infants and parents, prompting some NICUs to consider designs combining both. Research is needed to explore nurses' work experience in units combining pods and SFRs. The purpose of this study was to compare NICU nurses' work stress and the quality of their work environment in an OW and in a new unit of both pods and SFRs.

Methodology:

A pre-post occupancy study was conducted in a level 3 unit before and after transitioning to a new unit of 6-bed pods and SFRs (January 2016). Post-occupancy data were collected one year later (to allow staff to adjust) in the first 3 months of 2017.

Nurses were invited to participate if they were registered nurses, had worked in the unit for at least 3 months, and worked at least one shift per week. 54 nurses completed online questionnaires both pre- and post-transition. They responded to reliable and valid questionnaires assessing nurses' stress, support, ability to provide patient-centered care, perceptions of their work environment qual-

ity and of their healthcare team's effectiveness, as well as their work satisfaction. We also monitored adverse events (collected via incident reports) for the year before the transition (2014-15) and compared this to the entire period post-transition (2016-18).

Results:

There were no significant differences in nurse stress, satisfaction, support from colleagues, perceptions of team effectiveness and ability to provide family-centered care between the OW and the pod/SFR unit.

Although there was no significant difference in total work obstacles (Mean = 61.5 versus 58.4), differences were found on three of four obstacle subscales. Scores for total obstacles can range from 22 to 110, thus obstacles were not high in either environment. While nurses reported fewer organizational obstacles (e.g., difficulties obtaining information from colleagues) in the pod/SFR unit; both environmental and technology obstacles were greater in the pod/SFR unit. There was no difference in task obstacles.

There was a reduction in the number of adverse events. The monthly average was 15.3 events in the OW and 8.6 in the pod/SFR unit. Medication, diet and treatment adverse events all decreased (61, 75 & 52% respectively).

Discussion:

Contrary to what we expected based on previous studies, there were only a few differences in nurses' work experience. The timing of assessments is important to consider as we purposefully assessed nurses one year after the transition to allow time to adjust. While nurses found some aspects of the pod/SFR unit optimal, other aspects of the OW were viewed more favourably.

Our findings concerning environmental and technological obstacles are consistent with Smith and colleagues' study of five pediatric critical care units transitioning to SFR design. Nurses reported greater technological obstacles in the pod/SFRs. These include how easy it is to locate equipment/supplies, and how well supplies are stocked.

The distance between isolettes may contribute to greater environmental obstacles in the pod/SFRs. In the former OW unit, isolettes were a few feet apart; whereas in the pod/SFR distances are greater. Studies of SFR units have found that increased walking is an issue for nurses.

Support received from colleagues was no different. The questionnaire we utilized addresses the overall quality of staff relationships; not isolation from other staff. Concerns about isolation was evident in responses to open-ended questions. Nurses in a SFR units have reported that their colleagues are less available, and they are less satisfied with interactions with other team members.

Adverse events may have decreased due to less noise, fewer interruptions while performing tasks and a different system for storage of breastmilk.

Strengths of this study include: the high rate of participation, number of participants, the inclusion of nurses who worked in both units and could compare their work experience in both, and the use of well-established, reliable and valid measures.

Implications:

- Managers should ensure adequate staff to stock equipment and supplies in SFRs.
- There may be fewer organizational obstacles in the pod/SFR due to decreased noise, ease of locating charts, and the ability to gather in small groups at de-centralized stations for report.
- Managers may also want to develop strategies to ease isolation.

Learner Objectives:

1. Understand the impact of NICU design on nurses' stress and work environment, job satisfaction, support from colleagues and managers.
2. Learn about the benefits and limitations of a combined pods/SFRs unit design relative to commonly used open ward designs

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Gravens2019-8

Getting there- a journey to optimal breastfeeding in the NICU using the vehicles of a statewide breastfeeding collaborative and the Baby Friendly Project

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Background: Breastfeeding and use of human milk confer unique benefits to neonate. Nowhere is this statement truer than in the Neonatal Intensive Care Unit (NICU), particularly for the infant that is less than 1500 grams. There are numerous published evidence-based studies that have confirmed the benefits of supplying human milk to the neonate.

The NICU at Winnie Palmer Hospital for Women and Babies joined the Florida Perinatal Quality Collaborative" the Mother's Own Milk Initiative (MOM)" in May of 2016 and began working to optimize the use of mothers' own milk for babies less than 1500 grams admitted to the NICU. At the same time Winnie Palmer Hospital for Women and Babies began their Baby Friendly journey.

Aim / Purpose of the Project: The aim of this project was twofold: 1) improve the time of first pumping in mothers' who have delivered very low birthweight infants (VLBW) babies (<1500grams at birth) to 6 hours or less and 2) achieve Baby Friendly Designation. Design and Methods: We chose our AIM carefully knowing that if we did not get mother's pumping early and often and milk production was not adequate, we could never improve the outcome for increasing breastfeeding in that last week before discharge. Additionally our organization was on the "Baby Friendly Journey". The time of first feeding (within 6 hours of birth) was a key measure of success for Baby Friendly. It seemed logical to begin with the pumping/feeding within 6 hours of birth and combine both projects.

In order to obtain data for both the MOM and Baby Friendly designation, chart reviews of each infant's electronic record needed to be performed. Although our organization had an electronic medical record (EMR), the system in place did not allow for creating reports and all data needed to be retrieved manually. The process was extremely labor intensive taking up to 24 hours/week of dedicated data collection time. Despite not being able to retrieve data by generating reports, the manual process was helpful in that we were able to identify other aspects that needed review and examination for continued success with the project.

The MOM initiative goal was to have 90% of mother's who's infants were born at less than 1500 grams pumping in 6 hours or



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less after delivery, while Baby Friendly required 80% of all well newborns have the first feeding initiated within 6 hours. Studies show the sooner the mother begins pumping/feeding the more likely she is to continue. By focusing our work on getting the NICU Moms to pump within the first six hours and the well newborns first feed within six hours we determined we could meet Joint Commission Core Measure PC05 Exclusive Breast Milk Feeding of 52.9% Results and Outcomes: Participating in the MOM initiative while the organization was on the Baby Friendly Journey completely changed our expectation of when we could get our NICU Moms starting to pump for their neonates. Previously we were satisfied with initiation of pumping as long as it was within 24 hours of birth and usually it was within 12 hours. Because we combined these projects we collaborated with PACU, Baby Assessment Nurses (BAN), L/D Nurses NICU Nurses, NICU Lactation Consultants and the NICU Milk Room Staff. Team members worked together in PACU and L&D to initiate breast pumping, and hand expression. Over the eighteen months of the project we improved our initial pumping within 6 hours from 20% to 92%. For the first time ever we also achieved an exclusive Breast milk feeding rate in the entire hospital of 53%!

Education played a pivotal role in the success of this project. In order to achieve Baby Friendly designation, all team members (including anyone who worked in the organization) received specific breastfeeding education. The number of hours of education required ranged from 1 hour for our environmental services team members to 20 hours for our nursing team members. By combining the work of the MOM and Baby Friendly initiative we were able to educate the organization on the importance of pumping/feeding within the first 6 hours of life.

Implications and Conclusions: Many times when you have ongoing Performance Improvement projects such as the MOM and Baby Friendly the projects have competing priorities. In fact when we first began the work we were advised to keep the projects separate. We found that by combining the work of the MOM and Baby Friendly Initiatives we were able to focus the work for the entire organization on the importance of pumping/feeding within the first 6 hours of life. Winnie Palmer Hospital was Designated a Baby Friendly Facility in August of 2018, and is the largest delivery hospital in the United States to receive the designation!

Learner Objectives:

After reviewing the poster the learner will:

1. Describe the importance of early pumping for successful human milk feeding in the NICU.
2. Discuss the significance of combining the MOM project with the Baby Friendly Initiative to achieve success for the organization.

Gravens2019-9

Comparison of breastmilk production from mothers of premature and mature NICU's babies during the first week in our NICU

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Background: Better understanding of patient satisfaction and improving patient-provider communication could alleviate many problems that face the health care industry today. (Heath, 2017) This is most evident in the Neonatal Intensive Care Unit (NICU) where the tiniest and most fragile patients reside. The NICU is a mysterious place behind locked doors that require special badges and passes to enter. Much like when Dorothy arrived in Oz there is an overload of sensory input. Families are overwhelmed and frightened by the unfamiliar; the amount of equipment, noise and alarms. Families have identified respectful and timely communication important factors affecting parental satisfaction with NICU care. (Martin, D'Agostino, Passarella, and Lorch, 2016)

Behaviors identified as positively impacting patient satisfaction include communicating information in a respectful manner, development of rapport, providing emotional support and respecting the participation of parents in the care of their infant. (Martin, D'Agostino, Passarella, and Lorch, 2016). By focusing on improving these behaviors patient experience scores rise, which leads to an increase in financial performance, compliance with treatment regimens, care outcomes, and patient loyalty.

Aim / Purpose of the Project: Twenty nine of the forty questions on the Press Ganey Survey of patient satisfaction are directly or indirectly related to the ability of the staff to communicate with patients and families. (Press Ganey, 2017). The aim of this project was to significantly improve the NICUs patient satisfaction scores by providing comprehensive communication training to NICU Team Members (TM's).

Method: We utilized a communication training program that was created specifically to help TMs better communicate with families. Training consisted of 3 parts: initial "train the trainer" simulations, mandatory 2-3 hour interactive workshops on communication techniques and finally patient experience simulations. A unit neonatologist who is skilled in healthcare communication taught all offerings of the workshops to provide consistency. All TM's were trained from November 2017 through January 2018.

The Patient Experience Simulations were conducted by TMs who

completed the train the trainer component mentioned previously. We had a total of 17 trainers to including two Developmentalists, one Lactation Consultant, two Discharge Coordinators, three Educators, six Clinical Assistant Nurse Managers, and three Managers who had bedside care responsibilities and schedule flexibility. The Patient Experience Simulations were a mix of some presentation (brief and debrief) and simulation. Simulation classes were limited to 16. A Discharge Simulation and a Rounding Simulation were chosen as the simulations. All team members participated in both simulations. A comprehensive debrief with a power point presentation finished the simulations. Minimal materials were required. Four simulation rooms (2 for each of the scenarios) were used. To signify the successful completion of the simulations, a gold wrapped candy was awarded to each team member.

Results and Outcomes: Patient satisfaction scores 12 months before intervention were compared to patient satisfaction scores after intervention. Mean scores, percentile, and “top box” scores were analyzed. Overall scores as well as specific nursing and physician categories were examined.

Using data from Press Ganey, overall patient satisfaction scores increased for the 6 months following completion of intervention by 31 percentile points(60%) compared to the 12 months prior to the intervention. Standard nursing overall percentile increased from the 31st percentile during the previous 12 months to the 87th percentile for the 6 months following the intervention. Manner of physician communication increased from the 22nd percentile to the 74th percentile. Overall physician scores increased from the 32nd percentile to the 67th percentile. “Top Box” data showed an increase in 7.4 % compared to 6 months prior to the intervention.

Implications and Conclusions: We conclude that patient satisfaction scores can be significantly improved through extensive communication training. Unlike Dorothy we don't need ruby slippers; our findings provide objective data that reinforce the need for comprehensive communication training.

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Learner Objectives:

At the completion of this oral abstract session the learner should

be able to:

1. Discuss the importance of effective communication in the NICU
2. Recognize the opportunity that specific communication training provides for improving patient satisfaction scores
3. Discuss the benefits of communication simulation training for team members in the NICU setting.

Gravens2019-10

Long-term effects of neonatal complications on brain growth at 10 years of age in children born extremely preterm

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Each year over 1800 babies are admitted to the NICU at Winnie Palmer Hospital for Women & Babies, a regional perinatal center. Approximately 10% of admissions are transports via ambulances and helicopters from outlying facilities. The stresses to the baby during transport are extraordinary and cause challenges in providing optimal developmental care.

Resources were available at no cost. Air Methods assisted with vibration measurements in both the ambulance and helicopter using a microvibe, an instrument used for rotor wing vibration balancing. Professional engineering expertise on this project was provided by a neonatal volunteer retired from NASA Kennedy Space Center conducting failure analysis during the space shuttle era.

Exploring the stresses that occur during transport resulted in this process improvement study. Our primary goal was to improve neonatal transport processes and outcomes by minimizing stressors. Sound and vibration were identified as major stressors for both ground and air transports. Light and positioning were also identified as common stressors during neonatal transport. Noise measurements were taken during actual ambulance transports. Vibration measurements were assessed in the ambulance and helicopter using a microvibe device and using various mattress combinations. Vibration data was collected in transport vehicles without patients and did not require IRB approval.

Noise measurements were taken in the ambulance and helicopter; noise levels ranged from 71dB to 92dB. Noise levels were higher in the helicopter than the ambulance. Vibrations measurements were collected using various mattresses. Vibration was lowest in the helicopter using a ROHO custom air chambered mattress with measurement 7Hz. A fluidized positioner actually increased the vibration.

Considerations for Interventions:

- Determining acuity and optimal mode of transportation (i.e. ground, air, fixed wing)
- Consider speed and route if ground transportation
- Position in ambulance
- Positioning of baby
- Use of commercial positioning aides
- Custom air chambered mattress
- Ear Protection

- Light protection

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Learner Objectives: 2-3

1. Recognize the extraordinary stresses to babies and challenges to developmental care during NICU Transport.
2. Identify opportunities to provide optimal developmental care during NICU Transport.

Gravens2019-12

A Longitudinal Study of Resilience, Parental Efficacy, and Child Growth in Primary Caregivers of Growing Premature Infants Discharged from NICU: A Pilot Study

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Background: Birth of a premature baby is usually unexpected as is the baby's admission to the neonatal intensive care unit (NICU). Caregivers are educated on baby care needed during hospital-

ization and transition to home. Individual characteristics of the primary caregiver such as resilience and parental efficacy may play a role in successful transition to the home environment and subsequent growth and development of the child. This pilot study explored these variables over a 3 month period following hospital discharge.

Purpose: To explore and compare primary caregiver resilience and parental efficacy 1) over time and 2) relationship to child growth of premature infants discharged from NICU.

Design: This study used a longitudinal, comparative design to study primary caregiver resilience and parental efficacy, and child growth over a 3 month period of time beginning at discharge from NICU, at 1 month, and at 3 months.

Methods: To study primary caregiver resilience, the 14-Item Resilience Scale (RS-14) was used. This scale utilizes a Likert format ranging from 1 (strongly disagree) to 7 (strongly agree). Total scores range from 14 to 98 with higher scores indicating higher levels of resilience. Reliability and validity have been reported. Parental efficacy was measured using the Perceived Maternal Parenting Self-Efficacy (PMP-SE) tool; a 20- item questionnaire that involves four factors including 1) care taking procedures, 2) evoking behaviors, 4) reading behaviors or signaling, and 4) situational beliefs. It has demonstrated adequate reliability and validity. The tool utilizes four Likert-type responses; strongly disagree, disagree, agree, and strongly agree. Subjects were recruited when attending the NICU discharge class. Inclusion criteria included primary caregivers of premature infants being care for in level II NICU for at least 24 hours, and plan on being discharged from the level II NICU. They must also 1) speak and understand English, 2) reside in a house, apartment, or condominium, and 3) have an email account and access to a computer. Exclusion criteria included primary caregivers of growing premature infants discharged from level II NICU who do not speak and understand English, do not have established living arrangements, and/or do not have an email account and/or access to it. Also excluded in this pilot study were primary caregivers of premature multiple births and premature infants with long term complications or neonatal abstinence syndrome. The first surveys were collected via paper the day prior to discharge or discharge day. The surveys at 1 month and 3 months were collected via emails that were accessed either through a Smartphone or a computer. A pocket card to record height/length, weight, and head circumference of the infant over time when going to the physician or clinic was used to determine child growth. Subjects supplied this information at 1 and 3 months on the survey sent via email. Subjects received a \$10 gift card upon completion of the 3 month survey. Descriptive, comparative (t-test, ANOVA), and correlation Pearson coefficient tests were used to analyze data.

Results: Twelve subjects complete the first two surveys and nine subjects complete all three. Resilience (mean 85.6, 85.17, and 87.5) and parental self-efficacy (mean 68.3, 71.58, and 75) were high throughout the study, but did not change statistically over time. Parental self-efficacy and child's weight were positively correlated at one month ($r=-.696, p=0.012$).

Clinical Impact: Although caregivers are educated on baby care needed during hospitalization and transition to home, the indi-

vidual characteristics of the primary caregiver including resilience and parental efficacy may play a role in successful transition to the home environment and subsequent growth and development of the child.

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Gravens2019-16

Response of an Incubator-Based Active Noise Control System to a Syringe Pump Alarm

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Technological advances in neonatal intensive care have contributed greatly to decreases in infant mortality. (1,2,11,3-10) The neonatal intensive care unit (NICU) clinical team must provide support of basic functions including temperature and humidity control, nutritional support, and more. However, the mission of NICU care is also to support the healthy infant development. A critical component of healthy development is limiting the noxious noise to which the patient is exposed (12-16) while providing appropriate aural stimulation to promote brain and language development (17,18). In the same way that technology addresses physiologic needs through incubators for temperature and humidity management, it can also be applied to help address these developmental concerns through noise control.

Noise levels in NICUs have been shown to be consistently louder than guidelines provided by the American Academy of Pediatrics (AAP).(19-23) These guidelines stipulate that the

noise levels that the hospitalized infants are exposed to should not exceed 45 dB, A-weighted (dBA), averaged over one hour and should not exceed a maximal level of 65 dBA averaged over one second. (24) Noise measured both inside and outside an incubator show guidelines are frequently exceeded throughout the day. (20)

Health risks from noise exposure are many and significant including impact on intellectual development (16,25), the potential for hearing loss, (26,27) impact on growth,16 impact on stress,13,28-30 and a decrease in risk of intra- and peri-ventricular hemorrhage. (25)

Noise levels in NICUs have been shown to be consistently louder than guidelines provided by the American Academy of Pediatrics (AAP). These guidelines stipulate that the noise levels hospitalized infants are exposed to should not exceed 45dB averaged over one hour and should be below 50dB 90% of time. These guidelines are routinely not met.19,20,22,23,31-34 Reducing excessive noise in the NICU has been linked to improved weight gain,16 improvements in the amount and depth of sleep,(35-37) decreased motor responses during nursing interventions, (30,38) improved cognitive development,16,25 and decreased propensity to develop IVH-PVH and hearing loss.25

It is intuitive that increased noise levels will interfere with the sleep of an infant and this correlation is demonstrated in numerous studies.(30,35,37) Adequate sleep is essential for normal development and growth of preterm and very low birth weight infants (39) and can enhance long-term developmental outcomes. (40) The aforementioned data makes a compelling case for a technological solution.

A Neoasis™ system, a novel active noise control system for incubators was evaluated for its ability to attenuate the sound of a Medfusion 3500 syringe pump alarm. A GE Healthcare Omnibed infant incubator was placed in a sound isolation enclosure (WhisperRoom model MDL 4872E) and the Neoasis™ was installed with the incubator per manufacturer's instructions. A 16 bit 44.1kHz digitized recording of the syringe pump alarm was broadcast from a Micca Covo-S speaker, amplified by a PVL30A Speco amplifier. Sound pressure levels were recorded of the alarm tone inside the incubator while the Neoasis™ system was not active and then switched to active.

The alarm tone of the Medfusion 3500 syringe pump consists of a sequence of two tones, 715Hz and 950Hz. The Neoasis™ system reduced the 715Hz tone of the alarm signal by 24dB and reduced the 950Hz tone by 13dB, representing an elimination of 94% and 78% of the alarm noise (Figure 1). Given that the average sound inside a NICU incubator has been measured between 55dBA and 62dBA in clinical use,(20) this attenuation capability could bring the sounds inside the incubator below the recommended guideline of 45dBA for a much greater percentage of the day.

This non-contact technology has the potential to provide a less stressful environment for the hospitalized infant by reducing exposure to excessive sound pressure levels. Increased stress has been linked to a decrease in weight gain velocity.

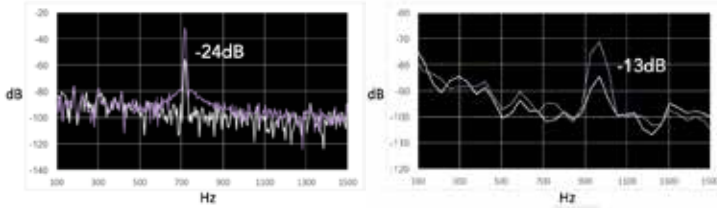


Figure 1. Spectrum plot of 710Hz and 950Hz sound pressure level attenuation

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9. Learner Objectives: 2-3

1. The implications of noise on the hospitalized infant is profound with both acute and chronic sequelae. The noise levels in the NICU routinely exceed guidelines.
2. An active noise control system has the potential to reduce noise levels to which the hospitalized infant is exposed without any patient contact.

Gravens2019-18

Reducing Noise in the Neonatal Intensive Care Unit: A Quality Improvement Project

St. Luke's Baptist Hospital, San Antonio Pediatric Developmental Services, Pediatrix an affiliate of Mednax. San Antonio, Texas

Amber Coston, MPAS, PA-C; Christina Sanchez; Clarissa Martinez, RN, BSN; Christine Aune, MD. amber_coston@mednax.com

SETTING: St. Luke's Baptist Hospital is a private hospital with a 36 bed Neonatal Intensive Care Unit that is designated as a level III NICU per the 2012 American Academy of Pediatrics guidelines. **BACKGROUND:** While meaningful sound (such as parents' voices) stimulates proper development, noise in excess of 45 decibels (dB) can have adverse effects on the growth and neurodevelopment of neonates. Excessive auditory stimulation can also cause cochlear damage. In addition, numerous physiologic changes can be associated with excess noise, including apnea, as well as fluctuations in heart rate, blood pressure, and oxygen saturation. Despite research documenting the negative effects noise has on the developing neonate, infants in the neonatal intensive care unit (NICU) are often exposed to noise that exceeds recommended levels. Through the years, numerous complaints & concerns have been received from staff & visitors regarding the noise level in the St. Luke's Baptist Hospital NICU. In addition, feedback from parents on a routinely administered NICU satisfaction survey has indicated that noise level is an ongoing concern for parents.

AIM: To reduce NICU noise levels by 10% & maintain the accepted range of ≤ 45 dB per guidelines set by the American Academy of Pediatrics (AAP) within an 8 month period of time.

DRIVERS OF CHANGE/INTERVENTIONS: A multidisciplinary team consisting of healthcare providers, support staff, and parents is working to decrease noise levels in the NICU. Decibel meter readings were obtained at four designated locations in the NICU every hour (24 hours a day) for seven days at baseline & after each cycle. Data was collected with a RadioShack Sound Level Meter with capability of measuring sound within a range of 50 – 126 dB with an accuracy of ± 2 dB.

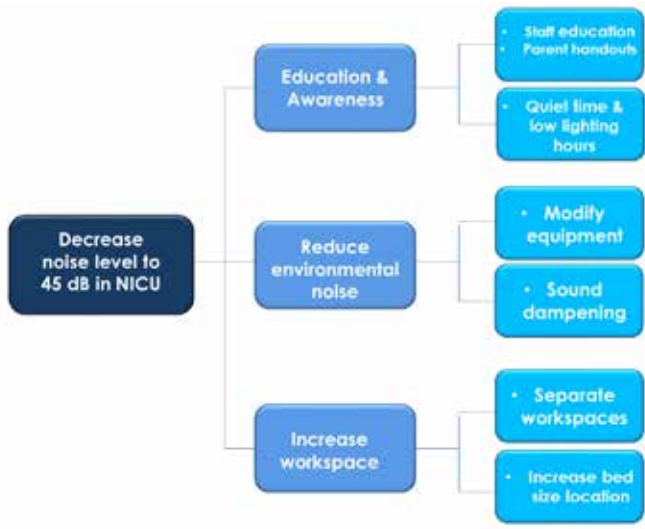
Baseline data collection – October 2017

PDSA Cycle 1 (“Awareness and Education”) – November 2017:

- Quiet time and low lighting hours (10:00 – 11:00 AM & PM) implemented
- Unit posters displayed
- Staff education provided in the form of in person lecture with PowerPoint
- Educational handouts provided to families of NICU patients
- PDSA Cycle 2 (“Environmental Change”) – December 2017:
- Settings for alarm volumes were monitored and decreased as much as possible per unit protocol
- Staff placed personal cellphone ringers on silent and away from patient bedsides
- Unit telephone ringers were set to the lowest volume setting possible
- Automatic paper towel dispensers were replaced with manual dispensers
- Metal soiled linen carts were replaced with carts containing a rubber insert to dampen sound when the cart is opened & closed

PDSA Cycle 3 (“Unit Modification”) – January 2018 - May 2018:

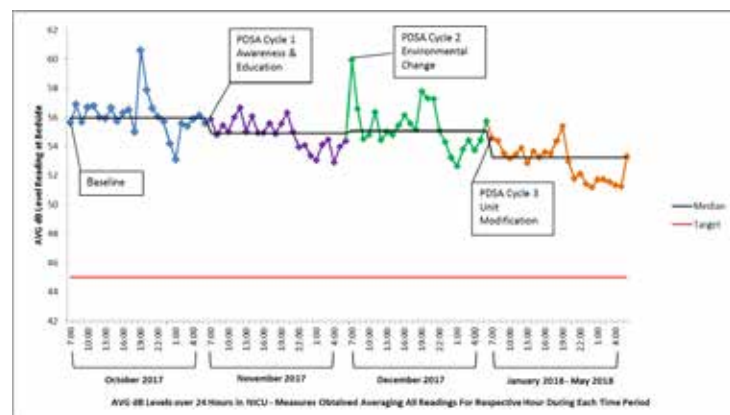
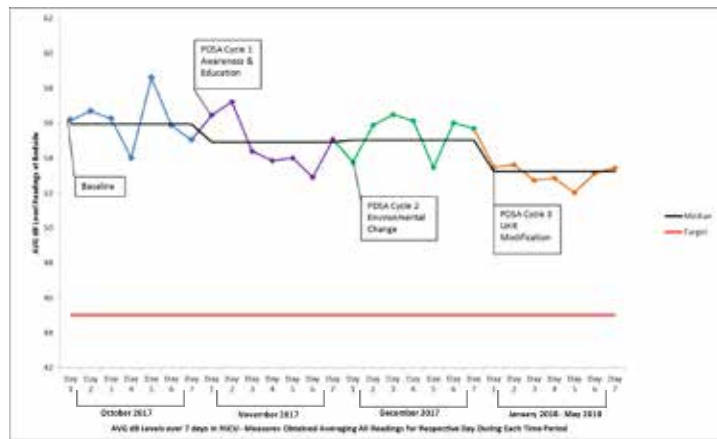
- Square footage per bed space was increased
- Separate work areas provided for staff



RESULTS: Median decibel meter reading at baseline was 55.95 dB. After PDSA Cycle 1, median reading was 54.92 dB (1.84% decrease from baseline). After PDSA Cycle 2, median reading was 55.04 dB (1.63% decrease from baseline). After PDSA Cycle 3, median reading was 53.21 dB (4.90% decrease from baseline).

Figure 1. Decibel Sound Level in a Level 3 NICU – 7 Day dB Audit Reported at 4 Time Intervals

Figure 2. Decibel Sound Levels in a Level 3 NICU – 24 Hour dB Audit Reported at 4 Time Intervals



DISCUSSION: Slight decline in sound was noted after PDSA Cycle 1 (especially during shift change which was a targeted area for improvement). The decline was sustained after PDSA Cycle 2, then further improvement was noted after PDSA Cycle 3. During PDSA Cycle 3, all data points were below the baseline median & a continuous decrease was demonstrated. These results are statistically significant & suggest that the trend is related to a change in process. It is evident that the most notable reduction in noise levels occurred after increasing overall unit dimensions & square footage per bed space during PDSA Cycle 3. In order to sustain & further decrease noise levels in the unit, it is apparent that education must be ongoing for noise reduction to remain a priority for staff and upon admission, it will be necessary to provide education for new parents/families regarding noise reduction and the importance of meaningful sound. In addition, it is important to note that the ambient baseline noise level in an empty room in the unit is 51-52 dB. Because of this, the structure of the facility must be considered when attempting to reduce noise levels in the future. Specifically, the noise from the air conditioning system, medical air outlets, and pneumatic tube system must be addressed with the structural engineering department of the hospital in order for noise levels to decrease further towards the goal of 45 dB.

KEY WORDS: noise reduction, NICU design, noise levels, auditory development, brain development, noise damage, neuroprotection

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LEARNER OBJECTIVES:

1. Identify common contributors to noise level in the NICU.
2. Identify ways to reduce noise in the NICU.

Gravens2019-19

Spiritual Struggles in Relation to Parents' Mental Health and Well-Being Post-Neonatal Intensive Care Unit Discharge

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Background and Purpose: Parents who experience the unexpected hospitalization of their infant following birth may struggle with stress and mental health during the neonatal intensive care unit (NICU) stay and post-discharge. (1-4) Having a child is a life-altering situation, but when the birth of that child is accompanied by an unexpected NICU stay, parents may call into question foundational views in life that are often fortified by religious and/or spiritual beliefs. (5) Thus, parents' spiritual struggles, particular with meaning, in the face of this stressful life experience can have implications for their emotional state. (6) The purpose of this study was to explore parents' experiences of spiritual struggles in relation to anxiety, depression, stress, and well-being after leaving the neonatal intensive care setting.

Budget and Resources: This study was funded in part by the Children's Miracle Network awarded to GMB and KKD and NIH-R01DK099350 awarded to KKD.

Methodology: In this study, 177 parents (125 mothers, 50 fathers, and 2 non-biological fathers with a mean age of 31.45 years) of infants who were hospitalized in the NICU for a mean of 34.63 days (range 5-203) and were born at the mean age of 32 weeks gestation completed questionnaires post-NICU discharge. Following IRB approval, names of mothers who had preterm births in 2015-May 2016 were collected from the Pennsylvania Bureau of Health Statistics. Approximately 1013 mothers were sent self-report questionnaires for themselves and their partner to complete and return to the primary investigator. One hundred and twenty families returned questionnaires (rate of 11.8%) per this method and five families returned questionnaires after responding to the study posting on Studyfinder. The self-report questionnaires completed for this study included general and religious/spiritual demographic questionnaires, the Spiritual Struggles Scale⁷ to assess spiritual struggles with meaning, Penn State Worry Questionnaire (8) to assess anxiety, CESD-R (9) for a measure of depression,

Stanford Acute Stress Reaction Questionnaire (10) revised for reflections on the NICU experience, and Satisfaction with Life scale¹¹ for an assessment of cognitive well-being.

Results: Data from parents indicated significant positive correlations between spiritual struggles, specifically with meaning, in relation to depression ($r = .38, p < .001$), anxiety ($r = .48, p < .001$), and acute stress related to the NICU experience ($r = .32, p < .001$). Significant inverse correlations were noted between cognitive well-being and spiritual struggles in meaning ($r = -.38, p < .001$). Further, higher levels of parents' acute NICU related stress was significantly positively correlated with increased depression ($r = .53, p < .001$) and anxiety ($r = .46, p < .001$), and inversely related to levels of well-being ($r = -.39, p < .001$). Linear regression analyses were conducted to determine the unique contributions of spiritual struggles in association with parents' experiences of worry, depression, and well-being post-NICU discharge. These hierarchical linear regressions models included gender and age in step 1, stress related to the NICU in step 2, and spiritual struggles in step 3, predicting separately to either anxiety, depression, or cognitive well-being. For all three models, spiritual struggles (specifically with meaning) remained a significant predictor of parents' depression, anxiety, and lower levels of cognitive well-being.

Conclusions: These findings indicate that parents who experience increased stress related to their NICU experience have higher rates of depression, anxiety, and lower cognitive well-being months after NICU discharge. Those parents who reported greater struggles with a challenged sense of life meaning as reflected through their spirituality also had more difficulty with their emotional and cognitive well-being. These findings have salient implications for the importance of parents' psychological and spiritual supports while in the NICU and post-discharge.

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Learner Objectives: 1. List how religious and spiritual struggles can have adverse effects on parental mental health post-NICU discharge. 2. Identify how to support parents in dealing with stress and mental health challenges post-NICU discharge.

Gravens2019-20

Volunteer Cuddlers as Developmental Care Partners in the NICU

Mary Wardell PT, DPT, PCS; Katherine Daeley RN, Volunteer Cuddler Program Coordinator; Ching Tay RN, MS, CNS RNC-NIC; Glenn Falero RCP; Ann Camelo and Susan Patalano, volunteer cuddlers.

Miller Children's and Women's Hospital, Long Beach

Purpose

To describe the development of a program for swaddled holding by volunteer cuddlers, specifically for very-low-birth-weight (VLBW) infants on bubble- CPAP (b-CPAP) support.

Background

Skin-to-skin (STS) holding is the gold standard in the NICU, with ample research showing improved parent-child bonding, physiological stability, stress tolerance, behavioral organization, and movement quality. In addition, daily holding as part of pre-feeding activities can help to progress state and cardiorespiratory endurance while promoting non-nutritive sucking (NNS). Some parents have limited availability for STS holding for a variety of reasons. Therefore, other strategies that can provide some degree of benefit similar to STS are needed. There is minimal research examining the effects of STS vs swaddled holding or the role of NICU cuddlers.

In this NICU, the volunteer cuddler program was first developed to help busy nurses hold stable infants during gavage feedings. However, the cuddler orientation program does not include specific training related to neuroprotection for VLBW infants or techniques to safely transfer and hold infants on bubble- CPAP, leading to some infants who do not receive the benefits of being held.

Budget: This was a PDSA project and all work was completed within scheduled work hours.

Program

We started with providing education to a select group of cuddlers

that included: 1) neurodevelopmental considerations for preterm infants, including sensory systems development and age appropriate stimulation, 2) basics of b-CPAP, and 3) technique for transferring an infant on b-CPAP and positioning for swaddled holding. Cuddler competencies were assessed by the PT or RCP at bedside. We also conducted a staff survey to determine receptiveness to utilizing volunteer cuddlers in the Small Baby Unit.

The pilot program began with one infant and the response was overwhelmingly positive. Additional cuddlers were then educated to safely hold small babies who were not on b-CPAP support. Barriers were identified and addressed as they arose (staff resistance, inconsistent identification of eligible infants, identification of trained cuddlers, etc).

Results

Over an 18 month period, 28 infants were included in the program. The average gestational age (GA) at birth was 25 weeks. Average post menstrual age (PMA) at initiation of swaddled holding was 31 weeks. Over the 18 month period, the average PMA at initiation of cue based feeding decreased from 36 weeks to 35 weeks; the average PMA at time of discharge decreased from 39 weeks to 36 weeks. The average Test of Infant Motor Performance (TIMP) Z- score at discharge was .2 standard deviations above the mean for adjusted age, indicating motor skills within normal limits for the adjusted age. There were no adverse responses observed or reported. Future plans are to include intubated infants in the program.

Implications for Family Support

This program is an innovative approach to providing neurodevelopmental supportive care to very-low-birth-weight (VLBW) infants whose families are not available on a consistent basis. It could lead to improved quality outcomes with minimal resource utilization.

Learner Objectives

1. Identify potential barriers to consistent skin-to-skin or swaddled holding with preterm infants on bubble CPAP support.
2. Critique a program that utilizes volunteer cuddlers to provide swaddled holding to preterm infants on bubble CPAP support.

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Gravens2019-22

Parents Demonstrate Heightened Emotional Arousal by Skin Conductance and Stress/Coping Behaviors while Telling their Personal NICU Story

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Background: Having a newborn that requires intensive medical care not only influences parents' perceptions of their birth experience, but continues transforming their perceptions of parenting even after leaving the neonatal intensive care unit (NICU).(1,2) Parents' elevated stress, depression, and anxiety symptoms while infants are in the NICU are well documented.(3-8) Parents deem the NICU environment as stressful and traumatic, due to the perceived loss of the parental role and the uncertain health status of their infant. (4,5,8) The ongoing struggle to find meaning in an unexpected life event, such as a newborn's need for intensive care following birth, could lead to a negative cyclical trajectory that continues to influence the familial system well beyond the newborn period.(5-10) Transformative Learning Theory explains learning through interpretation of life situations influenced by environmental, personal, and relational contexts that contribute to adaptive coping processes.(1,2) This study aims to examine the psychophysiological processes of stress and coping measured by skin conductance and behaviors observed through the transformative lens of parents telling their personal story of having a newborn hospitalized in the NICU following birth.

Hypotheses: 1: Parents' emotional arousal as demonstrated by skin conductance would increase during stress tasks including mental preparation, telling their NICU story, and completing a verbal math challenge. 2: Emotional arousal as demonstrated by stress/coping behaviors would increase during stress tasks. 3: Parents reporting depression/anxiety would demonstrate higher emotional arousal by skin conductance and stress/coping behaviors (i.e., flight) than those who did not report depression/anxiety. Budget and Resource: This study was funded by the Children's Miracle Network awarded to GMB and KKD and NIH-R01DK099350 awarded to KKD.

Methodology: An observational study on thirty parents (21 birth mothers and 9 fathers, median age 33 years) who had an infant in the NICU (current median age 14 months) were enrolled. Each observation, conducted between 12 to 6 pm, consisted of a 10-min-

ute baseline where the participant rested quietly, then completed 15-minutes of stress tasks using a modified Trier Social Stress Test (TSST) where parents were asked to mentally prepare their narrative, tell their experience of having a newborn in the NICU, and complete a verbal math challenge. (11) This was followed by a 20-minute recovery phase. Post recovery, surveys were administered on physical/mental health and perceived stress. Parents were given resources and suggestions for stress management. Referrals to mental health services were offered when indicated. Skin conductance, also known as electrodermal activity (EDA), was measured continuously starting at baseline through recovery by two palmar electrodes to detect sympathetic-mediated sweating during emotional arousal.(12) EDA was analyzed off-line using the MindWare® Mobile Impedance Cardiograph (MindWare® Technologies, Gahanna, OH). EDA mean of peaks (MP) measured in micro-Siemens (μS) depicts the amplitude of skin conductance fluctuations with an increase in amplitude indicating heightened sympathetic reactivity to an event stimulus.(13) Video-recorded behaviors during mental preparation and stress tasks were coded using an abbreviated Ethological Coding System for Interviews (ECSI) by trained research technologists with inter-rater reliability of 85%.(14) ECSI, a validated assessment of stress and coping behaviors (including facial expressivity and upper body movements) reports an overall behavioral composite score or distinct subcategories (i.e., prosocial, flight, assertion, displacement, and relaxation).(14)

Data analysis included comparisons between parents with self-reported depression/anxiety vs. non-depression/anxiety parents. Non-parametric Wilcoxon Signed Rank Tests evaluated differences in EDA (i.e., baseline, stress, and recovery), and Mann-Whitney U tests evaluated group differences.

Results: On average, median EDA mean of peaks (MP) doubled from baseline to stress (mental preparation, narrative, math challenge) and continued to increase an additional 12% during recovery (* $p \leq 0.01$; Figure 1A). Total stress/coping behaviors (ECSI) more than doubled from mental preparation to stress tasks (narrative, math) (* $p \leq 0.01$; Figure 1B).

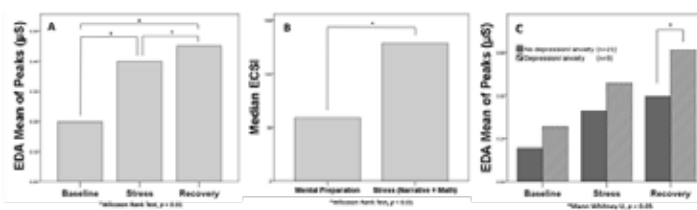


Figure 1: Skin conductance and behaviors in relation to stress (N = 30).

There was a significant between group median difference for EDA MP between depression/anxiety parents (n = 9) and non-depression/anxiety parents (n = 21) during recovery; the depression/anxiety group showed higher sympathetic reactivity than the comparison group (* $p \leq 0.05$; Figure 1C). The ratio of ECSI flight behaviors over total ECSI for all participants showed on average flight behaviors occurred 39% of the time. This ratio was the same for the non-depression/anxiety parents; while parents reporting depression/anxiety displayed flight behaviors 43% of the time. However, this group difference did not reach statistical significance.

Conclusions: These findings support the hypotheses that parents

of former NICU infants experienced heightened emotional arousal measured by skin conductance (EDA) and behaviors (ECSI) during stress tasks including telling their personal NICU story. Average responses for all parents showed that emotional arousal measured by skin conductance continued to increase beyond the stress tasks into the recovery phase. Further, parents who reported depression/anxiety showed significantly higher emotional arousal at recovery compared to parents who did not report depression/anxiety.

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Implications for Family Support: Our findings highlight the importance of supporting the mental health of parents of former NICU infants; as a third of the parents in our study reported feeling depressed and/or anxious several months after the infant's transition home from the hospital. We encourage care providers and family members to assist parents in expressing their feelings surrounding their traumatic lived experiences and to support them to find meaning in their coping processes. These supports include assisting families in allocating resources for stress management and appropriately referring them for mental health services when indicated.

Learner Objectives:

1. Understand the long-term impact of having had a newborn infant in the NICU on parental stress, coping, and mental health.
2. Identify methods to measure emotional arousal.
3. Consider how primary care providers and family members can support the mental health of parents of former NICU infants after hospitalization.

Gravens2019-23

Postpartum maternal communication during The Golden Hour is key: How well are we doing?

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Background and Purpose: Mothers whose newborns are admitted to the Neonatal Intensive Care Unit (NICU) are likely to face more challenges regardless of the gestational age of their baby. In an effort to alleviate some stress, immediate and effective communication from the NICU team is important. Data from our 2016-2017 patient satisfaction survey showed that our percent top box scores for post-delivery communication was low (44% n=48) when compared to other categories. NICU team initiated two main quality improvement projects involving post delivery maternal communication and discussion and encouragement of early hand expression of colostrum as a part of a Family Centered Care Program (FCCP).

Methods:

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Settings: We are a 20 bed community level 3 NICU with an approximate delivery volume of 4200 newborns/year and average of 450 NICU admissions per year. We aimed to target post delivery maternal communication and early hand expression of colostrum for the mothers of all babies admitted from the Labor and Delivery (L&D).

Mechanism: Based on feedback from our Family Advisory Board (FAB) members, we made a concerted effort to update not just the fathers/partners, who often accompany infants to the NICU, but the delivering mothers as well, within one hour after delivery. This was accomplished by requesting that the admitting physician, bedside nurse, or nurse manager return to L&D to update the mother. In this way, the partner is not tasked with the burden of updating the mother post-delivery and the mother has the opportunity to personally ask questions of the medical staff caring for her infant.

We initially communicated our patient satisfaction scores with the NICU staff. This was then followed up with email communication to staff about the new family communication processes. We created “smartphrases” in our Electronic Health Record (EHR) for physicians to easily document completion of this communication in the admission note. We audited all (n=188) of the admission notes between Sep 2017-2018 and instituted multiple interventions during this time (Figure 1).

Through more thorough communication, we also focused on improving maternal milk supply with the goal for mothers to express colostrum shortly after delivery, which evidence supports will increase breast milk production¹. During prenatal consultation the Neonatologist emphasized the importance of establishing maternal milk supply and provided the parents with a video² on how to perform hand expression of colostrum. The mother was offered the opportunity to view the video at her own pace. Working with our L&D nurse educator and staff, we identified “champions” to help educate RNs and mothers and to assist with the actual hand

expression. After delivery, L&D nurses began to document hand expression of colostrum within an hour after delivery for all NICU admissions (figure 2). Next, we plan to work with our lactation consultants to perform competency skill assessments of hand expression for all L&D staff.

Most barriers to implementation have stemmed from disseminating information about new changes and time lag of creating EHR flowsheets.

Impact: Tracking our goal to update mothers within one hour after delivery via chart audit of all admissions from L&D, we raised our rates of maternal communication from 25% (Sep 2017- Apr 2018) to 65% (Jun 2018- Sep 2018). Our rates of hand expression within one hour after delivery improved from 31% to 68% mid-intervention, prior to creating our team of champions and the addition of a designated place to document in our EHR. We are currently tracking family’s experiences through post-discharge patient satisfaction surveys.

Budget and resources: iPads were donated by a member of our FAB which were used to educate parents about hand expression.

Implications for family support: Our goal is for parents and families to feel well supported during their NICU journey and to improve breast milk supply and feeding at the time of discharge.

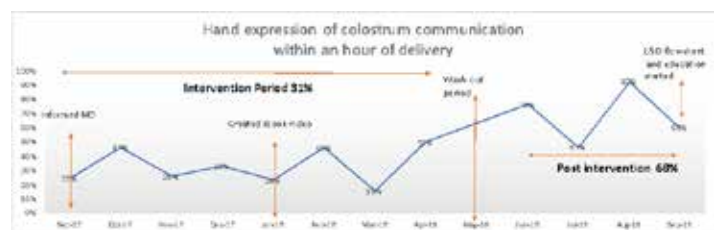
Learner objectives:

To recognize the importance of communicating with the mother after delivery for every NICU admission
 To learn about new ways to support families during their NICU journey, with hopes of taking ideas back to their own unit for implementation

To understand the importance of early hand expression of colostrum and improving breast milk supply and feeding

Bibliography:

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Gravens2019-24

Family Centered Care Program in a Community Level 3 NICU: From Womb to NICU and Beyond...

Malathi Balasundaram MD (1,2), Dharshi Sivakumar MD (1,2), Melissa Scala MD (1,2), Jody Charles MSN NE-BC (2); Stephanie Miller MD (1,2) Pediatrics, Neonatology, Stanford University School of Medicine, Stanford, CA (1), and El Camino Hospital NICU, Mountain View, CA (2).

Background and Purpose: Parents whose babies are admitted to Neonatal Intensive Care Units (NICUs) are subject to a variety of stresses, which in turn can lead to worsened outcomes for the infants. A formal Family Centered Care Program (FCCP) was started in 2016 as a Quality improvement project by nurses and physicians in order to provide psychosocial support to NICU families. The program begins at the time of a mother's admission to antepartum and continues beyond discharge of the infant from NICU. The aim of this program is to help families navigate the experience using multiple modalities and methods with the goal of lessening the psychosocial distress associated with admission to an intensive care unit.

Program: We embarked upon creating a program to better support our parents when the unthinkable happens, admission of their baby to a NICU. The FCCP was created using the National Perinatal Association interdisciplinary work group's recommendations. (1) Below is a description of the multifaceted approach we used to develop our program, from antepartum admission, to NICU stay, through discharge and beyond:

Antepartum: During prenatal consultation the Neonatologist supplements their visit to the parents by providing an iPad with pre-loaded content to review at their own pace. This includes a NICU tour video, stories written by former NICU parents with pictures of their infants from birth through years after discharge, information and videos on how to perform hand expression and the importance of establishing maternal milk supply, as well as information about visitor guidelines and procedures.

Delivery: Parents are invited to be present during infant resuscitation, stabilization and bedside procedures. Based on feedback from our Family Advisory Board (FAB) members, we made a concerted effort to update not just fathers/partners, who often accompany infants to the NICU, but mothers as well, within one hour after delivery. We have focused on improving maternal milk supply with the goal for the mothers to attempt to express colostrum within one hour of delivery. Working with our Labor & Delivery (L&D) nurse educator and staff, we now have champions to help educate RNs and mothers, assist with the actual hand expression, and document in the Electronic Health Record (EHR).

NICU stay: We encourage unrestricted parental presence in the unit. We were able to obtain parent badges to allow easier access into the locked unit. We strongly encourage early kangaroo care (2) even in sick infants. We implemented a six stage Developmental Care Path (3) that considers both the cardiorespiratory stability and physiologic maturity of the infant on a continuum to allow for change in infant status. This tool outlines which types of developmental interventions are appropriate and when. It also serves as a mode of communication between care providers and

families. In addition, a bedside binder was developed with educational materials, resources, and a keepsake section for parents to track milestones and collect mementos. An "arts and crafts" team creates and delivers handmade artwork using the infant's footprints monthly. We have staff-led monthly parent support group meetings to answer questions and offer support. Parents receive a baby friendly artistic "Parent Communication" letter from their infant but composed by the physician reflecting the infant's past week's course. A "parental comfort" team has been developed that provides snacks for families in the NICU, improved the accommodations of the parent lounge, and is now working on funding for weekly massage therapy for parents. We have implemented an Infant Driven Feeding (IDF) program that offers opportunities for in-depth parental education and infant-parent bonding around feeding.

Discharge: Discharge education starts at the time of admission when a discharge checklist is placed at every infant's bedside. At their own pace, parents are able to review educational content created by our FCCP team on iPads via the iBook app. Audits are performed to make sure this tool is being used. This checklist supplements and eases the discharge day teaching process. If parents would like to review discharge teaching at home, it is available on our website.

Beyond: Based on feedback from FAB, a team was created to contact parents for follow up within one week after discharge. Every year, families are invited to join us for an annual reunion. For families who wish to give back, they may decide to contribute by becoming a member of our FAB a year after discharge. We meet with our FAB quarterly to update them and receive feedback about current projects. We are currently in the initial planning stages to build and implement a Peer to Peer Buddy program, which includes a social worker and a mood disorder psychologist, to offer further support and guidance to NICU families.

Most barriers to implementation have stemmed from disseminating information about new changes and from the staff resistance to change.

Impact: Feedback from parents and our FAB members indicates that families appreciate the weekly "Parent Communication" letter and monthly bedside keepsakes. We measured our goal of updating mothers within one hour after delivery via chart audit of all admissions from L&D, we raised our rates of prompt maternal communication from 25% to 65% and rates of hand expression within one hour after delivery from 31% to 68% mid-intervention. This was prior to creating our team of champions and the addition of a place to document in our EHR. We are currently tracking family's experiences through post-discharge patient satisfaction surveys.

Budget and resources: iPads were donated by a member of our FAB. Our Hospital Foundation assisted with the purchase of Kangaroo chairs and licensing rights for the "Empower Program" offered by DandleLION. Hospital Administration is supporting the establishment of our Peer to Peer Buddy program.

Implications for family support: Our goal is for parents and families to feel well supported during their NICU journey.

Learner objectives:

To recognize the importance of developing a FCCP in every NICU
To learn about new ways to support families during their NICU journey, with hopes of taking ideas back to their own unit for implementation

To understand the importance of including parents in the implementation of a FCCP

Bibliography:

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Graven2019-25

Path to home starts at birth: benefits of consistent, early discharge teaching using technology as a supplemental resource.

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Background and Purpose: Often times, families feel that they are not adequately prepared for discharge from the Neonatal Intensive Care Unit (NICU) with their high-risk infant. This in turn contributes to poor infant outcomes, heightened family anxiety, and increased health-care utilization after discharge (1,2) American Academy of Pediatrics (AAP) guidelines (3) provide a basis for NICU discharge programs. The quality of discharge teaching has

proved to be the strongest predictor of discharge readiness, and is important to develop a comprehensive discharge preparation program.(1) Our 2016-2017 patient satisfaction survey results showed top box of 54% (n=59) in “consistency of staff teaching.” We created a comprehensive discharge teaching taskforce as a part of our Family Centered Care Program (FCCP).

Methods:

Setting: We are a 20 bed community level 3 NICU with an approximate delivery volume of 4200 newborns per year with average of 450 NICU admissions per year.

Mechanism: Discharge teaching was started at the time of NICU admission when a discharge checklist (DC) was placed at every infant’s bedside. At their own pace, parents were able to review educational content created by our FCCP team on iPads via the iBook application. Parents would then initial to sign off completion of each topic on the checklist (figure 1). This discharge teaching tool was designed to supplement and ease the teaching process on the day of discharge. The discharge content within the iBook has an easily navigated table of contents (TOC). We intentionally matched the discharge education TOC with the nurses’ Electronic Health Record (EHR) teaching documentation for an easy workflow. We did not place the discharge checklist at the bedside for readmissions or for infants staying less than 48 hours, as the amount of content was deemed too extensive for parental review during their short hospital stay.

Random audits were performed between April and September 2018 to assess this tool’s usage by parents. Audits included checking for the presence of the DC at the bedside and for 100% completion of the content by parents (Figure 2). These audits showed an improvement in the frequency (%) of the presence of the checklist at the bedside over the course of the first 6 months of implementation, however revealed that the 100% completion rate went down. This was presumably due to the delivery and admission of more ELBW babies which resulted in parents reviewing the contents at a slower pace. When the FCCP team reviewed the DC for these ELBW infants after discharge, a 100% completion rate was found. There were several improvements made to the process in the first 6 months after implementation. These included publishing of the discharge teaching content on the hospital website for parents to review from home during the hospitalization as well as after discharge; providing the website link to parents by staff during face-to-face and in written discharge instructions and the placement of the DC at the bedside for all admissions, regardless of duration of stay. This last change was based on parent feedback, thus allowing all parents to ask questions and review any partial content of their choosing. Additionally, nurses were then able to educate parents about the existence of the teaching instructions on the hospital website, even for short stay admissions.

Barriers to implementation have stemmed from disseminating information about new changes to staff, delay in uploading the content into the iBook due to hospital IT security concerns, resistance to including the checklist at the bedside as a part of nursing workflow, and delayed recognition that re-admitted families are often the most in need of consistent and in-depth discharge teaching.

Impact: Nurses felt that this tool improved the workflow on the day



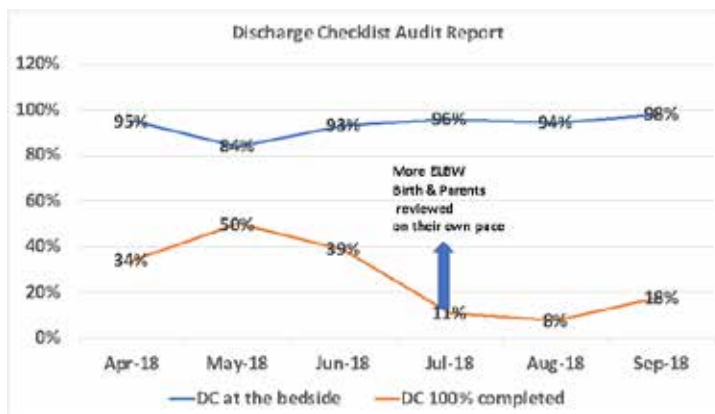
of discharge, making teaching easier for parents as they had seen content previously and were able to ask better informed questions. We hope to see an improvement in our patient satisfaction scores this year.



Discharge teaching checklist

DOL Discharge teaching started _____

Discharge teaching	Date & Initial
<input type="checkbox"/> Introduction	
<input type="checkbox"/> Taking a temperature	
<input type="checkbox"/> Bulb syringe use	
<input type="checkbox"/> Bathing	
<input type="checkbox"/> Diaper changing	
<input type="checkbox"/> Cord care	
<input type="checkbox"/> Newborn screening tests	
<input type="checkbox"/> Preterm baby screening tests	
<input type="checkbox"/> Tips and Tricks	
<input type="checkbox"/> Breast milk for preterm baby & Feeding your baby @ home	
<input type="checkbox"/> Post circumcision care	
<input type="checkbox"/> Putting your baby to sleep	
<input type="checkbox"/> Tummy time	
<input type="checkbox"/> Comforting your baby	
<input type="checkbox"/> CPR	
<input type="checkbox"/> Immunizations information	
<input type="checkbox"/> Pets @ home	
<input type="checkbox"/> Discharge medication administration	
<input type="checkbox"/> Follow up appointments	
<input type="checkbox"/> When to call Pediatrician	
<input type="checkbox"/> Safety tips	



Budget and resources: iPads were donated by a member of our Family Advisory Board (FAB) which were used to educate parents about discharge teaching.

Implications for family support: Our goal is for parents and families to feel well supported during their NICU journey and to help better prepare them for discharge by delivering consistent information.

Learner objectives:

To recognize the importance of discharge readiness and guide families through the discharge teaching process, starting at the time of NICU admission

To learn about new ways to support families using technology to enhance discharge teaching, ideally resulting in the sharing of ideas for implementation in many NICUs

Bibliography:

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2. *NICU discharge planning and beyond: recommendations for parent psychosocial support.* IB Purdy, JW Craig and P Zeannah
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Graven2019-26

NIC-C Nightshift Happiness Squad Decreases Stress and Increases Coworker Connectedness

Alison Kovacs MSN, RNC-NIC, CBC, Erin Coleman BSN, RN

Background

Existing studies have focused on night shift work and its “interference with circadian chronobiological rhythm.” An article entitled, *Night Work and the Risk of Depression* (2017) defined night shift as work between the hours of 11pm and 6am. The authors list several possible biological disturbances throughout the article: “sleep disruption, fatigue, diminished well-being, and risk of serious disease such as heart disease and breast cancer to mention a few.” The article further explains that the circadian rhythm impacts physiological metrics such as heart rate, body temperature, blood pressure, and hormone levels such as melatonin and cortisol. In addition to affecting physiological vital signs an interruption to circadian rhythm can also cause psychosocial strain, less healthy behavior, and impacted mental health. An article published by Laura Lyall et al. (2018) found that “disrupting the body’s internal clock- such as by doing regular night shifts- has been linked to increased risk of depression and reduced all-round wellbeing.” This was “the largest such study ever conducted” on over 91,000 people ages 37-73. Participants wore a wrist accelerometer as well as completed questionnaires. Researchers found that people with “interrupted circadian rhythms had an increased risk of depression and bipolar disorder, as well as feeling less happy and more likely to say they felt lonely.”

Purpose

The Children’s Hospital of Philadelphia (CHOP) Neonatal/Infant Intensive Care Unit (N/IICU) leadership team for NICU Central (NIC-C) decided to attack this problem. Although we would be unable to intercept the problem of interrupted circadian rhythm and necessity of shift work we could focus on increasing general happiness and decrease the feeling of loneliness among CHOP N/IICU employees. The team worked together to brainstorm ideas that would attract staff to come together in a safe, on site location during night shift. This time would be spent with positive staff interaction, snacks, and entertainment. Two organized events were held in June of 2018.

Hypothesis

Short surveys were given to all attendees upon admission to our events. Staff were asked to report levels of stress and level of co-worker connectedness before and after the events. As a team, we hypothesized that we would observe decreased levels of stress and increased levels of co-worker connectedness upon the completion of each event.

Nightshift Happiness Squad events were run from 10pm to 2am on two nights in June in a conference room on the unit. The only costs were covered by the leadership team running the events in the form of food and decorations.

The NIC-C Nightshift Happiness Squad began in June of 2018. The goal of this project was to create activities on the unit to which bedside nurses, respiratory therapists, senior nurse aids, and inpatients clerks could “escape” for a break to grab a snack and decompress with friends and colleagues. We hypothesized that of staff members would benefit from these activities in lowered stress and increased levels of co-worker connectedness. This group decided to focus on night shift opportunities that were harder to come by due to safety and staffing during the “off” shift hours in comparison with NIC-C day shift leadership, who had the ability to bring staff outside for meals and conduct mindfulness activities.

To begin, these events were advertised via email and screensavers played throughout our 98 bed unit. A conference room on the unit was reserved. Leadership nurses came up with fun ideas and purchased food, decorations, and created photo booth props. Our first event was a Friends Marathon, titled NIC @ Night. We utilized Netflix to play back to back 20 minute episodes of Friends for a 4 hour block of time. Popcorn and candy were available. Staff were invited to bring their meals as well. Our second event was a re-airing of a Phillies vs. Yankees baseball game from earlier that evening. We titled our second event Phillies, Phranks, and Phun. Guests were served hotdogs and soft pretzels. Short surveys were given to all attendees upon admission to our events. Staff were asked to report levels of stress and level of co-worker connectedness before and after the events.

We did not experience any barriers to implementing these events however we knew that not all staff would be able to attend the event due to acuity, importance, and safety in regards to patient care. Unit estimated staffing matrix recommends the usage of 74 nurses per shift which usually is not achieved. Respiratory therapists, senior nurse aids, and inpatients clerks were also invited. Their roles fluctuate in number so it is difficult to determine the total number of staff present on the unit during the date and times of the events. We were also unable to determine if each attendee submitted their surveys upon leaving.

Attendees were given short surveys upon entering each event. Each survey had three questions. Attendees were asked to circle a number on a 1-5 Likert scale depicting their current social/emotional status pre and post event. Our team collected 19 completed surveys from Event #1 and 17 completed surveys from Event #2.

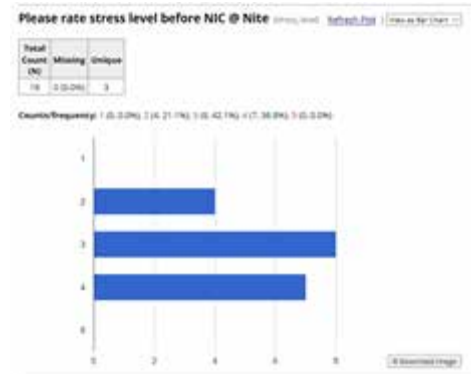
Event #1.

Questions:

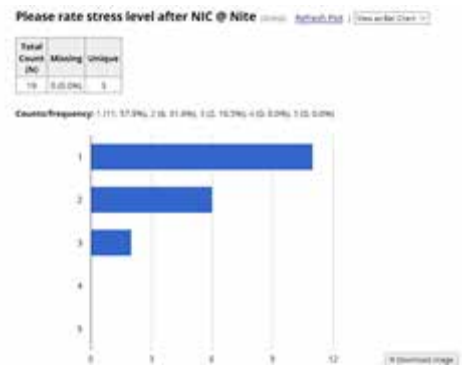
1. Please rate stress level before NIC @ Nite (Likert Scale 1(no stress)-5(high stress))
2. Please rate stress level after NIC @ Nite (Likert Scale 1(no stress)-5(high stress))
3. Do you have any other suggestions for group events?

Results for Event #1

Pre-survey



Post-survey



Result: Event attendees lowered their stress. Pre-survey average feeling of stress equaled 3.15 compared to a decreased result of 1.5 average post event. Attendees no longer ranked themselves above a Likert level 3 post event.

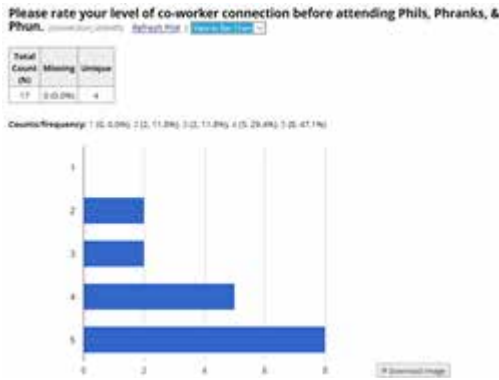
Event #2

Questions:

1. Please rate your level of co-worker connection before attending Phils, Phranks, & Phun. (Likert Scale 1(disconnected)-5(strongly connected))
2. Please rate your level of co-workder connection after attending Phils, Phranks, & Phun. (Likert Scale 1(disconnected)-5(strongly connected))
3. Do you have any other suggestions for group events?

Results for Event #2

Pre survey



This project focused on the unit nursing and ancillary staff. This project did not focus on patients' families, however, patients may receive higher quality care from nurses who are less stressed, happier, and feeling cohesive with their co-workers.

1. Upon viewing this poster learners will be able to identify three risks of nightshift work.
2. Upon viewing this poster learners will be able to define physiologic and social impact of interrupted circadian rhythm.
3. Upon viewing this poster learners will be able to describe the beneficial results of social events held on the unit during nightshift.

Post survey



Result: Event attendees increased their co-worker connectedness. Pre-survey average feeling on connectedness equaled 4.11 compared to an increased result of 4.47 average post event. Attendees no longer ranked themselves below a Likert level 3 post event.

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Gravens2019-27

Implementing a Primary Rehabilitation Therapy Model in the Neonatal Intensive Care Unit

Erica Moss, Master of Science in Occupational Therapy, cNID-CAP, Children's Healthcare of Atlanta, Scottish Rite, Sonika Tataria, Doctorate of Physical Therapy, Children's Healthcare of Atlanta, Eggleston

Background and Purpose:

The role of rehabilitation therapists in the Neonatal Intensive Care Unit (NICU) is constantly evolving. Therapeutic involvement is guided by evidence based practice to promote optimal developmental outcomes in this fragile population. Research indicates that developmental and family-centered care provides the best framework for improving neonatal outcomes. (1) Research also indicates that inconsistency of nursing care in the NICU can have detrimental effects on the neonate and his or her family. These effects include increased length of stay, increased respiratory support, and delays in planned discharges. (2) Inconsistent bedside nursing care is related to poor family satisfaction, which results in decreased parent and infant bonding and parental difficulty in recognizing infant cues and providing adequate support.(2) As a result, many centers have adopted a relationship based care model of primary nursing. This model positively affects therapeutic relationships between families and nurses. (3) To our knowledge, no studies have investigated the impact of a primary rehabilitation therapy model in the NICU.

The purpose of this project was to investigate the benefits and limitations of a primary rehabilitation therapist model in the NICU as experienced by nursing staff.

We hypothesize that the success of the model of primary nursing may support a similar model of primary therapy. A primary rehabilitation model will work to further enhance the patient/family care

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OPIOIDS and NAS

When reporting on mothers, babies,
and substance use

LANGUAGE MATTERS



I am not an addict.

I was exposed to substances in utero. I am not addicted. Addiction is a set of behaviors associated with having a Substance Use Disorder (SUD).



I was exposed to opioids.

While I was in the womb my mother and I shared a blood supply. I was exposed to the medications and substances she used. I may have become physiologically dependent on some of those substances.



NAS is a temporary and treatable condition.

There are evidence-based pharmacological and non-pharmacological treatments for Neonatal Abstinence Syndrome.



My mother may have a SUD.

She might be receiving Medication-Assisted Treatment (MAT). My NAS may be a side effect of her appropriate medical care. It is not evidence of abuse or mistreatment.

My potential is limitless.

I am so much more than my NAS diagnosis. My drug exposure will not determine my long-term outcomes. But how you treat me will. When you invest in my family's health and wellbeing by supporting Medicaid and Early Childhood Education you can expect that I will do as well as any of my peers!



Learn more about
Neonatal Abstinence Syndrome
at www.nationalperinatal.org



experience by allowing therapists to have a better understanding

of specific developmental needs of each infant and family. It will also provide rehabilitation therapists the tools necessary to support and engage the NICU nurses in the care of the infants and their families on a more individualized basis. These changes to the rehabilitation model may further optimize developmental outcomes of infants in the NICU and beyond.

Budget and Resources:

The development and implementation of the primary rehabilitation therapy model in the NICU is an ongoing effort requiring the collaboration of two NICU rehabilitation teams at Children's Healthcare of Atlanta. The development of the rehabilitation survey for nursing staff required the collaboration of two neonatal therapists with occupational and physical therapy backgrounds. This required a time commitment of approximately 8 hours a month for 3 months. Designated hours were set aside for each therapist to complete tasks associated with this project. The resources used included relevant research and published materials.

Program, Materials, or Methodology:

The primary rehabilitation model at Children's Healthcare of Atlanta (CHOA) at the Egleston and Scottish Rite campuses was implemented in 2015 and was developed based on the research indicating the positive outcomes for infants and their families when nurses adopted a primary care nursing model in the NICU. Literature review did not reveal rehabilitation specific research to support the rehabilitation primary model.

Each infant admitted to the NICU receives automatic occupational and physical therapy orders. The rehabilitation department assigns each infant to either an occupational or physical developmental therapist. The assigned therapist becomes the infant's primary therapist and visits with the patient and family between 2 to 4 times per week throughout the patient's hospital admission. If other disciplines are warranted as the infant grows, the primary therapist consults the appropriate specialty.

After several years of implementing this model, the rehabilitation department is satisfied with the extent of individualized care it is able to provide for each patient and family. To justify research to determine if this model of rehabilitation therapy should become standard for any NICU, we surveyed the NICU nursing staff to investigate how they perceived the implementation of a primary rehabilitation model in the NICU. An anonymous survey was sent out via email to all NICU nurses. The survey included 7 multiple choice questions related to nursing satisfaction and perception of whether the therapists are better able to meet the developmental needs of infants and families in the NICU using the primary therapy model. Additionally, the survey included an area for comments to provide feedback on the rehabilitation program

The survey was completed by a total of 128 NICU nurses during a 3 week period. When asked if nurses believe rehabilitation therapists in the NICU have an improved understanding of the developmental needs of the infants using the primary model of therapy, 91.4% of respondents reported that they either strongly agree or agree while only 8.6% reported that they neither agree or disagree, or disagree. Similarly, when asked if rehabilitation therapists have an improved understanding of caregivers needs in regards to developmental training in the NICU using the primary

model of therapy, 86.7% of respondents either strongly agreed or agreed while only 13.3% neither agreed or disagreed, or disagreed. Some nurses indicated in their comments that the primary model of therapy in the NICU helps familiarize them with the patient because of the consistency of care of the rehabilitation therapists while others nurses indicated concerns that care was not consistent between all available rehabilitation therapists at the hospital.

Impact or Results

The completed nursing survey overwhelmingly demonstrated positive feedback of the primary rehabilitation model that has been implemented in the NICUs at CHOA. The primary rehabilitation therapy model improves a therapist's ability to identify developmental needs of patients and families, thus improving a therapist's ability to provide both social and emotional support to families during and after their NICU admissions. This survey provides a platform for future studies to determine if primary rehabilitation models improve caregiver satisfaction and developmental outcomes of infants hospitalized in the NICU. This research can guide transformative change in rehabilitation models in NICUs throughout the world.

Implications for Family Support:

Developmental therapists in the NICU (OT and PT) play a vital role in the NICU at CHOA. Patients are followed for all developmental needs and therapists work closely with families to ensure caregivers are supported and involved in all aspects of care. Therapists write family centered goals and meet with parents in person or via phone weekly.

References:

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3. Dal Molin A, Gatta C, Gilot CB, et al. *The Impact of Primary Nursing Care Pattern: Results from a before-after study*. *J Clin Nurs*. 2018;27:1094-1102.

Learner Objectives:

1. The learner will reflect on current delivery models of nursing and rehabilitation.
2. The learner will be able to develop a model of rehabilitation that promotes a therapists better understanding of developmental, social, and emotional needs of infants and caregivers in the NICU
3. The learner will identify strengths and areas of opportunities that arise with the primary model of rehabilitation.
4. The learner will identify avenues for future research in rehabilitation models in the NICU

Gravens2019-29

Nurses' Knowledge, Attitudes, and Perceived Self-competency Regarding individualized Developmental Care in the Neonatal In-

tensive Care Unit

Patty Macho, PhD, RNC-NIC, BC
Cohen Children's Medical Center of NY

Abstract

Background: Premature infants are at a greater risk for developing cognitive and motor developmental delays. Researchers have investigated developmentally supportive interventions to improve outcomes and decrease negative effects of the NICU. Majority of successful interventions are based on the Theory of Individualized Developmental Care (IDC). IDC is a collection of evidence-based practices that include adapting care practices based on infant's behavioral and developmental state, involving parents in infant's care, and providing an environment that minimizes over stimulation of the infant.

Purpose: To describe NICU nurses' knowledge of IDC, attitudes towards IDC, how knowledge and attitudes affect their perceived competency, and to identify correlations. Study findings may lead to improved implementation of IDC and help increase positive outcomes for premature infants and family.

Methodology: IRB approval was obtained from both The CUNY Graduate Center and Northwell Health System for proposed research. A correlational quantitative design was used for the study. An electronic survey was developed and piloted and then sent to a convenience sample of 114 NICU nurses with at least 2 years' experience in a NICU working full or part time in a NICU in a large health system in the Northeast. All results were anonymous with no identifiers collected. Invitation to participate in survey was sent to all potential participants. A follow-up email containing letter of introduction, internet consent, and REDcap-(Research Electronic Data Capture) survey link were sent 4 days after initial email, 7 days after second email and 7 days after third email. Informational flyers were sent to all NICU Nurse Managers and Educators and hung in staff lounge or other appropriate areas. Data was collected via REDcap electronic survey. Descriptive statistics and Cronbach's alpha were computed. Spearman correlation coefficient for relationship between Individualized developmental care knowledge, attitudes and perceived self-competency and between each domain and ordinal variables on interest were computed. Partial correlation coefficients for relationship between 2 domains, while controlling for the effect of the third were also computed. Mann-Whitney or Kuska-Wallis test for associations between knowledge and demographics were computed. Main outcome measures where correlations between knowledge, attitudes and perceived self-competency, and correlations between knowledge and attitude and knowledge and perceived self-competency.

Analysis/Results: There were significant moderate positive correlations between knowledge, attitudes, & perceived self-competency. When adjusting for knowledge there was a significant correlation between attitude and competency ($p=0.013$). There was a significant association between knowledge and years of practice ($p=0.0149$) and individualized developmental care received an in service ($p<0.0001$). There is a positive correlation between levels of knowledge & attitude, ($p=0.0007$), between knowledge & self-competency, ($p=0.0051$), & between attitude & self-competency, (0.0011).

Implications for Practice: Based on positive correlation between knowledge, attitudes, and perceived self-competency providing education regarding individualized developmental care may lead to improved attitude and self-competency. These improvements may lead to improved positive outcomes for infants & families. Based on results of research the NICU has increased resources for developmental care especially in providing education to staff and families. A class on proper positioning and developmental interventions for infants has been developed and being implemented for parents along with increased funding for new developmental positioning devices in the NICU.

Implications for Research: Further studies to validate validity and reliability of survey are needed. Observational studies to compare perceived competency to care actually provided, a national survey of different regions, levels, or size NICUs, and what level of knowledge regarding individualized developmental care are optimal are also needed. Further qualitative studies on nurses' views and experiences with implementing individualized developmental care are also needed to improve the body of knowledge regarding individualized developmental care in the NICU.

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Objectives:

At the end of this presentation the learner will be able to:

State two correlations between knowledge, attitudes and perceived self-competency.

Describe the relationship between individualized developmental care in the NICU and positive outcomes for neonates and their family.

Gravens2019-30

Building walls. Building relationships. Tearing down hierarchies. A journey towards fully integrating families in neonatal care.

Tanya Bishop, BScN RN, MHM; Teresa Johnson, MSW, RSW; Leah Whitehead, BJ (H), University of King's College; Darlene Inglis, R.N., BScN, MN

Team affiliation NICU IWK Health Centre, Halifax, Canada.

Background and Purpose:

In light of the many advances in neonatal care, health care providers (HCP) and parents continue to express concern about

the socioemotional development of infants due to the lack of close physical contact to their parents. When parents are fully integrated into everyday care significant benefits ensue, not only for the infant, but for the family and conceivably for society at large. HCP's have reported feeling more satisfied in their roles when they help move parents from a place of isolation, dependency and helplessness, to a place of inclusion, confidence, and competence.

The trend towards Family Centered Care (FCC) has helped to promote parents to be more present in the NICU. FCC philosophy has prioritized the importance of parents as partners and decision makers and raised awareness regarding poorer outcomes when infants are separated from their parents. Based on narratives of families, the achievement of FCC has varied and efforts have often failed to bring to light how relationships of power, oppression and control may be the main impediments inhibiting HCPs from moving from the traditional model of care delivery.

Most recently, the Family Integrated Care (FIC) paradigm has been recognized as a more comprehensive approach to greater parent inclusion and involvement in the NICU. Concerns remain that uptake of this model will fall short unless HCPs are truly committed to challenging taken-for-granted oppressive care practices that inhibit parents from becoming equal collaborators in their infant's care. Neonatal HCPs must recognize that they are situated in an ideal position to either facilitate or impede intimacy between parents and their infant. This workshop brings together an interdisciplinary neonatal group involving clinicians, a parent and manager. The aim will be to present three essential areas to consider when integrating FIC in the NICU: 1) optimizing the physical environment; 2) embedding a Parent Partner Program; and 3) integrating change management to transform care.

At the completion of this workshop, learners will be able to:

1. List steps involved in operationalizing a single-family room at a Canadian tertiary-level NICU.
2. Describe two key ways in which authentic collaboration and connection has made a difference in the lives of families and ultimately baby outcomes in the NICU through a Parent Partner program.
3. Identify a road map for change management to transform the NICU and how it operationalized and constructed the FIC model

Speaker #1: Tanya Bishop, RN, BScN RN, MHM
Title: Operationalizing a single-family room NICU

To promote and support close contact and family involvement, our team has focused on the need for physical NICU environments where every baby and family can appreciate a private, comfortable environment where intimacy and relationships will be fostered. During the transition from a traditional open-bay design to a single-family room (SFR) design, we met many challenges, with staff apprehension identified as the most significant. This session will present highs, lows, and learnings from our journey of transitioning to single rooms. Key topics will include: site visit impact, family/staff/design team engagement strategy, role and outcomes of simulation, and a comprehensive alarm management approach. We will also share the unique insights gained from our multi-phase transition and present our strategies to accommodate the hybrid year spent

with infants and families admitted to both single family rooms and open-bay sites.

Speakers #2: Teresa Johnson & Leah Whitehead
Title: Building a Parent Partner Program

Courage. Joy. Fear. Hope. Connection. The birth of a child is often an emotional time for families. For those whose infants require neonatal intensive care the transition to parenthood becomes much more complex. Few understand this more than NICU parents themselves. Together, two mothers of babies born prematurely, and NICU Social Workers, collaborated to plan, develop and implement a Parent Partner Program in a Canadian tertiary level NICU. This program was built from the ground up with parent volunteers working steadily alongside NICU HCPs to provide support in the form of one-to-one conversations, family snack and chats, and creation of brief, dynamic relational orientation videos featuring parents informing parents. With the main goal being building relationships and supporting parents to feel more secure in a foreign environment, the program has grown to be a thriving network of 22 parent volunteers led by a unit-employed Parent Partner who has been involved in the recruitment of new volunteers and guiding the directions of organizational decisions being made in the NICU. The aim of this workshop is to provide the rationale for and steps to consider regarding the creation of a highly functioning Parent Partner Program fully embedded within the NICU that is able to address structures, processes and policies. The importance of building strong partnerships among healthcare providers and parents, need for open communication and a willingness to illuminate and reveal the pervasiveness of power that occurs in the everyday taken-for-granted activities encompassing both language and cultural practices that currently exist within the NICU will be discussed. Lastly, a review of the parent partner program's contributions and next steps will be presented.

Speaker #3: Darlene Inglis
Title: Transforming the NICU

In addition to structural and program changes, the inclusion of change management, most notably a philosophical paradigm shift in care beliefs, is an essential and often overlooked component of sustained integration of families as equal partners in neonatal care. Together as administrators, parents, physicians and staff, we have created a road map for change management to help us transform the NICU. The aim of this workshop will be to share this roadmap with participants. Specific ways in which this NICU operationalized and constructed the FIC model through staff education and human resource practices from interviewing and hiring to performance development and management will be described. Valuable insights will be discussed that raise consciousness through thoughtful engagement and discourse aimed to result in change within the NICU to consequently improve neonatal care by fully incorporating families. The importance of revealing the invisible and complex hierarchical structures that shape today's health care system will be addressed. In the words of Dr. Seuss, "Sometimes the questions are complicated, and the answers are simple".

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Gravens2019-31

Supporting and Enhancing NICU Sensory Experiences (SENSE): a guideline for positive, appropriate, and developmentally-timed sensory exposures in the NICU

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Background and Purpose:

The NICU environment can have deleterious effects on early brain structure and function. Although preterm infants are susceptible to negative and poorly timed external stimuli, they should be in utero and experiencing multidimensional sensory exposures, which drive early brain development. Instead, high-



risk infants in the NICU are exposed to invasive and painful medical interventions and lack positive and consistent forms of sensory exposures, which are critical for optimizing development. Parenting an infant in the NICU is challenging, and many parents do not know how or when to engage with their infants. While the use of sensory exposures, such as skin-to-skin care and massage, have been related to better parent and infant outcomes, most interventions are implemented inconsistently and/or for short periods of time in the NICU.

Budget and Resources:

This project was supported by the Betty and Gordon Moore Foundation and the University Research Strategic Alliance. SENSE is copyrighted by the Washington University Office of Technology Management. It has been made available for clinical and research applications at-cost. Hospitals can implement SENSE with a designated SENSE administrator (PT, OT, SLP, nurse) who educates and supports families to provide the sensory exposures and ensures infants tolerate the guideline as described.

Program, Materials, or Methodology:

To maximize the benefit of positive sensory exposures in the NICU, we have developed a structured sensory-based guideline titled Supporting and Enhancing NICU Sensory Experiences (SENSE), which includes specific doses and targeted timing (based on PMA) of interventions such as massage, auditory exposure, rocking, holding, and skin-to-skin care. The guideline was developed with the intention of optimizing parent engagement while providing the infant with positive sensory exposures to improve infant development and mother-infant interaction. A rigorous process of protocol development included: an integrative review that outlined 88 articles on sensory-based interventions that were used with preterm infants to improve outcome, expert input from a multidisciplinary group of 108 health care professionals that defined sensory interventions implemented across different NICUs, 3 multidisciplinary focus groups that provided a critical review of the guideline, and interviews with 20 mothers of preterm infants who gave input on feasibility of implementing the SENSE guideline. In this workshop, we will share the specific guideline on auditory, tactile, vestibular, kinesthetic, olfactory and multi-modal stimulation for preterm infants in the NICU as well as discuss implementation strategies that include early parent empowerment, educating on infant behavioral cues, modifying the intervention based on infant needs, use of a sensory support team, and timing appropriate sensory interventions.

Impact or Results:

The goal of the SENSE intervention is to engage parents in providing consistent, positive, developmentally appropriate sensory exposures to their infants across NICU hospitalization to improve the early parent-infant relationship and optimize outcomes. The results of a pilot study of SENSE that included 30 preterm infants compared to 50 historical controls will be discussed. In this pilot study, more parent confidence was observed in the SENSE group. In addition, the results of a randomized controlled trial of 70 preterm infants who received the SENSE intervention or standard of care will be discussed. Embedded in this trial, results that demonstrate how the SENSE intervention resulted in improved engagement among those with high social risk will be discussed.

Implications for Family Support:

The SENSE intervention is an implementation strategy aimed at supporting parents in providing appropriate sensory exposures to their infants in the NICU. Many parents do not know what to do, how to do it, and when to do sensory exposures with their infants. The SENSE interventions gives a concrete guideline to empower parents, while the implementation strategy enables individualization based on unique needs of each infant.

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Learner Objectives:

1. Participants will identify appropriate auditory, tactile, vestibular, kinesthetic, olfactory and multi-modal exposures for preterm infants at different PMAs.
2. Participants will identify important factors related to implementation of the SENSE intervention.
3. Participants will understand current evidence related to the SENSE intervention.

Gravens2019-37

NICU Infant Positioning Project

Lee Ann Perry, MSOT, OTR, NTMTC at McLane Children's NICU in Temple, TX; Lauren Olson, MOT, OTR at McLane Children's NICU in Temple, TX; Ruth Wilkerson, OTR, CNT, NTMTC at Early Childhood Intervention

Background and Purpose: When a baby is born early, they enter a gravity filled world before developing physical strength to pull themselves into flexion. Premies rely on caregivers to provide neuromotor support to improve muscle tone and

prevent musculoskeletal deformity. This is where infant positioning comes in. There are so many products on the market and methods for swaddling infants. The occupational therapists decided to start a quality improvement project to see how well the infants in our NICU were being positioned. Our aim statement: To provide education for nurses/staff in order to improve infant positioning, thereby promoting a developmentally supportive environment in the NICU. We planned to meet this aim statement by scoring positioning; the highest score each infant could receive was a 12. We established a goal of 10/12 and our stretch goal being 11/12.

Budget and Resources: positioning devices as needed; ordered through NICU department

Program, Materials, or Methodology: We used a scoring tool to objectively measure the quality of infant positioning and objectively track progress. This tool allowed us to score infant positioning in 6 areas: shoulders rounded, hands touching face, hips aligned and flexed, lower extremities softly flexed, head in midline, and neck in slight flexion with the opportunity to score a 0, 1, or 2 for each item. The highest possible score was 12. Random monthly infant positioning audits in our NICU revealed positioning deficits due to a lack of positioning devices and staff knowledge. A score of 7.87 for the month of January 2016 was calculated with 115 infants being scored. This led to a need for education and expanding our supply of positioning devices. Data was collected from January 2016 to August 2017; approximately 1600 infants were randomly scored over 18 months. During that time, education was provided such as in-services at nursing staff meetings, individual 1 on 1 training, buttons were distributed to promote positioning awareness were distributed, and new positioning devices were ordered. Poster presentations demonstrating developmentally supportive positioning were left in the break room. Staff members completed a positioning skills check off. Top performers were rewarded during random monthly audits.

Impact or Results: Overall, we observed an upward trend in infant positioning scores since implementing education to staff and increasing our repertoire of positioning devices with a score of 10.65 in August of 2017. The occasional decreases in scores made us realize the importance of providing continual education opportunities for new staff members and frequently refreshing our supply of devices as products wear out and/or disappear in the laundry.

Learner Objectives:

1. Describe developmentally appropriate infant positioning in the NICU.
2. Explain the benefits of developmentally appropriate infant positioning in the NICU.

Gravens2019-38

A pilot study: Pediatricians' ratings of infants' who had varied medical diagnoses related to disability and their expected advice for the infants' parents.

Robin Lynn Treptow, Ph.D. Ph.D. Candidate, Fielding Graduate University

Background and Purpose: A prejudice rooted in subtle cognitive processes that operate outside awareness is called an implicit bias. This bias may be based on a person's physical traits, e.g., a racial-linked, as shown in recent findings of medical providers' bias against minority children. Racial-linked bias ties into Down's (1866) use of ethnic traits to group children who had intellectual disability and evidence mounts for implicit bias against persons with Trisomy 21 (T21) who have physical markers suggestive of a DS phenotype. What people say about persons with T21 (e.g., positive expressions) often fails to match their internal views (e.g., negative perceptions). Such discrepancies exist even among those who care for such persons, e.g., doctors, and the biases extend towards children with the condition. But, what people think about babies with problems may affect how the babies learn and grow over time. Thus, this pilot study explored pediatricians' bias against intellectual disability, i.e., a commonly expected outcome for persons with T21, what they expected babies with vague signs of T21 or of other disability-related conditions to do as they grew up, and the advice they thought they might give the infants' parents.

Institutional grants, crowd sourcing, and scholarships totaling about \$3000 funded this pilot research. Costs were primarily for recruitment, i.e., purchase of contact emails, \$20 Amazon.com Gift Card incentives, and travel to solicit participants at a neonatal conference.

Program, Materials, or Methodology: This randomized, controlled pilot study joined implicit association test (IAT) and vignette methods to look at biases related to persons with intellectual disability in a neonatal setting. An IAT, i.e., a specialized survey using reaction times to measure unconscious biases, was built using IATGEN software for the Qualtrics® online research platform. The IAT was embedded into a Qualtrics® vignette survey involving hospitalized case examples of a few-days-old infant and his parents. Pediatricians with varied backgrounds and recruited from a variety of settings (N = 56) did the IAT with a subset of these (N = 51) doing the vignette survey. Most were white (86%), and female (66.6%); all respondents had a medical degree. Doctors were randomized to rate an infant with vague signs of T21, cerebral palsy (CP), fetal alcohol effects (FAE), or meconium aspiration syndrome (MAS). They listed advice they thought they might give to the infant's parents and provided data on their training and experiences related to developmental disabilities. Recruitment barriers, i.e., low response rates, were addressed by networking sampling methods, in-person recruitment, and incentives. Levels

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of implicit bias against persons with intellectual disability, ratings of infants, ratings of the infants' parents, and expected advice for parents were the primary outcome variables.

Impact or Results: Most pediatricians (93%) had high levels of negative implicit bias against persons with intellectual disability on the IAT. Vague signs of a T21 diagnosis described in the vignettes predicted pediatricians' lower ratings of infant potential with the largest effect sizes for pairings with MAS, as compared with CP and FAE. Thus, as compared to MAS, T21 means were lower ($p < .001$) for expected no disability traits (e.g., brainy, quick-witted; $dCohen = 0.89$) and projected accomplishment of daily living skills across childhood, adolescence, and adulthood ($dCohen = 1.64, 2.47, \text{ and } 1.70$, respectively)—and higher for traits linked to intellectual disability (e.g., slow learner; $dCohen = 3.05$). In contrast, early socioemotional skills were rated higher for T21 than for CP ($p = .01$, $dCohen = 0.56$). Later socioemotional skills did not differ for T21 as compared to any other infant condition. Finally, using responses to vignettes pediatricians offered less reassuring advice to parents of the infant in the T21 condition as compared to those of the MAS, but not the CP or FAE, control infant. This study closed gaps in the healthcare implicit bias literature on negative bias towards T21 in neonatal settings and lays groundwork for research in infants' early milieus (e.g., hospitals, early intervention agencies) taking into account the potential developmental impact of early and negative diagnosis-based bias.

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jir.12353.

Implications for Family Support. This study's results could be used to design training programs to identify and make medical providers aware of biases they might have against intellectual disabilities or about very young infants' potential based on vague signs of a medical condition, which might help them to offer families a more hopeful picture of what these infants might be able to do as they grow up.

Learner Objectives: Participants will (1) list two potential developmental impacts of implicit bias in neonatal settings; and (2) name one way that identifying and reducing such bias might better support families of infants with disability-related diagnoses.

Gravens2019-41

MyNICU: Be a part of the team. A quality improvement initiative using online technology to connect NICU families to their baby.

Beth Israel Deaconess Medical Center, Boston, Massachusetts, United States Sarah Evjy, RN, BSN, MyNICU Project Leader, sevgy@bidmc.harvard.edu Molly Wylie, NICU Family Program Manager, Scott Devlin, BIDMC Health Care Quality Karen Waldo, NICU Clinical Advisor Kathy Tolland, NICU Clinical Director

BACKGROUND AND PURPOSE:

The Beth Israel Deaconess Medical Center is a tertiary care center with approximately 5,000 deliveries per year & roughly 1,000 NICU admissions. Our NICU is a fast-paced 48-bed, semi-private room unit comprised of 32 Level II and 16 level III infants. We promote family-centered care in our NICU by educating parents to be involved in their baby's bedside care. The parents are part of the decision making process by attending daily rounds and family meetings. One of the greatest challenges we face in implementation of family-centered care is parent separation from their child. Our goal is to improve the families overall NICU experience by keeping them as connected, informed and educated as possible. To achieve this goal, we developed a secure online resource that provides parents valuable information and daily updates to understand their baby's ongoing care during their NICU stay. This web-based application is called MyNICU and went live in our unit in December, 2017.

BUDGET AND RESOURCES:

Our original budget of just under \$20,000 was provided to us by the Gordon and Betty Moore Foundation Grant whose focus was on family engagement in the critical care setting. This grant originally funded a web-based application called MyICU which was rolled out in all BIDMC adult ICU's in July 2016. Remainder of this grant money was

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given to our NICU to develop a tailored, web-based application to improve parent engagement and connectedness.

METHODOLOGY:

Pre-Launch:

-MyNICU launched in BIDMC adult ICU's in July 2016. MyNICU has been under-utilized by the adult ICU families. Enrollment relied on providers and included a paper-based consent.

-MyNICU project team endeavored to make MyNICU enticing to families. Electronic enrollment and consent streamlined sign-up process, removed barriers, and took the burden off staff.

-CribNews was previously created as an opt-in daily progress note offered to our NICU families. CribNews now incorporated into MyNICU enrollment process.

-Content for MyNICU was created, enhanced and displayed by project team. Former NICU parents consulted to give valuable input.

Launch:

-Educate staff regarding MyNICU's value to parents and staff.

-Educate staff on how and when to introduce parents to MyNICU. Educate providers to introduce MyNICU during antepartum consults.

-Staff encouraged to include MyNICU in daily workflow.

Post Launch:

-MyNICU support team to review daily MyNICU enrollment report.

--Determine which families have not yet enrolled in MyNICU

--Follow up with families who have not enrolled

-Weekly team meeting to review feedback and address issues.

On-Going Interventions:

-Quarterly MyNICU parent feedback survey sent to users.

-Analyze data to determine areas of improvement or enhancement.

IMPACT AND RESULTS:

MyNICU went live in our unit on December 12, 2017. Data from the most recent NICU Parent Satisfaction Survey (Figure 1) compared results pre and post MyNICU launch. There is a notable decrease from 29% to 25% in parents stating they were not provided enough information during their baby's NICU stay. We are hopeful that this decrease is related to the launch of MyNICU, thus providing parents with the information they previously may have been lacking.

The most recent MyNICU parent feedback survey (Figure 2) states that 89% of parents feel that MyNICU has provided them with quick, easy access to information that has helped them stay informed and involved with their baby's care. 57% have found MyNICU to help streamline the communication between the parents and their baby's care team. 92% of parents state that MyNICU has improved their overall NICU experience.

MyNICU enrollment data shows that we have a median family enrollment rate of 59.5% (Figure 3). With this data, we looked at barriers of enrollment. One barrier was the parents who were not anticipating an extended NICU stay i.e. their baby was born close to term. Another large barrier was our non-English speaking families. At times, 20% of our patient population are from non-English speaking families. Unfortunately, MyNICU is currently only available in English.

MyNICU usage data has shown that parents are logging in 1000- 2000 times per month (Figure 4). Using an average number of 30 enrolled families, parents are logging in roughly 1-2 times every day. Our hope for MyNICU was that parents would find value in daily use of this application.

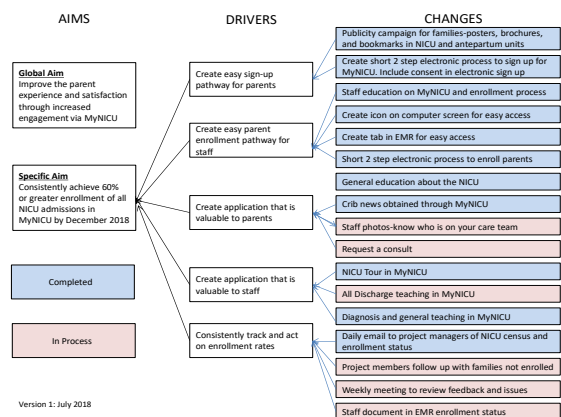
This collective data is complementary to our specific aim of a consistent family enrollment rate of 60% by December 2018 (Driver Diagram). Our data also supports our global aim that MyNICU will have a positive impact on parent satisfaction and their overall NICU experience.

IMPLICATIONS FOR FAMILY SUPPORT:

MyNICU has become a standard part of the family-centered care offered in our NICU. MyNICU has provided parents with the tools they need to stay informed, educated and connected to their baby's care. Parent feedback has helped us determine how to enhance content and functionality within MyNICU. We plan to incorporate MyNICU into a self-guided discharge teaching tool, where identified material can be "pushed" to parents specific for each baby. We would love to translate MyNICU for our non-English speaking families which would greatly impact the quality of the application for our families. We are optimistic that MyNICU will continue to improve parent satisfaction and their overall NICU experience.

LEARNER OBJECTIVES:

Identify how online technology can be used to improve NICU



Version 1: July 2018

parent satisfaction and the families overall NICU experience. Understand how online technology can be used to enhance communication between the parents and the care team.

Identify how online technology can be used to provide parents valuable information to understand their babies care; thus, em-

powering them to be educated members of their baby's care team.

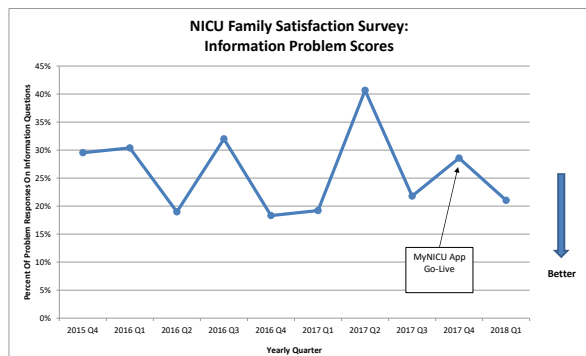


Figure 1

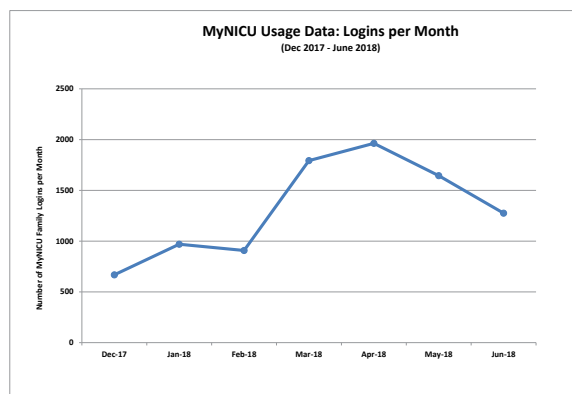


Figure 4

Gravens2019-42

On The Cusp of Life and Death, Choose Life

Dr. Stephanie Wellington, Physician, Certified Professional Coach, Stephanie@NurturingMDs.com, New York

The Neonatal Intensive Care Unit positions us to live on the cusp of life and death. Studies show that parents of NICU babies are adversely impacted by the NICU hospitalization. Psychologically they have increased rates of anxiety, insomnia, depression, and post-traumatic stress disorder.

These same stressors exert their effects on the medical team. As we enter the discussion of periviability, which challenges the medical team to produce optimal outcomes for infants who previously would not have been resuscitated, the pressure mounts.

How does a doctor in training, a mother with a baby in the NICU, or a seasoned physician meet the challenges of living on the edge of life and death? This talk takes a journey through human vulnerability which is often overlooked in the quest for the latest in research and technology to support these tiny patients.

Through case stories, participants will

- Learn how a neonatologist blended life coaching with medicine to shift from compartmentalization, a common mode of dealing with the stress and death in medicine, to detached involvement and reignite her passion and purpose.
- Gain insight into how a mother's past pregnancy losses dramatically contributes to her inability to connect and receive support from the nurses, doctors, and her family. Along her journey she experiences the power of releasing her past in order to be present for her daughter in the NICU.
- Discover the shift in perspective as a future neonatologist's vulnerability is not a sign of weakness but an opportunity to deepen and accept her humanity.

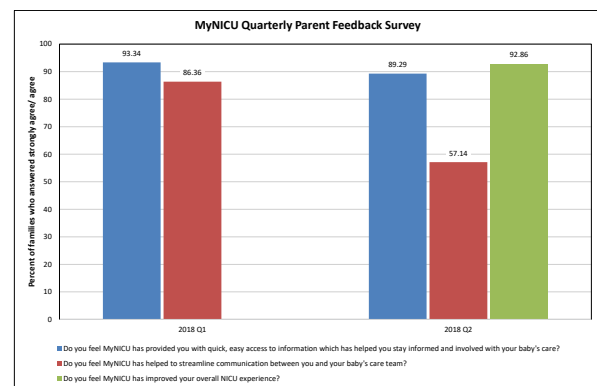


Figure 2

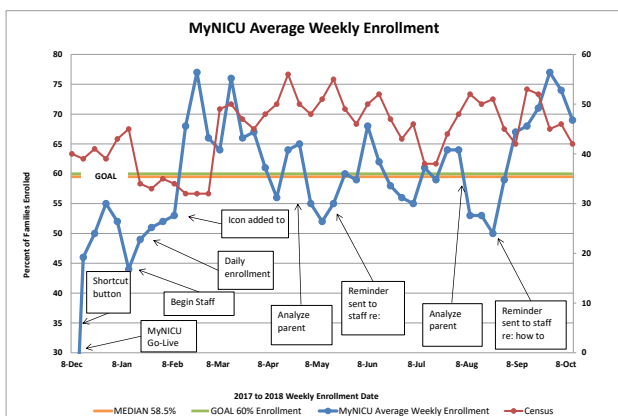


Figure 3

Ohio State University College of Medicine. She completed her Pediatric Residency and Neonatal Fellowship training at New York University School of Medicine. Her desire to support families in the NICU guided her to become a Certified Professional Coach from the Institute for Professional Excellence in Coaching (IPEC). She is a writer, speaker, and facilitator of NICU parent support groups. Her love of coaching has expanded and she hosts workshops and private coaching for physicians and medical professionals courageous enough to live into the highest vision for their life and career.

Gravens2019-45

Swallowing Dysfunction in The NICU – Silent Aspiration is Common, but Therapeutic Compensations Can Help

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Kayla Hernandez, MS, CCC-SLP; Reza Rahbar, MD; Boston Children's Hospital, Department of Otolaryngology, Boston

BACKGROUND: Modified barium swallow (MBS) studies are performed to evaluate swallow function and determine risk of aspiration (fluid/ food entering the lower airway). Infants rely on fluid for both hydration and nutrition. If an infant displays airway penetration or aspiration on regular liquids during the study, the feeding therapist may trial certain interventions during the procedure to see if they assist swallowing and airway protection. The most common interventions trialed during infant MBS procedures include modifying how the bolus is delivered - such as use of different feeding equipment (e.g. slower flowing bottle nipples) and positional changes (e.g. side-lying position versus reclined) – and/or making modifications to the bolus itself (i.e. thickened liquids).

AIMS: We aimed to describe the proportion of NICU infants referred for MBS who are found to aspirate, the proportion of those who aspirate who demonstrate silent aspiration (i.e. no cough in response to aspiration), as well as to investigate the effectiveness of common interventions trialed during MBS procedures.

METHODS: This was a retrospective review of 3 years' worth of MBS studies from a large Level III NICU.

RESULTS: Greater than 85% of NICU infants referred for MBS were found to aspirate. Approximately 95% of NICU infants who are found to aspirate on MBS demonstrated silent aspiration. Common sub-groups of NICU infants who silently aspirate include those with chronic lung disease, congenital heart defects, hypoxic brain injury, and congenital syndromes (e.g. trisomy 21). Interventions trialed were able to effectively mitigate aspiration risk in many infants, allowing them to continue to feed by mouth with these therapeutic compensations in place.

CONCLUSION: Many NICU infants referred for MBS display silent aspiration, but the use of therapy interventions, such as slower flowing bottle nipples, side-lying position, and thickened liquids, can allow many of these infants to feed safely.

3 LEARNING OBJECTIVES

At the end of this talk, participants will be able to:

- Describe how milk flow can impact on suck-swallow-breath coordination

- List 3 potential benefits of horizontal milk flow
- Describe 3 potential signs or symptoms that may indicate aspiration risk

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Gravens2019-46

Home enteral feeding for NICU graduates: Developing and implementing Clinical Practice Guidelines

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BACKGROUND: The establishment of oral (per os, PO) feeding competence is a challenge for most infants born prematurely. Unlike full-term infants, who are almost always able to safely and successfully PO feed from birth, most preterm infants will require some duration of enteral tube feeding (per gavage, PG) until they mature sufficiently and are medically stable enough to feed fully PO. Historically many NICUs would not consider discharging home infants who continue to require PG feeds to meet their nutritional requirements. More recently, an increasing number of NICUs have begun to allow select infants and families to transition to home with a feeding tube in situ, under the principle that the home environment is optimal for ongoing infant growth and development. It remains unclear (a) which patients would benefit most from this option, and (b) how can this process be optimized to support safe transition to home, meet the medical and developmental needs of high risk infants,

and provide adequate support to their families.

AIMS: The aims of this study were: (1) Describe our process for developing and implementing evidence-based clinical practice guidelines for home PG feeding, (2) Describe the characteristics of infants who left our NICU on PG feeds, and (3) Describe potential obstacles and difficulties encountered by infants and families during this process.

METHODS: A chart review was conducted for infants admitted to a large Level III NICU in 2016-2018.

RESULTS: Approximately 10-15 infants per year are discharged home from our NICU on PG feeds. Approximately 40% of these infants were discharged following gastrostomy (G-tube) placement, with the remainder having a nasogastric (NG) tube in situ. Infants were on average 44/40 weeks at the time of discharge. More than 90% of these infants were born \leq 30/40 weeks GA. The most common co-morbidities were IUGR, RDS, BPD, and PDA. Of note, approximately 75% of those who went home on PG feeds were on thickened feeds due to demonstrated aspiration risk and/or gastro-esophageal reflux management.

A large group of multidisciplinary clinicians from our NICU, the partnering children's hospital, and the primary care team collaborated in this process. Our experience indicates that infants can successfully discharge home with PG feedings, provided that: (a) the infant is otherwise physiologically stable and medically ready for discharge home; (b) the family is able to undergo training, achieve competency in using required medical equipment, and is agreeable to contingency planning, and (c) appropriate support and outpatient follow-up and coordination of care is in place. Potential obstacles and difficulties were identified, including opportunities for more streamlined medical decision-making, enhanced parent training and support in the NICU, and improved coordination of care with outpatient services. Proposed strategies to help address these will be discussed.

CONCLUSION: Evidence-based, multi-disciplinary clinical practice guidelines can result in improvements in staff consistency, quality of patient care, and improved patient and family experience. Effective partnership between a large number of multidisciplinary health care providers and families is critical for home enteral feeding to be a viable option.

LEARNING OBJECTIVES

At the end of this talk, participants will be able to:

- Describe the process involved in developing evidence-based multi-disciplinary clinical practice guidelines in the NICU
- List 3 important feeding topics that should be discussed with families of NICU infants prior to discharge
- List 3 common feeding challenges experienced by pre-term infants post-NICU discharge

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Gravens2019-47

Integrated Feeding Therapy Adds Value to NICU Follow-Up Programs

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BACKGROUND: Many NICU graduates continue to display feeding, growth, and developmental challenges post-discharge. Most NICU follow-up programs do not have feeding therapy as an integrated part of their multi-disciplinary team. We have found that even many infants considered at low-risk of later feeding difficulties end up presenting with significant issues that benefit from feeding therapy input within the broader NICU Follow-up Program umbrella.

AIMS: To describe feeding difficulties encountered in a NICU Follow-Up Program.

METHODS: Retrospective data was collected on infants attending NICU Follow-Up Program over a 12-month period. Any high-risk feeders (e.g. those discharged on tube feeding) were referred to specialist multi-disciplinary feeding clinics, with specialist physicians (e.g. GI, pulmonology), nutrition, and feeding therapy. Any low-risk feeders attending NICU follow-up clinic had their feeding screened by the clinic feeding therapist.

RESULTS: Our clinic follows more than 150 infants per year and provides more than 900 occasions of service. Greater than 80% of infants attending the clinic met the criteria for feeding therapy services. These are babies who otherwise would not have been reviewed by feeding therapy, unless the parents self-referred into a specialty feeding clinic. Common issues encountered include: concerns regarding swallow safety and aspiration risk, work of breathing during feeding, inefficient feeding, and or other concerning feeding behaviors. Interventions offered include: providing advice regarding changing bottle nipples and preparing thickened feeds, facilitating MBS and referral to sub-specialty providers, and providing advice regarding appropriate feeding equipment, seating, and strategies. Parents reported that the feeding therapy services are valued, and that the integrated framework of the clinic visits

saves them time and stress.

CONCLUSION: Many preterm infants considered at low-risk of later feeding difficulties end up presenting with significant issues that benefit from feeding therapy input. Our clinic data shows that integrated feeding therapy adds value to NICU follow-up programs, and provides improved multi-disciplinary, patient- and family-centered care for preterm infants.

3 LEARNING OBJECTIVES

At the end of this talk, participants will be able to:

- List 3 common feeding challenges experienced by preterm infants post-NICU discharge
- List 3 potential interventions that feeding therapists can offer as part of NICU follow up programs
- List 3 important feeding topics that should be discussed with families of NICU infants prior to discharge

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Gravens2019-48

Pediatric Feeding Disorder: Consensus Definition and Conceptual Framework

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Colleen Taylor Lukens, PhD; Children's Hospital of Philadelphia, Philadelphia

BACKGROUND: Most preterm and other medically complex infants display feeding difficulties in the NICU, and a large number of these infants continue to display difficulties well beyond their NICU stay. Pediatric feeding disorders require comprehensive assessment and treatment of four closely-related, complementary domains: medical, nutrition, feeding skill, and psychosocial. Despite inherent multiple underlying mecha-

nisms and need for multidisciplinary care, previous diagnostic paradigms have typically defined feeding disorders using the lens of a single professional discipline, with each professional discipline suggesting its own approach.

AIMS: To use the framework of the World Health Organization's International Classification of Functioning, Disability, and Health to develop diagnostic criteria for "Pediatric Feeding Disorder" (PFD).

METHODS: A multi-disciplinary expert group was convened, a comprehensive literature review was performed, and a unifying diagnostic term is proposed.

RESULTS: "Pediatric Feeding Disorder" (PFD) is defined as impaired oral intake that is not age-appropriate, and is associated with medical, nutritional, feeding skill, and/or psychosocial dysfunction.

The proposed diagnostic criteria for Pediatric Feeding Disorder includes: A disturbance in oral intake of nutrients, inappropriate for age, lasting at least 2 weeks and associated with 1 or more of the following:

Medical dysfunction, as evidenced by: Cardiorespiratory compromise during oral feeding; Aspiration or recurrent aspiration pneumonitis.

Nutritional dysfunction, as evidenced by: Malnutrition; Specific nutrient deficiency; or significantly restricted intake of one or more nutrients resulting from decreased dietary diversity; Reliance on enteral feeds or oral supplements to sustain nutrition and/or hydration.

Feeding Skill dysfunction, as evidenced by: Need for texture modification of liquid or food; Use of modified feeding position or equipment; Use of modified feeding strategies.

Psychosocial dysfunction, as evidenced by: Active or passive avoidance behaviors by child when feeding or being fed; Inap-



appropriate caregiver management of child's feeding and/or nutrition needs; Disruption of social functioning within a feeding context; Disruption of caregiver-child relationship associated with feeding.

CONCLUSION: The proposed diagnostic criteria for PFD use a conceptual framework that goes beyond disease-oriented or unilateral diagnostic paradigms, recognizing PFD as causing dysfunction in at least one of four closely-related, complementary domains. These criteria will enable pediatric practitioners to better characterize the needs of patient populations (including preterm and other medically complex infants, and their families), and promote the use of common, precise, terminology necessary to advance clinical practice, research, and health-care policy.

3 LEARNING OBJECTIVES

- Outline the new proposed definition of pediatric feeding disorder
- List the four domains that need to be considered in a child with pediatric feeding disorder
- List three potential benefits of a new unifying definition for pediatric feeding disorder

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Gravens2019-54

Catalysts for change: The impact of lighting, noise, and design on perceptions of the NICU environment

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Background and Purpose:

Neonatal Intensive Care Units contain some of the most fragile and vulnerable patient populations. Many NICU babies have little ability to regulate their own bodily systems, heightening the importance of their immediate environment in their development.

Recent longitudinal studies inform us that what impacts these fragile babies today, has a long lasting impact on them (Pineda, R., et al, 2014). Add to that, an increasing concern for Neonatal Abstinence Syndrome babies who's needs are mixed in terms of acuity and in parent-child bonding (MacMullen, N. J., Dulski, L. A., & Blobaum, P., 2014; Indian Health System, n.d.). Support for all these babies is not limited to their physical and cognitive needs, but also extends to their parents, grandparents and other loved ones, along with staff, whose constant vigilance of them often result in missed breaks and needed self-care. So what impact does their surrounding environment have on all these users?

The Recommended Standards for Newborn ICU Design [White et al. 2013] include recommendations for all aspects of NICU design including layout, materials, lighting and acoustics. The Facilities Guidelines Institute (2018) also provides minimum standards for NICU design. Most of these recommendations are based on best practice both in design and operations. Few studies exist to enable evidence based design decision making

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in this field. This research study is a pre/post study that was conducted when a NICU in an academic medical center was redesigned from an open bay NICU to a private room NICU to evaluate some of these standards. Specific areas of interest were lighting, acoustics, layout and design elements.

White et al. (2013) included recommendations for NICU ambient, procedure, and support area lighting. The Illuminating Engineering Society (IES) has also published limited recommendations for NICUs in the Lighting for Hospitals and Healthcare Facilities Recommended Practice RP-29-16. Many of the recommendations in IES RP- 29-16 are from the Recommended Standards for Newborn ICU Design. Both documents recommend cycled lighting for newborns about 28 week's gestation or older.

According to White [2013], there has been no demonstrated benefit of cycled light except for after 28 weeks gestation, when there is some evidence of a potential benefit. This is similar to the conclusion of Morag and Ohlsson [2016], who after systematically reviewing the relevant literature regarding NICU cycled light for preterm and low birth weight infants, found only a few outcomes that reached statistical significance, including cycled light resulting in a shorter stay versus continuous bright light or near darkness; however, Morag and Ohlsson also stated that the quality of evidence for cycled light was low.

White et al. (2013) included recommendations for infant, staff and parent areas to be design to produce minimal background noise and to contain and absorb much of the transient noise created. The combination of continuous background sound and transient sound in any of these areas shall not exceed an hourly Leq of 45 dB and an hourly L10 of 50 dB, both A-weighted, slow response. As well, transient sounds or Lmax shall not exceed 65 dB, A-weighted, slow response. Recommendations for heating, ventilation and air conditioning, along with material use are provided to help meet these recommendations.

Raman (1997) noted that sudden and loud noise leads to physiological and behavioral disturbances including sleep disturbance, motor arousals, such as startles, crying, hypoxemia, tachycardia, and increased intracranial pressure. Increased intracranial pressure can further contribute to intra-ventricular hemorrhage (Raman, 1997). Brown (2009) studied the effect of noise on preterm infants by reviewing many articles and concluded that lower levels of noise in the NICU may improve physiologic stability of preterm infants and long-term outcomes. Stevens et al (2010) reported significantly less sound and noise in the NICU after conversion from a conventional open-bay layout to a single-patient room layout.

Much research in this area is still needed. This study evaluated the prior open bay floor plan with the new NICU unit that houses 3 neighborhoods of 14 private rooms each with

a 24 hour architectural light scheme. This presentation brings together the owner, the architectural teams and the researchers to discuss the results and lessons learned.

Methodology:

This study followed a mixed-method approach wherein surveying via questionnaires were used to evaluate user perceptions. Lighting measures and acoustic readings were used to support the questionnaire responses. Most of these methods have

been previously tested for reliability and have been used during pre- and post-occupancy evaluations during other facility assessments. The mixed-method approach led to triangulation of findings and helped to inform lessons learned.

Impact or Results:

NICU LIGHTING

The majority of the luminaires in the new NICU patient rooms were white-tunable, changing in both spectral power distribution (known as the spectral power distribution, SPD) and intensity (amount of light). Occupants do not have control over the change in color temperature throughout the day; however, have control over the intensity of the white-tunable lighting.

The response to the lighting in the NICU is also being gathered through the surveys and through the lighting control system. The control system records every change in the lighting system, whether programmed or initiated by an occupant in the space. This data is being collected for every patient room. The initial data shows that there are more changes between 8 pm and 8 am than during the day, indicating that the programming of the lights during the day is meeting the needs of the occupants. Further analysis is needed to understand if there are changes to the lighting that could be more beneficial for the occupants during the evening hours. Initial analysis of the survey data from staff in the old NICU shows that the staff generally found the lighting to hinder their work, and that the light level and control of the lights was most important to the staff. Further analysis of the old and new NICU survey data is ongoing.

Learner Objectives:

1. Describe why NICU babies need special environmental considerations and how they can be accomplished using design features.
2. Examine how research findings can help inform design decision making.
3. Discuss how the findings inform the future of NICU design—includes audience participation.

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Gravens2019-56

Implementation of Infant Driven Feeding Protocol in a Level IV Neonatal Intensive Care Unit

Patty Macho, PhD, RNC-NIC, BC, Melisa Mancuso, MS, Diane Shimborske, BSN, RNC-NIC

Purpose

To successfully transition infants from gavage feeding to oral feeding based on readiness cues and not on gestational age or volume of feeding.

Background

Premature infants need to be able to coordinate sucking, swallowing and breathing while maintaining homeostasis in order to successfully oral feed. Conventional methods for successful feeding was based on quantity and duration of feeding not quality. Infants and parents found feedings to be stressful and frustrating due to force feeding.

Design

Infant Driven feeding protocol was initiated after a literature review and staff had completed an online education module and received one on one in-service. Laminated scoring tool and visual reminders placed at bedsides and scoring changed from paper to electronic medical record. Education incorporated into biweekly rounds on all shifts with daily reminders for infants being scored. Chart audits completed and results distributed to staff. Parent education done at bedside and incorporated into baby care classes. The main obstacle to implementation was staff resistance to implementing a new protocol that they believed would be more time consuming than conventional feeding method. Obstacle was overcome by education and sharing positive results with staff. As more staff became aware of the positive outcomes of infant driven feedings-obtaining full po feedings earlier with improved weight gain and decreased length of stay resistance disappeared. A culture change occurred in the NICU where all infants that qualify are now fed using infant driven feeding protocol that is initiated by the nurses-not the medical staff. A second barrier to successful implementation was the need to first score on paper then free text the score in the electronic medical record. A separate parameter was created and added to the EMR which has decreased the time for charting and helped eliminate nurses' resistance to charting score and following protocol.

Outcomes

In 2017 infants reached full oral feeds at a younger gestational age-10 days younger, than in 2016. In 2017 average length of stay decreased by 4.1 days compared to 2016 with subsequent decreased hospital costs. Parents expressed less frustration and

stress related to feedings and expressed increased satisfaction with parenting skills. Parents have increased knowledge of readiness to feed and disengagement cues when feeding infants and increased knowledge of need for gavage feedings vs po feeding. Implementation: All infants transitioning from gavage to oral feedings are scored using the infant driven feeding scale. Based on score oral feedings are either attempted or feeding gavage. Disengagement cues determine length of nipping.

Implications:

Infant Driven feedings should be implemented for all infants transitioning from gavage to oral feeding. Staff and parents need education and support on protocol and how to identify readiness to feed and disengagement cues. Parents need to be supported during feedings.

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3. Shaker, C.S. (2013). Cue-based Co-regulated Feeding in the neonatal Intensive Care unit: Supporting Parents in Learning to Feed Their Preterm Infant, *Newborn and Infant Nursing Reviews*, 13, 51-55.
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Objectives:

At the end of this presentation the learner will be able to:

1. Describe readiness to feed cues and disengagement cues.
2. Verbalize understanding of infant driven feedings in the NICU.
3. State 2 barriers to successful implementation of infant driven feedings and methods to overcome barriers.

Gravens2019-61

B.S.A.F.E.

Tamie Hotchkiss, BSN RN- Registered Nurse III, Patricia Sulecki, RN- Registered Nurse II, Jineen Flagg, MSN RN- Assistant Nurse Manager, Susan Foster, MSN RN, NEA-BC- Nurse Manager, NICU, Kathleen Moran, MSN RN, IBCLC- Milk Bank Coordinator, Deborah Tuttle, MD- Neonatologist, Stephen Pearlman, MD- Neonatologist, Christiana Care Health System

Program, Materials, Barriers

- Existing Electronic Systems do not integrate
- Full Time Equivalents – Budget Restraints
- Paper Process

Background & Purpose

In the Neonatal Intensive Care Unit (NICU) at Christiana Care, more than 100,000 breast milk feedings were administered in January 2017-December 2017. Breast milk administration errors are considered a serious safety event, with risk of harm to the

baby from exposure to blood borne pathogens which may transmit disease when ingested. Between 2003 and February 2017, the NICU experienced twelve breast milk administration errors. This can lead to costly lab testing, emotional distress for parents and feelings of stress and failure among staff. The goal of the BSAFE project is to reduce errors to zero, in the NICU, by June 2017.

Intervention(s): A multidisciplinary team of key stakeholders (nursing, providers, milk bank technicians) was identified, the team met weekly over the course of one month and individually reviewed each documented error, the preceding factors and shift events/ assignments in order to ascertain the workload and stress level of the environment in which the error occurred. A survey was developed and given to staff in order to determine what the barriers, concerns and process perceptions were. We also spent time trouble shooting (via RCA) preventable errors and areas of opportunity for process improvement in the milk administration pathway from first receiving the milk to actual administration. An education plan was developed and implemented (80% of staff was trained within one week) including: a new process of double verification (involving another staff member or parents/caregivers) in addition to the already utilized Mothers Own Milk System (MOMS) used to scan in and scan out breast milk as well as a recommitment letter signed by all staff acknowledging the importance of correctly administering breastmilk. We created unit signage and individual bed-space signs to encourage families and visitors as well as the nursing team to utilize the double verification system for safety which we named "BSAFE" for:

- Breastmilk
- Scan (milk)
- Ask (staff or caregiver)
- Feed (right milk)
- Every time

Results/outcomes: The BSAFE initiative successfully reduced our breast milk error rate from twelve to zero for 20 months, from February 2017 to October 2018 (and counting) as a unit; the NICU celebrates milestones of remaining error free.

Conclusion: The BSAFE initiative improved patient safety as well as patient outcomes in the unit by incorporating all caregivers and providers in the second verification process as well as refocusing staff nurse attention to the importance of safe milk administration. Ongoing review of the process, education for new staff and sharing our process at the biweekly Women and Children's service meetings are important next steps for this project. Continued random audits are completed to ensure compliance with the BSAFE process.

Gravens2019-62

Lessons of Transformation: Learning from 30 years of NICU planning and design

Cynthia Sparer, MPA, Sr. Vice President, Operations Yale New Haven Hospital, and Executive Director, Yale New Haven Children's Hospital, Laura Poltronieri, AIA, Principal, Poltronieri Tang & Associates

Background and Purpose

This presentation will analyze the planning and design concepts driving the design of over a dozen NICU design projects over the last 30 years. We will discuss, with input from multiple clinicians,

how they helped their institutions transform their NICU models of care. The presentation will highlight the key concepts and ideas behind the planning and design of each unit and provide post occupancy findings for each project. We will discuss how clinical care leaders at each facility led transformative change, and in partnership with the design team gave shape to evolving NICU design concepts. The workshop will culminate in a list of recommendations regarding a design process that supports transformation in design.

Program, Materials, or Methodology

This workshop will create a forum to trace how NICU planning and design has transformed from open ward NICUs in the mid 1980's to single family rooms designs, some now with couplet care rooms, and other innovative new programs and facilities supportive of family care taking with their neonates. The facilities and projects discussed will include but not be limited to NICUs at:

- Geisinger Medical Center
- New York – Presbyterian Morgan Stanley Children's Hospital
- Children's Hospital Wisconsin
- Shawn Jenkins MUSC Children's Hospital
- Yale New Haven Health
- Primary Children's Hospital, Intermountain Healthcare
- St Louis Children's Hospital/BJC
- Penn State Children's Hospital, Hershey Medical Center
- Nicklaus Children's Hospital
- OHSU Doernbecher Children's Hospital
- British Columbia Children's Hospital

Impact or Results

- o NICU design has transformed dramatically over the last three decades, due to ground breaking NICU projects that learn from each other in order and continually lead to the "next generation" of projects.
- o A dynamic planning process outline that empowers facilities to accomplish transformative NICU design through the planning process



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4. "Premature Infants Do Better With Touch"; Bill Snyder; Research at Vanderbilt, Vanderbilt University Publication, 16 March 2017.

Implications for Family Support

- o The ways families are supported in the NICU both physically and programmatically have transformed dramatically over the last thirty years. This workshop will identify and trace key transformations in family support practices at the dozen NICU's at key medical centers across the country.

Learning Objectives

1. Learn how clinicians and patient and family advocates directly transformed the design of a dozen NICU projects over the last three decades.
2. Understand the importance of integrating site visits, during the planning process and how the planning and design innovations at individual institutions then leads to transformation in subsequent unit designs.
3. Understand the importance of integrating POE data from previous projects into the planning process of new units in order to lead to important transformation.
4. Understand the data required to lead to transformative NICU design.

Gravens2019-63

Finding the Suite Spot

Susan Foster, MSN RN, NEA-BC- Nurse Manager, NICU Christiana Care Health System

Program, Materials, Barriers

- New Building Rooms Designed as Single Patient Rooms
- Changing Service Line Leadership
- Inadequate understanding of Couplet Care
- Financial Cost of Construction Changes

Background & Purpose

The Neonatal Intensive Care Unit at Christiana Care Health Systems is a 72 bed, level 3 unit built in the late 1990s. The three patient pod format was cutting edge at the time of its design, however, with the ever increasing acuity, infection prevention concerns, patient experience expectations and incredible patient care advances, the time to build a new NICU had come. In an effort to advance and optimize the Women and Children's service line, the decision to build a new Women and Children's Tower became a reality.

The incredibly large undertaking was presented to parent advisors, leadership, providers and staff as an opportunity to redefine

care in the mid-atlantic area; to develop a destination for care. Along with many ideas and options to reinvigorate and expand the care we deliver, the idea of couplet care was thrown onto the table as a unique idea to better serve our families.

Intervention(s)

Fast forward 2 years, leadership changes, approved building plans and a reconvening of building development teams. An interdisciplinary team of providers, staff and parent advocates from the NICU met to discuss room design in the new Women and Children's Tower. The idea of couplet care had been one of the integral parts for moving forward. With a NICU room size of 315 square feet, including a full bathroom, the challenge to define what successful couplet care might look like became quite daunting.

Understanding the purpose and benefits of couplet care, the team was committed to identifying a path forward. There could be no structural changes, rooms had to remain adaptable for all types of patients and a large learning curve, understanding and buy in of the significance of couplet care needed to be achieved.

Members of the group met with other Level III NICUs who had built new units, studied the European couplet care model and attended the 2018 Gravens Conference which presented a multitude of information around Couplet Care. Armed with the information that was obtained, we were able to go back to leadership with square footage ranges and requirements, the requested room adaptability, and mandated minimal change costs.

Results/Outcomes

The NICU will sit on two floors, 40 rooms per floor. The fourth floor will be single patient rooms with the ability of one parent to spend the night. The third floor will be a mix of 10 single patient Continuing Care (NAS) Nursery rooms, a large group care room, and 10 Couplet Suites. The Couplet Suites will be two single patient rooms with a large 7 foot interior opening/door between the two rooms. The post-partum NICU mom will occupy one room; her neonate will occupy the other. This gives mom the privacy that she may require/desire and the opportunity to step away from the infant's bedside, while also allowing for full participation in the infant's care. Our hope is that it allows for compromise around visitation, infection prevention and patient acuity. When the suite is not in use, the option to close off the two rooms via an opaque door allows for both rooms to be utilized independently as patient rooms.

Conclusion:

What began as a "pie-in-the-sky" idea was able to develop into an intentional, evidence based space that allows the closeness and participation of parents in the care of their newborn. Encourages interdisciplinary and collegial discussion and lays the groundwork for continued advances towards greater adaption of family based and developmental care of the newborn. The initial idea of creating a center that is a destination where young families can be cared for as a family in a nurturing, cutting edge environment now has the opportunity to develop.

Gravens2019-64

Bringing Babies and Parents Together: Jet ventilation and skin to skin, a multidisciplinary approach

Dallyce Varty, BScN, Kuljit Minhas, BSc RRT, Sarah Gillis, BScN IBCLC, Fraser Health Authority

Background and Purpose: "Very preterm births raise unique issues for parents and for healthcare services. The birth may be fast and unexpected, and parents may be immediately separated from their baby. The birth of very preterm baby is often an exceptionally stressful and traumatic time for parents" (Arnold, et al., 2013). With this, at the Fraser Health Authority (FHA) Royal Columbian Hospital (RCH), we were posed with a problem of the jet ventilator circuit box being placed close to the infant's head and therefore the infant was not being held skin to skin due to the constraints of the circuit box tubing. Understanding and applying the concepts and theory of Trauma-informed Age Appropriate Care (TiAAC) in the RCH Neonatal Intensive Care Unit (NICU) and in an attempt to reduce the exposure of stress and trauma (Coughlin, 2014) we wanted to safely secure the circuit box outside of the incubator and provide skin to skin care for these babies.

Budget and Resources: We worked together within a multidisciplinary approach. Leaders from nursing, respiratory therapy and occupational therapy took a lot of time and effort to lengthen the tubing to allow the box to move, but ensure that the ventilator pressures were still being delivered to the infant. We created a shelf to secure the box outside of the incubator. We then put together a program to safely transfer infants to their parents for skin to skin care.

Program, Materials, or Methodology: The largest barrier to implementation in the FHA RCH NICU was the safety of the infant and the concern of extubation. Once everyone felt the length of tubing was sufficient enough and the apparatus we created to hold the circuit box was secure, we made it standard for all infants on the jet ventilator to have the circuit box outside of the incubator. It was transferring the infants for skin that was the most complicated. We created evidenced based guidelines for skin to skin care, a stability criteria and a clear step by step program on how to transfer the infant. We then practiced repeatedly, making adaptations to the program. When we implemented we did not expect such positive results with having the circuit box outside the incubator and, once stable, how frequently and safely infants were being held skin to skin. If we knew this, we would have collected data earlier and kept track of all of our PDSA cycles. We were awarded a grant in which quality improvement data was collected and reviewed to demonstrate how our program is a safe and effective way to provide TiAAC to our most vulnerable patients through skin to skin while on the jet ventilator at FHA RCH NICU. The data we collected includes; how many times they were skin to skin with their parent, oxygen requirements, TCO2 readings and if there any safety incidents such as extubation. We reviewed 19 charts. Based on the chart reviews, S2S while on HFJV is a safe practice in FHA RCH NICU with the equipment and processes we have implemented.

The biggest result/accomplishment is that through the diligent development of our program to safely reunite babies and parents is that it has become the norm in our unit. The impact it has had on families and our patients has been exponential. Some infants would have gone their entire life without being

held. And now through our program they are being reunited with their parents in a safe and supported way.

Family Implications: It has given parents confidence in caring for their baby in a time where it can be very stressful, traumatic and life changing. Allowing skin to skin while on the Jet ventilator creates a quiet space for parent and baby to connect amongst the noise and chaos of the NICU environment. We want to share our work with others and to help other units facilitate the reunion of families.

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Learner Objectives:

- What TiAAC is in the NICU and how stress and trauma can impact infants
- Importance of Skin to Skin are as an intervention
- How to transfer an infant skin to skin while on a jet ventilator

NT

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Letters to the Editor

Board Certification for the Newborn Hospitalist. Letter to the Editor
Mon 6/17/2019 9:38 AM

Shabih Manzar, MD
Assistant Professor
Department of Pediatrics
College of Medicine
Louisiana State University Health Sciences Shreveport

Dear Dr. Goldstein,

The Newborn Hospitalist (NH) is perceived as a branch of Pediatric Hospital Medicine (PHM), as they provide in-patient pediatric medical care. In community hospitals, the viability of a pediatric hospitalist program depends upon the inclusion of newborn care. (1) In a teaching hospital, the need for NH is growing. Many of these university-based faculties are acquiring regional newborn nurseries, and for staffing, they are utilizing NH.

By definition, an NH is a physician who takes care of newborn infants. A broad job description includes attending deliveries, admitting, examining, and discharging newborn infants to and from the well newborn nursery, performing common neonatal procedures like umbilical line placement, frenectomy, circumcisions, and digital ligation. In some practices, NHs also attend high-risk deliveries and provide 24-hours in-house coverage to the level II Neonatal Intensive Care Unit. (2)

This year the American Board of Pediatrics (ABP) is offering the first sub-specialty board certifying examination in PHM. The eligibility criteria are available on the ABP website. (3) The admission criteria for PHM board states: "For individuals who practice exclusively in a niche area such as neonatal-perinatal medicine, pediatric emergency medicine, pediatric critical care, bone marrow transplant or well-baby nursery, such a niche practice limited to one population of hospitalized children will not qualify one for the practice pathway as that is not the intention of the hospital medicine certificate". The rationale for this statement is the avoidance of certification duplication for sub-specialist who are board certified Neonatologists and Pediatric Intensivists. General pediatricians working exclusively in the well-baby nursery are NH with board certification in general pediatrics. The statement does not give any way out or alternative to these practicing NH.

Newborn Hospitalists are in a very unique professional dilemma. At one end they are not qualified neonatologists, and the other they are cannot be board certified in PHM. For now, most NHs work in the hospitals and get credentialed based on their general pediatric board certification (GP-BC). However, the potential concern for these practicing NH is what if hospitals start asking for sub-specialty BC to work as NH. As there is no NH board offered by ABP, the health authorities have to find the alternatives. The question is: would hospitals and insurance companies accept GP-BC in lieu of PHM-BC from practicing NHs, or do all NHs have to be PHM-BC?

If the answer is PHM-BC, then ABP should provide an interim solution for NHs. As there is no structured NH fellowship program and ABP does not have a separate NH-BC examination, NHs need some reassurance from ABP. It could be a letter or a statement on the web page stating GP-BC as a valid alternative to PHM-BC for NHs. In the interim period, the NH could use this official statement when applying for hospital credentialing. The other potential option for ABP could be to let NHs take the PHM board based on the practice pathway for the first two cycles, years 2019 and 2021. This way, the senior, seasoned practicing NHs have an opportunity to become board certified. I will urge all practicing NHs to write to ABP about this concern before it gets too late, and they are left with either doing a PHM or Neonatology fellowship.

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3. <https://www.abp.org/content/pediatric-hospital-medicine-certification>

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Dear Dr. Manzar,

The institution of a hospitalist role brings up many questions. In the not so distant past, it was sufficient to have completed a pediatric residency to take care of patients in an inpatient setting. Board certification in Pediatrics included the components necessary -- those components that should have been provided by the residency to demonstrate competency in the care of hospitalized patients.

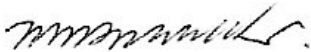
Now, the Pediatric Board confers a very different competency with the completion of a general pediatric residency. This competency no longer appears to include a hospital role. Essentially mirroring the change in pediatric residencies with an increased focus on outpatient pediatrics, most hospitalist positions are requiring additional training which can be conferred by the PHM-BC.

Dr. Manzur's commentary is very *apropos*, as it would seem that the Neonatal Hospitalist should have a designation that would recognize competency in our field. Certainly, as we relegate our neonatal training in residency to a much less significant role, there may be significant numbers of pediatric residents who do not have the skills to conduct an efficient resuscitation or intubate for that matter upon graduation.

Dr. Manzur is correct in raising this flag. Although many neonatal hospitalists may bridge their role to ultimately enter a neonatal fellowship, some may prefer to stay in a role defined by a different degree of involvement. A PHM-BC does not adequately provide document competency in neonatal care beyond that involved in care of babies in the normal nursery.

Should the ABP get involved and designate a separate neonatal hospitalist board? NT welcomes your comments.

Sincerely,



Mitchell Goldstein, MD
Editor in Chief

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Erratum (Neonatology Today June, 2019)

Neonatology Today has identified an erratum affecting the June, 2019 edition. Dr. Vincent Smith's contact information was incorrect. Dr. Smith can be reached at Vincent Smith <drk-sepia@gmail.com>

Corrections can be sent directly to LomaLindaPublishingCompany@gmail.com. The most recent edition of Neonatology Today including any previously identified erratum may be downloaded from www.neonatologytoday.net.

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Las nuevas mamás necesitan acceso a la detección y tratamiento para LA DEPRESIÓN POSPARTO



1 DE CADA 7 MADRES AFRONTA LA DEPRESIÓN POSPARTO, experimentando



Sin embargo, sólo el 15% recibe tratamiento¹

LA DEPRESIÓN POSTPARTO NO TRATADA PUEDE AFECTAR:



PARA AYUDAR A LAS MADRES A ENFRENTAR LA DEPRESIÓN POSPARTO



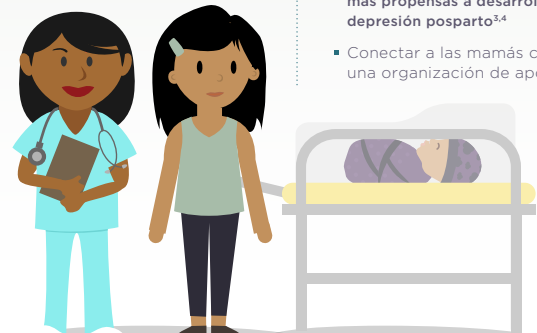
LOS ENCARGADOS DE FORMULAR POLÍTICAS PUEDEN:

- Financiar los esfuerzos de despistaje y diagnóstico
- Proteger el acceso al tratamiento



LOS HOSPITALES PUEDEN:

- Capacitar a los profesionales de la salud para proporcionar apoyo psicosocial a las familias... Especialmente aquellas con bebés prematuros, que son 40% más propensas a desarrollar depresión posparto^{3,4}
- Conectar a las mamás con una organización de apoyo



NCFIH National Coalition for Infant Health
Protecting Access for Premature Infants through Age Two
www.infanthealth.org

¹ American Psychological Association. Accessed on: <http://www.apa.org/women/resources/reports/postpartum-depression.aspx>
² National Institute of Mental Health. Accessed on: <https://www.nimh.nih.gov/health/publications/postpartum-depression-facts/index.shtml>
³ Journal of Perinatology (2019) 35, 529–536. doi:10.1097/JP.0000000000000147
⁴ Prevalence and risk factors for postpartum depression among women with preterm and low-birth-weight infants: a systematic review. Vigod SN, Villages L, Olesen L, Ross LE BJOG. 2010 Apr; 117(5):540-50.

Upcoming Medical Meetings

Quantum Caring for NICU Clinicians
Summerlin Hospital.png
August 24th, 2019, 8:30am - 5:00pm
Summerlin Hospital Medical Center,
Las Vegas NV
<https://www.caringessentials.net/quantum-caring-for-clinicians-workshop>

Innovations in Neonatal Care:
Celebrating 10 Years. The Future is Now!
August 11-13, 2019
Austin, Tx
<http://innovationsconference.com>

The AAP Experience
National Convention and Exhibition
New Orleans, LA
October 25-29, 2019.
<http://aapexperience.org/>

8th Annual Scientific Sessions of the
Cardiac
Neurodevelopmental Outcome
Collaborative
October 11-13, 2019;
Hospital for Sick Children, Toronto,
Ontario, Canada
www.cardiacneuro.org/upcoming/

NANN's 35th Annual Conference
Savannah Convention Center
Savannah, GA
October 9-12, 2019
<http://nann.org/education/annual-meeting>

International Lactoferrin Conference
Lima, Peru
November 4-8, 2019
<http://www.lactoferrinconference2019.com/index.html>
Chair: Dr. Theresa Ochoa,
Theresa.J.Ochoa@uth.tmc.edu

Miami Neonatology 43rd Annual
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November 10-13, 2019
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Philadelphia, PA
<https://2020.pas-meeting.org/>

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Loma Linda University Faculty Medical Group, Department of Pediatrics, Division of Neonatology, is seeking board certified or board eligible Neonatologists to join their team.

The Neonatal Intensive Care Unit (NICU) at Loma Linda University Children's Hospital is committed to providing the highest quality of family-centered medical care with our skilled, multi-disciplinary neonatal team. Our unit has 84 licensed beds for the most critically ill babies. As one of the few level 4 tertiary centers in Southern California, we are equipped to provide the highest level of care for newborns with the most complex disorders. Our facility has the largest Level IV NICU in California, serving approximately 25 percent of the state.

We have subspecialists in all medical and surgical areas that are available at all times and are supported by hospital staff with technical, laboratory, and service expertise. Pediatric neurologists work together with us in our NeuroNICU to diagnose, treat and monitor babies with neurologic injury or illness and we focus on providing neuroprotective, developmentally appropriate care for all babies in the NICU. Very specialized care is given in our Small Baby Unit to babies born at less than 30 weeks gestation. Babies at risk for developmental delay are followed up to 3 years in our High-Risk Infant Follow-up Clinic. Genetics specialists are available for evaluation and consultation.

Our Children's Hospital is designated as a Baby Friendly Hospital that supports breastmilk feeding for both term and preterm babies. Neonatal Social Workers and Child Life Specialists are important members of our team. It is our goal to support babies and families in culturally sensitive ways as our patients come from many different ethnic and religious backgrounds.

Loma Linda is located in the center of Southern California. A sunny climate augments the cultural benefits of Los Angeles and Palm Springs and the year-round recreational opportunities of nearby mountains, deserts and beaches.

This opportunity is not eligible for a J1 Waiver.



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Faculty Medical
Group

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Who We Are

With over 900 beds in four hospitals, we operate some of the largest clinical programs in the nation. We also offer the only Level I Regional Trauma Center and Children's Hospital in the Inland Empire servicing the largest county in the US. We lead in many areas of excellence; pediatrics, cardiac services, cancer treatment and research, mental health, chemical dependency, and other essential clinical disciplines. All this adds up to endless possibilities for our patients and for you.

The Neonatal Intensive Care Unit (NICU) at Loma Linda University Children's Hospital is committed to providing high-quality, family-centered care with our highly skilled, multi-disciplinary neonatal team. Our unit has 84 licensed beds for the most critically ill infants and a new Tiny Baby Program focusing on improving survival and outcomes of extremely low birth weight infants (<1000g at birth). As one of the only level 3 tertiary centers in Southern California, we are equipped to provide the highest level of care for the most complex disorders. We have subspecialists in all medical and surgical areas that are available at all times and are supported by hospital staff with technical, laboratory, and service expertise.

At Loma Linda University Health, we combine the healing power of faith with the practices of modern medicine. We consist of a University, a Medical Center with four hospitals, and a Physicians Group. These resources have helped us become one of the best health systems in the nation.

Contact Us

Please visit our website <http://careers.llu.edu> or contact Jeannine Sharkey, Director of Advanced Practice Services at jsharkey@llu.edu or (909) 558-4486.

If you are an individual who understands and embraces the mission and purpose of Loma Linda University and its entities as premier Seventh-day Adventist Christian institutions, please visit our website or call 1-800-722-2770. EOE/AA/M/F/D/V



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NEONATOLOGY TODAY

News and Information for BC/BE Neonatologists and Perinatologists



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Neonatology and the Arts

This section focuses on artistic work which is by those with an interest in Neonatology and Perinatology. The topics may be varied, but preference will be given to those works that focus on topics that are related to the fields of Neonatology, Pediatrics, and Perinatology. Contributions may include drawings, paintings, sketches, and other digital renderings. Photographs and video shorts may also be submitted. In order for the work to be considered, you must have the consent of any person whose photograph appears in the submission.

Works that have been published in another format are eligible for consideration as long as the contributor either owns the copyright or has secured copyright release prior to submission.

Logos and trademarks will usually not qualify for publication.

The topic is still "birds" for this month. Larry Tinsley, MD shares a photograph of a cool pair of penguins. The birds continue to rule.

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Manuscript Submission: Instructions to Authors

1. Manuscripts are solicited by members of the Editorial Board or may be submitted by readers or other interested parties. Neonatology Today welcomes the submission of all academic manuscripts including randomized control trials, case reports, guidelines, best practice analysis, QI/QA, conference abstracts, and other important works. All content is subject to peer review.
2. All material should be emailed to: LomaLindaPublishingCompany@gmail.com in a Microsoft Word, Open Office, or XML format for the textual material and separate files (tif, eps, jpg, gif, ai, psd, or pdf) for each figure. Preferred formats are ai, psd, or pdf. tif and jpg images should have sufficient resolution so as not to have visible pixilation for the intended dimension. In general, if acceptable for publication, submissions will be published within 3 months.
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5. A brief biographical sketch (very short paragraph) of the principal author including current position and academic titles as well as fellowship status in professional societies should be included. A picture of the principal (corresponding) author and supporting authors should be submitted if available.
6. An abstract may be submitted.
7. The main text of the article should be written in formal style using correct English. The length may be up to 5,000 words. Abbreviations which are commonplace in neonatology or in the lay literature may be used.
8. References should be included in standard "Vancouver" format. Bibliography Software should be used to facilitate formatting and to ensure that the correct formatting and abbreviations are used for references.
9. Figures should be submitted separately as individual separate electronic files. Numbered figure captions should be included in the main file after the references. Captions should be brief.
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