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A Comparison of Outcomes in Conservative Versus Active Treatment of Patent Ductus Arteriosus in Two Neonatal Intensive Care Units

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Abstract

Objective: *To determine whether the conservative management versus medical/surgical treatment of patent ductus arteriosus (PDA) in extremely low birth weight (ELBW) infants leads to improved morbidity, mortality, and length of stay (LOS).*

Study Design: *A cohort observational study was conducted on infants born October 31, 2017, through June 30, 2021, weighing ≤ 1000 grams with a confirmed PDA by echocardiogram. Median growth rate, LOS, ventilator days, need for oxygen at NICU discharge, major comorbidities, mortality, and the type of PDA treatment were collected. Subjects were divided into those who received only conservative management (Cohort 1) and those who received medical and/or surgical treatment to close the ductus (Cohort 2). Chi-square and Mann-Whitney U tests were used to compare baseline demographics and to determine any statistical significance in outcomes between the two cohorts.*

Results: *225 patients met the inclusion criteria, with 79 (35%) in Cohort 1 and 146 (65%) in Cohort 2. Upon comparison, demographics were similar among the two groups. There were no significant differences in weight gain, LOS, or ventilator days, nor in need for oxygen at NICU discharge, rates of necrotizing enterocolitis, bronchopulmonary dysplasia, or mortality (P > .05).*

Conclusion: *The management of ELBW infants with a PDA proved varied, with more than half receiving a medical and/or surgical intervention. This study failed to demonstrate significant improvement in several important outcomes or common comorbidities in Cohort 2. This suggests that while treating a PDA may benefit an infant's day-to-day clinical course, it may not improve their outcomes at NICU discharge. Further research is needed to increase statistical power and obtain generalizable results.*

Keywords

Ductus Arteriosus, Patent

Conservative Treatment

Infant, Extremely Low Birth Weight

Morbidity

Key Points

Should ELBW infants with a PDA be treated?

Many PDAs can be managed successfully with conservative treatment.

Medical or surgical closure of a PDA may not improve infant outcomes.

Introduction

Patent ductus arteriosus (PDA) is a prevalent heart defect in newborns, occurring at a rate of one in 2000 live births. It accounts for 5-10% of all congenital heart diseases in full-term infants. (1) Although the ductus arteriosus should functionally close within the first 72 hours of life, the incidence of closure is inversely related to birth weight and gestational age. (1-3) This makes it one of the most common problems encountered in the neonatal intensive care unit (NICU). At four days of life, it remains patent in 10% of infants born at 30-37 weeks, 80% of infants born at 25-28 weeks, and over 90% of infants born under 24 weeks. (3) A prolonged PDA can lead to left-to-right shunting, pulmonary over circulation, systemic hypoperfusion, cardiac remodeling, and eventual heart failure. (2-4) Large, hemodynamically significant PDAs are associated with prolonged mechanical ventilation, bronchopulmonary dysplasia (BPD), pulmonary hemorrhage, necrotizing enterocolitis (NEC), intraventricular hemorrhage (IVH), periventricular leukomalacia, cerebral palsy, retinopathy of prematurity (ROP), renal impairment, and mortality in preterm infants. (2-6)

"Therapy modalities include medical treatment with indomethacin, ibuprofen, and acetaminophen, and surgical or device closure. Although each of these methods has been shown to be effective in closing PDAs, large-scale studies have failed to demonstrate consistent long-term benefits compared to conservative, symptomatic management. (3,4,6,7)"

Therapy modalities include medical treatment with indomethacin, ibuprofen, and acetaminophen, and surgical or device closure. Although each of these methods has been shown to be effective in closing PDAs, large-scale studies have failed to demonstrate consistent long-term benefits compared to conservative, symptomatic management. (3,4,6,7) Overtreatment can lead to unnecessary exposure to indomethacin, ibuprofen, and acetaminophen; the use of these non-steroidal anti-inflammatory drugs (NSAIDs) has been associated with acute renal injury, oliguria, NEC, thrombocytopenia, and decreased blood flow to the brain, kidneys, and gastrointestinal tract. (2,3,7,8) Surgical, transcatheter, or device closure of PDAs can lead to pneumothorax, pneumonia, sepsis, laryngeal/phrenic nerve injury, vocal cord paralysis, acute kidney injury, prolonged mechanical ventilation, and even BPD. (1-3,9)

Previous research on PDA management has focused on comparing the efficacy of a specific type of medical or surgical treatment with conservative management. Less commonly, studies

have compared the outcomes of broad medical (using any type of medicine) or surgical management (using any intervention) with conservative management such as ventilator adjustments, fluid restriction, and intermittent diuretics. (10,11) Few studies have compared the benefits of any intervention (medical or surgical) with conservative management. Our study compared the neonatal outcomes of extremely low birth weight infants (ELBW) receiving medical ad/or surgical treatment to conservative management to determine whether there is any clear benefit from treating PDA during the NICU stay.

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Methods

A cohort observational study was conducted from October 31, 2017, through June 30, 2021. Data was collected from Banner – University Medical Center Phoenix and Banner Children's at Desert Medical Center, level III NICUs in the Phoenix, Arizona, area. Admissions were screened by creating a report using the BabySteps® application (Pediatrix Medical Group Inc., Sunrise, FL). This report included infants with a birthweight ≤ 1000 g diagnosed with a PDA of any size after an echocardiogram. Study inclusion criteria also specified that the infant was inborn. Infants were excluded based on comorbidities such as chromosomal, renal, and significant cardiac anomalies (other than a PDA) or other comorbidities at the discretion of the Principal Investigator. The Banner Health Institutional Research Board provided human protection oversight, and the study can be found on Clinicaltrials.gov as NCT04379843.

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Once an infant was found eligible to be included, the electronic health record system, Cerner Millennium (Oracle Corporation, Austin, TX), was used to collect data, including demographics, birth information, and outcomes during hospitalization. The length of stay (LOS) was recorded, as well as the average weight gain (calculated by dividing the total weight gain during admission by the LOS). The days the infant required respiratory support of continuous positive airway pressure or higher were included as ventilator days. Mortality after the first 48 hours of life, the diagnosis of BPD or NEC, and supplemental oxygen usage at discharge were collected. Management of the PDA was categorized as either conservative (symptomatic care), medical (use of ibuprofen, indomethacin, acetaminophen), or interventional/surgical management (via invasive catheter closure or ligation). The subjects were further divided into conservative management (Cohort 1) and medical and surgical management (Cohort 2).

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Baseline differences were calculated to determine whether the two cohorts' demographic and clinical characteristics were similar. Chi-square tests were used to evaluate the sex, racial, and ethnic breakdowns, and the Mann-Whitney U test was used to evaluate differences between the median birth weight and gestational age (GA). Clinical outcomes were similarly compared between the cohorts. Mortality after 48 hours of life, the need for oxygen at NICU discharge, and the presence of BPD or NEC were compared using Chi-square tests. Mann-Whitney U tests were used to compare LOS, average weight gain, and the number of ventilator days.

Results:

During the study period, there were 466 infants admitted to the 2 study sites weighing ≤ 1000 g at birth. Of these, 265 patients were diagnosed with a PDA. Forty infants were excluded from the study for the following reasons: born in the community or at another hospital (n = 19), congenital anomalies (n = 12), hemodynamically significant heart defect other than a PDA (n = 2), serious comorbidities (n = 4), and those still hospitalized at the end of the data collection period (n = 3). This left 225 patients that met inclusion criteria between the 2 NICUs, over half of which (53%) were male. The overall racial stratification was: 77% White, 11% Black, 7% American Indian, < 1% Asian, and 5% Other/Unknown. Twenty-nine percent of the infants were identified as having a Hispanic ethnicity. A large portion (71%) of the 160 infants were delivered

Table 1. Demographics

	Total Population N = 225	Cohort 1 n = 79	Cohort 2 n = 146	Cohort 1 versus Cohort 2 *P*-value
Sex (male)[a]	0.53	0.61	0.50	**.025**
Cesarean section delivery[a]	0.71	0.81	0.66	**.016**
Birth weight (grams)[b]	760 (725-780)	765 (685-800)	750 (723-782)	.509
Gestational age (weeks)[b]	25.3 (25.0-25.6)	25.6 (25.0-26.3)	25.1 (25.0-25.4)	.163
Race[a]				.459
White	0.77	0.77	0.77	
Black	0.11	0.13	0.10	
Asian	0.01	0.00	0.01	
American Indian	0.06	0.08	0.06	
Other/Unknown	0.05	0.02	0.06	
Ethnicity[a]				.506
Hispanic or Latino	0.29	0.27	0.31	

[a]Mean, [b]Median (Confidence Interval 95%)

via cesarean section. The infants had a median gestational age of 25.3 weeks and a median birth weight of 760 g. A classification of demographics by cohort can be seen in Table 1.

The average LOS for the total population was 113.5 days, with 66.8 ventilator days and a mean average weight gain of 24.2 g/day. Nineteen infants (8.4%) died between 48 hours of life and discharge. There was a diagnosis of NEC in 20 infants (8.9%), 190 (84.4%) developed BPD, and 104 (46.2%) required supplemental oxygen upon discharge. It should be noted that some subjects were transferred or had died before a diagnosis of BPD, or the need for oxygen at NICU discharge could be assessed.

Of the infants who met inclusion criteria, 79 (35%) were in Cohort 1, having received conservative management for their PDA. Cohort 2 consisted of 146 infants (65%) that received medical or surgical management. The cohorts were similar in racial and ethnic distribution ($P \geq .05$), median birth weight, and GA at birth.

Table 1. Demographics

	Cohort 1 n = 79	Cohort 2 n = 146	*P*-value
Length of Stay (days)[b]	111 (97.9-124.4)	115 (109.7-124.0)	.329
Weight gain (grams/day)[b]	24.1 (23.0-25.1)	24.3 (23.5-25.6)	.368
Ventilator days[b*]	59 (54-75)	71 (65-74)	.126
Bronchopulmonary dysplasia[a*]	0.80	0.87	.205
Necrotizing enterocolitis[a]	0.11	0.08	.436
Oxygen at hospital discharge[a]	0.44	0.47	.663
Mortality after 48 hours[a]	0.13	0.06	.095

[a]Mean, [b]Median (Confidence Interval 95%)
*Ventilator days = duration of respiratory support of nasal continuous airway pressure or above
*Bronchopulmonary dysplasia = any oxygen support at 36 weeks postmenstrual age

Interestingly, male infants were more likely to receive conservative management than females (63% versus 48%, *P* = .025). In addition, infants who were delivered by Cesarean section were more likely to receive conservative management than those born vaginally (81% versus 66%, *P* = .016) (Table 1). The outcomes at NICU discharge between the cohorts were comparable in terms of mortality, LOS, the number of ventilator days, average weight gain, need for oxygen at NICU discharge, and rates of BPD and NEC (*P* > .05) (Table 2).

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Discussion:

Untreated large PDAs cause left-to-right shunting leading to pulmonary over-circulation and systemic under-circulation. (2) Over time, this can lead to pulmonary edema, suboptimal gas exchange, ineffective ventilation, pulmonary hemorrhage, and eventual BPD. (2-5) The undue strain on the right side of the heart can lead to eventual congestive heart failure in severe cases. (1,3) Ongoing left-to-right shunting leads to ductal steal, where the body receives persistent under circulation and low diastolic blood pressure. (1) This disruption in blood flow leads to dysfunction in oxygen-sensitive organs like the brain, eyes, kidneys, and gastrointestinal tract. As a result, infants with a prolonged, hemodynamically significant PDA are more at risk for IVH, ROP, NEC, oliguria, acute kidney injuries, and death. (1-6) One study of very premature infants (birth weight ≤ 1500 g and GA ≤ 29 weeks) by Dr. Noori et al. (12) found that infants whose PDA failed to close had an eightfold increase in mortality. Our study did not track the incidence of IVH, ROP, or renal dysfunction; however, a number of the infants, regardless of management, had NEC, BPD, need for oxygen at NICU discharge, and mortality, which is known risk factors of PDA.

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Scores of studies over many decades have shown that pharmaceuticals can be helpful in the closure of PDAs. A recent meta-analysis by Marconi et al. (13) analyzed 64 randomized controlled trials and 24 observational studies, totaling nearly 15 000 research subjects. They found that infants who received indomethacin (odds ratio [OR] 0.17, credible interval [CrI] 0.11-0.24), ibuprofen (OR 0.19, CrI 0.12-0.28), and acetaminophen (OR 0.15, CrI 0.09-0.26) were more likely to have their PDAs close when compared to a placebo. (13) Surgical treatment can also be successful by ligating the ductus arteriosus or a mixture of dividing the ductus and closing it with sutures or clips. (1) Yet, the surgery itself is not without risks. A 25-year cohort study by Foster et al. (14) showed that 44% of ELBW infants who underwent a PDA ligation had at least one short-term complication from the repair. In an additional study of almost 200 infants who underwent surgical closure of their PDA, the majority did not exhibit the expected outcome of a rapid improvement in cardiorespiratory status and went on to develop BPD. (15) In recent years, less invasive transcatheter device closure has become more common with promising results. (2)

Although medical and surgical treatments have shown to be successful in closing PDAs, consistent, long-term beneficial effects are few when compared to conservative management. (3,4,6,7) This is especially true for infants > 1000 g, as up to 97% of PDAs will close with conservative treatment by discharge from the NICU. (16) Given this, in recent years, neonatologists' treatment has trended towards less active management, which often involves fluid restriction, diuretics, ventilation adjustments, and "watchful waiting" until the PDA closes or at least becomes less hemodynamically significant. (1,2,16,17) Bixler et al. (17) reviewed all infants born at 23-30 weeks GA with a PDA from indomethacin decreased from 32 to 18%, and PDA ligation decreased from 8.4 to 2.9%. (17) Over time, neonatologists have recognized that a conservative approach avoids the invasiveness, side effects, and expenses of medical and/or surgical management, with potentially the same results in managing PDA-related morbidities and mortality.

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A reduction in active treatment was similarly found by Hagadorn et al. (18), who studied nearly 14,000 very low birthweight (VLBW) infants with PDA at 19 children's hospitals across the United States. Between 2005-2014, the use of NSAIDs or surgery to treat PDAs decreased by 11% per year. Although this was temporally associated with improved survival, there was also an increased incidence of BPD, periventricular leukomalacia, ROP, and acute renal failure. Ultimately, the increase in conservative PDA management did not lead to significant changes in preterm outcomes or mortality. (18) This mirrors the findings from our study, where infants who received active treatment failed to demonstrate significant improvements in known complications of PDA. Our data also failed to show improvements in the ventilator days, average weight gain, length of hospital stay, and need for oxygen at NICU discharge. In some categories, such as the length of hospital stay, ventilator days, incidence of BPD, and need for oxygen at discharge, the infants in Cohort 1 had improved outcomes, although none of these differences achieved statistical significance.

"Our results align with much of the existing literature that suggests conservative management may be a safe option and could provide advantages over other treatments. (10,17,19-21) During a review of over 800 000 infants at 280 NICUs across the United States, Bixler et al. (17) found that a less invasive approach was associated with a lower incidence of mortality, IVH, NEC, and severe NEC (P < .001), with the incidence of BPD being the only outcome that did not change."

Our results align with much of the existing literature that suggests conservative management may be a safe option and could provide advantages over other treatments. (10,17,19-21) During a review of over 800 000 infants at 280 NICUs across the United States, Bixler et al. (17) found that a less invasive approach was associated with a lower incidence of mortality, IVH, NEC, and severe NEC (*P* < .001), with the incidence of BPD being the only outcome that did not change. A meta-analysis by Hundscheid et al. (10) compared the effects of conservative management with any medical or surgical treatment. It was composed of 12 cohort studies and four randomized controlled studies and included infants born < 32 weeks GA, or < 1500 g. In the cohort studies totaling nearly 42 000 infants, those who received conservative management had a higher risk of mortality (relative risk [RR] 1.34, 95% CI 1.12-1.62). However, they had a lower risk of BPD (RR 0.55, 95% CI 0.46-0.65), NEC (RR 0.85, 95% CI 0.77-0.93), IVH (RR 0.88, 95% CI 0.83-0.95), and ROP (RR 0.47, 95% CI 0.28-0.79). In the four randomized controlled trials with 720 patients, there was no significant difference in outcomes of mortality, BPD, NEC, IVH, or ROP between the groups who received active versus conserva-

tive PDA treatment. (10)

A study by Park et al. (21) analyzed treatment data on all South Korean infants with a PDA between 2015-2018, totaling over 12,000 patients. Infants who received active PDA treatment (whether pharmaceutical or surgical) had no significant differences in the incidence of mortality or IVH. Conversely, infants who received active PDA treatment had a higher incidence of BPD (OR 2.23, 95% CI 1.83-2.71), NEC (OR 2.35, 95% CI 1.75-3.51), sepsis (OR 2.65, 95% CI 2.17-3.25), and ROP (OR 1.47, 95% CI 1.17-1.86). (21) Clyman et al. (19) compared outcomes of pharmaceutical treatment versus conservative management of PDA in infants < 28 weeks GA across 17 international NICUs (the United Kingdom, the United States of America, Sweden, and Turkey). There was no difference between the two groups in the presence of a PDA at discharge or the need for surgical ligation. Similar to the findings in our study, the incidence of mortality, BPD, and NEC were comparable between the two groups. Infants who received pharmaceutical treatment and were born at 26-28 weeks GA achieved full enteral feeds later and had higher incidences of mortality and late-onset non-coagulase-negative *Staphylococcus* bacteremia. (19) Letshwiti et al. (20) studied VLBW infants who were fluid-restricted and received increased positive end-expiratory pressure as the first-line intervention (conservative treatment) to 2 other cohorts who received ibuprofen for a hemodynamically significant or clinically symptomatic PDA. The infants in the conservative treatment group had significantly decreased BPD compared to the other two groups and no changes in other measured short-term outcomes. (20)

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There is increasing evidence that conservative management may be equally effective and perhaps somewhat safer than pharmaceutical or surgical treatments. However, it would not be justified to argue that active treatment does not have a place in managing PDAs. In isolated cases, infants with a particularly large PDA and an unstable clinical course may benefit from medical, transcatheter, or surgical treatment. Isayama et al. (22) highlight the need to identify which infants may most benefit from intervention definitively. Their 2020 review of over 39 000 infants showed a significant U-shaped relationship between the observed/expected PDA treatment ratio and adverse outcomes. This suggests a fine line between PDA treatment's potential advantages and harms, where the benefits may only exceed the risks when a PDA is hemodynamically significant. (22) In addition, Elhoff et al. (23) found that delaying indomethacin treatment in favor of conservative management makes it less likely to be successful. Perhaps treatment options must be used more judiciously and selectively, not eliminated.

A common limitation of this study and others is the possibility of confounding variables affecting the outcomes. Infants who received active PDA treatment may have had, on average, a more unstable, traumatic clinical course than those who received conservative management. This would make them more likely to experience BPD, IVH, NEC, ROP, and death, whether their PDA was treated with pharmaceuticals or surgery. Yet, due to active PDA management, some of these patients may have experienced less severe comorbidities than they otherwise would have.

Other limitations include that it was confined to 2 NICUs in Arizona, which may not represent the national and international neonatal population. Our study was limited to ELBW infants, so the results cannot be justifiably extrapolated to the remainder of the NICU population with PDAs. Furthermore, our study only included 225 research subjects, which limits the statistical power of this study. Male infants and those delivered via Cesarean section were significantly more likely to receive conservative management, which may bias the results of our study. Infants were not further divided into subgroups by GA or PDA size to analyze possible differences that may have been present. We defined BPD in our study solely by the presence of supplemental oxygen at 36 weeks postmenstrual age; newer definitions that may more accurately categorize BPD are now available. (24)

Further research across multiple medical centers and states, with careful clinical course controls, needs to be conducted to minimize bias and determine which PDAs would genuinely benefit from medical or surgical treatment to improve an infant's NICU course and post hospital outcomes.

"Unless an infant is clearly symptomatic from a PDA, conservative management should be strongly considered to limit unnecessary therapies and their undesirable side effects. Our study showed no benefits in the outcomes at NICU discharge for ELBW infants whose PDAs were treated with medication and surgery versus conservative management."

Conclusion

Unless an infant is clearly symptomatic from a PDA, conservative management should be strongly considered to limit unnecessary therapies and their undesirable side effects. Our study showed no benefits in the outcomes at NICU discharge for ELBW infants whose PDAs were treated with medication and surgery versus conservative management. There was no statistically significant difference in mortality, LOS, ventilator days, average weight gain, BPD incidence, NEC, or need for oxygen at NICU discharge. These results suggest that while large, clinically significant PDAs may benefit from medical and surgical treatment, many can be managed conservatively with little to no impact on outcomes by hospital discharge.

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Letters to the Editor

Letter to the Editor: Better Safe than Sorry: A Sorry State of Affairs

Dear Editor

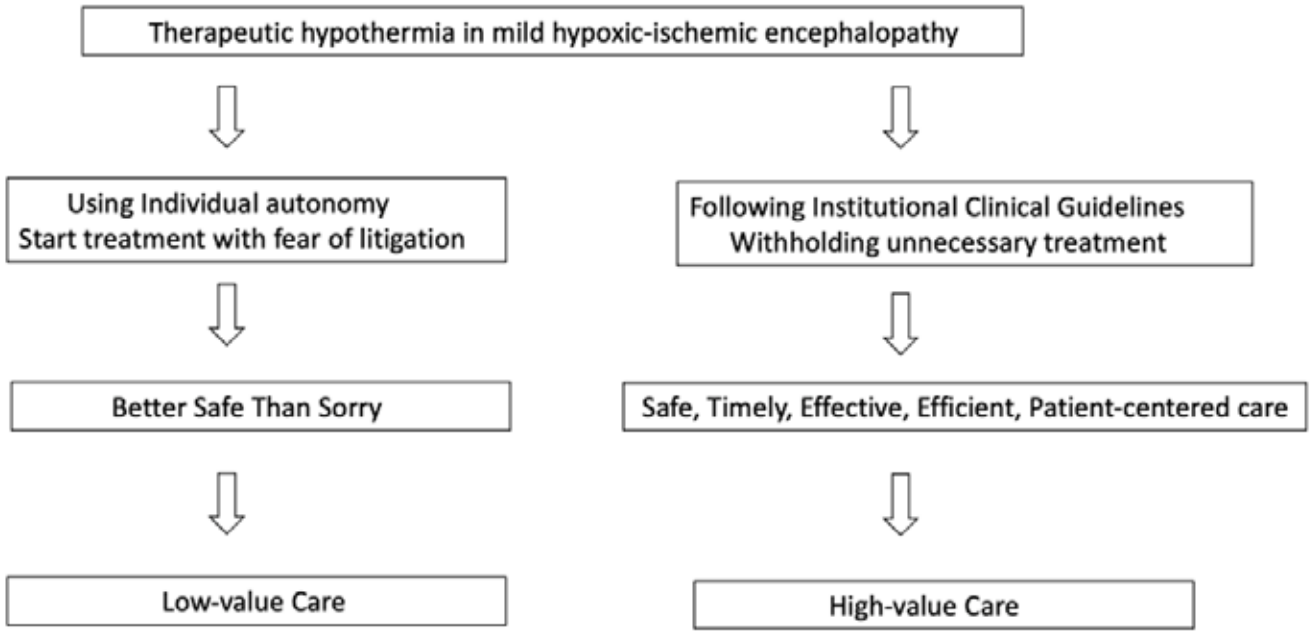
Care of neonates involves making appropriate decisions based on evidence. While most decisions are tailored to the policy or guidelines, providers can personalize the care. Due to the fear of litigation in general and the lack of concrete evidence in specific, certain individualized clinic decisions could lead to excessive use of healthcare resources. With the increasing cost of healthcare, it is essential to address these practices and improve the general healthcare quality.

" Due to the fear of litigation in general and the lack of concrete evidence in specific, certain individualized clinic decisions could lead to excessive use of healthcare resources. With the increasing cost of healthcare, it is essential to address these practices and improve the general healthcare quality."

In the quest to promote high-value care (HVC), healthcare facilities (HCF) conduct quality assurance (QA) exercises. An example of HVC is the implementation of antibiotic stewardship. However, despite the availability of institutional guidelines, HCF still struggles with individualized decisions of the healthcare providers under the notion of 'better safe than sorry.' This slogan is widely used when the stakes are high. Here we present the example of therapeutic hypothermia (TH) in mild hypoxic-ischemic encephalopathy (HIE) (Figure). The recent literature findings range from no benefits to harm in providing TH in mild HIE. (1-5)

"Providing treatment with the fear of litigation and medicolegal repercussion may trigger low-value care and should be viewed critically. Holding a treatment that is costly and has shown no benefits is HVC. In HVC, doing less is more. In most QA meetings, during case discussions, the most common question is, 'why was this intervention not taken.' The committee should rephrase the question and ask 'why this intervention was done.'"

Providing treatment with the fear of litigation and medicolegal repercussion may trigger low-value care and should be viewed critically. Holding a treatment that is costly and has shown no benefits is HVC. In HVC, doing less is more. In most QA meetings, during case discussions, the most common question is, 'why was this intervention not taken.' The committee should rephrase the question and ask 'why this intervention was done.' Just saying 'better safe than sorry' is not a plausible excuse for low-value care. The practice paradigm should change and be practiced in the QA



meetings for better and less costly healthcare.

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Dear Dr. Manzar,

Thank you for an interesting analysis of cost-benefit dynamics. Certainly, where laboratory tests, therapeutic action, and other medical adventures are undertaken to avoid a lawsuit, the patient benefit is minimal, and "Better Safe Than Sorry" is the reigning theme, but is low-value care ever high-value? (1)

Admittedly, I have changed the question, but I have been amazed by "Low-value Care" saving the day when "dumb luck" prevented significant morbidity and mortality. For discussion, a baby was delivered by routine cesarean section at term with no reported risk factors. The pediatrician ordered the sepsis workup on this patient because the nurse confused this patient with one with a similar last name who did have risk factors for sepsis. The CBC and CRP were beyond belief and were repeated and confirmed. The baby was assessed and found to be asymptomatic but admitted to the NICU for antibiotic therapy despite an understanding that the baby had been misidentified as at risk in the first place. Group B Strep grew from the blood culture at less than 12 hours. The baby developed respiratory distress and pulmonary hypertension but avoided progression to ECMO. The parents were aware of the situation but were incredibly thankful that their child had received "low-value" care.

Yes, this case is anecdotal and rare, but then there is the question, at what cost is litigation? That question may also define value. (2) We should not practice defensive medicine but be aware of the cost of caring for a damaged baby, the one in a million baby that fell through the cracks. No algorithm is 100% effective, no policy is 100% correct, and babies do not read textbooks. (3)

"Yes, this case is anecdotal and rare, but then there is the question, at what cost is litigation? That question may also define value. (2) We should not practice defensive medicine but be aware of the cost of caring for a damaged baby, the one in a million baby that fell through the cracks."

These risks must be reconciled with real-world numbers. If there is a 0.1% chance of error, this appears to be a reasonable risk, but if that risk of error is spread out over all of the babies admitted to a busy newborn service, the results can be disastrous. If the center delivers 500 babies a month, six babies per year are affected by the risk on average. At a 0.01% risk, that number drops to less than one baby per annum; at 0.001%, it may be a decade or more before the risk materializes. Conversely, in a center that delivers five babies a month, a 0.1% risk of occurrence indicates a very unlikely materialization of the risk comparable to 0.001% at the larger center. (4)

When we look at low and high-value care metrics, risk prevalence, tolerance and management must factor in the number of patients potentially affected by the condition. Where the risk is immaterial and not suggestive of any penetrance in a given year, yes, this is a low-value intervention. In the busy unit down the street, the intervention may be of high value because of the expected occurrence at regular intervals. (5)

"When we look at low and high-value care metrics, risk prevalence, tolerance and management must factor in the number of patients potentially affected by the condition. Where the risk is immaterial and not suggestive of any penetrance in a given year, yes, this is a low-value intervention. In the busy unit down the street, the intervention may be of high value because of the expected occurrence at regular intervals. (5)"

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Erratum (Neonatology Today December, 2022

Neonatology Today is not aware of the erratum affecting the December, 2022 edition.

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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Fellow's Column: Letter to the Editor "A Delphi Survey – Enhancing Parents' Knowledge and Practice of Kangaroo Mother Care"

Dear Editor:

With great interest, I read "A Delphi Survey – Enhancing Parents' Knowledge and Practice of Kangaroo Mother Care" (Paulse, N. A Delphi Survey – Enhancing Parents' Knowledge and Practice of Kangaroo Mother Care. Neonatology Today. 2022;17(11):3-10). In this article, Paulse aims to establish guidelines for a teaching program to enhance parents' understanding and application of kangaroo mother care (KMC) for preterm infants. The Delphi Survey method assessed a panel of experts to determine the essential KMC practice directives to include in the teaching program. The authors encourage applying these created directives in practice and evaluating their effects on KMC coverage. We believe this teaching program could adequately address one of the most important barriers in KMC practice, patient education. Hopefully, improving patients' understanding of KMC will increase their engagement in KMC. As challenges associated arise, we believe it would be valuable to analyze and amend the program directives as needed.

"The authors encourage applying these created directives in practice and evaluating their effects on KMC coverage. We believe this teaching program could adequately address one of the most important barriers in KMC practice, patient education. "

Since the introduction of KMC twenty-five years ago in Columbia (1), several meta-analyses and systematic reviews have shown the benefits of KMC (2). It is now widely accepted and practiced in multiple countries (3). While KMC is beneficial and popular, some barriers hinder its prevalence in practice and understanding. In "Kangaroo mother care: a systematic review of barriers and enablers," published in 2016, Chan et al. categorized barriers to kangaroo mother care practice into six categories: Buy-in and bonding, Social support, Time, Medical concerns, Access, and Context (4). In another study, Alenchery et al. split the barriers to skin-to-skin contact (SSC) into three main branches: system barriers, experiential barriers, and knowledge barriers (5). Both studies emphasize the importance of parents' knowledge and patient education as major barriers to KMC. Paulse's created directives hope to address this knowledge gap regarding KMC accordingly. While we believe it would be beneficial to address general patient education, other barriers to KMC application should be addressed to create a more comprehensive directive.

Additionally, directives addressing Covid-19 patient education regarding KMC should be added. At the beginning of the Covid-19 pandemic in 2020, the American Academy of Pediatrics (AAP) temporarily recommended separating newborns from mothers with Covid-19 due to a lack of knowledge about the virus (6). This initial guideline created detrimental separation practices and negatively impacted KMC practice (7). In July 2020, the AAP guideline was amended because direct breastfeeding and rooming-in were proven safe. After all, perinatal transmission of Covid-19 is unlikely if proper precaution is taken (8). A comparative risk analysis published by Minckas et al. found that the benefit of KMC outweighs the mortality risk of Covid-19 by 65-fold in preterm neonates in low- and middle-income countries, which further supports KMC practice during the Covid-19 pandemic (9). We believe updating parents about the most recent Covid-19 postnatal care guidelines is crucial to their newborns' care. Misinformation can cause parents to unnecessarily fear Covid-19 transmission, which may become a barrier to applying KMC. Additionally, many hospitals have strict and complicated visitor guidelines due to Covid-19, which could exasperate parents' fear of transmission to their newborns and negatively affect their willingness to practice KMC.

"Misinformation can cause parents to unnecessarily fear Covid-19 transmission, which may become a barrier to applying KMC. Additionally, many hospitals have strict and complicated visitor guidelines due to Covid-19, which could exasperate parents' fear of transmission to their newborns and negatively affect their willingness to practice KMC."

Paulse and Venter focus on parents' vital role in KMC practice through their KMC directives. We agree with the importance of patient education and suggest expanding the guidelines to address the views of other associated parties, such as healthcare professionals and lawmakers. Per Minckas et al., these associated parties provide patients with the services and protection that encourage them to practice KMC. In a multi-site implementation research study by Mony et al., patients were more inclined to practice KMC due to support from government leadership, health workers' recommending KMC as the standard of care, and systematic changes in infrastructure and policy (10). To promote the frequency of KMC, Mony recommends creating policies that minimize mother and baby separation, allowing parents to care for their hospitalized children, and focusing on the needs of the mother and baby through integrated care. Policymakers must put these principles into practice while allowing for adaptation in the event of unique cases.

"In an interview with a NICU nurse in Southern California, we learned that time and human resources have been limiting factors in providing KMC for patients."

In order to better understand potential barriers to KMC, various healthcare personnel who participate in KMC should be consulted. In an interview with a NICU nurse in Southern California, we learned that time and human resources have been limiting factors in providing KMC for patients. By combining general principles established by Paulse and Venter with individual opinions on barriers to care, the created directives could provide both the backbone and terminal bridges to enhance KMC practice from top-to-bottom and bottom-to-top directions for all those involved.

In conclusion, we sincerely appreciate the KMC directives created by Paulse and Venter.

"We would love to expand on their idea by providing information for directives that address Covid-19 concerns and healthcare professionals' input. We hope this letter will promote positive discussion and ultimately increases KMC awareness."

We would love to expand on their idea by providing information for directives that address Covid-19 concerns and healthcare professionals' input. We hope this letter will promote positive discussion and ultimately increases KMC awareness.

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Sincerely,

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Dear Dr. to be Chen,

Thank you for a very cognitive review of this paper. KMC's simplicity causes much concern because of perceived risks to the care of the patients. There is also a knowledge gap between what parents, nurses, and physicians expect. The idea of skin-to-skin did not begin recently but is probably as old as our species and may extend back further. There are certainly animal analogies to KMC. The point is that there was never an instruction manual or a right or wrong way of engaging skin-to-skin parents with the baby. Prematurity does complicate the interaction, and there are individual issues that are care-related that may preclude KMC in certain instances, but this does not connotate an inability to engage or approach engagement at some later point.

"COVID-19 did present a conodrum. (1) We understood that this pathogen was capable of causing severe morbidity and mortality in adults and that several cases of vertical transmission had produced disease in neonates. Unique in this particular situation was the concern that COVID-19 would in some way affect staff and thereby cause staffing issues. "

COVID-19 did present a conodrum. (1) We understood that this pathogen was capable of causing severe morbidity and mortality in adults and that several cases of vertical transmission had produced disease in neonates. Unique in this particular situation was the concern that COVID-19 would in some way affect staff and thereby cause staffing issues. To the editor's knowledge, there is no documented COVID-19 passage from a neonate vertically to NICU staff. Strict visitation policies that precluded the presence of one or both of the parents for large epochs of the hospital stay were toxic to the presumption of routine KMC and any teaching regarding these practices. (2, 3)

As the pandemic progressed, it became apparent that the risks were different than initially thought. COVID-19 did not have to be a barrier to KMC and teaching. Moving forward, we must learn that programs involving parents' and babies' separation are not sustainable. However, with the next pandemic or health, scare come

new risks, and it is impossible to quantify how the health systems will react, especially if this threat involves increased risk to infants and staff members. (4)

The resource issue must be separated from the applying KMC. In theory, with parents who understand their role, neonates in KMC should be more stable and require less monitoring. These directives must focus on realistic expectations, maintenance of the infant-parent dyad, and further the benefits offered by KMC.

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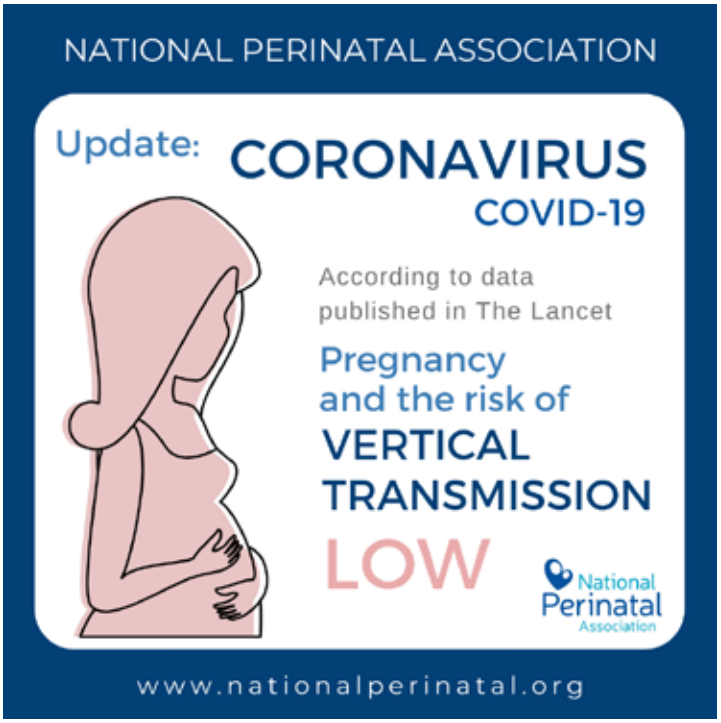

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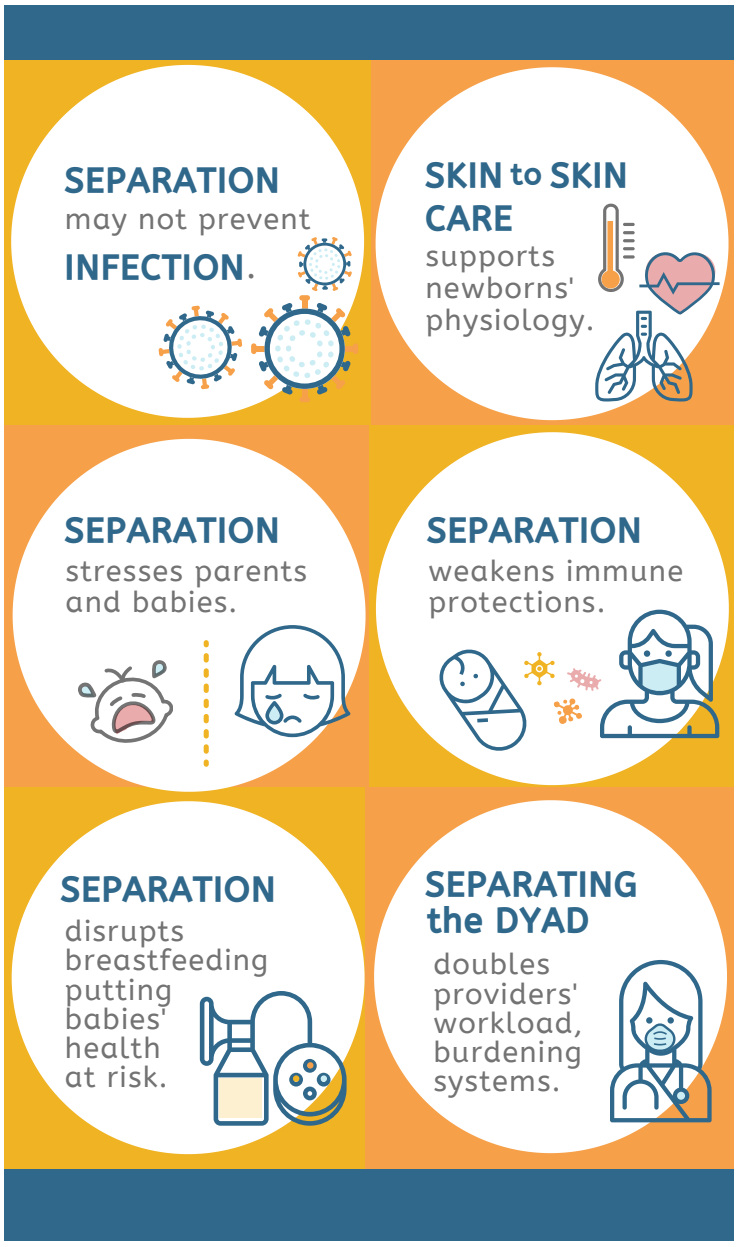

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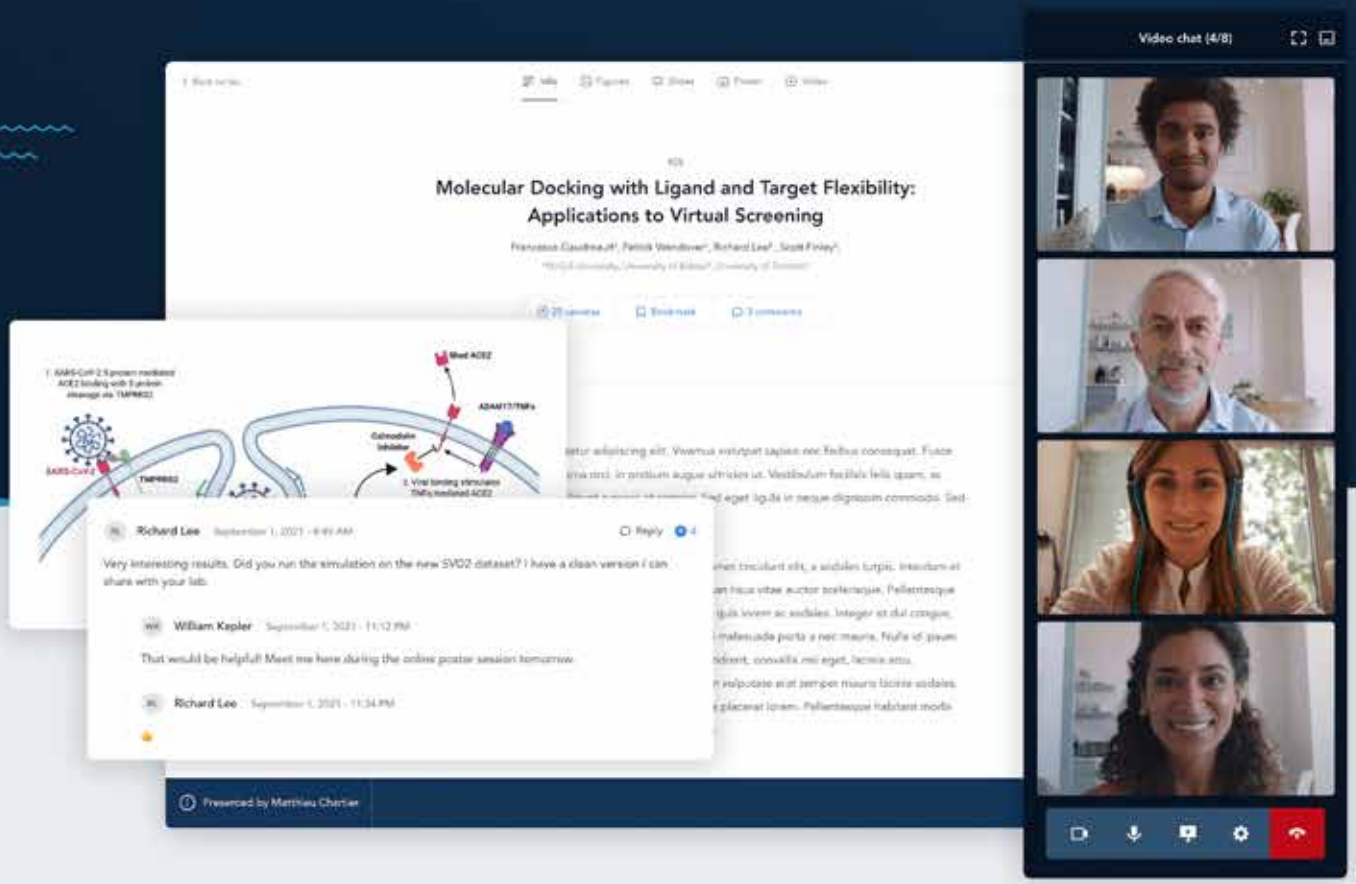

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Dress is casual throughout the conference. Please bring a jacket to the meeting rooms, as they are often cold. Physical distancing will be observed. Masks are optional.

The hotel has complimentary parking.

Airport & Ground Transportation

The two airports nearest the hotel are Tampa International Airport (TPA) and St. Petersburg/Clearwater airport (PIE). Both airports offer car rental.

Taxi fare from Tampa airport can exceed $60. Uber and Lyft average around $35 ish, before tips.

For more information on Tampa airport, visit https://www.tampaairport.com/guest-services and the St. Petersburg/Clearwater airport, visit http://www.fly2pie.com/

Sunset Dinner & Dancing On The Beach

Please register: Sunset Dinner & Dancing on the Beach Party Tickets, Thu, Mar 9, 2023 at 6:00 PM | Eventbrite

Online Dinner Reservations

https://www.eventbrite.com/e/sunset-dinner-dancing-on-the-beach-party-tickets-410139386947

36TH ANNUAL GRAVENS CONFERENCE ON THE ENVIRONMENT OF CARE FOR HIGH RISK NEWBORNS

Conference Background

In a perfect world, there would be no need for a NICU. Yet our reality is that babies continue to be born too sick, too soon, and with medical conditions requiring hospitalization. Activities in the NICU have a profound impact on the babies, their families and the staff. What you do matters. Your work has the potential to impact a neonate's health outcome, as well as that of the family and staff in the NICU.

Since the 1980s, neonatal care providers have worked to mitigate the stress experienced by babies, parents and providers. Doing so has involved change and its inherent struggles, but eventually we have adapted our NICU culture, policies and approach. We strive to nurture the developmental needs of babies and the emotional and informational needs of their parents through evidence-based knowledge in neurodevelopmental science, developmental care, healthcare design, and family support. This work continues at The 36th Annual Gravens Conference.

Registration Fees

Early Bird Full Conference In-Person Registration Early Bird Ends 1/6/2023	$685.00
Remote, in real time	$625.00
Full Time Students/Trainee Registration In-Person	$300.00
Group In-person Registration 3 and more	$560.00
Nurses/Allied Health Professionals In-person	$495.00
Nurses/Allied Health Professionals Remote in Time	$425.00
Single Day In-person Registration	$200.00
NICU Parent Registration In-person	$300.00
NICU Parent Registration Remote in Time	$300.00
Full Conference In-person 3/8-3/11	$750.00
Institutional Group Zoom Registration	$1000.00
International Low Income Country Zoom Registration	$85.00
International Zoom Registration	$125.00

Course Objectives

- At the conclusion of the program, participants should be able to:
- Relate rationale for implementing optimal family centered, developmentally supportive care and environmental design approaches in newborn intensive care units.
- Describe rationale and evidence to keep parents and babies consistently together from delivery to discharge
- Identify current environmental design for newborn intensive care units that benefit babies, families and staff.
- Compare and contrast evidence based developmental and family centered care programs.
- Implement evidence based infant and family centered developmental care changes in your unit.

Target Audience

This program has been developed to meet the educational needs of healthcare practitioners such as Neonatal Nurses (RNs, NNPs, ARNPs), NICU Therapists, Neonatologists, Pediatricians, Psychologists, Occupational Therapists, Physical Therapist, Speech-Language Pathologist, Family Support Staff, Architects, Hospital Administration, Infant & Child Development Specialists, Social Workers & Counselors, Parents and Family members and other professionals working with high-risk infants, their families or their physical environment.

Competencies to be addressed

PATIENT CARE AND PROCEDURAL SKILLS;
Medical knowledge; Systems-based practice; Professionalism; Interpersonal and communication skills.

DISCLAIMERS:
Final number of continuing education credits maybe changed based on speakers objectives. PAC/LAC reserves the right to amend speakers, topics and scheduling at any time.

GRIEVANCES:
Any grievances may be made to info@paclac.org

Continuing Education

PAC/LAC is accredited by CMA to provide continuing medical education for physicians.

PAC/LAC is an approved provider by the California Board of Registered Nursing, Provider number CEP 5862.

Pending accreditation approval (application in process)

- Occupational Therapy
- Respiratory Care Therapist

Documentation will be provided for self-reporting:

- Physical Therapy
- Architect
- Speech/Language and Audiology Therapists

Certificate Policy:

After completion of the course evaluation, you will be provided with a continuing education certificate. Make sure to save your certificate.

PAC/LAC will assist you with finding your certificate for up to 1 year from the event without cost. For assistance with any certificates older than 1 year from the time of the event, PAC/LAC charges $20 for the first certificate, and $15 for each additional certificate requested each calendar year. A $10 processing fee will be added to requests needing fulfillment within 24 hours.

Equal Opportunity & Accommodations for Disabilities:

PAC/LAC is an Equal Opportunity /Affirmative Action / Equal Access Institution.

For disability accommodations contact PAC/LAC at 818-708-2850, or email Gayane Pakhanyan at gpakhanyan@paclac.org a minimum of fifteen (15) working days in advance of the event

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High-Reliability Organizing (HRO): Engagement Matters, Is Personal, and Initiates Enactment

Daved van Stralen, MD, FAAP, Sean D. McKay, Errol van Stralen, Thomas A. Mercer, RAdm, USN (Retired)

Abstract

Organizations do not engage. People engage. There are circumstances we encounter when we cannot choose not to act. Unfavorable risk-benefit ratios are not a reason to decline. Lack of Engagement becomes Karl Weick's 'enacted failure by not acting.' Engagement is contextual acting within an unstable environment, and that acting removes constraints on acting. Context is the effect of subtle, nuanced, ephemeral details. Engagement makes use of and strengthens the individual's sense of self-efficacy and internalizes their locus of control. Separated from contextuality are those in positions of leadership. "To engage" becomes the initiator for action. Action becomes the source of learning. Learning and action generate experience.

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Introduction

Organizations do not engage; people engage. For the HRO, *not* engaging and *not* acting ARE failures because there is no enactment. The significance of engagement is enshrined in the public safety directive of *duty to act*. In the operational area, engagement generates information and creates the structure necessary for operations in an unstable environment (1). In organizational science, Karl Weick introduced *enactment* to "preserve the central point that when people act, they bring events and structures into existence and set them in motion" (2).

The relation between engagement and enactment may appear trivial. Weick and one of the authors (DvS) had a 15-year discussion about whether the military and public safety concept of engagement was subsumed by enactment (Weick's view) or whether it was the engagement that initiated enactment (the author's view). A request by the editor (MG) of *Neonatology Today* for an article describing "pragmatic HRO for pandemic COVID" (3) led to a resolution of the debate. For the report, the authors believed that the contextualized pragmatic stance and the abstract, scientific rationality of the normative stance for HRO were a source of conflict. Weick, on the other hand, identified the two perspectives as forming a gap, but a gap that could only be bridged through the act of engagement (3)

"Neither engagement nor enactment develops from pure thinking. They develop through acting. From the operational perspective, acting is how we think. The literature on motor cognition now supports this experience of operators (4, 5). "

Neither engagement nor enactment develops from pure thinking. They develop through acting. From the operational perspective, acting is *how* we think. The literature on motor cognition now supports this experience of operators (4, 5). Weick brought to organizational science the perspective that "cognition lies in the path of the action. *Action precedes cognition and focuses cognition*." "People who act in organizations often produce structures….and opportunities that were not there before they took action" Karl Weick (6).

Engagement makes use of and strengthens the individual's sense of self-efficacy and internalizes their locus of control. Engagement is how a person crosses the gap between proficiency and expertise and builds a sense of moral agency (7, 8) and the authors' experience.

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Delay or the lack of engagement in public safety and military operations is unthinkable. Two of the authors (DvS and SDM) observed what to them was extended evaluation before providing medical care. This was the first difference they observed in emergency responses between public safety and healthcare. Do you need a blood gas to treat a patient in respiratory distress?

Do the eyes or the blood gas drive engagement? Emergency respiratory evaluations incorporate blood gas analysis as part of the

assessment. Blood gas values are precise, static measurements at a single time point. If the blood gas tells you what to do, you might have done that when you drew the blood. Physical examination has accuracy. Examinations are continuous, allowing us to identify the presence and rate of deterioration and improvement. One of the authors (DvS), observing this delay, developed a visual respiratory evaluation method to support rapid engagement (9). The exam (CRAWL) reduced the time to respiratory treatment and airway intervention and continues to be used in subacute care, EMS (10-12),a local PICU (Merrick Lopez, personal communication), and a special unit in SOCOM (Special Operations Command).

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CRAWL is the acronym of its elements:

(1) **Color** or hypoxemia,

(2) **Respiratory** rate and rhythm,

(3) **Air** entry and inspiratory: expiratory ratio,

(4) **Work** of breathing, and

(5) **Level** of consciousness (11).

Lack of Engagement becomes Karl Weick's 'enacted failure by not acting.' Failure to act produces constraints that were not there before they took action. However, the danger is insidious. The act of not acting or engaging generates institutional or organizational knowledge that is difficult to refute (2). For example, the fear of endotracheal intubation of epiglottitis became a routine procedure while creating a PICU (Ronald M. Perkin and one of the authors, DvS).

The problem of engagement by 'not acting' and its relation to enactment as 'enacted constraints' has impeded the implementation of HRO. Not engaging leads to a failure by not acting. This failure then enacts constraints on thinking and acting. The outcomes of these constraints become beliefs and organizational knowledge. Anyone in conflict with the organization's knowledge becomes suspect and not trusted. The result is that no one acts outside of accepted organizational understanding (1, 13). The organization measures its safety and reliability with knowledge gained from the consequences of not acting.

Engagement *is* contextuality—the loss of contextuality results in the incomplete translation of theory into practice (3). Failure to acknowledge context also misses the individual's innate drive to engage in a situation and solve it as a problem. At this point, we can discern engagement as the individual who responds to circumstances due to and from personal knowledge and experience. The salience of a discrepancy or a disruption in their performance draws the individual's attention.

The individual identifies and responds to the early herald of failure. The individual decides to engage in the state of covert, compensated failure. There is always sufficient contextual ambiguity that the individual can pass on a contextual discrepancy or operational disruption. Leadership and a Lessons Learned program can develop staff into the "leader-leader" necessary for the HRO (14, 15).

More challenging to change is a culture of enactment by not acting. A social environment that impedes engagement through language and attitudes leads to constriction (16). The individual then has limited capacities of thought, narrowing of feelings, and decreased stress capacity.

In the final analysis, it is not "commands" from outside that drive engagement, but when something that was once irrelevant to the person becomes relevant abruptly.

The Loss of Contextuality

Engagement is contextual acting within an unstable environment, and that acting removes constraints on acting. Through engagement, enactment produces structures and opportunities (1, 6). It is this contextuality that reveals areas for improvement and which drives Lessons Learned (13). The enactment of 'failure by not acting' is not visible, therefore, not amenable to Lessons Learned. More insidious is the loss of contextuality when we fail by not acting.

Engagement by 'not acting' and 'enacted constraints' soon separates the organization from the organization's context. The operation environment of an HRO contains forcing functions and abrupt crises of varying magnitudes (17). What works now may fail later; what failed before may work now. The HRO continually learns and adapts. Nevertheless, the loss of contextuality places the organization and its leaders at risk for "conceptual arrest" – the Lesson Learned is a concept, an abstraction that has not yet been contextualized. That is, learning and understanding do not progress through experience-concept-context-application.

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Context distinguishes practice and experience from theory, abstractions, and concepts. A fundamental problem of gap analysis develops from excessive reliance on abstractions and concepts to interpret experience. When we apply concepts to situations, we act in the top-down direction – from the abstract to the contextual. Abstractions can readily be applied to cases in various contexts with little ability to verify fidelity to the situation (18). The conception "becomes a means of arrest far more than a means of advance in thought" William James (19). 'Conceptual arrest' occurs when the organization accepts concepts independent of the ability to use the concepts as contextual actions (13, 18). Abstractions and concepts not tested in context, that is, the operational environment can be dangerous and can kill (20).

Decontextualized Leadership

Separated from contextuality are those in positions of leadership. Context is the effect of subtle, nuanced, ephemeral details. Two individuals standing side-by-side will have different experiences. During a discussion of these details with the authors, Karl Weick observed that "micromanagement is details without the context."

The reduced influence of context allows the increasing power of abstractions and concepts, particularly tightly coupled concepts with linear connections. For example, when discussing responses to stress and fear, the authors commonly encounter the belief that these responses follow a fixed, linear progression; are distinct and discrete from each other; cause irrational actions and panic; and cannot be modulated except by rigorous training. These beliefs do not fit the authors' experience, whether the person is in public safety, the military, or a civilian (12, 15, 21-29).

The sense of mastery gained from the study of theory and concepts contributes to a greater influence of knowledge by description. This comes at the expense of knowledge by acquaintance. Theory and concepts inform discussions of complex science and chaos with the inclusion of the cliché "the fog of war." People function and operate in complex environments, chaotic situations, and through the fog of war. That is what Engagement is.

Shifting Baselines

New individuals joining an HRO may not become aware of engagement as integral to operations against forcing functions and abrupt crises. This unfamiliarity contributes to the shift in baseline knowledge and experience over time (30). The organization's lexicon shifts from engagement and operational performance to abstractions, concepts, and mastery of academic literature. This unnoticed shift in baseline leads to the loss of history, memory, knowledge, and capability.

Mastery of concepts no longer serves operations. Instead, operations must conform to concepts. "When I joined the fire department [1948], the purpose of administration was to serve the firefighters. Today [1977], the purpose of the firefighter is to support the administration," William Corr 'mentoring' one of the authors (DvS). Corr was the author's fire captain, LAFD, and WWII US Navy veteran, South Pacific Theater. Knowledge by description, whether as mastery of concepts or for administrative purposes, has a long history of usurping knowledge by acquaintance.

"Autocorrelation, when the past influences the present or from interactions with other systems, makes the system more susceptible to feedback loops. Even minor or mundane extraneous noise signals will allow the system to achieve resonance."

Engagement can inform description to extend knowledge and understanding. What makes the translation difficult is the nature of linguistic elements that form the lexicon between those operating in unstable and structured environments. Command authority becomes expressed through policies, protocols, rules, and algorithms. Reliance on analogy, metaphor, and cliché generates less rigor when discussing plans and actions.

These baseline shifts carry distinct risks to the HRO:

- The auditing policies, protocols, rules, and algorithms to achieve conformity
- Substitution of analogy and metaphor for concise, objective descriptions
- Application of clichés as thought-terminating devices

Auditing. Engagement comes from the individual in situations challenging the organization's knowledge and understanding. Without a known path, people will make errors, but these are errors from changed circumstances (1, 31) and at the boundaries of knowledge and performance (32). Such operational errors are corrected through continuous engagement as one corrects oneself through learning by doing. Operational errors are *correctable errors of accuracy* made during periods of uncertainty and ambiguity. We must not confuse these transient, correctable errors for the more consequential *errors of precision* that occur during periods of stability and certainty (1).

Individuals audit conformance to policies, protocols, rules, and algorithms. Joe Martin, LAFD fire captain, was considering command of the EMS QA section of a major fire department. He contacted one of the authors (DvS) who worked with him as a fire Rescue Ambulance paramedic. The concern of the author was the loss of context by the auditors. They may come to view their work as protecting the fire department – that is, protecting the department from paramedics. If so, it was the author's experience that auditors develop a 'guard mentality,' guarding the department's reputation, and the paramedics would develop a 'prisoner mentality,' protecting themselves from the department while avoiding notice by their officers. The author found Zimbardo's (33) study of prisoners and guards enlightening when working with staff providing QA by staff authority.

"Prevented are classical logic, rigid models, and tightly coupled concepts. Without a Gaussian distribution, we become limited in comparing our situation with a reference class or predicting an accurate trajectory. Uncertainty is a fundamental cause of psychological stress."

Patrick Bolton and Mathias Dewatripont (34) describe three main types of authority: line authority, staff authority, and functional authority:

- *Line authority* comes from the owners through the chain of command and follows an organizational chart reflecting superior-subordinate relationships.
- *Staff authority* advises and supports line executives and managers, for example, in quality audits, legal counsel, finance, and human relations.
- *Functional authority* gives line personnel authority to act in a particular function or situation.

Martin's colleagues argued against him taking the assignment, as

none respected the QA section. Upon assuming command of the

"Though not entropy, we consider uncontrolled behavior as a form of red or pink noise. Human behavior interacts with the entropies of energy and information to create forcing functions. We cannot predict how someone will behave in a confusing situation or under threat,"

section, Martin focused on preventing the guard mentality – the mission of the QA section was to support the field paramedics. In his first year with QA, the program became a respected section.

Analogies and metaphors. When encountering novel or uncertain situations, we anchor thought and reduce stress through analogy and metaphor. They also have utility in descriptions – such as for power when we used horsepower to describe the power of a car's engine. However, analogies and metaphors do not serve to extend understanding when such stories almost entirely occupy the discussion. Identifying internal 'logical' links to other analogies and metaphors does not make a valid argument. Yet this approach has moved from informal talks to more formal presentations. In these situations, using analogies and metaphors may represent a lack of experience from engagement.

Clichés. "All season" operators with outdoor experience know that a "slippery slope" can be ascended, descended, and traversed. If necessary, a route can be found that circumvents the slippery slope. However, the slippery slope cliché has become a common reference to ethics or risk management, acting as a thought-terminating cliché that asserts certitude and stops discussion (16). What does slide down the slope is the extension of our under-

"On the other hand, structures exposed to entropic dissipating energy must remain within a specified range for continued operations. The system fluctuates in response to these environmental forcing functions, with variance increasing with the power of the forcing functions."

standing.

The Engagement Imperative

There are circumstances we encounter when we cannot choose *not* to act. Unfavorable risk-benefit ratios are not a reason to decline. The uncertainty means we will operate without a plan. Failure has become a genuine option. This describes the realm of engagement for individuals in an HRO but also presents the difficulty of HRO implementation. We are compelled to act, yet organizational factors impede, impair, and even prevent action.

Risk and *risk management* are common elements when discussing HROs, being defined in proactive and reactive terms. They take on a different meaning during active interaction with a hazard. In engineering, risk derives from the magnitude of harmful consequences and the probability of an event causing them (35). Initially developed for financial investment, risk management refers to identifying, analyzing, and accepting or mitigating risk or uncertainty. The International Organization for Standardization (ISO) has published standards for risk management known as the ISO 31000 family of standards (36). (The ISO intentionally adopted initials that do not match those of its three official languages.)

Describing how HRO works in practice but not in theory, Todd R. LaPorte and Paula M. Consolini rarely used the term risk. For them, HRO is "an organizational process colored by efforts to engage in *trials without errors*, lest the next error be the last trial."

Engagement as "trials without errors" is not a business model. That is, the business sense of 'error' is a measure of deviation from the norm or what is accepted. For the HRO, error uncovers a change in circumstance, identifies the boundary of knowledge, and forms our zone of performance (32). We cannot choose to engage based on risk assessments. That is, the risk outweighs the benefit.

Engagement is driven by the idea that "failure *is* an option." We operate "without a plan" by relying on the brain's cognitive functions (24, 37, 38). We take advantage of stress-induced constraints and fear circuitry behaviors to overcome the inherent vice of stress and maladaptive fear-circuitry behaviors (22, 39). The vital HRO characteristic of modulating amygdala-driven behaviors is significant (24, 27, 39, 40).

Engagement can start abruptly, compelling a person to act or investigate. Direct action may start before adequately identifying threats, acquiring sufficient knowledge to act, or knowing what will work. Or circumstances may draw out the initial engagement allowing the certainty of information and the expectations of bystanders to change, if not multiply, and conflict. Time branches rather than forming a path. George Orwell (41) describes these changes of information, and even the degree of the threat, after he was told that an elephant was ravaging the bazaar and asked to "please come and do something about it." "A story always sounds clear enough at a distance, but the nearer you get to the scene of events, the vaguer it becomes."

In the HRO, the engaged individual identifies discrepancies and disruptions as early heralds of failure. Engagement, then, becomes the conduit necessary for the identification and engagement of early heralds of failure (42). "HRO may be a trajectory of engagement that fuses now with the experience of then into simultaneous inquiry and redescription," Karl Weick (personal communication).

Engagement is not simply doing something or choosing a protocol. Engagement operates at several levels. The novelty differs from the novice to the veteran. The meaning will shift from "just getting through" to the development of moral agency (43). Team formation changes from hierarchy to reciprocal support toward a shared objective. Regardless of the various ways to discuss engagement, only a few elements support engagement, and a few impair engagement.

In one author's experience (DvS), the starkest difference between the fire Rescue Ambulance (RA) medics on scene and healthcare professionals in the hospital was how RA medics decided and acted but kept an eye on the effectiveness of the action. The medic's only monitoring was responses to their actions. Circumstances,

the environment, and the patient always changed. On the other hand, healthcare professionals evaluated the patient and decided on an action but did not continuously monitor the effectiveness of the action. An RCP recently described this during an activity to adjust the mechanical ventilator for better patient phonation and comfort. "Some doctors come in, say the orders, then leave. We do not see them again."

"Operators must continue operating and controlling the system in a totally new and unprecedented environment and adverse conditions. Coming up with an unprecedented plan is strongly culturally driven," Najmedin Meshkati and Yalda Khashe (31)."

Without an appreciation of engagement, we lose the meaning of evaluation, decision, action, and observation. Our interactions with failure make visible the early heralds of that failure. Visibility facilitates earlier engagement of subsequent incidents. To respond earlier, however, is to respond to ambiguous signals. While much is made of "weak" signals, these are more likely early, subtle, nuanced, and even punctuated signals in an emergency. These signals' salience, meaning, and relevance are lost to outsiders.

> An angry father demanded hospital admission for his wife, who was in labor. Over the 12 hours of repeated visits, her cervix had yet to dilate. The obstetrics intern requested one of the authors (DvS, at the time, a third-year medical student) to accompany him, concerned the father would become physically violent. They were in the labor and delivery area.
>
> The father's voice became loud and stern with increasing urgency while standing face-to-face with the intern, imperceptibly closing in on the intern. That was not the danger. In the author's fire rescue ambulance experience interacting with "human stress failures," people talking and yelling do not rapidly become physical. The individual becoming quiet is when they are most likely to attack physically. You want to keep them talking with some logic to *their* words, not necessarily logical for you. The actual danger was the intern inadvertently touching the father, who had been taking small steps closer while leaning in. Had the intern inadvertently touched the father, the father would have felt justified in hitting. The urgency in the father's voice indicated the level of force that would ensue.
>
> As the father moved, the intern would take small steps backward, his voice developed a nervous crackle, and his words became less organized. The solution was to have the father move back without physical contact. The author, standing alongside the intern who faced the father, leaned slightly with his shoulder coming between them. The father stepped slightly forward. The intern backed up. The author did not move. Next, the author slightly twisted his shoulder toward the father. The intern and father kept arguing. The author twisted his shoulder forward again. The father took a slight step back. The author took a slight step forward. The father's tone quieted. He began listening to the intern, whose voice was becoming more confident, and his words were more structured. The father took a larger step backward. Then he began accepting what the intern said.
>
> As the intern and author walked away, the intern remarked, "I guess I didn't need you after all."

Effective engagement is often not visible.

Engagement is Individual

Signals from the environment are ambiguous and contain uncertainty (44). High-Reliability Organizations (HRO) work in this world of practice rather than theory (35). Engagement bridges the gap between theory and practice, moving theory into the practical world to create the *practical domain of engagement* (3, 45-47). This article describes practical actions for engagement when encountering an outlier, discrepancy, or disruption.

In the 1970s, Los Angeles Fire Department Drill Instructors (DI) told fire Rescue Ambulance (RA) recruits, "When you arrive on scene, you're '*It*.'" That is, the senior partner and the recruit would handle everything on the scene, not leaving until all unstable problems were made stable and citizens were treated and either made safe or transported to the hospital. The medics would work alone, without radio contact, unless they requested other units. Fire and police units only responded at the RA's request, except for shootings when the RA would be dispatched along with responding police units. The Fire Department would provide support, but the two medics were in charge.

"The DIs told the recruits to engage. Do something. To engage may be only calling for help. That is OK. The recruits must make themselves safe, then the citizens safe. But the recruits had to do something."

RA recruits, including one of the authors (DvS), worried they would not know what to do when they found themselves approaching a medical emergency or rescue alone or when they might encounter violent individuals. The DIs told the recruits to engage. Do something. To engage may be only calling for help. That is OK. The recruits must make themselves safe, then the citizens safe. But the recruits had to do something.

As vague and ambiguous as this seems, the order "to engage" became the initiator for action. The action became the source of learning. Learning and action could then generate experience. While some individuals may have twenty years of experience in a field, it may be the same year, year after year. That is not engagement. For the Fire Rescue Ambulance crews, every year became a different year. That is the product of engagement.

Some people reach a sufficiently high level of expertise that they become the expert who is the standard for others and a source of knowledge under challenging circumstances. These experts develop excellent intuition and have effective habitual responses to various situations. The risk is "doing the same year, year after year."

Because the trajectory of a response cannot be predicted, every response was treated by RA medics as if it could abruptly deteriorate. This repeated approach of thinking and acting as if the situation was new improved existing skills while extending the

RA's range of skills (46). Other actor's domains involved in the response, firefighters, police officers, nurses, and physicians, became teachers and sometimes mentors in real-time as the RA medic continued the process of learning to understand and perform better. In effect, RA medics compared their performance to those working around them. Often the greatest improvement was gained from constructive feedback after a bad choice on the scene or a bad outcome. The result was a more effective performance during live-or-die situations.

"Often the greatest improvement was gained from constructive feedback after a bad choice on the scene or a bad outcome. The result was a more effective performance during live-or-die situations."

After one of the authors (DvS) finished his probationary period, he had command of the RA at a traffic collision impeding rush hour traffic. This was during the initial expansion of EMT services within the fire department and the introduction of paramedic services in the state. The author's driver was a new firefighter with only first-aid training. The firefighter reported that the driver had no injuries. A cursory evaluation of the driver supported that conclusion. Access to the patient prevented obtaining a blood pressure.

Further, the firefighter believed the team, working with tow truck operators on the scene, could quickly pry the vehicle door open. [At that time, in that area, tow trucks commonly arrived at an accident scene to tow disabled vehicles.] He explained that calling for a physical rescue assignment (a ladder truck, two engines, and a battalion chief) would needlessly block the road during rush hour. It would take about 30 minutes for a vehicle carrying the "Jaws of Life" to arrive on the scene. A paramedic RA was at least 20 minutes away, with no guarantee of availability.

The patient began turning gray and stopped talking, an early sign of a heart attack that may have led to the accident or could have occurred after the accident. Unable to open the vehicle door, the author called for a physical rescue assignment.

The RA transported the patient to the hospital, where he died 14 hours later from a heart attack.

That evening the fire captain thanked the author for his work. The captain stated that because the author was the most qualified RA medic the fire department had for the call, the department would support him and everything he did. The captain then asked what the author would do differently next time. The captain provided several reasons for each different decision point. The captain then explained why it's OK to call out too much equipment; it is not an overreaction. It is not a "crying wolf." There is no crying wolf in the fire department because a delayed response will kill, while a response can be canceled anytime.

The captain repeated that the author was the department's most qualified RA medic for the call. He added that other medics were more capable and others were more experienced, but they were not available. So, the author was the most qualified RA medic for that assignment. The department would stand behind the author and his actions.

The captain finished with, "There are a thousand things that happen on the scene. You can only see a hundred. You can only act on ten. I may see a different hundred. I may act on a different ten. That doesn't mean I'm better than you; only that I'm different," Captain, Fire Station 11, LAFD, personal communication.

Even if engaged side by side in unexpected events, people experience the incident differently and have different forms of sensemaking. "This remains, to me, one of your more powerful, rich experiences. One can dwell on its implications for a long time." Karl Weick, personal communication.

Every individual in healthcare is the most qualified person to help – at that time. And we will do well to support them.

"This is the process of becoming an expert – thinking and acting as if each situation was new, identifying how every situation can abruptly deteriorate, and comparing one's performance to the performance of adjacent domains. Comparing an organization's performance to expert performance is the part of a Lessons Learned program that is often overlooked or misunderstood (13, 48)."

This is the process of becoming an expert – thinking and acting as if each situation was new, identifying *how* every situation can abruptly deteriorate, and comparing one's performance to the performance of adjacent domains. Comparing an organization's performance to expert performance is the part of a Lessons Learned program that is often overlooked or misunderstood (13, 48).

To extend PICU care into pediatric subacute care, one of the authors (DvS) asked staff to observe all paramedic responses to the facility – if that could have been performed. Next time, the staff would do it. Advancing to the Emergency Department and then the PICU, the subacute staff would evaluate if that care could be provided in the subacute. Soon, bedside staff treated acute respiratory failure with hand ventilation, temporary placement of a mechanical ventilator, then a discussion with the on-call pediatrician. Calls to 9-1-1 transfers to the ED and admissions to the PICU rapidly decreased (49, 50). An unexpected finding occurred when families requested that their child not be weaned from the ventilator. These children had become more active – and began smiling (51). This is the direct extension of medical care through engagement, from the Los Angeles City Fire Department Rescue Ambulance through the PICU to a nursing home, to enhance the lives of profoundly disabled children.

This change in care, the mechanical ventilator as an enhancement of life, came through an expert performance developed by engagement of routine events. But the excellent intuition and effective habitual responses of experts can also decrease engagement by the expert and those subordinates who rely on the expert. That, and the above method of acquiring expert performance,

Table 1. VUCA-2T (27)

Volatility	A rapid, abrupt change in events
Uncertainty	Lack of precise knowledge, need for more information, unavailability of the necessary information
Complexity	A large number of interconnected, changing parts
Ambiguity	Multiple interpretations, causes, or outcomes
Threat	Impaired cognition and decision-making
Time Compression	Limitations acquiring information, deciding or acting before consequential changes

Table 2. Liminality (27)

Conventional Operations	Liminal Operations
Familiar	Threshold of Transition
Structured	Passage for travel, but not traveling
Knowledge by description	Gaps in knowledge (54)
Hierarchical support	Alone
Standards	Learn by doing
Known rules	Old rules do not apply
Familiar relations	New rules unknown
Prevent Failure	Consequence driven

have been identified by K. Anders Ericsson et al. (52). engagement can develop expert performance. At the same time, the failure to engage leads to the loss of expert performance.

Engagement in a VUCA-2T environment (Table 1) or within the liminal zone (Table 2) is not well described in the academic literature. When it is described, it may come under criticism as not derivative from science (5, 53). When described as personal experience, engagement risks derision as "anecdotal" (the authors' personal 'anecdotal' experience).

"When it is described, it may come under criticism as not derivative from science (5, 53). When described as personal experience, engagement risks derision as "anecdotal" (the authors' personal 'anecdotal' experience)."

One of the authors (DvS) described this plight with Bob Bea, Professor Emeritus, Civil Engineering, University of California, Berkeley (55). He responded:

> "Our [dangerous] work has termed this *interactive-real-time assessment and management of risks*. This approach was completely overlooked until the early 1990s. We were taught that there was only *proactive* (before operations) and *reactive* (after) – and that was it. And we thought we could capture all of the risks with the proactive approaches - and then provide adequate defenses if 'justified' – but we were missing some really major risks that were fundamentally unpredictable and unknowable."
>
> Bob Bea, 08/30/2005, personal communication

Engagement as *interactive real-time risk assessment and management* is more than doing things or following a protocol. Engagement is the projection of thought into the stochastic environment, thinking during abrupt change, generating information from uncertainty, and creating a structure where there was none.

Attention Initiates Engagement

We engage our attention every time we observe a discrepancy from what we expect or a disruption of activity. Physical engagement is the active search for alternative actions and better solutions amid a changing environment (56). The brain resets attention, reframes the situation, and changes from achieving a goal to performing specific tasks (57). The locus coeruleus-norepinephrine system (LC-NE) mediates selective attention for salient stimuli while silencing irrelevant stimuli. The brain can encode and filter salience (58).

"When detected below the level of consciousness, this attention reset creates an uncomfortable feeling of dread, worry, anxiety, etcetera. Objectively articulating the circumstances without subjective interpretations, along with physical investigation, can identify the source of the discomfort. Without a reference, the feeling can drive vigilance for early heralds of failure. This can be difficult for the novice to appreciate."

When detected below the level of consciousness, this attention reset creates an uncomfortable feeling of dread, worry, anxiety, etcetera. Objectively articulating the circumstances without subjective interpretations, along with physical investigation, can identify the source of the discomfort. Without a reference, the feeling can drive vigilance for early heralds of failure. This can be difficult for the novice to appreciate. One of the authors (DvS) asked a resident physician to monitor a child in the PICU closely. Then the resident asked, "Monitor for what?" Thinking this was obvious, the author responded, "If I knew what to monitor for, I wouldn't ask you to monitor." Those with experience in dangerous contexts understand the author's frame of reference, while those without such expertise appreciate the resident's frame. This demonstrates the necessity for us to articulate both the expected, unexpected and the novel discrepancies and disruptions that may occur.

High-Reliability Situations (HRS) arise as outliers from routine and mundane events. HROs maintain vigilance for these outliers, considering such discrepancies as early heralds of failure or the initial presentation of disruptive processes (3). These early heralds are readily missed as the system compensates. This compensated state will be missed unless staff are taught what is salient or relevant. To generate vigilance in staff, we describe this as the *covert, compensated state*. When unrecognized, the HRS becomes visible in the *overt, decompensated state,* which too easily devolves into cascading failure.

A 'noisy' frequency, an element in the system with long periods from internal feedback or autocorrelation, may become a forcing function against the system. This low-frequency, rare events have a greater influence on the system than more common, high-frequency events with less spectral density (59). Regardless of size, these disturbances and disruptive processes are normal environmental variations but are seen at different scales (59).

"The alternative is to presume an environment described by Gaussian distributions where outliers can be disregarded at certain standards of deviation due to randomness and independence of data: the randomness of inherent processes and the independence between outcomes of those processes."

The operator in an HRO views outliers as the initial presentation of change, an indicator of what can become possible. The alternative is to presume an environment described by Gaussian distributions where outliers can be disregarded at certain standards of deviation due to randomness and independence of data: the randomness of inherent processes and the independence between outcomes of those processes. This is the basis of the fire Rescue Ambulance crew's approach described above – the trajectory of a response cannot be predicted; every response was treated as if the patient could abruptly deteriorate.

The Individual

You can do it. As mentioned earlier, one of the authors (DvS) learned that when he arrived as a fire Rescue Ambulance medic, he was "*It*." He and his partner would resolve the situation. But the various spoken and unspoken elements underscored he could do it, though alone on the scene, he was not. When the author's Fire Captain, William Corr, observed a momentary pause by the author before engaging in a situation, he would say, "You can do it."

- Speaking at the welcoming program for new medical students, one of the authors (DvS) spoke after a series of faculty, medical students, and administrators spoke. Most speakers included warnings about the difficulty of medical school. The author started with the phrase, "You can do it." For the next few weeks, students approached the author to say he was the first person to tell them they could do it.
- An assistant fire chief told one of the authors (DvS) about his experience as one of the first county paramedics. The medical director for the program (Thomas Zirkle) was also a battalion chief for his department. His first paramedic response was for a cardiac arrest. It was the paramedic's father. He looked up and saw Dr. Zirkle, who looked at him and said, "You can do it." The paramedic successfully resuscitated his father.
- Another one of the authors (TAM) was departing the ready room for his first Vietnam combat mission. The captain of his aircraft carrier (a Korean War Naval Aviator) told the aviators, "You can do it."

"You can do it" may be the mantra that initiates and drives High-Reliability Organizing.

Colonel John Boyd, a US Air Force tactician, proposed a method of action and feedback through an OODA Loop (Observe, Orient, Decide, and Act) by looping back from the action to make a new observation (60). The use of Boyd's OODA Loop in EMS and pediatric critical care by one of the authors (DvS) (61, 62)2006</date></pub-dates></dates><pub-location>Dallas, Texa</pub-location><publisher>American Medical Director's Association (AMDA had brought his work to the attention of Karlene Roberts, part of the UC Berkeley HRO group.

Karl Weick described the utility of Boyd's OODA loop if we were to start with *action,* the Act phase (personal communication). Acting is the first step in engagement and is the active part of Weick's sensemaking; acting is also the initiator of Weick's enactment, and acting can create both visible and correctable failure through looping. The latter is critical in HRO to oppose failure from *not* acting, a failure that is invisible, not detectable, and not correctable.

The linearity and sequencing of rules and plans produce the appearance of reason and logic, while these rules and strategies are created apart from concrete reality. The expert following the rules performs poorly (43, 63-65). We must guard against false protective mechanisms such as abstractions, regulations, false confidence, or self-admiration.

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When engaging the HRS, individuals contextually shift their values from conformity and obedience for stable environments to initiative and creativity for the HRS. It is the shared duty of workers in dangerous contexts to precept the novice for safety and performance, whether during routine times or operations (27). How we treat subordinates can create the expert we will later defer to for deference to expertise.

Self-efficacy, internal locus of control, and increased stress capacity enable the individual to engage in the HRS. Decision-making with reciprocal feedback keeps the operator close to events,

generates information, identifies relevance, and gives meaning. Our perceptions help us recognize whether a response was due to our actions, giving us a sense of agency (66). Without action, we do not gain that sense of agency, and it is this sense of agency that supports expert performance.

> ***"In healthcare, we direct our expert performance to support and treat our patients. The individual begins to make a difference – improvement is from the individual's judgment and actions rather than algorithms."***

In healthcare, we direct our expert performance to support and treat our patients. The individual begins to make a difference – improvement is from the individual's judgment and actions rather than algorithms. *Moral* agency gives meaning to one's actions, either internalized by the individual or interpreted for the individual by a leader. Patricia Benner (67) described *moral agency* as a result of the individual acting independently, then observing that their actions made someone's life better. With that knowledge comes responsibility for the care provided (8). Benner placed the development of moral agency at the crossing of the gap between simple competence and the richness of expertise.

To view expert performance without moral agency is to view healthcare as a skill independent of treating a person. In our view, healthcare actions are *engagements* bounded by Aristotle's practical wisdom (prudence) (68). (Prudence is first of Aristotle's Four Cardinal Virtues: prudence, justice, temperance, and fortitude.) Practical wisdom is the wisdom for *the particular,* and actions are taken *for the good of the community*. In this specification, when we treat for the good of the patient and accommodate the patient's environment, we are using practical wisdom.

There are several ways to understand what happens next. Engagement comes from the individual. We cannot assume that the individual will recognize and internalize how their actions have improved the patient's life. Some leaders, colleagues, and organizational cultures impair this internalization. Subtle isolation remains a method to control, discipline, or remove a member of the organization. An unfortunate consequence is constricting the individual's emotions (16). Healthcare as a working environment contains elements that can over-consolidate with stress-induced and fear circuitry disorders and related amygdala-driven disorders (39). In a person with constricted emotions, these disorders can consolidate with environmental stressors and generate clinically severe anxiety disorders.

> ***"Healthcare as a working environment contains elements that can over-consolidate with stress-induced and fear circuitry disorders and related amygdala-driven disorders (39)."***

HRO-engaged leadership develops different outcomes. Sense-giving by the leader guides the novice for effective action and later interpretation of the experience (69). Distinguishing effectiveness from outcome helps the novice to take responsibility for the action rather than the result. This separation reduces the influence of bad outcomes on the individual's self-esteem (28). Recognition of one's part in care, and acknowledgment by others, frames actions in a way that increases the development of moral agency (8). Self-efficacy and locus control internalization develop under-engaged leadership guidance (40). The outcome of engagement under the engaged leader results in the internalization of HRO and the development of passion.

This shift from the external influence of rules and algorithms to the internalization of judgment and moral agency underscores the growth from novice to expert veteran. Comments that may motivate veterans likely intimidate novices. Telling novices why they engage, based on the veteran's internalized experience, makes little sense to the novice. In our experience, focusing on how engagement helps will more likely support the novice to engage.

The Five Characteristics of HRO

The five well-known characteristics of HRO have become an accepted hallmark of describing an organization as an HRO (70). Less is discussed on whether the five characteristics are goals alone or methods to reach the goal of HRO. When viewed as structures for engagement, the characteristics can guide the organization toward the goal of HRO. Considering these as attitudes makes the five principles better understood and accessible (14).

> ***"Attitudes influence behaviors; in this way, attitudes can create a bias for action for immediate engagement, even if that engagement takes the form of observation or notification. Attitudes make the five HRO characteristics personal."***

Attitudes influence behaviors; in this way, attitudes can create a bias for action for immediate engagement, even if that engagement takes the form of observation or notification. Attitudes make the five HRO characteristics personal. We have found that framing the five principles as derivations from attitudes increases understanding of their purpose and acceptance by members of the organization, from the senior-most official to the most recently hired on the line.

Executives and administrators often struggle with "preoccupation" and "failure." They do not see the purpose of always thinking of failure, and they do not want their employees preoccupied, or focused, on any one thing, let alone failure. However, if executives and administrators do not want failure, what are they doing to identify and engage early signs of failure? Do they have the plan to bring events to a resolution rapidly?

While there is good information on the "servant" and "transformative" leader, in the HRO, leaders also defer to expertise. The physician who developed the sentinel event program for The Joint Commission advised two authors (TAM and DvS) that physicians had difficulty deferring to non-physicians. One author, a retired US Navy Admiral, pointed out that command consists of those duties

you cannot delegate. The other author (DvS) then described three duties a physician cannot readily delegate: diagnostic authority, prescriptive authority, and surgical procedures. Otherwise, physicians can defer to the expertise of the non-physician.

"Positioned as attitudes, we see how the five principles develop from experience and then frame the processes necessary to reach High-Reliability Organizing. The five principles describe natural, effective, adaptive responses to adversity and hostile environments."

Positioned as attitudes, we see how the five principles develop from experience and then frame the processes necessary to reach High-Reliability Organizing. The five principles describe natural, effective, adaptive responses to adversity and hostile environments. If we assume that attitudes drive behaviors, carefully distinguishing this from creating behaviors, the five attitudes are reasonably close to behaviors. Our beliefs do not change the environment; our attitudes do.

Preoccupation with Failure

What is the individual's attitude toward failure or system vulnerability? What is your attitude toward a discrepancy or system disruption? The individual will first identify and respond to the outlier as an early herald of failure or engage the state of covert, compensated failure.

Reluctance to Simplify

What is the individual's attitude toward working with complex situations? What is their drive to investigate? Individuals act within the context of events to identify the details and sort through the ever-present complexities.

Sensitivity to operations

What is the individual's attitude toward changing work priorities without notice? What is the individual's attitude toward maintaining normal work assignments during a large disturbance? This is situational, allowing for continuous adjustment to the operation. Individuals notice and respond to anomalies and outliers rather than disregarding them as random events.

> Karl Weick (personal communication) added this principle because organizations would disrupt, if not stop, their strategic operations due to the distraction of a tactical situation. He also noticed that organizations that failed did not adjust their plans in real-time for changes at the operational level.
>
> "Operations also include enactment. Sensitivity also means being aware of your *own* impact in displacing, shaping, and creating what you think is merely external and out there: 'I need to be sensitive to *my* impact.'" Karl Weick (personal communication)

Commitment to Resilience

What is the individual's attitude about stopping when engaged? What is the individual's attitude toward working on a problem without a known solution? Individuals will continue enactment as engaged acting, which maintains or regains a stable state in a dynamic situation.

Deference to Expertise

What is the individual's attitude toward the knowledge of those who have less experience or are lower in the hierarchy? Individual superiors defer to the local knowledge of subordinates, recognizing that in dynamic, contextual situations, information must be updated and beliefs revised. Individuals may have the necessary knowledge from experience outside the organization or the situation itself.

"Being natural does not imply being adaptive or effective. The organization can form engagement to enact failure by not acting. The HRO forms engagement into enactment to create reliability, structure, and new opportunities."

Conclusion

The well-known five characteristics of HRO describe not only engagement but the HRO's support for personal engagement. Engagement is an innate human drive in response to abrupt local environmental changes. Being natural does not imply being adaptive or effective. The organization can form engagement to enact failure by not acting. The HRO forms engagement into enactment to create reliability, structure, and new opportunities.

Engagement for the novice is to "do something." Doing something makes the novice part of the problem and part of the solution. With experience from engagement, the novice bridges the gap between proficiency and expertise while also developing a sense of moral agency.

It is through individual engagement, rather than commands from the outside that the work of an HRO gets done.

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STANDARDS AND SAMPLE RECOMMENDATIONS FOR INFANTS IN THE INTENSIVE CARE UNIT

SYSTEMS THINKING IN COMPLEX ADAPTIVE SYSTEMS

- Are the baby and family central to the mission, values, environment, practice & care delivery of IFCDC in the unit?
- Are the parents of each baby fully integrated into the team and treated as essential partners in decision-making and care of the infant?
- What are the strategies and measurements used to improve and sustain IFCDC in the unit?

POSITIONING & TOUCH FOR THE NEWBORN

- Are the positioning plans therapeutic and individualized, given the care needs and development of the baby?
- Are the positioning and touch guidelines continually reviewed by the team, including the parents, and adapted to meet the changing comfort needs of the baby?

SLEEP AND AROUSAL INTERVENTIONS FOR THE NEWBORN

- Can the team confidently describe the "voice" or behavioral communication of the baby?
- Are the baby's unique patterns of rest, sleep, and activity documented by the team and protected in the plan of care?

SKIN-TO-SKIN CONTACT WITH INTIMATE FAMILY MEMBERS

- Is the practice of skin-to-skin contact supported and adjusted to the comfort needs of each baby, parent, & family member?
- Are the parents & family members supported to interact with the baby to calm, soothe, & connect?

REDUCING AND MANAGING PAIN AND STRESS IN NEWBORNS AND FAMILIES

- Are parents supported to be present and interactive during stressful procedures to provide non-pharmacologic comfort measures for the baby?
- Are there sufficient specialty professionals to support the wellbeing of the team, including parents, families, and staff? Examples include mental health, social, cultural, & spiritual specialists.

MANAGEMENT OF FEEDING, EATING AND NUTRITION DELIVERY

- Are the desires of the m/other central to the feeding plan? Is this consistently reflected in documentation with input of the m/other?
- Does the feeding management plan demonstrate a feeding & nutrition continuum from in-hospital care through the transition to home & home care?

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during the COVID-19 pandemic

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Here's what you can do...

Wash Your Hands

- This is the single, most important thing you can do to stop the spread of viruses.
- Use soap.
- Wash for more than 20 seconds.
- Use alcohol-based sanitizers.

Limit Contact with Others

- Stay home when you can.
- Stay 6 feet apart when out.
- Wear a face mask when out.
- Change your clothes when you get home.
- Tell others what you're doing to stay safe.

Provide Protective Immunity

- Hold baby skin-to-skin.
- Give them your breast milk.
- Stay current with your family's immunizations.

Take Care of Yourself

- Stay connected with your family and friends.
- Sleep when you can.
- Drink more water and eat healthy foods.
- Seek mental health support.

Immunizations Vaccinations save lives. Protecting your baby from flu and pertussis lowers their risks for complications from coronavirus.

WARNING

Never Put a Mask on Your Baby

- Because babies have smaller airways, a mask makes it hard for them to breathe.
- Masks pose a risk of strangulation and suffocation.
- A baby can't remove their mask if they're suffocating.

If you are positive for COVID-19

- Wash with soap and water and put on fresh clothes before holding or feeding your baby.
- Wear a mask to help stop the virus from spreading.
- Watch out for symptoms like fever, confusion, or trouble breathing.
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Briefly Legal: Neonatal Neurological Injury Associated with Vacuum-Assisted Delivery

Barry Schifrin, MD, Maureen Sims, MD

"Vacuum-assisted deliveries (VAD) account for about 5% of all deliveries. (1) They are considered safe and effective when maternal, fetal, or obstetrical indications (Table) mandate an expedited delivery and prerequisites are met."

Vacuum-assisted deliveries (VAD) account for about 5% of all deliveries. (1) They are considered safe and effective when maternal, fetal, or obstetrical indications (Table) mandate an expedited delivery and prerequisites are met. Serious fetal injuries are uncommon, and long-term population studies comparing children delivered by VAD with those delivered by normal spontaneous vaginal delivery demonstrate no difference in neurocognitive outcomes. (2). Notwithstanding the infrequent association of neonatal injury with VAD, they are commonplace in medico-legal allegations of fetal injury during labor.

Case History

Past Medical History

At the time of her delivery, the patient was a 31-year-old primigravida. Her past medical history included a LEEP procedure on her cervix. During her pregnancy, she developed hyperemesis gravidarum with an 18 lb. weight loss, treated with intravenous hydration. At 20 weeks gestation, she developed palpitations, tachycardia, and tremors, and from that time forward, her care was provided by high-risk specialists. She had two glucose challenge tests: the first was normal, and the second was elevated at 8.1 mmol/L. A follow-up GTT was normal. Her prenatal antenatal lab work was normal. At 29 weeks; gestation, a Cardiology consultation found bouts of premature atrial contractions but no pathologic source for her cardiac symptoms and tremors. The fetus demonstrated normal activity, growth, and amniotic fluid volume despite these issues.

At 40.5 weeks gestation, she appeared at the hospital complaining of contractions. She was assessed as being in "false labor" with a reassuring NST. She was scheduled for induction of labor for postdates the next day only to begin labor spontaneously with leakage of clear fluid early the next morning. On admission to the hospital, her cervix was 3 cm. dilated, 80% effaced, and the head was at -3 station (3/80/-3). The initial tracing showed moderate variability, accelerations with fetal movement, and absent decelerations with intermittently prolonged and coupled contractions. After 3 hours, she was 5 /100/-2. After 9 hours with the cervix unchanged, the patient requested analgesia, and shortly after that, she requested a cesarean section rather than continue with a trial of labor. The nurse encouraged her to think it over, and the trial of labor was continued.

"After 3 hours, she was 5 /100/-2. After 9 hours with the cervix unchanged, the patient requested analgesia, and shortly after that, she requested a cesarean section rather than continue with a trial of labor. The nurse encouraged her to think it over, and the trial of labor was continued."

At 10 hours, the patient was given Demerol for pain; after 15 hours, the cervix was unchanged over the past 9+ hours. At 17 hours of labor, oxytocin augmentation was initiated, and at 19 hours, an epidural was placed. At 24 hours, the cervix was only 7 cm dilated; at 28 hours, the cervix was 8 / 100% / -1; and by 30 hours, the cervix was only 9 cm dilated. Despite the excessive uterine activity, oxytocin was increased following each of these examinations. Finally, at 32 hours, the cervix became fully dilated, with the presenting part at 0 station. The FHR tracing showed fetal tachycardia (165 bpm) with moderate variability and accelerations; decelerations were absent. There had been numerous runs of excessive uterine activity in which four contractions occurred within 6 minutes. Over time, the baseline heart rate rose to 180 bpm with decreased to absent variability and prolonged accelerations with intermittent, brief variable decelerations.

With the onset of pushing at 33+ hours, the baseline rose to 190 bpm, accompanied by late decelerations with frequent and coupled contractions. Almost 90 minutes later, at 35 hours, she stopped pushing because she was tired. When pushing ceased, the patient received a top-off dose of anesthesia. In response, the fetus showed further deterioration in the tracing with more obvious late and prolonged decelerations with decreased /absent variability and baseline FHR of about 180 bpm - a "conversion pattern." The fetus had likely suffered an injury – prior to applying the vacuum. (3)

Table I

Indications for VAD

Maternal	Maternal exhaustion or inability to push.
	Cardiac, pulmonary, vascular, neurological, and ophthalmological conditions in which (lengthy) pushing is contraindicated
Fetal -	Fetal compromise that is not relieved by conservative measures.
Obstetrical -	Prolonged second stage.

"In response, the fetus showed further deterioration in the tracing with more obvious late and prolonged decelerations with decreased /absent variability and baseline FHR of about 180 bpm - a "conversion pattern." The fetus had likely suffered an injury – prior to applying the vacuum. (3"

At 36 hours, the patient was positioned for a vacuum-assisted delivery (VAD). A Kiwi vacuum device was placed (at a "+2 station"), and traction was applied in concert with the patient pushing. The vacuum popped off and was then reapplied. After multiple tractions with pushing over the next 35 minutes, the infant's head was delivered, but the development of shoulder dystocia stalled the delivery of the body. Using various maneuvers (McRobert's, suprapubic pressure, and Woods), the shoulder was released after about 3 minutes. During these efforts after the pop-off of the vacuum, the FHR tracing revealed a stable heart rate of about 140 bpm, with moderate variability and accelerations coincident with the mother's expulsive efforts. Decelerations were absent despite the persistent attempts at VAD. This sequence represents the maternal heart rate (MHR) insertion, not the FHR, into the recording – a well-known pitfall of external fetal monitoring. (4)

The labor pattern represents a markedly abnormal labor curve – a significant protraction, if not arrest, of the active phase of labor. Having achieved full dilatation, it will be almost five hours before a complicated and prolonged operative vaginal delivery ultimately delivers the patient. The mother sustained a 3rd-degree laceration of the perineum. The procedure details are not adequately described in terms of the station, molding, caput, flexion, number of pulls, or effort. In his deposition, implausibly, the physician maintained that there was no caput, and the fetal head descended with each traction.

The placental weight plotted out at the 3rd percentile with an F/P ratio of 8.1. Microscopic examination revealed "acute chorioamnionitis" with Stage 2, Grade 1 maternal and fetal inflammatory responses. There was also a "mild to moderate" lymphohistiocytic villitis involving about 2% of the placental tissue.

The Newborn

The 3500-gram male infant received Apgar scores of 4, 6, and 8 at 1, 5, and 10 minutes respectively. His head circumference was 34.5 cm, and his length was 37.2 cm, yielding a ponderal index of 2.4. There is no immediate description of the baby's head following the prolonged VAD. Umbilical blood gases show mild metabolic acidemia. At birth, the baby's heart rate was >100 bpm, with poor muscle tone and weak respirations requiring CPAP with 100% oxygen. The umbilical venous pH was 7.22, pCO_2 39, pO_2 18, HCO3- 16 mmol/L, and base deficit (BD) 10. His arterial cord pH was 7.16, pCO_2 51, pO_2 20, HCO3- 18 mmol/L, and BD 11. A capillary blood gas collected at about 70 minutes of age revealed a pH of 7.17, pCO_2 49, pO_2 38, HCO3-18 mmol/L, and BD 10.9 mmol.

On admission to the nursery, the baby was described as "alert" and moving appropriately with intact primitive reflexes. He was maintained on CPAP. An IV was started, and antibiotics were administered. At about 1.5 hours of age, the baby's hemoglobin was 16.8 g/L. His WBC count was 40,850 x 10^6/L, the neutrophil count 25,570, the nucleated red blood cell count was mildly

Table II

Prerequisites for VAD

1. Gestational age at least 35 weeks gestation
2. Knowledge of previous deliveries and pelvic adequacy
3. Absent fetal disorders
   a. bleeding disorder (hemophilia, von Willebrand's, alloimmune thrombocytopenia)
   b. Osteogenesis imperfecta, ?IUGR
4. Properly obtained informed consent, including:
   a. the recommendation, indication, benefits, risks, and alternatives to VAD.
   b. The understanding that the procedure may be unsuccessful and that cesarean section may be necessary. (Risk >15%)
   c. Reassurance that the patient will be updated during labor about factors influencing the likelihood of operative delivery.
   d. A willingness to abandon the procedure if difficulties are encountered.
5. Immediate availability of anesthesia providers should a cesarean section be necessary. (especially if an indication is "fetal distress."
6. Empty maternal bladder
7. Adequate anesthesia
8, No previous attempt at operative vaginal delivery (e.g., forceps)

Table III'

The feasibility of safe delivery and the success of VAD

The previous obstetrical history

The course of labor (patterns of dilatation of the cervix and the descent of the fetal head)

The estimated fetal weight

The amount of caput, molding, asynclitism

The station, position of the fetal head

The fetal head engagement is not the same as 0 station – (May need an abdominal exam to verify.

elevated, and his platelet count was mildly depressed at 130,000 x 10^6/L.

The baby's mean blood pressure at 4 hours of age was 37 mmHg but improved somewhat over time. At about 12 hours of age, the baby's capillary lactate level was elevated at 6.3 mmol/L. His blood glucose was 3.1 mmol/L, and his ionized calcium was low at 1.03 mmol/L. Because of an x-ray showing free air in the mediastinum, the infant was taken off CPAP. Subsequently, his oxygen saturation fell to about 40%, and he had an episode of "staring" associated with bradycardia to 90-95 bpm. Sepsis, intracranial pathology, seizures, and a metabolic abnormality were considered in the differential diagnosis. There ensued multiple episodes of apnea associated with oxygen desaturation and bradycardia. A head ultrasound revealed a right subependymal hemorrhage with some dilation of the third and fourth ventricles. At about 15 hours, the infant was described as "pale/pink, jittery, and hypertonic." He was noted to be less active than earlier in the day. His heart rate had slowed, and his urine output was "decreased." A spinal tap was negative, as was a CSF culture. At 18 hours, the infant displayed rhythmic, rightward movements of his eyes, right hand, and leg, for which lorazepam was administered, followed by phenobarbital and Acyclovir, for suspected seizure activity.

"About 25 hours after birth, the infant was transferred to a Children's Hospital. The admission note included a reference to "increased upper limb tone" and swelling over the occipital area of the head, attributed to the vacuum extraction. "

About 25 hours after birth, the infant was transferred to a Children's Hospital. The admission note included a reference to "increased upper limb tone" and swelling over the occipital area of the head, attributed to the vacuum extraction. Blood work in the hours after the admission included a-mildly abnormal INR at 1.7 and 1.8; the serum creatinine was unremarkable

Although clinical seizure activity was absent, an aEEG revealed subclinical seizures for which pyridoxine and phenobarbital were administered. Subsequently, phenytoin was added to the regimen for "apnea" spells which required PPV. The aEEG continued to show a discontinuous voltage pattern and multifocal sharp waves but no seizures. There were no cortical responses on visual or somatosensory evoked potential testing.

The baby's urine output was low; at less than 0.5 ml/Kg/hour, his serum sodium had fallen to 122 mmol/L. His sodium level and urinary output were corrected with an infusion of concentrated sodium chloride. Various metabolic and genetic investigations collected on the first day of admission were negative. In the afternoon of DOL 2, a neurological examination was abnormal, with a lack of spontaneous movement, "quivering, shuddering, shivering" movements, and increased tone and deep tendon reflexes on his right side.

An ultrasound examination of the brain at 36 hours of life demonstrated minimally increased echogenicity in the basal ganglia, thalami, and slit ventricles. MRI examination on DOL 5 demonstrated increased signal (T1) restricted diffusion in the basal ganglia and thalami, perirolandic regions, parasagittal frontal lobes, and the corpus callosum splenium and in the posterior watershed regions, left greater than right with small posterior and posterior fossa subdural hematomas. T2 images reveal increased signals in the white matter and heterogeneous signals in the basal ganglia and thalami. Subarachnoid hemorrhage was also seen. The ventricles were normal in size, shape, and position. The MR angiogram and venogram were normal, but there was bilateral caput, mild bilateral cephalohematomas, and a mild subgaleal hemorrhage.

Follow-up MR performed at DOL 25 demonstrated a markedly increased signal in the BGT, with faint extension to the perirolandic regions. There was mild atrophy and prominence of the ventricles and sulci related to decreased brain volume. On T2, there was an increased signal in the white matter, especially in the perirolandic regions. The subdural hematomas had decreased in size but were still apparent.

These images were entirely consistent with a recent hypoxic-ischemic injury and obvious trauma. None of these findings

Table IV

Factors compromising the success of VAD

1. Maternal obesity, Large fetus
2. Protracted labor (dilatation or descent)
3. Malposition (OP, OT), Asyclitism
4. High presenting part
5. Pop-offs
6. Failure to obtain descent of the fetal head with each traction
7. The prolonged effort and need for "excessive force."
8. The improper direction of the traction

suggest any congenital abnormality or more remote injury. The basal ganglia and thalamus involvement are consistent with an acute near total episode, the parasagittal frontal lobes, and the posterior watershed regions, typical of (prolonged partial pattern) HI injury.

"These images were entirely consistent with a recent hypoxic-ischemic injury and obvious trauma. None of these findings suggest any congenital abnormality or more remote injury. The basal ganglia and thalamus involvement are consistent with an acute near total episode, the parasagittal frontal lobes, and the posterior watershed regions, typical of (prolonged partial pattern) HI injury."

The allegations of the plaintiff

The care of the patient and her fetus during labor fell hopelessly below any reasonable standard of care. Throughout, there were failures to:

1. Appreciate the diminishing feasibility of safe vaginal delivery.
2. Appreciate and respond to the abnormalities of the FHR tracing, including the insertion of the MHR into the tracing.
3. Recognize and properly respond to abnormalities of the uterine contraction patterns.
4. Recognize and properly control the rate of infusion of oxytocin.
5. Failed to appreciate the improbability of safe vaginal delivery with a vacuum extractor and provide informed consent to the patient.
6. Improper use of the vacuum device
7. Failed to abandon attempts at VAD in a safe and timely manner.
8. Failed to make simultaneous preparations for double-setup should the procedure fail.
9. These failures led to permanent, hypoxic-ischemic, and traumatic injuries to the baby's brain during his mother's labor and delivery.
10. These injuries were preventable by adherence to reasonable standards of obstetrical care.
11. In addition, the nurses failed to properly inform the responsible physicians and substandard recording of the events of labor and delivery and a description of the head of the newborn.

The response of the defense:

1. While in utero, hypoxia-ischemia event was "a significant contributor" to the baby's neurological impairments, it was most likely due to an acute, severe event that likely took place between 12 hours and four days prior to birth.
2. The clinical signs manifested immediately after birth and resolving by two days of life were "not in keeping with having suffered [severe] hypoxia-ischemia in the final hours of labor."
3. Although the baby's birth weight and clear amniotic fluid volume were in the normal range, the small placenta raised concerns about long-term placental insufficiency leading to a hypoxic-ischemic insult.
4. While chorioamnionitis is commonly seen in normal births and babies with normal outcomes, the pathology report noted vasculitis of the umbilical cord blood vessels, a particularly strong risk factor for cerebral palsy. (5)
5. The infection is a contributing feature but was not the direct cause of the baby's encephalopathy.
6. The base deficit (BE) values of the cord (-11 mmol/L) and on follow-up at about 71 minutes (10.9) are seen very frequently in infants who go on to have a normal neonatal course and normal long-term outcome. Ultimately, these values failed to meet the "criteria for perinatal asphyxia" as vouchsafed by ACOG (6).

Table V

Neonatal complications (11-13)(12-14)

Hemorrhage – intracranial, Subgaleal, cephalohematoma

HIE – Consider injury in 2nd stage of labor preceding VAD.

Shoulder dystocia - brachial plexus injury.

Bruising, chignon, scalp trauma

"For the fetus to be injured on admission to the hospital, as believed by the defense experts, requires that the fetus suffer a significant hypoxic-ischemic event sufficient to cause discernible neurological injury in the two days between hospital visits without a change in fetal activity or FHR pattern. The experts do not comment on what that stealth event was or when it might have occurred to precipitate such an injury in this normally grown, apparently responsive fetus."

Comment

For the fetus to be injured on admission to the hospital, as believed by the defense experts, requires that the fetus suffer a significant hypoxic-ischemic event sufficient to cause discernible neurological injury in the two days between hospital visits without a change in fetal activity or FHR pattern. The experts do not comment on what that stealth event was or when it might have occurred to precipitate such an injury in this normally grown, apparently responsive fetus. The defense experts seem content to attempt to derive the timing and mechanism of injury from the clinical and laboratory circumstances accompanying the newborn. They paid no attention to the prolonged course of labor, the excessive uterine activity, fetal cardiac decelerations, tachycardia and the misadventures with the vacuum, and the potential for trauma associated with the operative delivery. There is also no appreciation that for over 20 minutes in the 2nd stage of labor, the MHR, not the FHR, is being monitored.

"They paid no attention to the prolonged course of labor, the excessive uterine activity, fetal cardiac decelerations, tachycardia and the misadventures with the vacuum, and the potential for trauma associated with the operative delivery. There is also no appreciation that for over 20 minutes in the 2nd stage of labor, the MHR, not the FHR, is being monitored. "

Vacuum usage

The decision to proceed with VAD requires careful selection of patients, proper attention to technique, and continual progress in descent with each traction effort. The safety of a VAD is universally linked to the proper selection of patients based on maternal, fetal, and obstetrical indications and prerequisites (Tables I and II). (7) (8) The prerequisites for VAD include full dilatation of the cervix, an engaged presenting part, based on knowledge of the position and the "true" station of the presenting part (taking into account potentially confounding features such as molding, malposition, caput, and asynclitism). Prerequisites also include a reasonable expectation of success and a willingness to abandon the procedure when difficulties supervene (detachments or "pop-offs"), when descent is not made with each pull, or when the "excessive" effort is required. Vacca (9) pointed out that the maximum force applied to the vacuum handle can be generated with the operator's flexing fingers. In the appropriately selected patient, a vacuum-assisted vaginal delivery will be accomplished within 10-15 minutes using no more than five pulls in association with maternal pushing.

The VAD is undertaken only with reasonable expectations of success. Numerous factors influence the likelihood of success after reaching full dilatation, and the prerequisites met. (Tables III and IV). The reported failure rate for vacuum extractions varies considerably from about 5% to about 25% and is significantly higher with the fetal head in the occiput posterior position. (10) It is widely understood. However, outcome statistics for vacuum deliveries are confounded by the fact that the indication for the vacuum, especially "fetal distress," is associated with adverse outcomes. In an analysis of 179 cases of neonatal injury associated with VAD that were the subject of medico-legal action, Schifrin et al. found a VAD failure rate of about 50%. In that study, the appearance of injury raised essential questions about the proper selection of patients, the technique, and especially in multiple applications of the device. Notably, hypoxic-ischemic injury following VAD was more likely to represent injury during the 2nd stage of labor before applying the vacuum. Abstract: Marinac-Dabic D, Schifrin BS, Bright R. Adverse Effects of Vacuum Assisted Delivery Devices. ACOG – Annual Clinical Meeting – April 2003, New Orleans, LA)

"Maternal complications occur in about 10% and consist mostly of perineal and vaginal lacerations. Fetal complications (Table V) are increased with prolonged or multiple applications or with the device's application at the high station, in nulliparas, or those with a history of cesarean section. VAD in a prior pregnancy is a risk factor for cesarean section in a subsequent delivery."

Maternal complications occur in about 10% and consist mostly of perineal and vaginal lacerations. Fetal complications (Table V) are increased with prolonged or multiple applications or with the device's application at the high station, in nulliparas, or those with a history of cesarean section. VAD in a prior pregnancy is a risk factor for cesarean section in a subsequent delivery. Sequential use of instrumental delivery carries significantly higher neonatal morbidity than when a single instrument is used. Undertaking a VAD is associated with an increased risk of shoulder dystocia and subsequent brachial plexus injury.

The known risks of VAD should prompt a directed evaluation of the neonate over the first several hours of life with prompt attention to the potential for clinically apparent SGH. During this observation period, a bonnet should not be placed on the baby's head.

Denouement

In the abstracted case, undertaking a vacuum under the circumstances was fraught, with few prospects of safe vaginal delivery, irrespective of the failure to recognize the insertion of the MHR into the tracing. Labor progress, especially in the 2nd stage, was poor. There was an apparent failure to descend, with a malposition (ROT). In this respect, given the duration of labor and pushing and the malposition of the fetal head, the physician's belief that there was no caput or molding of the fetal head seems implausible. These latter features are indeed present on the neonatal MRI examination. At the time of the VAD, the physician averred that the fetal head was in ROT position and at +2 station - presumably engaged. Because of the obvious caput, molding, and malposition (and the difficulty in effecting delivery), the fetal head was likely higher in the pelvis (and unengaged) despite the estimated +2 station. This interpretation would make the initial attempt at VAD contraindicated by reasonable standards of care. Further, it was only with extraordinary efforts of traction and maternal pushing that the fetus was delivered vaginally.

In this case, the appearance of a "conversion pattern" on the tracing permitted the conclusion that the fetus had indeed suffered a neurological injury before applying the vacuum. (3) This does not exclude the potential for additional ischemic or traumatic harm from the VAD or the manipulations associated with releasing the shoulder dystocia. It is also important to consider the potential synergistic effect of infection as evidenced by placental pathology showing chorioamnionitis on both the maternal and fetal sides of the placenta, along with sustained fetal tachycardia. Chorioamnionitis appears to reduce the fetal threshold for brain injury, especially in a fetus with abnormal FHR tracing and prolonged labor. (5)

"It is also important to consider the potential synergistic effect of infection as evidenced by placental pathology showing chorioamnionitis on both the maternal and fetal sides of the placenta, along with sustained fetal tachycardia. Chorioamnionitis appears to reduce the fetal threshold for brain injury, especially in a fetus with abnormal FHR tracing and prolonged labor. (5)"

These features, including the normal tracing at the outset of labor, permit the conclusion that the most likely timing of the hypoxic-ischemic and traumatic injuries occurred during the intrapartum period and was preventable with the provision of reasonable standards of care and proper attention to the reasonable interpretation of the course of labor, uterine contractions, and the fetal responses thereto.

The case was settled prior to trial.

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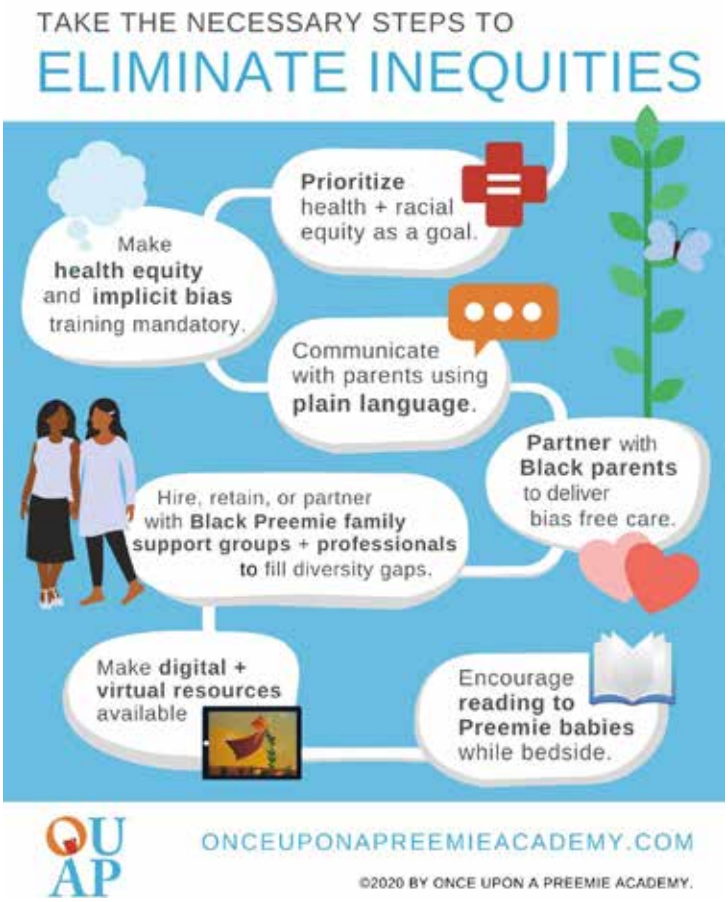

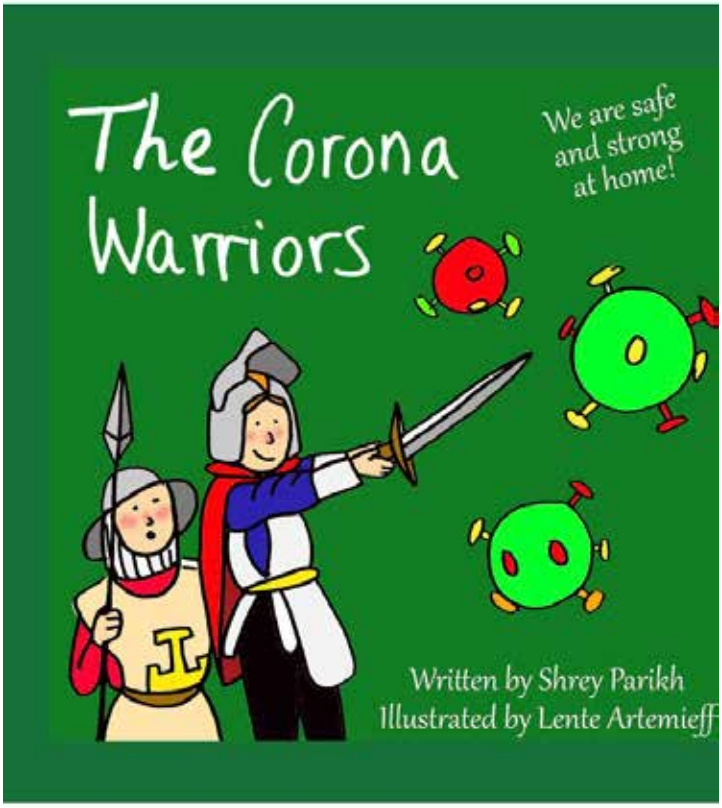

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SHARED DECISION-MAKING PROTECTS MOTHERS + INFANTS DURING COVID-19

KEEPING MOTHERS + INFANTS TOGETHER

Means balancing the risks of...

- HORIZONTAL INFECTION
- SEPARATION AND TRAUMA

EVIDENCE

We encourage families and clinicians to remain diligent in learning **up-to-date evidence**.

PARTNERSHIP

What is the best for this unique dyad?

SHARED DECISION-MAKING

- **S** EEK PARTICIPATION
- **H** ELP EXPLORE OPTIONS
- **A** SSESS PREFERENCES
- **R** EACH A DECISION
- **E** VALUATE THE DECISION

TRAUMA-INFORMED

Both parents and providers are confronting significant...

- FEAR
- GRIEF
- UNCERTAINTY

LONGITUDINAL DATA

We need to understand more about outcomes for mothers and infants exposed to COVID-19, with special attention to:

- MENTAL HEALTH
- POSTPARTUM CARE DELIVERY

NEW DATA EMERGE DAILY. NANN AND NPA ENCOURAGE PERINATAL CARE PROVIDERS TO ENGAGE IN CANDID CONVERSATIONS WITH PREGNANT PARENTS PRIOR TO DELIVERY REGARDING RISKS, BENEFITS, LIMITATIONS, AND REALISTIC EXPECTATIONS.

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Gravens By Design: Gravens 2023 Preview – The Environment of Care in the NICU

Robert D. White, MD

"Since its inception, one of the primary goals of the Gravens Conference has been to provide evidence and experience on the NICU environment of care, which encompasses both NICU design and operational aspects of care, such as lighting and sound control. "

Since its inception, one of the primary goals of the Gravens Conference has been to provide evidence and experience on the NICU environment of care, which encompasses both NICU design and operational aspects of care, such as lighting and sound control. That these environmental influences have a considerable impact on developing newborns and their families and caregivers is now well-understood, although there is uncertainty about how individual environmental aspects should be controlled. We have gone through stages of NICU care in which there was too much light and then, once recognized, have provided too little light in many cases. Likewise, we routinely allowed too much noise in NICUs of the past but now may be at risk of providing too little in the way of nurturing sounds, often because of a misplaced intent to protect infant sleep.

"At the 2023 Gravens Conference, there will be several opportunities to learn about new opportunities to enhance the environment of care, both in existing NICUs and for those planning new NICU construction."

At the 2023 Gravens Conference, there will be several opportunities to learn about new opportunities to enhance the environment of care, both in existing NICUs and for those planning new NICU construction. On day one, Dr. Bjorn Westrup from Karolinska Institute in Stockholm will be given the Gravens Award and present the Karolinska experience with couplet care in the NICU, which maximizes parent/infant interaction in the crucial first days of life. The introduction of couplet care has structural and operational implications, so caregivers from all NICUs, whether planning new construction or not, can benefit from learning the value of this newest model of NICU care.

"All Care is Brain Care" is a new Vermont-Oxford Network initiative that has widespread implications for care practices but certainly depends on an optimal environment of care for its success. Dr. Sonia Bonifacio will provide an overview of this VON collaborative that is currently enrolling NICUs; a preview of this project is available at https://public.vtoxford.org/quality-education/brain-care/.

Creating small baby units within NICUs is becoming an increasingly common strategy to optimize the care of our most vulnerable patients. Again, these initiatives have structural and operational implications that those considering developing such a program should be aware of, but there are also more generalizable lessons applicable to the care of all high-risk newborns, even within a conventional NICU space. Drs. Kris Reber and Raylene Phillips will present their experience with small baby units, emphasizing these care practices that can be generalized for ELBW babies in all NICUs.

"Family-centered care has been a consistent theme of the Gravens Conference. Several formalized programs have been introduced and studied in recent years, so there is now a large body of evidence to support this culture and structured programs to facilitate it."

Family-centered care has been a consistent theme of the Gravens Conference. Several formalized programs have been introduced and studied in recent years, so there is now a large body of evidence to support this culture and structured programs to facilitate it. This topic will be introduced on day one and explored in much greater detail in the Developmental Care and Family Integrated Care Track on day two; Dr. Joy Browne will describe these presentations more thoroughly in next month's Graven's column in Neonatology Today. In the meantime, the increased encouragement and utilization of families as active care team members have significant implications on how a NICU should be designed.

Day two of the Gravens Conference allows participants to choose between the Design and Developmental Care tracks. NICU design continues to evolve so that the design track will include new unit presentations by teams from a level II NICU in Green Bay, WI, a level III NICU in Gainesville, FL, and a level IV NICU in Turku, Finland. A presentation on color in hospital design will hopefully provide useful ideas to all participants. 2023 is also the year for an update to the Recommended Standards for Newborn ICU Design; a consensus committee will be meeting to finalize the 2023 changes shortly before the Gravens Conference so these newest updates will be presented in the design track with an opportunity

for input and questions from participants. Audience participation will also be the focus of a "crowdsourcing" forum in which participants present their design questions and challenges to the other attendees so they can share their experiences and advice. One abstract session on day three will also be devoted to design topics.

"Attendees of the 2023 Gravens Conference should gain a solid understanding of the structural and operational features of a NICU that optimize the outcomes of high-risk newborns and the well-being and satisfaction of the families and caregivers who spend so much time there."

Attendees of the 2023 Gravens Conference should gain a solid understanding of the structural and operational features of a NICU that optimize the outcomes of high-risk newborns and the well-being and satisfaction of the families and caregivers who spend so much time there.

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COVID-19

STOP THE SPREAD AT HOME

What to do when you or a loved one is infected.

HYGIENE TIPS

MOUTH
- Wear a face mask or face shield.
- If in car, wear mask & put windows down.
- NO cloth face masks for children younger than 2yrs.
- Avoid kissing

EYES
Wear protective eye gear (glasses)

HANDS
ALWAYS wash your hands

CLOTHING
- Wear a jacket when dealing with infected.
- DO NOT share clothing, sheets, or pillows.

BATHROOM

- Sanitize EVERYTHING.
- Clean after every use.
- Patient gargle Listerine every morning & night.

PROTECT

- If infected, notify everyone in contact from the past 10 days.
- Ask Dept. of Health for further assistant.
- Call 211 for FREE delivery services.

If you are feeling sicker, DON'T WAIT. Call your doctor immediately.

SELF ISOLATION

- Sick should be separate from household.
- Room with window preferred
- Aerate room 3x day.
- Create a room divider with sheet.
- Keep water and sanitation liquids near
- Keep garbage bag in room.
- Don't cuddle with pets.

6 FT

Practice social distancing

KITCHEN

- Use SEPARATE utensils.
- Clean utensils separately.
- If sick avoid the kitchen.

TRACK COVID-19 NEAR YOU BY VISITING COVIDNEARYOU.ORG

#STOPTHESPREAD

MIORA

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COVID-19

DETENER LA PROPAGACIÓN EN CASA

Qué hacer cuando usted o un ser querido está infectado.

CONSEJOS DE HIGIENE

BOCA
- Use una mascarilla o careta
- Si está en el automóvil, use una máscara y baje las ventanas
- NO mascarillas de tela para niños menores de 2 años.
- Evitar besos

OJOS
Use equipo de protección para los ojos (lentes)

MANOS
SIEMPRE lávate las manos

ROPA
- Use una chaqueta cuando se trata de infectados.
- NO comparta ropa, sábanas o almohadas.

BAÑO

- Desinfecte TODO.
- Limpiar después de cada uso
- El paciente hace gárgaras con Listerine todas las mañanas y noches.

PROTEGER

- Si está infectado, notifique a todos los contactos de los últimos 10 días.
- Pídale al Departamento de Salud por más ayuda.
- Llame al 211 para obtener servicios de entrega GRATUITOS.

Si te sientes más enfermo, NO ESPERES. Llame a su médico de inmediato.

AISLAMIENTO

- Los enfermos deben estar separados del hogar.
- Habitación con ventana preferida
- Airear la habitación 3x al día
- Crea un separador de ambientes con sábana.
- Mantener agua y líquidos de saneamiento cerca
- Mantenga una bolsa de basura en la habitación.

6 FT

Practica el distanciamiento social

COCINA

- Use utensilios SEPARADOS.
- Limpie los utensilios por separado.
- Si está enfermo, evite la cocina.

SIGUIR COVID-19 VISTAR COVIDNEARYOU.ORG

#STOPTHESPREAD

MIORA

Visitar Miora.org

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Ways to Manage Covid 19 @ Home

Household

1. Stay 6 feet apart from others at all times.
2. Wear protective covering over mouth and eyes (mask AND shield/goggles/glasses) when near others. (Do not put masks on children under 2 years old)
3. Gargle with antiseptic mouthwash in the morning and evening.
4. Wash hands 10-12x a day, before each meal for at least 20 seconds.
5. Keep good ventilation throughout home. (open windows/doors) where possible
6. Do not share towels, blankets, pillows with sick.
7. Call 211 for assistance/free delivery of services.
8. Wear protective clothing (jacket, gloves, mask) that can be removed after being around infected.

Stop the Spread at HOME

MIORA

Sick

1. Self-isolate by staying in separate room with separate bathroom where possible. Don't go into shared spaces.
2. Create a room divider with sheet, if shared space is unavoidable.
3. Ventilate room with fresh air at least 3x per day.
4. Keep water and sanitation products in room.
5. Keep plastic garbage bag in room.
6. Protect pets - don't cuddle.
7. Notify contacts in last 10 days.
8. Don't wait! Call doctor if symptoms get worse.

Maneras de manajer COVID-19 en casa

Hogar

1. Manténgase 6 pies de distancia de los demas en todo momento.
2. Use una cubierta protectora sobre la boca y la máscara para los ojos Y el protector / gafas / anteojos cuando esté cerca de otras personas. No ponga máscaras a niños menores de 2 años.
3. Hacer gárgaras todas las mañanas y noches con productos de enjuague bocal antiséptico que contienen alcohol.
4. Lavesé la manos 10-11 veces al día, y antes de cada comida por lo menos 20 segundos.
5. Mantéga Buena ventilacion en toda la casa. Abra las ventanas y puertas cuando sea posible.
6. No compartá toallas, cobijas, y almohadas con personas que esten infectados.
7. Llame al 211 para obtener servicios de entrego gratuitos.
8. Use ropa protectora, chaqueta, guantes, máscara que se pueda quitar después de estar cerca de infectados.

Detén la propagacion en casa

MIORA

Enfermo

1. Aíslese permanecindo en una habitación separada con baño separado. No vayas a espacios compartidos
2. Si no se puede aislarse crea un separador de ambiente con una sabana.
3. Ventile la habitacion con aire fresco por lo menos 3 veces al día.
4. Mantenga agua y productos de saneamiento en la habitacion.
5. Mantenga una bolsa de basura en la habitación.
6. Proteja a las mascotas, no las abrace.
7. Notifique a todos los contactos de los últimos 10 días.
8. No espere! Si se siente peor llame a su medico.

WEAR A MASK

PROTECT PARENTS + BABIES

COVID-19

When we all wear masks...

We protect parents and babies.

Project Sweet Peas + National Perinatal Association

USA UNA MASCARILLA

PROTEGER A LOS PADRES Y BEBÉS

COVID-19

Cuando todos usamos mascarillas ...

Protegemos a los padres y los bebés.

Project Sweet Peas + National Perinatal Association

Fragile Infant Forums for Implementation of IFCDC Standards: Developmentally Supportive Care Means Individualized Care...

Erin Sundseth Ross, Ph.D., CCC-SLP

"Providing developmental care during the ICU stay is challenging, partly because every baby and every family is unique. Care must be individualized to the ever-changing baby and family needs which require systems-thinking, advocacy, education, and teamwork."

Abstract:

Providing developmental care during the ICU stay is challenging, partly because every baby and every family is unique. Care must be individualized to the ever-changing baby and family needs which require systems-thinking, advocacy, education, and teamwork. This article explores the importance and the challenge of providing individualized care for the infant and the family. It highlights how the Recommended Standards, Competencies, and Best Practices for Infant and Family-Centered Developmental Care can help individualize care across the six identified evidence-based developmental care domains.

The Infant and Family Centered Developmental Care (IFCDC) Consensus Committee and their Recommended Standards, Competencies, and Best Practices for Infant and Family-Centered Developmental Care focus on providing care within intensive care settings that exemplify best practices for neuroprotection of the baby's developing brain. These principles and evidence-based practices view the infant as an active partner in care, primarily championed within the Newborn Individualized Developmental Care and Assessment Program (NIDCAP®), which demonstrated improved outcomes for both the infant and the family. (1-8) A later meta-analysis and review of developmental care programs, in general, provide more recent data suggesting improved outcomes after discharge. (9)

"The Infant and Family Centered Developmental Care (IFCDC) Consensus Committee and their Recommended Standards, Competencies, and Best Practices for Infant and Family-Centered Developmental Care focus on providing care within intensive care settings that exemplify best practices for neuroprotection of the baby's developing brain."

"IFCDC is grounded in designing and providing care to meet the needs of each infant – which will differ based on gestational age, medical comorbidities, socio-cultural, family, and environmental factors. Additionally, every family is unique, and therefore, the support that each family requires is different as well."

Family-centered care is a movement toward integrating families into the care of their hospitalized infants. (10) As developmental care and family-centered principles evolved and as evidence accumulated to demonstrate their effectiveness, so did the concept of Infant and Family-Centered Developmental Care (IFCDC), which includes both the infant AND the family. However, too often, the core principle of IFCDC, *individualized care*, is misunderstood or missed altogether.

Box 1:
Examples of integration of individualized care into the developmental care standards for infants in intensive care

Systems Thinking:

Standard 6: The interprofessional collaborative team should provide IFCDC through the transition to home and continuing care for the baby and family to support the baby's and family's optimal physiologic and psychosocial health needs.

- Competency 6.2: Procedures that engage the family in assessing the readiness of themselves and the baby for transition to the home environment should be developed, implemented, and evaluated.
- Competency 6.4: Assessment with the family of their confidence level for managing the baby in the home and community environment should be implemented.

Positioning and Touch:

Standard 1: Babies in intensive care settings shall be positioned to support musculoskeletal, physiological, and behavioral stability.

- Competency 1.0: Body position shall be individualized and monitored for the head, trunk, and extremity alignment and movement.

Standard 4: Babies in ICU settings shall experience human touch by family and caregivers.

- Competency 4.4: To avoid overstimulation, individualized frequency and duration of supplemental, gentle touch shall be determined by evaluating the baby's behavioral and physiological parameters before, during, and after the touch interaction.

Sleep and Arousal:

Standard 1: Intensive care units (ICUs) shall promote developmentally appropriate sleep, arousal, and sleep-wake cycles.

- Competency 1.3: The ICU shall implement a system to document the individual baby's sleep and arousal states and cycles.

Skin-to-Skin Contact (SSC):

Standard 1: Parents shall be encouraged and supported in early, frequent, and prolonged skin-to-skin contact (SSC) with their babies.

- Competency 1.2: Information in a variety of appropriate formats and the parent's language should be provided about the SSC policy and how it applies specifically to them and their baby, including a) inclusion and exclusion criteria; b) indications and techniques for kangaroo care (KC) and hand containment (HC); and c) who may be designated by parents to participate in SSC.
- Competency 1.7: Parents shall be supported to recognize their baby's behavioral communications of stress and relaxation during SSC.

Standard 2: Education and policies in support of skin-to-skin contact between parents and their babies shall be developed, implemented, monitored, and evaluated by an interprofessional collaborative team.

- Competency 2.6: SSC educational content should include ways to individualize SSC according to the baby's medical condition, behavior, and state organization and should include: a) descriptions, techniques, and indications for KC or gentle supportive HC; and b) techniques and scripts for supporting the use of these options to parents.

Pain and stress:

Standard 1 (Families): The interprofessional team shall document increased parental/caregiver well-being and decreased emotional distress (WB/D) during the intensive care hospital (ICU) stay. The stress levels of the baby's siblings and extended family should also be considered.

- Competency 1.9: Appropriate emotional interventions and support shall be provided by social workers, psychologists, and psychiatrists within the ICU to parents/caregivers with debilitating symptoms or acute distress.

Standard 2 (Babies): The interprofessional collaborative team shall develop care practices that prioritize multiple methods to optimize baby outcomes by minimizing the impact of stressful and painful stimuli.

- Competency 2.9: Pain and stress management should be individualized based on each baby's behavioral and physiological communication and consideration of the parents' expressed preferences.

Feeding, Eating, and Nutrition Delivery

Standard 1: Feeding experiences in the intensive care unit (ICU) shall be behavior-based and baby-led. Baby-led principles are similar whether applied to enteral, breast-, or bottle-feeding experience.

- Competency 1.7: Baby behavior at the beginning (baseline) of feeding and changes during feeding for physiologic, motor, behavioral state, and interaction parameters shall guide the feeder's decision to continue or discontinue the feeding. While some loss of stability is common, the focus shall be on maintaining a minimal level of baseline physiologic stability and behavior throughout the feeding or regaining baseline stability when the baby loses stability during the feeding.
- Competency 1.9: Baby behavior and medical stability shall guide initiation of oral feeding attempts as gestational age does not address normal developmental variability or the impact of medical comorbidities.

IFCDC is grounded in designing and providing care to meet the needs of each infant – which will differ based on gestational age, medical comorbidities, socio-cultural, family, and environmental factors. Additionally, every family is unique, and therefore, the support that each family requires is different as well. These essential supports are not static. Infants and families evolve over time, requiring a system and staff that are attuned and flexible in their response to these unique needs.

Unfortunately, often the needs of infants and families are missed or mistimed when NICUs do not prioritize individualizing care. So despite the application of IFCDC, implemented with various interpretations and approaches, there is still room for improvement. Could individualization of care be the missing link?

"The Recommended Standards, Competencies, and Best Practices for Infant and Family-Centered Developmental Care provide individuals, units, and systems with the tools to help with individualized care."

The challenge to individualization

Protocols are a mainstay of medicine, nursing, and ancillary care practice. (11) In many cases, protocols lead to improved outcomes. (12-14) How do systems and individual professionals achieve optimal outcomes with best practices that use standards and competencies while maintaining the need to individualize practices? The Recommended Standards, Competencies, and Best Practices for Infant and Family-Centered Developmental Care provide individuals, units, and systems with the tools to help with individualized care. Each of the six domains within these best practices includes standards and competencies focused on individualized care for the infant and the family. These standards can be accessed at https://nicudesign.nd.edu/nicu-care-standards/ . Box 1 provides examples of how the Standards, Competencies, and Best Practices integrate individualized care.

"To consistently provide individualized care in support of pain, stress, sleep, and arousal, parents/families and staff must be educated in understanding the infant's communication. Once everyone "speaks the language of the newborn," protocols can be implemented to reduce the variability of caregivers in their response to the infant's needs."

To consistently provide individualized care in support of pain, stress, sleep, and arousal, parents/families and staff must be educated in understanding the infant's communication. Once everyone "speaks the language of the newborn," protocols can be implemented to reduce the variability of caregivers in their response to the infant's needs.

For example, painful and invasive procedures negatively affect preterm infant brain growth and developmental outcomes. (17) However, preterm infants at different gestational ages have different behavioral responses to pain. For instance, Gibbins and colleagues documented facial responses and physiological changes during heel lances in preterm infants stratified by gestational ages. (18) Physiological responses were similar across ages, but facial responses differed based on gestational age, with the youngest infants showing the least change. (18) Fabrizi and colleagues demonstrated that infants less than 34 weeks of gestation had similar neuronal activity to noxious (heel lance) and non-noxious (tactile) touch. In contrast, infants older than 34 weeks did not. (19) This suggests that the ability to discriminate touch inputs emerges between 35 and 37 weeks gestation. Pain and stress are managed best when treatments are offered based on the baby's communicative signs and responses. (20)

In another example, the NICU setting and other intensive care settings for infants often separate infants from their families. Separation is stressful and has consequences that negatively influence the infant and the family. (15, 16) The best exemplar of the benefit of non-separation of babies and mothers is the practice of skin-to-skin (STS) care. Within SSC, positioning and touch protocols are encouraged to support appropriate interactions and minimize stress. These protocols are individualized by considering the infant's gestational age, medical comorbidities, and needs and observing the infant's responses.

"Since infants demonstrate different responses to the same activities, routine caregiving protocols should be designed with the ability to individualize based on infant behaviors. Not all touch or oral stimulation protocols may be beneficial."

Other caregiving approaches that show different responses from each baby include the respiratory status or gastrointestinal functions that may improve with changes in position or with positional aids for some but not all infants. (21, 22) Swaddling is associated with more stable cardiorespiratory function during and after painful as well as routine procedures for some infants and may be especially beneficial for infants with Neonatal Abstinence or Neonatal Opioid Withdraw Syndromes. (23, 24) In a study published in 2020, preterm infants with lower PMAs demonstrated more motor and autonomic stress during weighing and bathing. (25) Since infants demonstrate different responses to the same activities, routine caregiving protocols should be designed with the ability to individualize based on infant behaviors. Not all touch or oral stimulation protocols may be beneficial; some infants may have apnea or bradycardia in response to these protocols. (26, 27) Bembich and colleagues concluded that recognizing adaptive and maladaptive responses to caregiving by each baby allows nurses to individualize and personalize their interactions with pre-

term infants. (25)

The evidence-based exemplar of individualizing Feeding, Eating, and Nutrition delivery

Perhaps the domain where individualization is most needed is Feeding, Eating, and Nutrition Delivery (FEND). There is mounting evidence that feeding advancement guided by protocols leads to improved growth, nutrition, metabolic and developmental outcomes. (28) In a recently published Quality Improvement (QI) study, a standard feeding protocol was developed to decrease the time to achieve full enteral feeds. (29) This protocol decreased the mean number of days to reach full feeds from 13 days to 9 days, with a decrease in central line use from 8.5 days to 5.7 days. (29) Clearly, with these protocols, the infant's response to enteral feedings also guides decisions within the protocol. The key is to have a system to determine whether the infant tolerates the advancement – a standardized response to the infant's reactions. Nevertheless, in a recent review, Lubbe found that feeding regimes and protocols for advancing to oral feedings are inconsistent and often contradictory. (30) Often with the transition from tube to oral feedings, "what we have done" is the norm rather than evidence-based practice. (30)

" Protocols provide structure and limit variability due to practices. The key is to find structure and limit variability due to practice, while allowing flexibility to meet the infant's needs."

How can these principles of practice standardization within the framework of individualized care for infants and families be applied to the questions swirling around oral feedings? What gestational age to start oral feedings with an infant? Shall oral feedings begin with bottle feeding or breastfeeding? When to introduce the complement to the initial feeding mode? Can preterm infants achieve exclusive direct breastfeeding without increased lengths of stay? These questions and many more have different answers depending on the system, unit, staff, infant, and family factors.

Protocols provide structure and limit variability due to practices. The key is to find structure and limit variability due to practice, while allowing flexibility to meet the infant's needs.

Each infant is a competent communicator, another core principle for IFCDC. They can help individualize pathways to meet their needs. Unlike nutritional guidelines based primarily on numbers, learning to eat is a developmental skill. Like all developmental skills, infants achieve skills within windows of time, but not based on a strict age. For other developmental milestones, such as walking, there may be a five or six-month window for acquisition and another six to twelve months for mastery. (31-33)

Nevertheless, professionals and parents frequently feel infants should eat and go home at the same age. The window of time that the majority of healthy preterm infants eat everything and go home is 34.5 to 38.5 weeks in most research studies, with the mean GA being 36.5 weeks. (34, 35) Infants with medical comorbidities will be in the hospital longer. (34, 35)

The difference in timing for developmental milestones is a significant factor that often is overlooked. This variability in maturation leads to infants being challenged to eat when they are not ready. Studies have shown the potential dangers of beginning oral feedings too early, with poor pharyngoesophageal function noted in infants younger than 35-36 weeks. (36, 37) However, some babies can begin oral feedings at younger ages than others. So how does the professional individualize cue-based programs while respecting the maturation of the infant? The baby is the best person to listen to when navigating these differing and changing abilities.

"However, some babies can begin oral feedings at younger ages than others. So how does the professional individualize cue-based programs while respecting the maturation of the infant? The baby is the best person to listen to when navigating these differing and changing abilities."

Because of the neurodevelopmental nature of learning to eat, most FEND standards and competencies address the need to individualize care based on the infant and family needs. The first standard expects that "feeding experiences in the intensive care unit (ICU) shall be behavior-based and baby-led. Baby-led principles are similar whether applied to enteral, breast, or bottle feeding experience." (38) Feeding outcomes have improved with programs focusing on attending, interpreting, and responding to baby behaviors. (30, 39-53) Ten of the twelve competencies within this standard address the need to individualize care to both the infant's and the family's needs.

How to implement individualized IFCDC

Making changes to practice is hard, and it is challenging when the outcomes are varied with so many factors influencing success. Individualizing to the needs of both babies and families makes this challenge even harder. Therefore, the IFCDC Consensus Committee has begun Fragile Infant Forums for Implementation to support professionals in integrating the standards and competencies within their unit. The first workshop focused on the FEND domain, with a white paper written after this first workshop. https://nicudesign.nd.edu/assets/491808/fifi_s_white_paper_version_5_10_19_22_jbckjb_final_2022.pdf . It provides strategies to determine where their unit is and what they might strive towards when considering feeding, eating, and nutrition delivery for infants in ICU settings.

The six current principles within the IFCDC Principles-Concept Model consider the need to individualize through systems thinking in complex adaptive systems. The family also needs to be heard. Every family will have different backgrounds, cultures and languages, educational needs, and physical/tangible needs. Furthermore, every family will have different emotional and social needs. Intensive care units need to provide comprehensive individualized family support, which is difficult until we ask the family what they need. (54-57)

By attending to, listening, and responding to the infant's commu-

nication, care can be individualized even for the tiniest of humans who are non-verbal, yet through their behavior, they can have a voice in their care. This leads to improved neuroprotection of the developing brain and infant mental health, two additional principles within the concept model. By doing the same with families within Intensive Care settings, true partnerships can be formed for the benefit of the infant and the family.

Developmental care is not a "one-size-fits-all" program. While research studies provide data to inform pathways and programs, every baby and every family requires individualized care. With this kind of thoughtful, well-designed care that "fits" the baby and family, our long-term outcomes may look even brighter.

"The IFCDC principles-concept model can be accessed online at: https://nicudesign.nd.edu/assets/425320/ifcdc_concept_model_revised_design_by_zj_nov_2020_1_.pdf"

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Disclosures: Dr. Ross owns intellectual property related to feeding infants in the NICU setting (SOFFI®)

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Friday, February 3, 2023		
TIME	**SESSION TITLE**	**SPEAKER**
7:00am-5:30pm	AAP Registration Desk Open	
7:30am-12:30pm	**Neonatal Coding Seminar**	Scott D. Duncan, MD, MHA, FAAP Kate Stanley, MD, FAAP
10:00am-10:15am	Break	
1:00pm-3:00pm	**Neonatal Coding: Afternoon Deep Dive***	Scott D. Duncan, MD, MHA, FAAP Kate Stanley, MD, FAAP
	General Session	
1:00pm-1:15pm	Welcome	Dena K. Hubbard, MD, FAAP - Chair
1:15pm-1:25pm	**Introduction of L. Joseph Butterfield Lecture**	Munish Gupta, MD, FAAP
1:25pm-2:00pm	**L. Joseph Butterfield Lecture: Doing the Right Things: Leadership and Challenges in Risk-Appropriate Care**	Wanda D. Barfield, MD, MPH, FAAP
2:00pm-2:15pm	**L. Joseph Butterfield Lecture: Question and Answer**	Wanda D. Barfield, MD, MPH, FAAP
2:15pm-2:45pm	**Law and Politics in Newborn Care**	Mark Del Monte, JD
2:45pm-3:00pm	**Question and Answer**	
3:00pm-3:15pm	Break / Visit the Exhibits	
3:15pm-3:45pm	**A New Standard of Excellence for NICU Family Wellbeing: Lessons Learned from AAP Carousel Care National**	Margaret "Katie" Hoge, MD, FAAP
3:45pm-4:00pm	**Question and Answer**	
4:00pm-4:15pm	**Section Update**	Munish Gupta, MD, FAAP
4:15pm-4:45pm	**Facts and Fiction: Treatment of Gastroesophageal Reflux in Bronchopulmonary Dysplasia**	Erik A. Jensen, MD
4:45pm-5:00pm	**Question and Answer**	
5:00pm-5:30pm	**The Case of Point-of-Care Ultrasound in Neonatology**	Maria V. Fraga, MD
5:30pm-5:45pm	**Question and Answer**	
5:45pm	Adjourn for the Day	Dena K. Hubbard, MD, FAAP

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Saturday, February 4, 2023		
TIME	**SESSION TITLE**	**SPEAKER**
7:00am-4:00pm	AAP Registration Desk Open	
7:00am-8:15am	Continental Breakfast / Visit the Exhibits	
8:00am-8:45am	**Updating Guidelines for the Management of Neonatal Hypoglycemia - Are We 12 Years Smarter**	Camilia R. Martin, MD, MS, FAAP
8:45am-8:50am	Break	
8:50am-9:50am	**Concurrent Breakout Sessions**	
	Routine Car Seat Tolerance Screening - What Is The Evidence?	Erik A. Jensen, MD
	Supporting Emerging Young Leaders and Keeping Wise Counsel	Wanda D. Barfield, MD, MPH, FAAP
	Caring for the Caregiver - Beyond Recognition into Intervention	Margaret "Katie" Hoge, MD, FAAP
	Advocacy Case Conference: How to Navigate Challenges Outside the NICU	Mark Del Monte, JD
	What is My Clinical FTE?	Satyanarayana Lakshminrusimha, MD, FAAP
9:50am-10:00am	Break / Visit the Exhibits	
10:00am-11:00am	**Concurrent Breakout Sessions**	
	Routine Car Seat Tolerance Screening - What Is The Evidence? (*Repeat from 8:50am Session*)	Erik A. Jensen, MD
	Supporting Emerging Young Leaders and Keeping Wise Counsel *(Repeat from 8:50am Session)*	Wanda D. Barfield, MD, MPH, FAAP
	Caring for the Caregiver - Beyond Recognition into Intervention *(Repeat from 8:50am Session)*	Margaret "Katie" Hoge, MD, FAAP
	Advocacy Case Conference: How to Navigate Challenges Outside the NICU *(Repeat from 8:50am Session)*	Mark Del Monte, JD
	Helping Parents Who Have Lost One of Twins	Keith Barrington, MD
11:00am-11:10am	Break / Visit the Exhibits	
11:10am-12:10pm	**Concurrent Breakout Sessions**	
	What is My Clinical FTE? *(Repeat from 8:50am Session)*	Satyanarayana Lakshminrusimha, MD, FAAP
	Title-TBD	Daphna Yasova Barbeau, MD, FAAP
	Building a Research Program in Private Practice	Kaashif Ahmad, MD, MS, FAAP
	Drivers of Nutritional Practice Variations: Marketing, Evidence-Based, or Lack of Evidence	Camilia R. Martin, MD, MS, FAAP
	Staffing and Workforce Issues	Scott D. Duncan, MD, MHA, FAAP Kate Stanley, MD, FAAP
12:10pm-1:15pm	**Lunch-Round Table: Defining Neonatology Workforce**	
1:30pm-5:00pm	**Half-Day Seminar (Optional)**	
	POCUS Workshop-Registration Required **Session 1: 1:30pm - 3:00pm** **Session 2: 3:30pm - 5:00pm**	Maria V. Fraga, MD Shazia Bhombal, MD Jason Stoller, MD William Corder, MD
5:00pm	Adjourn for the Day	

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Sunday, February 5, 2023		
TIME	**SESSION TITLE**	**SPEAKER**
7:00am-12:05pm	AAP Registration Desk Open	
7:00am-8:00am	Continental Breakfast	
	General Session	
8:00am-8:10am	Welcome	Dena K. Hubbard, MD, FAAP - Chair
8:10am-8:45am	**Title-TBD**	Keith Barrington, MD
8:45am-8:55am	**Question and Answer**	
8:55am-9:35am	**Behavioral Economics in Neonatology**	Satyanarayana Lakshminrusimha, MD, FAAP
9:35am-9:50am	**Question and Answer**	
9:50am-10:00am	Break / Visit the Exhibits	
10:00am-10:35am	**The History Behind Medications Used for Neonatal and Infant Cardiopulmonary Resuscitation**	Kaashif Ahmad, MD, MS, FAAP
10:35am-10:50	**Question and Answer**	
10:50am-11:30pm	**Keynote Session: Title-TBD**	Daphna Yasova Barbeau, MD, FAAP
11:30pm-12:00pm	Closing Remarks	Dena K. Hubbard, MD, FAAP - Chair
12:00pm	Course Adjourns	

2023 Workshop on Neonatal-Perinatal Practice Strategies		
February 3-5, 2023		
Fees	**Early Bird Rate (on or before January 5, 2023)**	**Full Rate (January 6, 2023 or after)**
AAP SONPMe Members	$760	$910
AAP Fellows/ Candidate Members/International Members	$800	$950
AAP Resident Members/Post-Residency Training Members	$520	$520
Family Physicians	$840	$990
Nonmember Physicians	$1,040	$1,190
Nonmember Residents/Post-Residency Training Nonmembers	$800	$800
Allied Health Professionals	$760	$910
Nonmember Medical Student	$760	$760
Medical Student	$300	$300
Senior Member	$520	$670
S01 - Optional Coding Seminar-Friday, February 3, 2023	$310	$360
updated: 10/27/22		


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Resisting Resistance Is Not Futile

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.

"Resistance (R) and Compliance (C) determine a system's time constant (τ); as they increase, τ increases, and as they decrease τ decreases."

Resistance (R) and Compliance (C) determine a system's time constant (τ); as they increase, τ increases, and as they decrease τ decreases. In mechanical ventilation, τ determines the point at which the volume entering the lung can no longer be delivered entirely, and the point at which volume delivered to the lung can no longer completely escape.

Each component of the system has a τ associated with it. We cannot measure differences in C between alveoli nor differences in R between airways, but we know that R increases exponentially as airway diameter decreases. The best we can do is estimate an average for the system and watch for signs of gas trapping, such as hyperinflation and inadvertent PEEP. One must exercise caution when assessing hyperinflation because it may be from too much mean airway pressure (MAP) or gas trapping resulting from an insufficient MAP. It is not an exact science, and warnings come after the fact.

While relatively low C, the endotracheal tube (ETT) has a fixed and calculable R for any given pressure and flow. It is a source of increased R simply because the ETT inner diameter is smaller than that of the airway in which it sits, and it effectively increases anatomical dead space due to its length. When considering R, we rightly focus on airway diameter, but R also increases linearly as ETT length increases and flow rate increases.

As our patient population becomes ever smaller, the risk of gas trapping increases, exacerbated by smaller ETTs. R associated with a 2.0 mm ETT is roughly triple that of a 2.5. Once stocked for rare emergencies, these small tubes are now routinely used in some units. The R of the 5 Fr catheters required to suction a 2.0 mm ETT is so high that the physical passage of the catheter is likely more effective at clearing the tube than removing secretions, especially if secretions are viscous.

Secretions in the ETT itself or the conducting airways also increase R and may result in localised gas trapping due to a ball valve effect. At the bedside, a caregiver may report suctioning scant secretions yet observe a marked improvement in ventilation after doing so; it takes very few secretions in a tiny airway to interfere with ventilation. The lack of observable secretions in the catheter may lead to less suctioning, which may not be helpful. Additionally, the high R of the catheter increases the time required to get secretions up at a given pressure, and a quick pass down the ETT and out may not be effective.

"The lack of observable secretions in the catheter may lead to less suctioning, which may not be helpful. Additionally, the high R of the catheter increases the time required to get secretions up at a given pressure, and a quick pass down the ETT and out may not be effective."

We cannot change the laws of physics, but in clinical practice, we can take steps to reduce R. Making an ETT as short as possible is one, and although this does not have a significant effect on R, it also decreases dead space, thus increasing ventilatory efficiency. Proper ETT sizing is also essential, and the most appropriate size should be chosen whenever possible.

Beyond the above mitigations, the tools available to clinicians are limited by available ETTs. Here not all are created equal. For instance, at least one ETT is available with a smaller outer diameter for a given size than others on the market: the Intube® from Intersurgical® (1). Decreasing the outer diameter may allow a larger inner diameter ETT to be placed and reduce the need for a 2.0 ETT. It does, however, not address the tube's inner diameter.

Quite some time ago, I listened to a talk at what was formerly known as the "Snowbird" conference. The presentation was about

a different kind of ETT with thin walls reinforced with a steel coil. The design was such that a 2.5 mm ETT had the same inner diameter as a standard 3.0 mm. The presenter was puzzled about the lack of demand given the product's superiority, despite its higher cost. It was the Kolobow tube. A study comparing a 2.5 Kolobow ETT to a conventional 2.5 one found the Kolobow ETT had 59% less R, and that work of breathing was reduced by 45% (2). These findings are remarkable and predictable, given the physics behind the resistance. Another study showed improved ventilatory efficiency. (The tube used in the latter study was not identified as a Kolobow tube but did fit the description) (3).

"A study comparing a 2.5 Kolobow ETT to a conventional 2.5 one found the Kolobow ETT had 59% less R, and that work of breathing was reduced by 45% (2). These findings are remarkable and predictable, given the physics behind the resistance. "

At the time of this presentation, a 23-week post-menstrual age (PMA) infant was rarely offered resuscitation (indeed, resuscitation was actively discouraged), nor were those weighing less than 500 grams. (I recall tiny babies being weighed before any active resuscitation commenced). Fast forward to the present times, and this is no longer the case. Ventilating the "nano-premie" may require inserting a 2.0 mm ETT with all its inherent problems. Were a 2.0 mm ETT available with a 2.5 mm ETT's inner diameter, ventilation and suctioning would be vastly easier.

Dr. Kolobow died in 2018 and was instrumental in developing many medical devices, including ECMO (4) and a unique ETT that did not require suctioning (5). It would be a real shame if the Kolobow ETT is lost with him.

"Other than the ETT, the choice of ventilation mode impacts the effects of R, namely high-frequency jet ventilation (HFJV). The physics behind the jet's delivery of fresh gas flow, along with an inspiratory to an expiratory ratio of up to 1:12, reduces (but does not eliminate) the likelihood of R-induced gas trapping."

A good motto is "All tiny babies are either gas trapping or are about to." Other than the ETT, the choice of ventilation mode impacts the effects of R, namely high-frequency jet ventilation (HFJV). The physics behind the jet's delivery of fresh gas flow, along with an inspiratory to an expiratory ratio of up to 1:12, reduces (but does not eliminate) the likelihood of R-induced gas trapping. Comparing ventilator set PEEP with that measured by the jet helps the clinician identify when gas trapping is occurring; jet measured PEEP approaching ventilator set PEEP indicates gas trapping or imminent gas trapping. I believe HFJV is the mode of choice for ventilating the smallest babies.

"Using a 2.5 mm ETT as a bridge between the LifePort® and the smaller ETT is easy to do and is also more secure. I would be happy to send a short video clip demonstration to anyone unsure of how this is done."

Just as there once was no 3.0 LifePort®adapter for the Bunnell LifePulse® jet ventilator, currently, there is no 2.0 adapter available. Clinicians shoehorned a 3.5 LifePort® adapter into a 3.0 ETT before the 3.0 adaptor was available. Using a 2.5 LifePort® in a 2.0 ETT is a more significant challenge as it is more difficult to dilate the tube sufficiently to accommodate the larger size. In my limited experience doing so, I have found it is easily inadvertently disconnected. Using a 2.5 mm ETT as a bridge between the LifePort® and the smaller ETT is easy to do and is also more secure. I would be happy to send a short video clip demonstration to anyone unsure of how this is done.

Where HFJV is not available, avoiding higher frequencies when using high-frequency oscillatory ventilation (HFOV) and ensuring optimal inflation with appropriate MAP gives more time for gas to exit the lung while maintaining airway patency reduces R. What the best choice of mode to ventilate tiny babies remains a topic of controversy and debate. Nevertheless, in this author's opinion, conventional ventilation makes it unsuitable for tiny babies. To paraphrase, "It's the resistance, stupid!"

"Where HFJV is not available, avoiding higher frequencies when using high-frequency oscillatory ventilation (HFOV) and ensuring optimal inflation with appropriate MAP gives more time for gas to exit the lung while maintaining airway patency reduces R. What the best choice of mode to ventilate tiny babies remains a topic of controversy and debate."

This is not a product endorsement or recommendation.

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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.

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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.

Leadership

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.

Health Equity Column: What is your Definition of Health Equity?

Jenné Johns, MPH, Selena Tisdale

What is your definition of health equity?

Basically, everyone, no matter race or ethnic background, having an equal opportunity to live healthy and receive the best healthcare there is.

What are your organizational priorities for addressing health and racial equity in perinatal and neonatal care?

"Basically, everyone, no matter race or ethnic background, having an equal opportunity to live healthy and receive the best healthcare there is."

On an organizational level here, lately, we have been participating in a good bit of training, webinars, and classes in reference to this. So for my organization, I would look at it as just to ensure that we continue to advocate for the families that cannot speak for themselves or choose not to speak for themselves because a lot of people have to look at, I guess, risk on their behalf. You know you can't say everything you want to, so sometimes it takes someone else to speak for you. So, in that case, being that we're in a better position to actually speak on these matters, that's what I feel our priority should be. Speaking about it on every avenue possible that we can to get it out there to let them know that, look, it exists. We are all for that. We are about making change. We either want to come together as one to make this happen or want to continuously hear from us every day, every week. However, it has to go in order to make this happen and make this change because it's sad to say it still exists, and I am a victim of that.

"Speaking about it on every avenue possible that we can to get it out there to let them know that, look, it exists. We are all for that. We are about making change. We either want to come together as one to make this happen or want to continuously hear from us every day, every week."

What personal and professional experiences led you to focus on health equity in perinatal and neonatal care?

Well, for one, my personal experience as a mother of a preemie and now as an owner and the founder of my organization. It's kind of like it's a must-do. I must do this. There are absolutely no questions about it. In my experience, I would not wish that on anyone else because, honestly speaking, you don't know people's mental state when they're going through their journey at that time. It is not just about the NICU. They have homes to go back to also, so you don't know what they're experiencing at home and some of them may still be employed, so that's work, home, and the NICU. That's a lot on someone. And in my case, it was just one particular doctor that I had an issue with, to the point where it was, though, I didn't even want any more interactions with him. He really did not know how to speak to me. He spoke to me as if I was illiterate and the sad thing about it is, I have several degrees, but I had to let him know that later on. I didn't let him know anything. I would allow him to speak to me however he felt it at that moment because I wanted to be the one to let him know to stop judging me just by looking at me. I don't have time to dress nicely when I come in here when I'm coming straight forward.

"He really did not know how to speak to me. He spoke to me as if I was illiterate and the sad thing about it is, I have several degrees, but I had to let him know that later on. I didn't let him know anything. I would allow him to speak to me however he felt it at that moment because I wanted to be the one to let him know to stop judging me just by looking at me."

You don't know what kind of work I actually do, and I may only have time to come straight to the NICU after I get off work, but he was very, very, very judgmental. Everyone else was excellent. I loved them, but he was very harsh. He came to me, and he had some paperwork on the clipboard, and he said, "Good morning. You need to sign this DNR." I had to look around like, "You're talking to me?" and he was like, "Yes, because I mean we've tried everything that we can possibly try, and I don't see the reason why he should suffer any longer" or this and that, and he just went, and he was very short, and that is just how he was. And then I would see how he interacted with other families and it was nothing like how he interacted with me. I was like, okay, that's it all right. So I looked at him and I told him my exact words. I say I don't mean no harm, no disrespect, because, at the end of the day, he is still in

a unit with my son. He still has access to my son. So I had to be very careful of the words I chose to give him, so I told him I said: "I don't mean any disrespect to you, but can I please speak to the head doctor in charge of this unit, and I need to also speak with the actual director over the NICU."

"So I had to call a meeting, and we sat around the table, and I was not playing with them at all. And that doctor, to this day, I can tell you he still works there, but his attitude is a 360. Everything. I mean it's a complete 360. I'm not there yet being so social with him at this point, but on a business level, when I do go to the NICU, of course, yes, you know, speak with him, but it's very, very brief, but I could see the change in him."

And he was like, "What do you need that for, I'm trying to tell you…" I said, "Don't worry about that. Thank you for your services, to thank you for everything you have done this far, but I need to speak with them." So really, how he was thinking of me, that wasn't the way he expected me to respond. So when the head doctor came out and the actual director over the NICU and, as I explained to them, I do not want any interactions with him. I don't want him to have any more doings with my child as long as he is here. Nothing, period. And for them to respond to me the way they did, I wasn't the first person he did that to. So that was an issue for me. So I had to call a meeting, and we sat around the table, and I was not playing with them at all. And that doctor, to this day, I can tell you he still works there, but his attitude is a 360. Everything. I mean it's a complete 360. I'm not there yet being so social with him at this point, but on a business level, when I do go to the NICU, of course, yes, you know, speak with him, but it's very, very brief, but I could see the change in him. He had several trainings, and from my understanding, he's still going through more training. Anything that comes up, he's placed in there to take it, and he needs that because I told them I could have been someone else that actually took this a little further, and it would not have been nice. But I wanted to give them the opportunity to fix the issue internally before it gets out of hand.

"What is your call to action for the industry as we seek to eliminate health and racial inequities in perinatal and neonatal care?"

What is your call to action for the industry as we seek to eliminate health and racial inequities in perinatal and neonatal care?

Mandatory training and classes. That is the call of action. No questions. No way around that. They need more patients to do surveys and feedback. If a doctor or nurse's name is mentioned in this feedback, they need to get them and put them in a class immediately. Let them know why they are put in this class. They can't know the patient that named them because that can cause problems also, but once it is listed, the specific employee needs to enroll in the training. They need to be monitored at least for a few weeks, not just for one week because anyone can put on a show for just one week. If they don't do these surveys or feedback, nobody is going to say anything. For the people that do not have a voice or are afraid to express their feelings, that would be a way they can get how they are feeling out, it would be anonymous, but they can get the names out, and that is the only way it can be fixed.

"Mandatory training and classes. That is the call of action. No questions. No way around that. They need more patients to do surveys and feedback. If a doctor or nurse's name is mentioned in this feedback, they need to get them and put them in a class immediately. Let them know why they are put in this class."

Disclosure: *The authors have no disclosures.*

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About the Author: Jenné Johns, MPH:

Title: President and Founder

Organization: President, Once Upon A Preemie www.onceuponapreemie.com and Founder, Once Upon A Preemie Academy www.onceuponapreemieacademy.com

Jenné Johns, MPH is President of Once Upon A Preemie, Founder of Once Upon A Preemie Academy, mother of a micropreemie, author, speaker, advocate, and national senior health equity leader. Once Upon A Preemie is a non-profit organization with a two-part mission: 1.) to donate Once Upon A Preemie books to NICU families in under resourced communities, and 2.) lead virtual health and racial ethnic training programs and solutions to the neonatal and perinatal community through the Once Upon A Preemie Academy. Jenné provides speaking, strategic planning and consultation services for fortune 500 companies focused on preemie parent needs from a cultural lens and reading as a tool for growth, development, and bonding. Jenné is also a national senior health equity thought leader and has led solutions-oriented health equity and quality improvement portfolios for the nations' largest health insurance and managed care companies.

About the Author: Selena Tisdale-Shaw

Title: Executive Director/Founder

Organization: Eli Collins Foundation for Premature Babies

Short Bio: I am Selena Tisdale-Shaw, the Executive Director/Founder of Eli Collins for Premature Babies. I am married to a very supportive and loving husband, and I have two daughters and a granddaughter. I founded this organization in May 2016, after the death of my son Eli who was a micro preemie. He was born at 23 weeks 6 days, weighing 1 pound 3 oz. He lived for five months. He died due to complications with his lungs. After several months of grieving and trying to get myself together, I established this non-profit organization to assist the families traveling on this journey.

Thirteen-year-old Emily Rose Shane was tragically murdered on April 3, 2010 on Pacific Coast Highway in Malibu, CA. Our foundation exists to honor her memory.

In Loving Memory

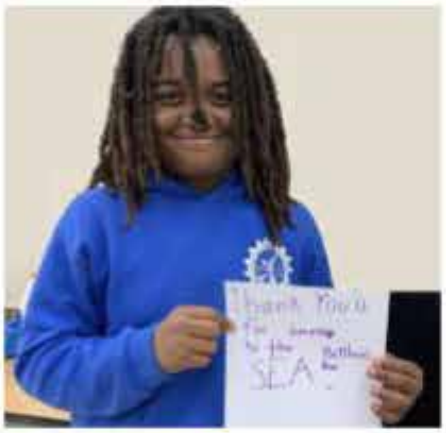
August 9, 1996 - April 3, 2010

Each year, the Emily Shane Foundation SEA(Successful Educational Achievement) Program provides academic and mentoring support to over 100 disadvantaged middle school students who risk failure and have no other recourse. We have served over 700 children across Los Angeles since our inception in the spring of 2012. Due to the COVID-19 outbreak, our work is in jeopardy, and the need for our work is greatly increased. The media has highlighted the dire impact online learning has caused for the very population we serve; those less fortunate. **We need your help now more than ever to ensure another child is not left behind.**

Make a Difference in the Life of a Student in Need Today!
Please visit emilyshane.org

Sponsor a Child in the SEA Program

The average cost for the program to provide a mentor/ tutor for one child is listed below.



1 session	$15
1 week	$30
1 month	$120
1 semester	$540
1 year	$1,080
Middle School	$3,240

The Emily Shane Foundation is a 501(c)3 nonprofit charity, Tax id # 27-3789582. Our flagship SEA (Successful Educational Achievement) Program is a unique educational initiative that provides essential mentoring/tutoring to disadvantaged middle school children across Los Angeles and Ventura counties. All proceeds directly fund the SEA Program, making a difference in the lives of the students we serve.

Are We Making our Babies Sicker?

Kelly Welton, BA, RRT-NPS

"For the past five years or so, I have been on a personal quest to find out what is in our food here in the U.S. Rewind to 1992, when I gave up artificial colors, flavors, sweeteners, fast food, junk food, and caffeine when I decided to get pregnant. I wanted my baby to have the best health advantage, so I cut all those things out of my diet."

For the past five years or so, I have been on a personal quest to find out what is in our food here in the U.S. Rewind to 1992, when I gave up artificial colors, flavors, sweeteners, fast food, junk food, and caffeine when I decided to get pregnant. I wanted my baby to have the best health advantage, so I cut all those things out of my diet.

That was before GMOs were introduced to the American food supply in 1996.

I will not debate the GMO topic here, but I will ask you to pause and think about diseases like metabolic syndrome, restless leg, fibromyalgia, leaky gut syndrome, and psoriasis.

Hardly anyone had these problems prior to 1996, and much fewer children. Now, watch TV for 5 minutes, and you cannot help but see multiple ads for new diseases and symptoms. Furthermore, people are noticing that what used to be solely adult diseases now affect more and more children.

Moreover, although the moniker "Breast is best" has been around for a while, not all preterm or term infants can have human breast milk.

As a result, companies have capitalized on the next best thing: cow's milk. I recently watched a documentary on food allergies that spoke of how the American Dairy Council in the 1950s and 60s decided that humans should consume the milk of another species. Lots and lots of milk. In addition, facts such as cow's milk having twenty times the casein levels of human milk. The prevalence of allergies to milk, either due to the milk itself or the by-products of what the cow was fed that got into her milk.

In the 60s, in certain parts of the country, the formula also symbolized status. If you breastfed your baby, you were poor and could not afford formula.

Baby formula companies have long tried hard to make their formula resemble human milk as closely as possible. At the same time, the product has to be shelf-stable when non-refrigerated, and the powdered form must be easy to reconstitute in water. These conveniences have resulted in many additives to their products.

"Baby formula companies have long tried hard to make their formula resemble human milk as closely as possible. At the same time, the product has to be shelf-stable when non-refrigerated, and the powdered form must be easy to reconstitute in water."

Have you ever read the ingredients in the formula? Look at these ingredients; would you feed this to your baby?

Similac special care premature:

Water, Nonfat Milk, Corn Syrup Solids, Medium-chain Triglycerides, Lactose, Whey Protein Concentrate, Soy Oil, Coconut Oil. Less than 0.5% of C. Cohnii Oil, M. Alpina Oil, Beta-Carotene, Lutein, Calcium Phosphate, Ascorbic Acid, Potassium Citrate, Calcium Carbonate, Soy Lecithin, Monoglycerides, Magnesium Chloride, m-Inositol, Sodium Citrate, Carrageenan, Potassium Hydroxide, Ferrous Sulfate, Choline Bitartrate, Taurine, Choline Chloride, Niacinamide, L-Carnitine, Zinc Sulfate, Potassium Chloride, Salt, Potassium Phosphate, d-Alpha-Tocopheryl Acetate, Calcium Pantothenate, Vitamin A Palmitate, Cupric Sulfate, Riboflavin, Thiamine Chloride Hydrochloride, Pyridoxine Hydrochloride, Folic Acid, Manganese Sulfate, Biotin, Phylloquinone, Sodium Selenate, Vitamin D3, Cyanocobalamin, and Nucleotides (Cytidine 5'-Monophosphate, Disodium Guanosine 5'-Monophosphate, Disodium Uridine 5'-Monophosphate, Adenosine 5'-Monophosphate).

Enfamil :

Corn syrup solids (47%), Vegetable oil, Casein hydrolysate, modified corn starch, mortierella alpina oil, scizochytrum sp oil, lactobacillus rhamnosus, calcium citrate, calcium phosphate, potassium chloride, potassium citrate, sodium citrate, calcium hydroxide, magnesium oxide, ferrous sulfate, zinc sulfate, cupric sulfate, manganese sulfate, sodium iodide, sodium selenite, choline chloride, ascorbic acid, niacinamide, calcium pantothenate, vitamin d3, thiamin hydrochloride, riboflavin, vitamin B6 hydrochloride, folic acid, vitamin K1, biotin, vitamin B12, inositol, vitamin A palmitate, L- cystine, L -tyrosine, L -tryptophan, L-taurine, L-carnitine.

The first ingredient in Enfamil is essentially sugar! The general public is happy to read on the label that table sugar is not used but does not mention that corn syrup is essentially sugar and likely is GMO with traces of glyphosate. Is anyone testing? Similac contains carrageenan, a substance banned in Europe. Both formulas, concocted by experts, contain very different ingredients. Why?

"Who decides that these babies need supplements not present in human milk? Most hospitals choose their formula brand by granting to the lowest bidder. In addition, there have been a few formula recalls over the years due to contamination."

Who decides that these babies need supplements not present in human milk? Most hospitals choose their formula brand by granting to the lowest bidder. In addition, there have been a few formula recalls over the years due to contamination. We all know breast is best and that certain situations warrant an exception: drug contamination, mom unable to produce milk or feed/pump, mastitis, and more. In these situations, how can we better feed our NICU babies? Perhaps we could call for more donor breast milk from moms with good diets and no contaminants.

Human to human, as it was meant to be. Is it time?

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Disclosures: The author has no conflicts noted.

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The Village Son

A Life's Journey

Iranian village to a university professor in the United States of America in this memoir. As a boy, his unruly behavior was sedated by scholastic challenges as a remedy. At age twelve, he left home for junior high school in a provincial capital. At first, a lack of self-esteem led him to stumble, but he soon found the courage to tackle his subjects with vigor. He became more curious about the world around him and began to yearn for a new life despite his financial limitations. Against all odds, he became one of the top students in Iran and earned a scholarship to study medicine in Europe. Even though he was culturally and socially naïve by European standards, an Italian family in Rome helped him thrive. The author never shied away from the challenges of learning Italian, and the generosity of Italy and its people became part and parcel of his formative years. By the time he left for the United States of America, he knew he could accomplish whatever he imagined.

Houchang D. Modanlou

Father and Infant Loss Podcast: Adding a New Resource for Bereavement Support

Barb Himes, CD

first candle

Saving babies. Supporting families.

First Candle's efforts to support families during their most difficult times and provide new answers to help other families avoid the tragedy of the loss of their baby are without parallel.

"In our work to advance infant-safe sleep practices and reduce mortality rates due to Sudden Unexpected Infant Death (SUID) and Sudden Infant Death Syndrome (SIDS), we are reminded of the importance of bereavement support during the holidays and the darker winter months and this season of awareness also reminds us of the value of grief support year-round."

In our work to advance infant-safe sleep practices and reduce mortality rates due to Sudden Unexpected Infant Death (SUID) and Sudden Infant Death Syndrome (SIDS), we are reminded of the importance of bereavement support during the holidays and the darker winter months and this season of awareness also reminds us of the value of grief support year-round.

"We continue to provide bereavement support to parents and families through online groups and individual telephone support and by seeking to connect those grieving to additional resources."

We continue to provide bereavement support to parents and families through online groups and individual telephone support and by seeking to connect those grieving to additional resources.

One area we have seen growing is peer-driven bereavement support by and for fathers. There are many private Facebook groups, books, blogs, and retreats (1) And in early January 2023, what is believed to be the first such podcast program in North America, Guys and Grief, will begin weekly broadcasts on Spotify and Apple Podcasts.

The podcast is being hosted by three fathers whose existing friendships were strengthened by mutual support around pregnancy or infant loss. Brian Scruton and his wife lost their first child in January 2019, Brad Kogut and his wife suffered six miscarriages over four years, with one successful pregnancy, and Brandon Thurman and his wife lost their daughter in 2019. None is a medical professional, and the program is designed to be approachable to the layperson.

"A podcast can be a safe space for people to listen and grieve, and you can do it wherever you are," Scruton says.

A 2020 meta-study (2) of literature published between 2007 – 2019 that evaluated grief and bereavement behaviors of fathers following the death of their child concluded that in Western societies, despite evolving gender roles over the years, "many fathers navigate loss through stoicism, self-isolation, and hard work."

"We want to let dads know they are not alone and to help them grieve in the way that dads grieve," Kogut says. "Group therapy is not for everyone."

"The program, at the outset, will include a discussion of general perceptions of paternal grief, with each host outlining his own bereavement experience around miscarriage and infant loss. Podcast listeners will have the opportunity to submit questions and make requests for topics via email (guysandgrief@gmail.com) and the Facebook page. "

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As the program format progresses, there will be guest speakers, lighter moments "when appropriate," and a goal of developing a diverse community across generational, cultural, ethnic, and gender-identifying spheres.

There is also a hope that the program may provide health care providers and other existing sources of support for families with an additional resource for grieving fathers and extended family members as they cope with infant and child loss.

Guys and grief can be accessed via Spotify, Facebook, Instagram, and Apple Podcast, and a link to the podcast will also be available on the First Candle website.

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Disclosures: *The author is a Certified Doula and the Director of Education and Bereavement Services of First Candle, Inc., a Connecticut-based not-for-profit 501(c)3 corporation. Brian Scruton is a volunteer and member of the Board of Directors of First Candle.*

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About First Candle

First Candle, based in New Canaan, CT, is a 501c (3) committed to eliminating Sudden Unexpected Infant Death while providing bereavement support for families who have suffered a loss. Sudden Unexpected Infant Death (SUID), which includes SIDS and Accidental Suffocation and Strangulation in Bed (ASSB), remains the leading cause of death for babies one month to one year of age, resulting in 3,500 infant deaths nationwide per year.

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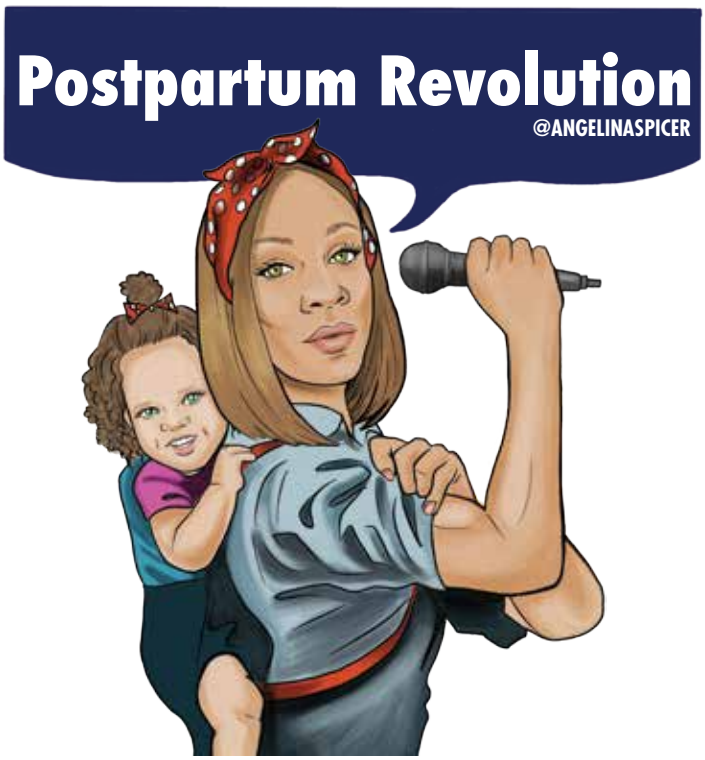


Neonatology Today's Digital Presence

Neonatology Today's now has a digital presence. The site is operational now and defines the future look of our digital web presence. By clicking on this https://www.neonatologytoday.org/web/., researchers can download individual manuscripts both in digital format and as part of the original PDF (print journal). While the PDF version of Neonatology Today will continue in its present form, we envision that the entire website will be migrated to this format in the next several months. We encourage you to take a look, "kick the wheels," and let us know where we still need to improve.. We are working towards making the website more functional for subscribers, reviewers, authors and anyone else. Although we have not yet applied for inclusion in the National Library of Medicine Database (Pub-Med), this new format meets several of the important metrics for this ultimate goal. As of December, 2020, NT has its own account with CrossRef and will assign DOI to all published material.

As we indicated last month, we look forward to a number of new features as well.

1. An online submission portal: Submitting a manuscript online will be easier than before. Rather than submitting by email, we will have a devoted online submission portal that will have the ability to handle any size manuscript and any number of graphics and other support files. We will have an online tracking system that will make it easier to track manuscripts in terms of where they are in the review process.
2. Reviewers will be able to review the manuscript online. This portal will shorten the time from receipt of review to getting feedback to the submitting authors.
3. An archive search will be available for journals older than 2012.
4. A new section called news and views will enable the submission of commentary on publications from other journals or news sources. We anticipate that this will be available as soon as the site completes the beta phase
5. Sponsors will be able to sign up directly on the website and submit content for both the digital and PDF issues of Neonatology Today.

Neonatology Today will continue to promote our Academic True Open Model (ATOM), never a charge to publish and never a charge to subscribe.

If there are any questions about the new website, please email Dr. Chou directly at:

fu-sheng.chou@neonatologytoday.net

COPING WITH COVID-19

KEEP PATIENTS UP-TO-DATE WITH CHANGES IN POLICIES SO THEY KNOW WHAT TO EXPECT. LISTEN TO THEIR CONCERNS.

Provide culturally-informed and respectful care.

TELL PARENTS HOW YOU WILL KEEP THEM AND THEIR BABIES SAFE DURING THEIR NICU STAY.

Use technology like video chat apps to include family members who can't visit the NICU.

myNICUnetwork.org

and

National Perinatal Association
NICU Parent Network

My Perinatal Network and My NICU Network are products of a collaboration between NPA and NPN.

TOP 10

RECOMMENDATIONS FOR THE PSYCHOSOCIAL SUPPORT OF NICU PARENTS

SUPPORT 4 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.

Welcome!

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."

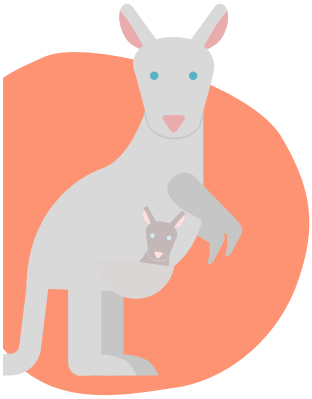
10 HELP US HEAL

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

SUPPORT4NICUPARENTS.ORG

SUPPORTING KANGAROO CARE

SKIN-TO-SKIN CARE DURING COVID-19



GET INFORMED ABOUT THE RISKS + BENEFITS

work with your medical team to create a plan

GET CLEAN

WASH YOUR HANDS, ARMS, and CHEST

with soap and water for 20+ seconds. Dry well.

PUT ON FRESH CLOTHES

change into a clean gown or shirt.

IF COVID-19 + WEAR A MASK

and ask others to hold your baby when you can't be there

National Perinatal Association

nicuparentnetwork.org

NPN NICU PARENT NETWORK

nationalperinatal.org/skin-to-skin

Position available for Neonatal Nurse Pretensioner (NNP)

Excellent practice opportunity for a NNP in an established Los Angeles neonatal practice. The Neonatal Hospitalist Group (NHG) is interviewing for an NNP to join the practice. The practice includes four NICU's in the Burbank and Glendale area. Call is from home with excellent work life balance. If you are interested, please email Robert Gall, MD, at robertgallmd@gmail.com.

Protecting your baby from

Respiratory Viruses:

What parents need to know this RSV and flu season

RSV (Respiratory Syncytial Virus) and flu infections affect the lungs and can cause serious breathing problems for children and babies.

Certain diagnoses can make children and babies more vulnerable for serious complications - including prematurity, chronic lung disease, heart conditions.

You can limit the spread of viruses by wearing a mask, washing your hands with soap & water, and using alcohol-based hand sanitizer.

The fewer germs your baby is exposed to, the less likely they are to get sick. Limit visitors. Avoid crowds. Stay away from sick people.

Immunizations save lives. Stay up-to-date with your family's flu and COVID-19 vaccinations. This helps stop the spread of deadly viruses.

Babies older than 6 months can get a flu shot. There is no vaccine for RSV, but monthly antibody shots during RSV season can help protect them.

National Perinatal Association

www.nationalperinatal.org/rsv

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Once Upon A Preemie Academy

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Connect2NICU

+ Deidre McDaniel, MSW, LCSW
Health Equity Resources and Strategies

+ Dalia Feltman, MD, MA, FAAP
Univ. of Chicago Pritzker School of Medicine

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Raising Global Awareness of RSV

Global awareness about respiratory syncytial virus (RSV) is lacking. RSV is a relatively unknown virus that causes respiratory tract infections. It is currently the second leading cause of death – after malaria – during infancy in low- and middle-income countries.

The RSV Research Group from professor Louis Bont, pediatric infectious disease specialist in the University Medical Centre Utrecht, the Netherlands, has recently launched an RSV Mortality Awareness Campaign during the 5th RSV Vaccines for the World Conference in Accra, Ghana.

They have produced a personal video entitled "*Why we should all know about RSV*" about Simone van Wyck, a mother who lost her son due to RSV. The video is available at www.rsvgold.com/awareness and can also be watched using the QR code on this page. Please share the video with your colleagues, family, and friends to help raise awareness about this global health problem.

RSV GOLD

A Global Mortality Database for Children with RSV Infection

The RSV awareness video was produced in collaboration with the Bill & Melinda Gates Foundation

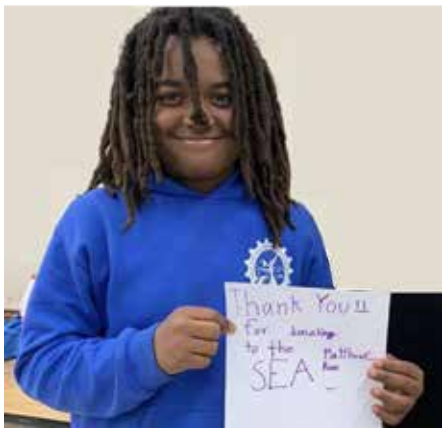
Thirteen-year-old Emily Rose Shane was tragically murdered on April 3, 2010 on Pacific Coast Highway in Malibu, CA. Our foundation exists to honor her memory.

Each year, the Emily Shane Foundation SEA(Successful Educational Achievement) Program provides academic and mentoring support to over 100 disadvantaged middle school students who risk failure and have no other recourse. We have served over 700 children across Los Angeles since our inception in the spring of 2012. Due to the COVID-19 outbreak, our work is in jeopardy, and the need for our work is greatly increased. The media has highlighted the dire impact online learning has caused for the very population we serve; those less fortunate. **We need your help now more than ever to ensure another child is not left behind.**

Make a Difference in the Life of a Student in Need Today!
Please visit emilyshane.org

Sponsor a Child in the SEA Program

The average cost for the program to provide a mentor/ tutor for one child is listed below.



1 session	$15
1 week	$30
1 month	$120
1 semester	$540
1 year	$1,080
Middle School	$3,240

The Emily Shane Foundation is a 501(c)3 nonprofit charity, Tax id # 27-3789582. Our flagship SEA (Successful Educational Achievement) Program is a unique educational initiative that provides essential mentoring/tutoring to disadvantaged middle school children across Los Angeles and Ventura counties. All proceeds directly fund the SEA Program, making a difference in the lives of the students we serve.

Considerations for Reducing Maternal Mortality

Elizabeth Filipovich, MPH

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.

"Maternal mortality in the United States is on the rise and has been for the past several decades. This trend stands out as other high-income countries, like the United Kingdom and Canada, have lower maternal mortality rates."

Maternal mortality in the United States is on the rise and has been for the past several decades. This trend stands out as other high-income countries, like the United Kingdom and Canada, have lower maternal mortality rates. Birthing people in the United States now experience worse mortality rates than the prior two generations. Maternal mortality ratios, or deaths per 100,00 live births, are used to illustrate the massive racial disparities among birthing people. Non-Hispanic Black birthing people have pregnancy-related mortality rates nearly 3x that of their white counterparts.

"The Centers for Disease Control defines maternal mortality as "the death of a woman during pregnancy, at delivery, or soon after delivery." Maternal deaths are further divided into two categories: pregnancy-related and pregnancy-associated deaths."

The Centers for Disease Control defines maternal mortality as "the death of a woman during pregnancy, at delivery, or soon after delivery." Maternal deaths are further divided into two categories: pregnancy-related and pregnancy-associated deaths. Pregnancy-related deaths are defined as "the death of a woman while pregnant or within one year of the end of pregnancy, regardless of the outcome, duration, or site of pregnancy, from any cause related to or aggravated by the pregnancy or its management but *not* from accidental or incidental causes."

Pregnancy-associated but *not* related deaths are "the death of a woman while pregnant or within one year of pregnancy from a cause or cause unrelated to pregnancy. Often, when maternal mortality is researched and discussed, the body of work emphasizes pregnancy-related deaths. For example, the statistics used in the above paragraph reference pregnancy-related deaths exclusively. However, a better understanding of factors contributing to many accidental, pregnancy-associated but not related deaths is essential for effective methods to reduce the number of maternal deaths in the United States, regardless of cause or manner of death.

Well-documented maternal death causes include hemorrhage, cardiomyopathy, or other cardiac causes, and worsening underlying conditions or other medical causes often deemed pregnancy-related. Equally important are other causes of death, including accidental poisonings or overdoses, maternal suicides, or homicides. These are pregnancy-associated, *not* related, or not *directly* caused or exacerbated by pregnancy. The many touchpoints of care in the perinatal period provide opportunities for intervention and opportunities for improved perinatal care, particularly for birthing people who have a history of substance use disorder (SUD), history of anxiety, depression, or other mood disorders, or families who may be at risk for violence, instability, or other significant hardship.

"Well-documented maternal death causes include hemorrhage, cardiomyopathy, or other cardiac causes, and worsening underlying conditions or other medical causes often deemed pregnancy-related. Equally important are other causes of death, including accidental poisonings or overdoses, maternal suicides, or homicides."

Statewide and local Maternal Mortality Review Committees (MMRC) are convened to examine maternal death trends by comprehensively reviewing deaths that occur during or within one year of pregnancy. MMRCs are multidisciplinary and include representatives from a spectrum of perinatal care providers, including public health, obstetrics, maternal-fetal medicine, pediatrics, nursing, midwifery, community health organizations, mental and behavioral health, and patient/family advocacy groups. MMRCs meet to discuss cases and collaboratively create evidence-based recommendations to prevent future deaths. MMRCs provide critical evidence for legislatures, health systems, and public health leaders to endorse safety bundles and new laws to prevent future deaths.

"MRCs meet to discuss cases and collaboratively create evidence-based recommendations to prevent future deaths. MMRCs provide critical evidence for legislatures, health systems, and public health leaders to endorse safety bundles and new laws to prevent future deaths."

While MMRCs retrospectively review maternal deaths to understand preventable causes of these deaths further, providers and clinicians across all disciplines, as well as the public, can proactively impact the alarming rate of maternal deaths in this country. Neonatal care providers have a critical role. Despite becoming increasingly standard practice to have postpartum follow-up visits before four weeks postpartum, this is not universally implemented. Even if a postpartum follow-up is scheduled, not all birthing people attend a follow-up visit, as evidenced by several studies documenting that 11-46% do *not* attend a postpartum visit. However, well-child visits are very well attended by postpartum people. By capitalizing on the touchpoint of the well-child visits, providers capture an opportunity for assessment and potential referral or intervention.

Neonatal providers can contribute to reducing maternal mortality in several ways. Pediatric and family providers are often left out of the conversation, but the reality is that many providers for infants have more touchpoints with birthing people in the postpartum period than their prenatal providers. Pediatric visits for neonates and infants provide the opportunity for intervention that begins with a thorough assessment of the birthing person and include awareness of resources available to provide to patients, as well as understanding that wellness is facilitated by a host of factors extend beyond the physical health of the patient.

The scope of this newsletter article is not broad enough for the depth of discussion, but rather draws attention to how social determinants of health contribute to maternal deaths and how providers can continue to care for their patients by addressing them. Providers should attempt to understand the environment of each family. By exploring significant relationships, one can understand the birthing person's support systems, the likelihood of experiencing violence, housing circumstances, income stability, etc. By connecting identified birthing persons to support services and resources and following up on successive pediatric visits, perinatal providers can reduce maternal mortality. For more information on perinatal mood disorders, perinatal substance use, and many other resources for providers and families, please visit National-Perinatal.org.

"For more information on perinatal mood disorders, perinatal substance use, and many other resources for providers and families, please visit NationalPerinatal.org"

About the author:

Elizabeth Filipovich, MPH, is a public health program administrator from Pennsylvania. She obtained her MPH in Maternal and Child Health from George Washington University and serves on the NPA Board of Directors as the VP of Programming.

Disclosure: The National Perinatal Association www.nationalperinatal.org is a 501c3 organization that provides education and advocacy around issues affecting the health of mothers, babies, and families.

NT

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Respiratory Syncytial Virus:

How you can advocate for babies this RSV season

Track national data and trends at the CDC's website www.cdc.gov/rsv

Identify the babies at greatest risk

including those with CLD, BPD, CF, and heart conditions

Teach families how to protect

their babies from respiratory infections

Advocate broader insurance coverage for palivizumab prophylaxis so more babies can be protected *

Use your best clinical judgement

when prescribing RSV prophylaxis

Tell insurers what families need

and provide the supporting evidence

National Perinatal Association

*See the NPA's evidence-based guidelines at www.nationalperinatal.org/rsv

Respiratory Syncytial Virus

Really Serious Virus

Here's what you need to watch for this RSV season

Coughing that gets worse and worse

Breathing that causes their ribcage to "cave-in"

Rapid breathing and wheezing

Bluish skin, lips, or fingertips

RSV can be deadly. If your baby has these symptoms, don't wait. Call your doctor and meet them at the hospital.

Thick yellow, green, or grey mucus

that clogs their nose and lungs, making it hard to breathe

Fever that is more than 101° Fahrenheit

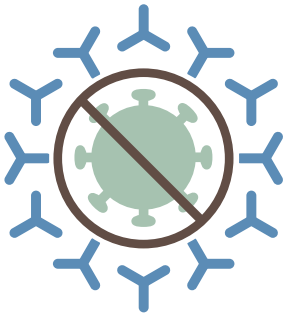
which is especially dangerous for babies younger that 3 months

National Perinatal Association

www.nationalperinatal.org/rsv

Protecting your baby and family from

Respiratory Viruses:



What parents need to know this RSV and flu season

Like COVID-19, RSV (Respiratory Syncytial Virus) and flu affect the lungs and can cause serious breathing problems for children and babies. Talk to your family about the risks.

Certain diagnoses can make children and babies more vulnerable for serious complications from respiratory viruses - including prematurity, chronic lung disease, and heart conditions.

You can limit the spread of viruses by wearing a mask, washing your hands with soap & water, using an alcohol-based hand sanitizer, and getting vaccinated.

The fewer germs your baby is exposed to, the less likely they are to get sick. Let people know you need their help to stay well. Limit visitors. Avoid crowds. Stay away from sick people.

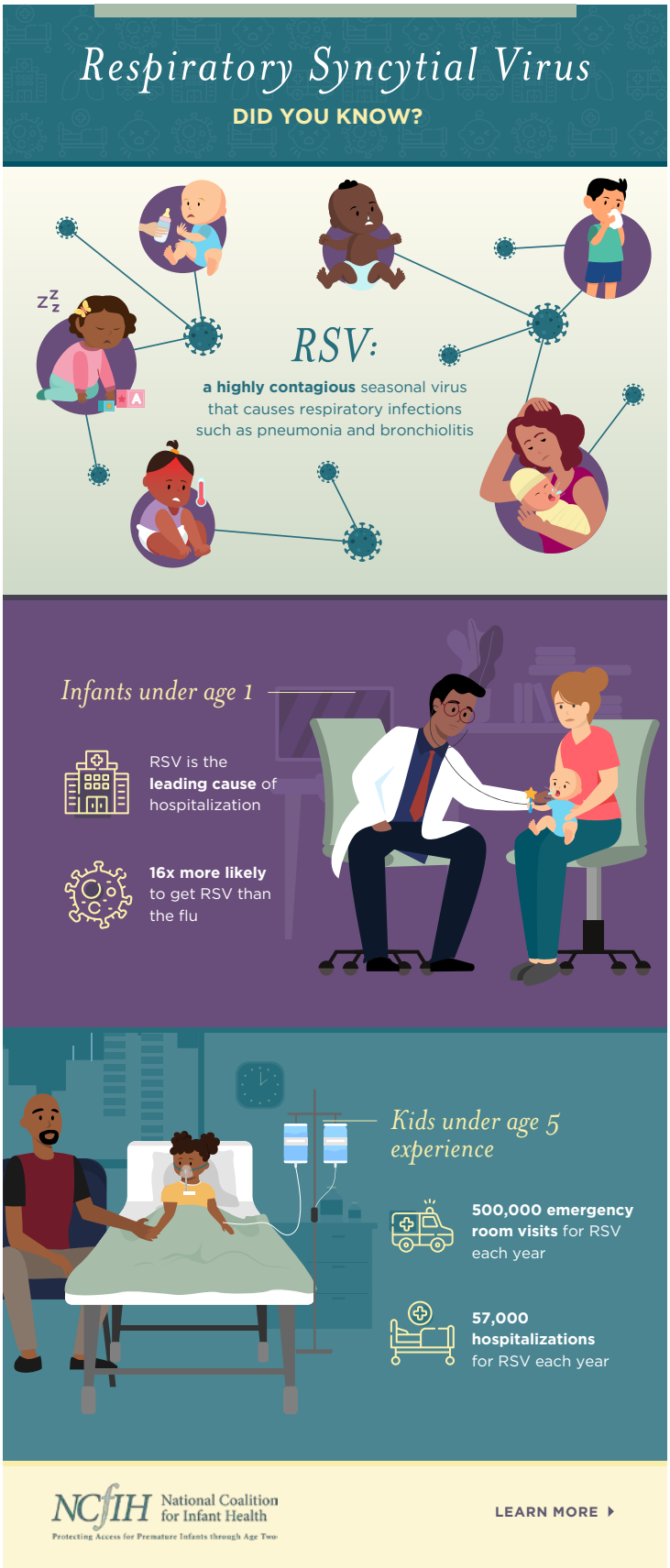
Immunizations save lives. Stay up-to-date with your family's flu vaccinations and COVID-19 boosters. This helps our community stay safe by stopping the spread of deadly viruses.

Babies older than 6 months can get a flu shot and COVID-19 vaccinations. There is no vaccine for RSV, but monthly antibody shots during RSV season can help protect them.

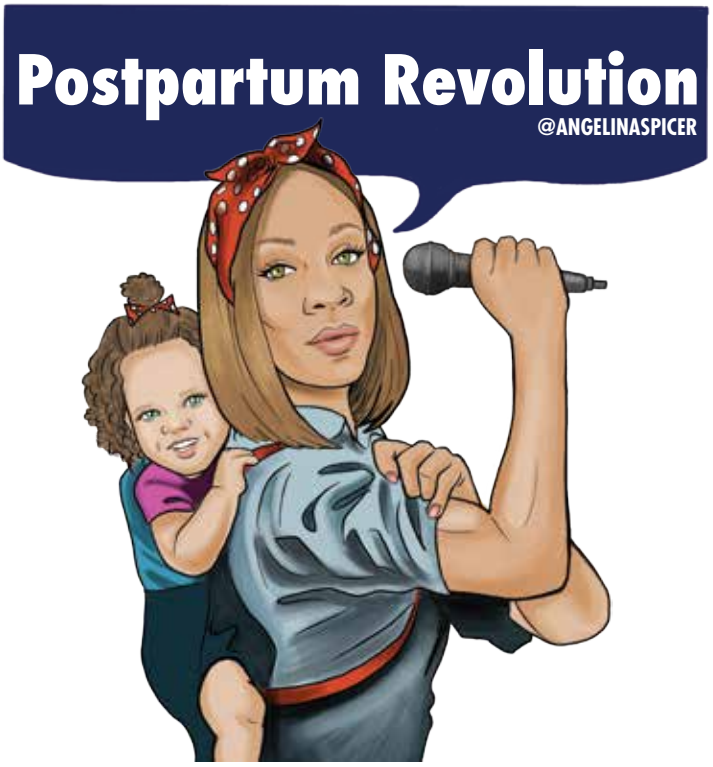
WE CAN HELP PROTECT EACH OTHER.

National Perinatal Association

www.nationalperinatal.org/rsv



The Gap Baby: An RSV Story



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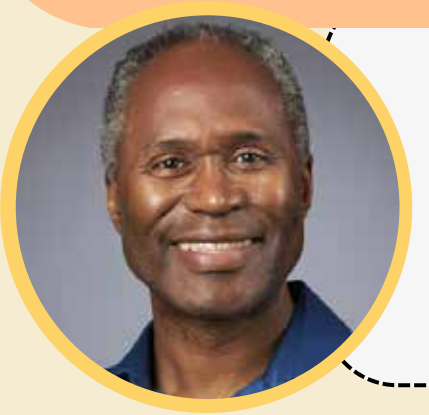
FCC Taskforce Webinar

March 16, 11-12:30 PT

Importance of NICU discharge guidelines and standards



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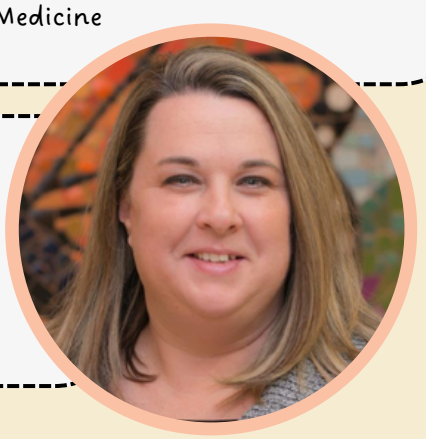
Parent Advocate



Using technology to provide early and consistent discharge education to NICU Families

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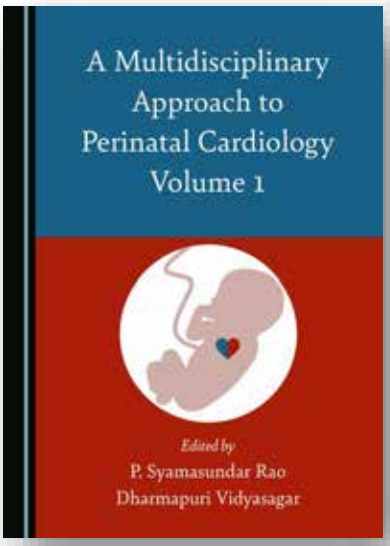
A Multidisciplinary Approach to Perinatal Cardiology *Volume 1*

Edited by P. Syamasundar Rao and Dharmapuri Vidyasagar



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Book Description

Recent developments in diagnostic and therapeutic aspects of cardiac and neonatal issues have advanced the care of the newborn. To achieve excellence in cardiac care, however, close interaction and collaboration of the pediatric cardiologists with neonatologists, pediatricians, general/family practitioners (who care for children), anesthesiologists, cardiac surgeons, pediatric cardiac intensivists, and other subspecialty pediatricians is mandatory. This book provides the reader with up-to-date evidence-based information in three major areas of neonatology and prenatal and neonatal cardiology. First, it provides an overview of advances in the disciplines of neonatology, prenatal and neonatal cardiology, and neonatal cardiac surgery in making early diagnosis and offering treatment options. Secondly, it presents a multidisciplinary approach to managing infants with congenital heart defects. Finally, it provides evidence-based therapeutic approaches to successfully treat the fetus and the newborn with important neonatal issues and congenital cardiac lesions. This first volume specifically explores issues related to perinatal circulation, the fetus, ethics, changes in oxygen saturations at birth, and pulse oximetry screening, diagnosis, and management.

About the Editors

Dr P. Syamasundar Rao, MD, DCH, FAAP, FACC, FSCAI, is Professor of Pediatrics and Medicine and Emeritus Chief of Pediatric Cardiology at the University of Texas-Houston Medical School. He received his medical degree from Andhra Medical College, India, and subsequently received post-graduate training both in India and the USA before joining the faculty at the Medical College of Georgia, USA, in 1972. He has also served as Chairman of Pediatrics at King Faisal Specialist Hospital and Research Center, Saudi Arabia, and Professor and Director of the Division of Pediatric Cardiology at the University of Wisconsin and St. Louis University, USA. He has authored 400 papers, 16 books and 150 book chapters, and is a recipient of numerous honors and awards.

Dr Dharmapuri Vidyasagar, MD, MSc, FAAP, FCCM, PhD (Hon), is currently Professor Emeritus in Pediatrics at the University of Illinois, Chicago, where he served as Professor of Pediatrics for four decades. He is a graduate of Osmania Medical College, India. He has published over 250 papers and authored several books with a focus on prematurity, neonatal pulmonary diseases and neonatal ventilation. His goal is to reduce neonatal mortality in the USA and around the world, and he has received multiple awards and honors including the Ellis Island Award.

A Multidisciplinary Approach to Perinatal Cardiology Volume 1 is available now in Hardback from the Cambridge Scholars website, where you can also access a free 30-page sample.

My NICU Network
My Perinatal Network

National Perinatal Association + NICU Parent Network

Online L&D Staff Education Program

Caring for Pregnant Patients & Their Families:

Providing Psychosocial Support During Pregnancy, Labor and Delivery

WWW.MYPERINATALNETWORK.ORG

Continuing education credits provided by

pac-lac

About the Program

- **WHO SHOULD TAKE THE PROGRAM?** This program is designed for both office and hospital staff in all disciplines that interact with pregnant patients and their families. A key focus is recognizing risk factors for perinatal mood and anxiety disorders, and mitigating their impact through provision of trauma-informed care.

- **WHY TAKE THE PROGRAM?** Families will benefit when staff have improved skills, through enhanced parental resilience and better mental health, and improved parent-baby bonding leading to better developmental outcomes for babies. Benefits to staff include improved skills in communicating with patients; improved teamwork, engagement and staff morale; reduced burnout, and reduced staff turnover.

- **HOW DOES THE PROGRAM ACHIEVE ITS GOALS?** Program content is representative of best practices, engaging and story-driven, resource-rich, and developed by a unique interprofessional collaboration of obstetric and neonatal professionals and patients. The program presents practical tips and an abundance of clinical information that together provide solutions to the emotional needs of expectant and new parents.

- **HOW WAS THE PROGRAM DEVELOPED?** This program was developed through collaboration among three organizations: a multidisciplinary group of professionals from the National Perinatal Association and Patient + Family Care, and parents from the NICU Parent Network. The six courses represent the different stages of pregnancy (antepartum, intrapartum, postpartum), as well as perinatal mood and anxiety disorders, communication techniques, and staff support.

Program Objectives

- Describe principles of trauma-informed care as standards underlying all communication during provision of maternity care in both inpatient and outpatient settings.
- Identify risk factors, signs, and symptoms of perinatal mood and anxiety disorders; describe treatment options.
- Define ways to support pregnant patients with high-risk conditions during the antepartum period.
- Describe obstetric violence, including ways that providers may contribute to a patient's experience of maternity care as being traumatic; equally describe ways providers can mitigate obstetric trauma.
- Describe the importance of providing psychosocial support to women and their families in times of pregnancy loss and fetal and infant death.
- Define the Fourth Trimester, and identify the key areas for providing psychosocial support to women during the postpartum period.
- Identify signs and symptoms of burnout as well as their ill effects, and describe both individual and systemic methods for reducing burnout in maternity care staff.

Continuing education credits will be provided for physicians, clinic and bedside nurses, social workers, psychologists, and licensed marriage and family therapists. CEUs will be provided by Perinatal Advisory Council: Leadership, Advocacy, and Consultation.

PROGRAM CONTENT

COMMUNICATION SKILLS CEUs offered: 1

Learn principles of trauma-informed care, use of universal precautions, how to support LGBTQ patients, obtaining informed consent, engaging in joint decision-making, delivering bad news, dealing with challenging patients.

Faculty: Amina White, MD, MA, Clinical Associate Professor, Department of OB/Gyn, University of North Carolina, Chapel Hill, NC; Sue Hall, MD, MSW, FAAP, St. John's Regional Medical Center, Oxnard, CA; Karen Saxer, CNM, MSN, University of North Carolina Maternal-Fetal Medicine, UNC Women's Hospital, Chapel Hill, NC; Tracy Pella, Co-Founder & President, Connected Forever, Tecumseh, NE.

PERINATAL MOOD AND ANXIETY DISORDERS CEUs offered: 1

Identify risk factors for and differential diagnosis of PMADs (perinatal mood and anxiety disorders), particularly perinatal depression and/or anxiety and posttraumatic stress syndrome. Learn the adverse effects of maternal depression on infant and child development, and the importance of screening for and treating PMADs.

Faculty: Linda Baker, PsyD, psychologist at Unstuck Therapy, LLC, Denver, CO; Sue Hall, MD, MSW, FAAP, neonatologist at St. John's Regional Medical Center, Oxnard, CA; Angela Davids, Founder of Keep 'Em Cookin', Baltimore, MD; Brittany Boet, Founder of Bryce's NICU Project, San Antonio, TX.

PROVIDING ANTEPARTUM SUPPORT CEUs offered: 1

Identify psychosocial challenges facing high risk OB patients, and define how to provide support for them, whether they are inpatient or outpatient. Recognize when palliative care is a reasonable option to present to pregnant patients and their families.

Faculty: Amina White, MD, MA, Clinical Associate Professor, Department of OB/Gyn, University of North Carolina, Chapel Hill, NC; Sue Hall, MD, MSW, FAAP, neonatologist at St. John's Regional Medical Center, Oxnard, CA; Angela Davids, Founder of Keep 'Em Cookin', Baltimore, MD; Erin Thatcher, BA, Founder and Executive Director of The PPROM Foundation, Denver, CO.

PROVIDING INTRAPARTUM SUPPORT CEUs offered: 1

Describe how to manage patient expectations for labor and delivery including pain management; identify examples of obstetric violence, including identification of provider factors that may increase patients' experience of trauma; learn how to mitigate patients' trauma, and how to provide support during the process of labor and delivery.

Faculty: Sara Detlefs, MD, Fellow in Maternal-Fetal Medicine, Baylor College of Medicine, Houston, TX; Jerry Ballas, MD, MPH, Associate Clinical Professor, UCSD Health System, Maternal-Fetal Medicine, Department of Obstetrics, Gynecology and Reproductive Sciences, University of California at San Diego, San Diego, CA; MaryLou Martin, MSN, RNC-NIC, CKC, Women's and Children's Services Nurse Educator, McLeod Regional Medical Center, McLeod, SC; Claire Hartman, RN, IBCLC, Labor & Delivery, University of North Carolina Hospital, Chapel Hill, NC; Crystal Duffy, Author of Twin To Twin (from High Risk Pregnancy to Happy Family), and NICU Parent Advisor, Houston, TX; Erin Thatcher, Founder and Executive Director of The PPROM Foundation, Denver, CO.

PROVIDING POSTPARTUM SUPPORT CEUs offered: 1

Define the 4th Trimester and the importance of follow-up especially for high risk and minority patients, learn to recognize risk factors for traumatic birth experience and how to discuss patients' experiences postpartum; describe the application of trauma-informed care during this period, including support for patients who are breastfeeding and those whose babies don't get to go home with them.

Faculty: Amanda Brown, CNM, University of North Carolina Hospital, Chapel Hill, NC; ; Sue Hall, MD, MSW, FAAP, neonatologist at St. John's Regional Medical Center, Oxnard, CA; Crystal Duffy, Author of Twin To Twin (from High Risk Pregnancy to Happy Family), and NICU Parent Advisor, Houston, TX.

SUPPORTING STAFF AS THEY SUPPORT FAMILIES CEUs offered: 1

Define burnout and compassion fatigue; identify the risks of secondary traumatic stress syndrome to obstetric staff; describe adverse impacts of bullying among staff; identify the importance of both work-life balance and staff support.

Faculty: Cheryl Milford, EdS, Consulting NICU and Developmental Psychologist, Director of Development, National Perinatal Association, Huntington Beach, CA; Sue Hall, MD, MSW, FAAP, neonatologist at St. John's Regional Medical Center, Oxnard, CA; Erin Thatcher, BA, Founder and Executive Director, The PPROM Foundation, Denver, CO

Cost

- RNs: $10/CEU; $60 for the full program
- Physicians, licensed clinical social workers (LCSWs), licensed marriage and family therapists (LMFTs): $35/CEU; $210 for the full program
- Although PACLAC cannot award CEs for certified nurse midwives, they can submit certificates to their own professional organization to request credit. $35/CEU; $210 for the full program

Contact help@myperinatalnetwork.org to learn more.

Faculty

Linda Baker, PsyD
Psychologist at Unstuck Therapy, LLC, Denver, CO.

Jerasimos (Jerry) Ballas, MD, MPH
Associate Clinical Professor, UCSD Health System, Maternal-Fetal Medicine, Department of Obstetrics, Gynecology and Reproductive Sciences, University of California at San Diego, San Diego, CA.

Amanda Brown, CNM, MSN, MPH
University of North Carolina-Chapel Hill Hospitals, Chapel Hill, NC.

Sara Detlefs, MD
Fellow in Maternal-Fetal Medicine, Baylor College of Medicine, Houston, TX.

Sue L. Hall, MD, MSW, FAAP
Neonatologist, Ventura, CA.

Claire Hartman, RN, IBCLC
Labor & Delivery, University of North Carolina Hospital, Chapel Hill, NC.

MaryLou Martin, MSN, RNC-NIC, CKC
Women's and Children's Services Nurse Educator, McLeod Regional Medical Center, McLeod, SC.

Cheryl Milford, EdS.
Former NICU and Developmental psychologist, in memoriam.

Karen Saxer, CNM, MSN
University of North Carolina Maternal-Fetal Medicine, UNC Women's Hospital, Chapel Hill, NC.

Amina White, MD, MA
Clinical Associate Professor, Department of Obstetrics and Gynecology, University of North Carolina, Chapel Hill, NC.

Parent/Patient Contributers:

Brittany Boet
Founder, Bryce's NICU Project, San Antonio, TX.

Angela Davids
Founder, Keep 'Em Cookin', Baltimore, MD.

Crystal Duffy
Author of Twin To Twin (from High Risk Pregnancy to Happy Family), and NICU Parent Advisor, Houston, TX.

Tracy Pella, MA
Co-Founder and President, Connected Forever, Tecumseh, NE.

Erin Thatcher, BA
Founder and Executive Director, The PPROM Foundation, Denver, CO.

CANCELLATIONS AND REFUNDS

- For Individual Subscribers:
  - If you elect to take only one course, there will be no cancellations or refunds after you have started the course.
  - If you elect to take more than one course and pay in advance, there will be no cancellations or refunds after payment has been made unless a written request is sent to help@myperinatalnetwork.com and individually approved.
- For Institutional Subscribers:
  - After we are in possession of a signed contract by an authorized agent of the hospital and the program fees have been paid, a 50% refund of the amount paid will be given if we are in receipt of a written request to cancel at least 14 (fourteen) days prior to the scheduled start date for your hospital's online program.
  - Refunds will not be given for staff members who neglect to start the program. Also, no refunds for those who start the program, but do not complete all 6 courses within the time frame allotted.

For Physicians: This activity has been planned and implemented in accordance with the Institute for Medical Quality and the California Medical Association's CME Accreditation Standards (IMQ/CMA) through the Joint Providership of the Perinatal Advisory Council: Leadership, Advocacy and Consultation (PAC/LAC) and the National Perinatal Association. PAC/LAC is accredited by the Institute for Medical Quality/California Medical Association (IMQ/CMA) to provide continuing education for physicians. PAC/LAC takes responsibility for the content, quality and scientific integrity of this CME activity. PAC/LAC designates this activity for a maximum of 6 *AMA PRA Category 1 Credit(s)TM*. Physicians should only claim credit commensurate with the extent of their participation in the activity. This credit may also be applied to the *CMA Certification in Continuing Medical Education*.

For Nurses: The Perinatal Advisory Council: Leadership, Advocacy and Consultation (PAC/LAC) is an approved provider by the California Board of Registered Nursing Provider CEP 5862. When taken as a whole, this program is approved for 7 contact hours of continuing education credit.

For CAMFT: Perinatal Advisory Council: Leadership, Advocacy, and Consultation (PAC/LAC) is approved by the California Association of Marriage and Family Therapists to sponsor continuing education for LMFTs and LCSWs. CE Provider #128542. PAC/LAC maintains responsibility for the program and its content. Program meets the qualifications for 6 hours of continuing education credit for LMFTs and LCSWs as required by the California Board of Behavioral Sciences. You can reach us at help@myperinatalnetwork.org.

SHARED DECISION-MAKING PROTECTS MOTHERS + INFANTS DURING COVID-19

KEEPING MOTHERS + INFANTS TOGETHER

Means balancing the risks of...

- **HORIZONTAL INFECTION**
- **SEPARATION AND TRAUMA**

EVIDENCE

We encourage families and clinicians to remain diligent in learning **up-to-date evidence**.

PARTNERSHIP

What is the best for this unique dyad?

SHARED DECISION-MAKING

- **S** EEK PARTICIPATION
- **H** ELP EXPLORE OPTIONS
- **A** SSESS PREFERENCES
- **R** EACH A DECISION
- **E** VALUATE THE DECISION

TRAUMA-INFORMED

Both parents and providers are confronting significant...

- **FEAR**
- **GRIEF**
- **UNCERTAINTY**

LONGITUDINAL DATA

We need to understand more about outcomes for mothers and infants exposed to COVID-19, with special attention to:

- **MENTAL HEALTH**
- **POSTPARTUM CARE DELIVERY**

NEW DATA EMERGE DAILY. NANN AND NPA ENCOURAGE PERINATAL CARE PROVIDERS TO ENGAGE IN CANDID CONVERSATIONS WITH PREGNANT PARENTS PRIOR TO DELIVERY REGARDING RISKS, BENEFITS, LIMITATIONS, AND REALISTIC EXPECTATIONS.

Partnering for patient-centered care when it matters most.

nann.org nationalperinatal.org

National Association of Neonatal Nurses

National Perinatal Association

FREE ONLINE EDUCATION

Coping with COVID-19

A viral pandemic

A racial pandemic within a viral pandemic

Will mental illness be the next inevitable pandemic?

WWW.MYNICUNETWORK.ORG

and

National Perinatal Association
NICU Parent Network

Immunization Against COVID-19 Is Crucial

Mitchell Goldstein, MD, MBA, CML

The Alliance for Patient Access, 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 di[1]rectors. Its physician leadership is supported by policy advocacy management and public affairs consultants.

In 2012, AfPA established the Institute for Patient Access, a related 501(c)(3) non-profit corporation. The Institute for Patient Access is a physician-led policy research organization dedicated to maintaining the primacy of the physician-patient relationship in the provision of quality health care. In furtherance of its mission, IfPA produces educational materials and programming designed to promote informed discussion about patient access to approved therapies and appropriate clinical care.

Visit allianceforpatientaccess.org and instituteforpatientaccess.org to learn more about each organization.

AfPA | Alliance for Patient Access

IfPA | Institute for Patient Access

"COVID-19 immunization has been with us since December 2020. These immunizations have decreased symptoms' severity, reduced mortality risk, reduced disease transmission, and made communities healthier and safer for those at most significant risk."

COVID-19 immunization has been with us since December 2020. These immunizations have decreased symptoms' severity, reduced mortality risk, reduced disease transmission, and made communities healthier and safer for those at most significant risk. The loss of human lives would have been many times that which has already been experienced. (1-4)

"Several types of immunizations are available. Although mRNA products are thought to be new and untested, this technology was developed in the 1990s, almost thirty years ago. "

With an extended indication, COVID-19 immunization is now available for children, adolescents, and adults. Data suggest that these preparations are safe in pregnancy and may decrease the disease burden in these individuals. Several types of immunizations are available. Although mRNA products are thought to be new and untested, this technology was developed in the 1990s, almost thirty years ago. These products instruct messenger RNA within human cells to make COVID-like proteins that trigger the immune system and produce a response capable of fighting the virus. Protein subunit vaccines are referred to as "traditional" since they have been used to produce immune responses again influenza, pertussis, and hepatitis B. A modified, harmless version of the virus proteins is delivered to the cell, and the cell creates a novel response to the foreign protein. Finally, vector vaccines have been used for decades to fight diseases such as chickenpox, malaria, and tuberculosis. These use modified viruses, not necessarily of the same type, to train the body to fight infection. Viruses causing the common cold can be modified to fight COVID. COVID vaccines are recommended for everyone ages six months and older, and boosters for everyone ages five years and older, if eligible. (5)

"Importantly, and despite insistence by some to the contrary, COVID immunization is a safe and sound process. COVID vaccines have been thoroughly tested through multi-phase randomized trials with tens of thousands of participants."

Importantly, and despite insistence by some to the contrary, COVID immunization is a safe and sound process. COVID vaccines have been thoroughly tested through multi-phase randomized trials with tens of thousands of participants. These products have proven safe and effective for adults and children. (6) US FDA,

EMA, and WHO have vetted and approved the use of these products for the general population at risk. (7-9)

These immunizations are readily available in doctor's offices, neighborhood pharmacies, and community health centers. Other venues may offer immunizations as well. Although there are increasingly more options for immunization, a healthcare provider or pharmacist can help decide which product is best for the individual seeking protection.

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1. https://www.mayoclinic.org/diseases-conditions/coronavirus/symptoms-causes/syc-20479963
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8782520/
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5. https://www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html
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9. http://www.bccdc.ca/Health-Info-Site/Documents/COVID-19_vaccine/WHO- EUA-qualified-covid-vaccines.pdf

Disclosure: *MItchell Goldstein, MD,MBA, CML is a physician member of AfPA*

NT

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Immunizing Yourself Against **COVID-19**

COVID-19 vaccines have been shown to:

- Lessen the severity of symptoms[1]
- Reduce disease transmission[3]
- Reduce risk of mortality[2]
- Make communities healthier and safer[4]

Understanding the Options

COVID-19 vaccines are available for children, adolescents and adults. There are 3 types to choose from.

mRNA VACCINES

New to market, but research has been ongoing since the 1990s.

HOW THEY WORK: **Instruct cells to make COVID-like proteins that trigger the immune system to fight the virus.**

PROTEIN SUBUNIT VACCINES

Used for three decades against the flu, whooping cough and hepatitis B.

Deliver harmless versions of the COVID protein that train the immune system to fight the virus.

VECTOR VACCINES

Used for decades against chickenpox, malaria and tuberculosis.

Use a modified virus, such as a common cold, to teach the body to fight off COVID.

COVID vaccines are recommended for everyone ages 6 months and older, and boosters for everyone ages 5 years and older, if eligible.[5]

Safe and Sound

COVID vaccines have been:

- **Thoroughly tested** through multi-phase trials with tens of thousands of participants[6]
- **Proven safe and effective** for adults as well as children[7]
- **Vetted and approved** by the US FDA and EMA and endorsed by the WHO[8-10]

Get Your Jab

Vaccines are available at your:

- **Doctor's office**
- **Neighborhood pharmacy**
- **Community health center**

Talk to your **health care provider** or **pharmacist** about which vaccine is right for you.

1. https://www.mayoclinic.org/diseases-conditions/coronavirus/symptoms-causes/syc-20479963
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8782520/
3. https://www.nejm.org/doi/full/10.1056/nejmc2107717
4. https://royalsocietypublishing.org/doi/full/10.1098/rsif.2020.0683
5. https://www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html
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GAfPA Global Alliance for Patient Access

NCPA NATIONAL COMMUNITY PHARMACISTS ASSOCIATION

Keeping Your Baby Safe

during the COVID-19 pandemic

How to protect your little one from germs and viruses

Even though there are some things we don't know about COVID-19 yet, there are many more things that we do know. We know that there are proven protective measures that we can take to stay healthy.

Here's what you can do...

Wash Your Hands

- This is the single, most important thing you can do to stop the spread of viruses.
- Use soap.
- Wash for more than 20 seconds.
- Use alcohol-based sanitizers.

Limit Contact with Others

- Stay home when you can.
- Stay 6 feet apart when out.
- Wear a face mask when out.
- Change your clothes when you get home.
- Tell others what you're doing to stay safe.

Provide Protective Immunity

- Hold baby skin-to-skin.
- Give them your breast milk.
- Stay current with your family's immunizations.

Take Care of Yourself

- Stay connected with your family and friends.
- Sleep when you can.
- Drink more water and eat healthy foods.
- Seek mental health support.

Immunizations Vaccinations save lives. Protecting your baby from flu and pertussis lowers their risks for complications from coronavirus.

WARNING

Never Put a Mask on Your Baby

- Because babies have smaller airways, a mask makes it hard for them to breathe.
- Masks pose a risk of strangulation and suffocation.
- A baby can't remove their mask if they're suffocating.

If you are positive for COVID-19

- Wash with soap and water and put on fresh clothes before holding or feeding your baby.
- Wear a mask to help stop the virus from spreading.
- Watch out for symptoms like fever, confusion, or trouble breathing.
- Ask for help caring for your baby and yourself while you recover.

We can help protect each other.

Learn more

www.nationalperinatal.org/COVID-19

National Perinatal Association

The Gap Baby: An RSV Story

A collaborative of professional, clinical, community health, and family support organizations improving the lives of premature infants and their families through education and advocacy.

The National Coalition for Infant Health advocates for:

- **Access to an exclusive human milk diet** for premature infants
- **Increased emotional support resources** for parents and caregivers suffering from PTSD/PPD
- **Access to RSV preventive treatment** for all premature infants as indicated on the FDA label
- **Clear, science-based nutrition guidelines** for pregnant and breastfeeding mothers
- **Safe, accurate medical devices** and products designed for the special needs of NICU patients

www.infanthealth.org

ICAN: International Children's Advisory Network: Empowering Pediatric Patients Worldwide

Abby Clark

" If you are new to iCAN, please visit our website at www.iCAN.health to learn more about how to get involved and the ways that you can support our mission of helping children around the world."

iCAN: Happy New Year from the International Children's Advisory Network! "Empowering Pediatric Patients Worldwide"

Happy New Year from the International Children's Advisory Network, Inc. (iCAN). iCAN has many exciting opportunities and plans for 2023! If you are new to iCAN, please visit our website at **www.iCAN.health** to learn more about how to get involved and the ways that you can support our mission of helping children around the world.

iCAN's Parent Council is recruiting members to join. The iCAN Parent Council is an engaged group of parents and caregivers dedicated to supporting youth initiatives throughout iCAN. A member of the Parent Council does not have to have a child who is an iCAN Youth Member. This group is for all! Join Here: **https://www.icanresearch.org/councils-committees**

Currently, the council has a parent survey open. Please consider taking this quick survey to assist our parent council help families understand the process of clinical trials! Link to survey:**https://www.surveymonkey.com/r/DMGCRXPv** Apply Here: **https://www.icanresearch.org/councils-committees**

Do you have internships or additional engagement opportunities? Our YAP program is full of bright, unique individuals who often have personal experiences with chronic or rare conditions. We are happy to post those opportunities on our website and send them out to our vast network. Please get in touch with iCAN at **abbyclark@icanresearch.org** for more information.

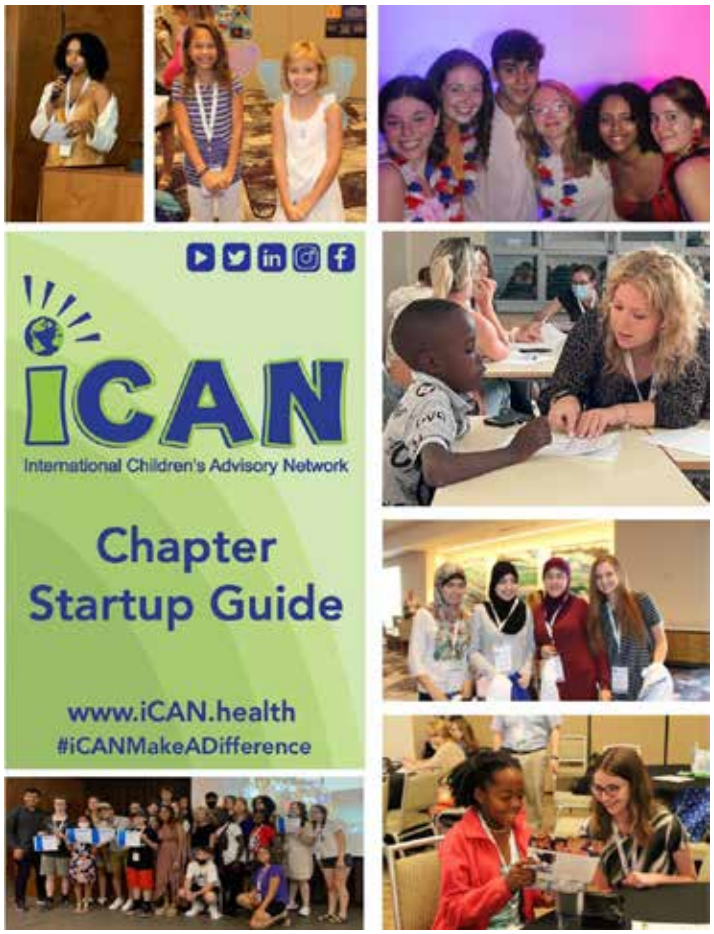
They are an engaged group of young people interested in a medical career. They meet monthly and are provided with access to internship, speaking, and research opportunities. If you know a young person, please have them apply!

Do you want to help support pediatric patients worldwide? iCAN is looking for sponsors, speakers, and donations for our 2023 Annual Research and Advocacy Conference on July 10 - 14, in San Diego, California! We will partner with our sister organization, the International Society for Pediatric Innovation (iSPI). This annual event allows our members to learn from one another's unique experiences as kids with chronic and/or rare conditions and network with leading healthcare professionals. In turn, the iCAN summit affords the scientific community direct engagement with children, young adults, and families so that they may learn about the importance and value of the pediatric patient voice in research, medicine, and innovation. Help kids attend this transformative event by "Supporting a Child" to go (see above flier) or sponsoring iCAN! Learn More: **https://www.icanresearch.org/summit**

We are kicking off the New Year with our January Ask the Experts session! Mark your calendar for January 21, 2023, at 10:00 a.m.EST. All are welcome to attend, and kids of all ages are invited to join. Additional sessions for 2023 will be coming, so keep your eyes open! We welcome all doctors, researchers, and community leaders to join us. Sign up for this session, as you won't want to miss it. We are always looking for experts to speak to our

"Help kids attend this transformative event by "Supporting a Child" to go (see above flier) or sponsoring iCAN! Learn More: https://www.icanresearch.org/summit."

kids, so if you are interested, please email iCAN! To join this fun and free event. Please register: www.icanresearch.org/events.



If you want to create a project or initiate a new chapter, please reach out to Abby Clark at **abbyclark@icanresearch.org** to get started today. It is FREE to start a Chapter. To learn more,

Check Out: **https://www.icanresearch.org/chapters**.

Disclosure: *The author has no conflicts of interests to disclose.*

NT

" We welcome all doctors, researchers, and community leaders to join us. Sign up for this session, as you won't want to miss it. We are always looking for experts to speak to our kids, so if you are interested, please email iCAN! To join this fun and free event. Please register: www.icanresearch.org/events."

Corresponding Author

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2023 iCAN SUMMIT

to be held July 10-14th in Southern California

iCAN
International Children's Advisory Network

Learn more:

www.iCANResearch.org

Registration opens March 1st, 2023

iCAN is not responsible or liable for any and all travel arrangements (including but not limited to flights, trains, cars, transport of any kind, accommodations, meals, reservations or other rental / vacation services acquired) by/for participants for any reason. iCAN is not responsible for any attendee medical needs. iCAN advises attendees to purchase travel insurance for the iCAN Summit.

Join Us In-Person for 2023

Kids - Make Your Summer Count!

- Travel to California
- Share your expert voice
- Shape the future of clinical research
- Support new pediatric innovation
- Learn about careers in healthcare
- Engage with global leaders
- Meet friends from around the world
- Make a positive impact in healthcare

SHARED DECISION-MAKING PROTECTS MOTHERS + INFANTS DURING COVID-19

KEEPING MOTHERS + INFANTS TOGETHER

Means balancing...

EVIDENCE

We encourage families and clinicians to remain diligent in learning **up-to-date evidence**.

PARTNERSHIP

SHARED DECISION-MAKING

What is the best for this unique dyad?

- **S**EEK PARTICIPATION
- **H**ELP EXPLORE OPTIONS
- **A**SSESS PREFERENCES
- **R**EACH A DECISION
- **E**VALUATE THE DECISION

TRAUMA-INFORMED

Both parents and providers are confronting significant...

- FEAR
- GRIEF
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LONGITUDINAL DATA

We need to understand more about outcomes for mothers and infants exposed to COVID-19, with special attention to:

- MENTAL HEALTH
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NEW DATA EMERGE DAILY.
NANN AND NPA ENCOURAGE PERINATAL CARE PROVIDERS TO ENGAGE IN CANDID CONVERSATIONS WITH PREGNANT PARENTS PRIOR TO DELIVERY REGARDING RISKS, BENEFITS, LIMITATIONS, AND REALISTIC EXPECTATIONS.

Partnering for patient-centered care when it matters most.

National Association of Neonatal Nurses
nann.org

National Perinatal Association
nationalperinatal.org

Your Pregnancy and Substance Use

4 Things you can do to improve your health and lower your risk for complications

Get Prenatal Care

Start early. Go to all your visits. Empower yourself with information so you can make smart decisions. Build relationships with providers who understand Substance Use Disorders (SUDs) and know how to help. Partner with them to reach your goals. But remember, you do not need to be abstinent from substance use to get care. Go now.

Reduce Your Use

There are simple things you can do to limit the harm substances might do.

- Use fewer substances
- Use smaller amounts
- Use less often
- Learn how to use safer

Reducing or quitting smoking is a good place to start. Set your goals, then ask for help.
One of the best things you can do is to stop using alcohol. We know that even small amounts are risky. And when combined with benzos and opioids, alcohol can kill.

Use Medications for Opioid Use Disorder (MOUD) if you are opioid dependent

Methadone and Buprenorphine (Subutex® or Suboxone®) are the "Standard of Care" during pregnancy because they:

- Eliminate the risks of illicit use
- Reduce your risk for relapse
- Can be a positive step towards recovery

Take Good Care of Yourself

You deserve a healthy pregnancy & childbirth.

- Eat healthy and take your prenatal vitamins
- Find the right balance of rest and exercise
- Surround yourself with people who care

Your Health Matters

Academy of Perinatal Harm Reduction
www.perinatalharmreduction.org

National Perinatal Association
www.nationalperinatal.org

Education. Anytime, Anywhere.

Academy of Neonatal Care

The Academy of Neonatal Care serves to educate Respiratory Therapists, Nurses, and Doctors in current and best practices in Neonatal ICU care. We prepare RT's new to NICU to fully function as a bedside NICU RT. Our goal is to enrich NICU care at all levels. Beginner to Advanced Practice, there is something for you at:

www.AcademyofNeonatalCare.org.

Keeping Your Baby Safe
from respiratory infections

RSV
COVID-19
colds
flu

How to protect your little ones from germs and viruses

This year is an especially dangerous cold and flu season - especially for vulnerable infants and children. Fortunately, there are proven protective measures that we can take to stay healthy.

Here's what you can do...

Wash Your Hands

- This is the single, most important thing you can do to stop the spread of viruses.
- Use soap.
- Wash for more than 20 seconds.
- Use alcohol-based sanitizers.

Limit Contact with Others

- Stay home when you can.
- Stay 6 feet apart when out.
- Wear a face mask when out.
- Change your clothes when you get home.
- Tell others what you're doing to stay safe.

Provide Protective Immunity

- Hold your baby skin-to-skin.
- Give them your breast milk.
- Stay current with your family's immunizations.

Take Care of Yourself

- Stay connected with your family and friends.
- Drink more water and eat healthy foods.
- Seek mental health support.
- Sleep when you can.

Get Immunized

Vaccinations save lives. Protecting your baby from COVID-19, flu and pertussis lowers their risks for complications from respiratory infections.

WARNING

Never Put a Mask on Your Baby

- Because babies have smaller airways, a mask makes it hard for them to breathe.
- Masks pose a risk of strangulation and suffocation.
- A baby can't remove their mask if they're suffocating.

If you feel sick or are positive for COVID-19

- Wash with soap and water and put on fresh clothes before holding or feeding your baby.
- Wear a mask to help stop the virus from spreading.
- Watch out for symptoms like fever, confusion, or trouble breathing.
- Ask for help caring for your baby and yourself while you recover.

We can help protect each other.
www.nationalperinatal.org/rsv

National Perinatal Association

PROTECT YOUR FAMILY FROM

RESPIRATORY VIRUSES

flu coronavirus pertussis RSV

WASH YOUR HANDS
often with soap and warm water.

GET VACCINATED
for flu and pertussis. Ask about protective injections for RSV.

COVER COUGHS AND SNEEZES.
Sneeze and cough into your elbow.

USE AN ALCOHOL-BASED HAND SANITIZER.

STAY AWAY FROM SICK PEOPLE
Avoid crowds. Protect vulnerable babies and children.

National Perinatal Association

www.nationalperinatal.org

FREE RESOURCES FOR YOUR NICU

Coping During COVID-19

Targeted interventions to improve the mental health of parents, infants, families, and providers

BONDING WITH YOUR BABY

HELPING CHILDREN AND FAMILIES COPE

CAREGIVERS NEED CARE TOO

National Network of NICU Psychologists

nationalperinatal.org/psychologists

Respiratory Syncytial Virus:

How you can advocate for babies this RSV season

Track national data and trends at the CDC's website www.cdc.gov/rsv

Identify babies at greatest risk

including those with CLD, BPD, CF, and heart conditions

Teach families how to protect

their babies from respiratory infections

Advocate for insurance coverage for palivizumab prophylaxis so more babies can be protected *

Use your best clinical judgement

when prescribing RSV prophylaxis

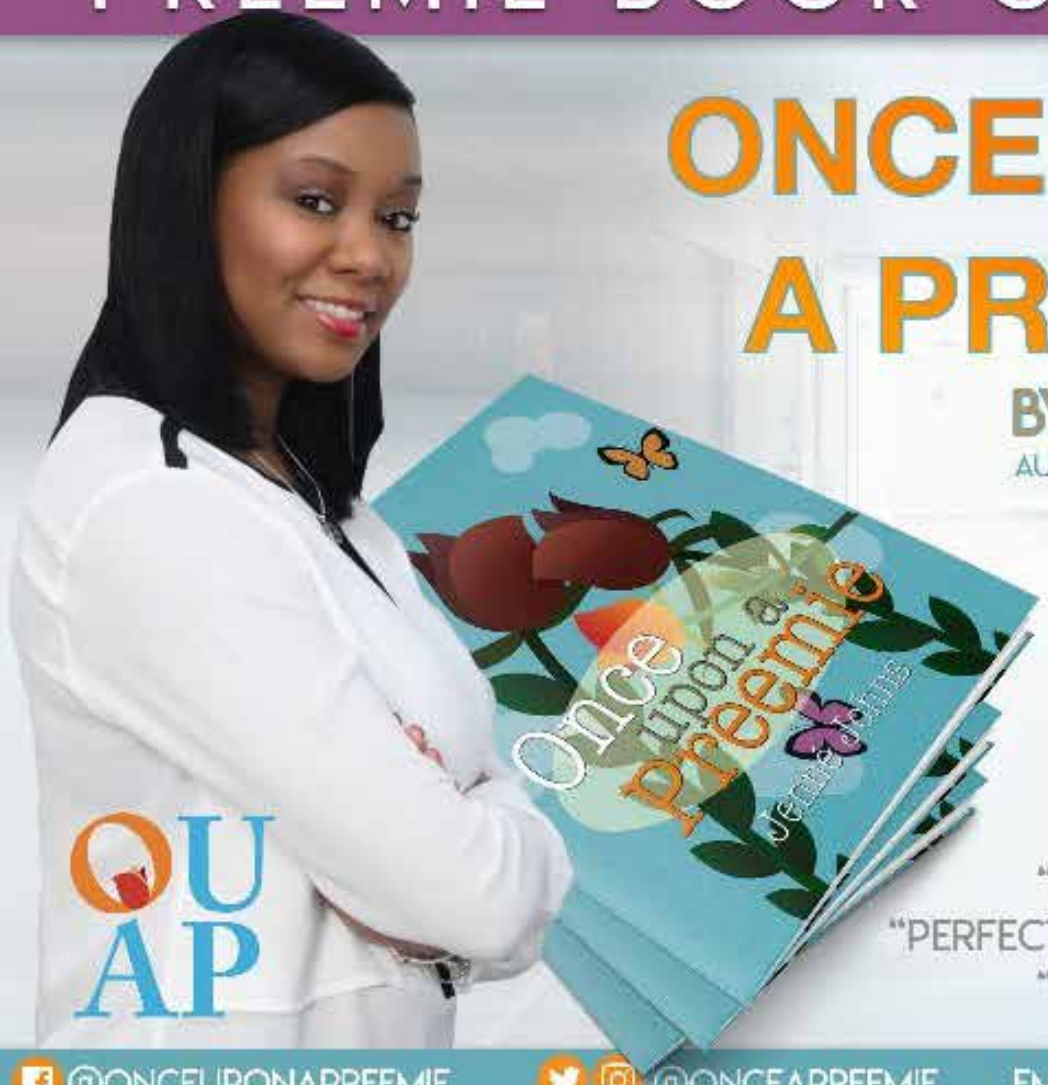
Tell insurers what families need

and provide the supporting evidence

National Perinatal Association

*See the NPA's evidence-based guidelines at www.nationalperinatal.org/rsv

PREEMIE BOOK ON SALE



ONCE UPON A PREEMIE

BY JENNÉ JOHNS

AUTHOR | SPEAKER | ADVOCATE

QUAP

"ONE OF A KIND"
"PERFECT FOR PREEMIE FAMILIES"
"ENCOURAGING"

@ONCEUPONAPREEMIE @ONCEAPREEMIE EMAIL: HI@ONCEUPONAPREEMIE

ONCE UPON A PREEMIE IS A BEAUTIFUL NEW WAY TO LOOK AT THE LIFE OF A PREEMIE BABY. IT EXPLORES THE PARENT AND CHILD NEONATAL INTENSIVE CARE UNIT (NICU) JOURNEY IN A UNIQUE AND UPLIFTING WAY.

SPEAKING ENGAGEMENTS

PREEMIE PARENT ALLIANCE SUMMIT
NATIONAL ASSOCIATION OF PERINATAL SOCIAL WORKERS
CONGRESSIONAL BLACK CAUCUS ANNUAL LEGISLATIVE CONFERENCE
NATIONAL MEDICAL ASSOCIATION ANNUAL CONFERENCE
HUDSON VALLEY PERINATAL PUBLIC HEALTH CONFERENCE
MATERNITY CARE COALITION ADVOCACY DAY

MEDIA APPEARANCES

Preemie Family

The Joyner Report

PEBBLES of Hope

WDAS 105.3 FM

CBS RADIO

wgts 91.9 Washington, D.C.

MAJIC 102.3 92.7 The Real Sound of the DMV

AVAILABLE FOR $12.99 ON AMAZON OR ONCEUPONAPREEMIE.COM

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.

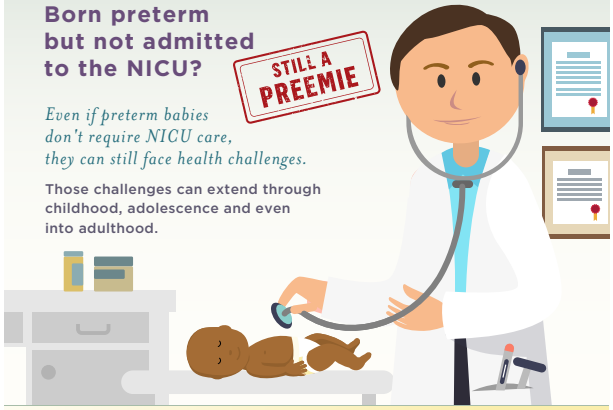
But because some health plans determine coverage based on a preemie's weight, **families of babies that weigh more may face access barriers and unmanageable medical bills.**

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 health problems
- Are disadvantaged from birth

All Preemies

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

NCfIH National Coalition for Infant Health

Protecting Access for Premature Infants through Age Two

www.infanthealth.org

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

National Perinatal Association

FREE Online CE Activity

Nurses: parents trust you.

You can help reduce the risk of Sudden Infant Death Syndrome (SIDS), the leading cause of death among infants between 1 month and 1 year of age. Take our **free continuing education (CE) activity** to stay up to date on the latest safe infant sleep recommendations. Approved for 1.5 contact hours.

Learn more about the free online activity at **https://nichd.nih.gov/SafeSleepCE.**

The CE activity explains safe infant sleep recommendations from the American Academy of Pediatrics and is approved by the Maryland Nurses Association, an accredited approver of the American Nurses Credentialing Center's Commission on Accreditation.

NIH *Eunice Kennedy Shriver* National Institute of Child Health and Human Development

SAFE TO SLEEP®

Compiled and Reviewed by Saba Saleem, BS, OMS 4

COVID-19 causes serious health problems during pregnancy, new data review finds

NEWS PROVIDED BY

Nebraska Public Media

By Jackie Ourada

January 20, 2023

Expectant mothers have an increased risk of adverse health effects when infected with COVID-19, according to a **new review of data** in the health journal BMJ Global Health.

The review shows pregnant people who had COVID were nearly four times as likely to require intensive care. They were also nearly eight times as likely to die, compared to pregnant women who didn't have COVID-19.

UNMC infectious disease specialist Dr. Mark Rupp said the virus doesn't only affect pregnant people.

"They also found that for the newborn baby, that it will significantly increase risk of being born low eight and also having premature birth," Rupp said.

The study, which included data from the United States, Hong Kong, Sweden, Turkey and other countries, also shows pregnant women have a 41% increased risk of admission to an intensive care unit when they contract COVID. Statistics show they also have an increased risk of developing blood clots during a COVID infection.

Rupp says the best protection against those outcomes is getting vaccinated. Vaccinated, expectant moms can also pass along antibodies and protection from COVID-19 to their newborns.

"The newborn baby gets what we call passive immunity – meaning that they don't have to get a shot. They don't have to get sick from disease and they will have some protection passed on from their mother, that also will wane over time," Rupp said.

Despite data indicating COVID-19 vaccinations are safe, vaccination rates among pregnant women are down across the country. Rupp said he understands pregnant people don't want to introduce new things into their body, but COVID-19 vaccinations, like flu shots, are proven to help keep moms and their babies out of the hospital.

"The vaccine has been given literally in millions of doses to pregnant women across the globe, there is not a safety signal that it causes problems either in the pregnant woman or in her developing child."

Overall, Rupp said it would be beneficial to have more people vaccinated against COVID-19 to ease the strain on Nebraska hospitals, which are still understaffed and near capacity.

"It doesn't take very much now for the health care system to really be taxed," Rupp said. "We saw that with relatively minor bumps in RSV with influenza [in 2022] and now with COVID-19. We are seeing some increasing signals for hospitalization in the Northeast, and we fear that that will come to our region as well in the coming weeks."

SOURCE Nebraska Public Media

NT

CHOP Researchers Identify Potential Genetic Variants Linked to Increased Cancer Risk in Children with Birth Defects

Source CHOP News

November 30, 2022

Researchers from Children's Hospital of Philadelphia (CHOP) have identified several genetic variants associated with increased risk of cancer in children with non-chromosomal birth defects, such as congenital heart disease and defects of the central ner-

vous system. While the risk of developing cancer is not as high as children with chromosomal birth defects, it is significantly higher than children with no birth defects at all, and the findings may provide a basis for early detection in these understudied patients.

The findings were recently published in the journal *Biomarker Research*.

Children with birth defects are more likely to develop cancer, and that increased risk of cancer persists into adulthood. Prior studies have demonstrated that children with chromosomal birth defects, such as Down syndrome and Klinefelter syndrome, are more than 11 times more likely to be diagnosed with cancer than children without any birth defects. However, children with non-chromosomal birth defects are up to 2.5 times more likely to be diagnosed with cancer than those without birth defects. With birth defects of any kind occurring in 1 in every 33 births in the United States each year, that increased risk implicates a significant number of children.

The underlying genetics of non-chromosomal birth defects have not been studied in great detail. Researchers at the Center for Applied Genomics (CAG) at CHOP wanted to determine what molecular mechanisms were at play and potentially identify genetic clues that could lead to early identification of cancer in these patients.

"We assembled one of the largest pediatric oncology and birth defects projects in children as part of the Gabriella Miller Kids First program project, which helps to uncover new insights into childhood cancer and structural birth defects," said Hakon Hakonarson, MD, PhD, director of the CAG at CHOP and senior author of the study. "With this partnership, we sought to identify functional molecular pathways based on mutations we identified as part of this study."

In this study, researchers used data obtained from whole genome sequencing of blood samples from 1,653 individuals without chromosomal abnormalities that were acquired from the Kids First Data Resource Center. These samples included 541 birth defect probands – the first person in a family to receive genetic counseling or testing for hereditary risk of a disease – with at least one type of malignant tumor, 767 birth defect probands without malignant tumors, and 345 healthy family members who are parents or siblings of the aforementioned probands. Additionally, once variants were identified, whole genome sequencing data from 40 birth defect probands from outside the data resource center, including 25 patients with at least one type of cancer, were used to further validate the study.

The study identified thousands of variants of interest, including 119 genes with at least two variants in coding regions – regions of the gene that will eventually be transcribed and translated into proteins to carry out essential functions – and 478 genes with at least 20 variants in their non-coding regions. Five genes in particular – *AXIN2, BMP1, CR1, ERBB2*, and *RYR1* – are associated with birth defects and increased risk of cancer. Additionally, the researchers built a deep learning model to assess the variants of interest identified in the Kids First cohort when compared with the 40 validation samples and found that they had achieved approximately 75% accuracy, with even greater accuracy for variants that were associated with non-coding regions.

Further detailed analysis of this data could identify genes and noncoding mutations that not only result in specific birth defects but also identify which types of cancer they are more prone to and whether the risk is more pronounced in childhood or adulthood.

"While more research is needed to delve into the variants of interest we identified, this study represents a critical step toward the earlier detection of cancer children with non-chromosomal birth defects," Hakonarson said.

The sequencing data was provided through the Gabriella Miller Kids First Pediatric Research Program consortium (Kids First), supported by the Common Fund of the Office of the Director of the National Institutes of Health. The study was supported by Institutional Development Funds from CHOP to the CAG.

Liu et al, "Identification of risk variants related to malignant tumors in children with birth defects by whole genome sequencing." *Biomark Res*. Online November 16, 2022. DOI: 10.1186/s40364-022-00431-y.

Contact: Ben Leach, The Children's Hospital of Philadelphia, 267-426-2857 or leachb@email.chop.edu

SOURCE CHOP News

NT

CHOP Helps Develop New Guidelines for Neonatal Resuscitation Studies

NEWS PROVIDED BY

CHOP News

January 12, 2023

Researchers at Children's Hospital of Philadelphia (CHOP) have led an international group of experts in developing new guidelines for neonatal resuscitation research. The guidelines, developed by the International Liaison Committee on Resuscitation Neonatal Life Support Task Force, will standardize data definitions for those engaged in this area of research, allowing for better comparisons across studies and ultimately better outcomes.

Clinical research on neonatal resuscitation has accelerated over recent decades, but there are no standardized definitions or reporting guidelines for neonatal resuscitation clinical studies, making it difficult to compare studies or make clinical recommendations. To address this, the International Liaison Committee on Resuscitation Neonatal Life Support Task Force established a working group to develop reporting guidelines for neonatal resuscitation, based on similar guidelines that were developed for adults in 1990 in Utstein Abbey, Norway.

The Utstein-style reporting guidelines focus on resuscitation of newborns immediately after birth for respiratory failure, bradycardia, severe bradycardia, or cardiac arrest. The researchers identified seven relevant domains: setting, patient, antepartum, birth/pre-resuscitation, resuscitation process, post-resuscitation process, and outcomes. Within each domain, relevant data elements were identified as core versus supplemental. The researchers determined that core data elements should be collected and reported for all neonatal resuscitation studies, while supplemental data elements may be collected and reported using standard definitions when possible.

"We hope the Neonatal Utstein reporting guidelines will assist investigators engaged in neonatal resuscitation research and facilitate data pooling in meta-analyses, enhancing the strength of neonatal resuscitation treatment recommendations and subsequent guidelines," said first author Elizabeth E. Foglia, MD, MA, an attending neonatologist with the Division of Neonatology at Children›s Hospital of Philadelphia.

Learn more about the new guidelines, which were published in Pediatrics, here.

Contact: Dana Bate, The Children's Hospital of Philadelphia, 267-426-6055 or bated@email.chop.edu

SOURCE CHOP News

NT

Adopting pediatric readiness standards improves survival in hospital emergency departments

Friday, January 13, 2023

What

Emergency departments that have the highest levels of coordination of health care, personnel, procedures and medical equipment needed to care for ill and injured children have far higher rates of survival than hospitals with low readiness, according to a study funded by the National Institutes of Health. Researchers found that more than 1,400 children's deaths may have been prevented if hospital emergency departments had adopted national pediatric care readiness standards as laid out by the National Pediatric Readiness Project(link is external). The six-year study of 983 emergency departments in 11 states followed nearly 800,000 children.

The National Pediatric Readiness Project was established to ensure that all emergency departments have the coordination of health care, personnel, procedures and medical equipment needed to care for ill and injured children. According to the project's checklist(link is external), standards include specifications for physician and nurse certification, patient assessment, triage, medication administration, and trauma resuscitation and stabilization. In the current study, researchers sought to determine if adopting the readiness standards would lower the death rate among children admitted to emergency departments for serious injury or illness. They ranked the emergency departments into four segments (quartiles) according to the extent they had implemented the readiness standards.

Compared to children cared for in low-readiness departments, children with injuries cared for in high-readiness departments had a 60% lower chance of dying in the hospital; and children with medical illness had a 76% lower chance of dying while they were in the hospital. Similarly, among roughly 545,000 children in six states, injured children in the highest quartile had a 41% lower chance of dying within a year and children with medical issues had a 66% lower chance of dying within a year, compared to children cared for in hospitals in the lowest readiness quartile.

The study was conducted by Craig D. Newgard, M.D., of Oregon Health & Science University, Portland, and colleagues. It appears in *JAMA Network Open*. Funding was provided by NIH's *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD) and the Health Resources and Services Administration.

A previous study by the authors found that adopting the readiness centers at trauma centers improved the survival of children with serious injuries.

Who

Cinnamon Dixon, D.O., M.P.H, a medical officer in the NICHD Pediatric Trauma and Critical Illness Branch, is available for comment.

Article

Newgard, CD. Emergency department pediatric readiness and short- and long-term mortality among children receiving emergency care. *JAMA Network Open. 2023*.

About the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD): NICHD leads research and training to understand human development, improve reproductive health, enhance the lives of children and adolescents, and optimize abilities for all. For more information, visit https://www.nichd.nih.gov.

About the National Institutes of Health (NIH): NIH, the nation›s medical research agency, includes 27 Institutes and Centers and is a component of the U.S. Department of Health and Human Services. NIH is the primary federal agency conducting and supporting basic, clinical, and translational medical research, and is investigating the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit www.nih.gov.

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Institute/Center

Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)

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301-496-5133

NT

NIH funds eight studies to advance rapid diagnosis of COVID-19-related inflammatory syndrome in children

Monday, January 9, 2023

The National Institutes of Health has awarded eight research grants to refine new technologies for early diagnosis of severe illnesses resulting from SARS-CoV-2 infection in children. The new awards follow grants issued in 2020 to foster methods for diagnosing children at high risk for Multisystem Inflammatory Syndrome in Children (MIS-C(link is external)), a rare, severe and sometimes fatal after-effect of SARS-CoV-2 infection or exposure in children.

"These highly innovative technologies and tools have the potential to greatly improve the care of children with SARS-CoV-2 infection and other fever-causing illnesses," said Bill Kapogiannis, M.D., of NIH's *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), which oversees the grants.

The awards are from NIH's Predicting Viral-Associated Inflammatory Disease Severity in Children with Laboratory Diagnostics and Artificial Intelligence (PreVAIL kIds) initiative. They are part of the Rapid Acceleration of Diagnostics Radical (RADx-rad) program to support new, non-traditional approaches and reimagined uses of existing tools to address gaps in COVID-19 testing and surveillance.

Although some children develop mild or no symptoms from COVID-19, others will develop more severe effects, including MIS-C, which results in inflammation of one or more organs, including the heart, lungs, kidneys, brain, skin, eyes and gastrointestinal tract.

The 2020 awards supported studies involving more than 7,400 research participants in four countries and yielded prototype methods and techniques for potential use in clinics, emergency departments and for hospital inpatients. These PreVAIL kIds studies were supported through NIH's RADx-rad initiative and were part of an NIH collaborative research effort called CARING for Children with COVID. Results from these studies include a laboratory technique for detecting specific immune cells associated with MIS-C; databases that help diagnose children at risk for MIS-C and severe COVID-19, based on certain blood proteins and genetic biomarkers; and a database that can distinguish between MIS-C, Kawasaki disease (which has similar symptoms) and fever-causing viral and bacterial infections.

The new awards will allow researchers to continue their efforts to develop ways to rapidly diagnose MIS-C and identify those at risk for serious and long-term effects of SARS-CoV-2. Earlier identification of those most at risk will allow for earlier interventions to prevent severe health effects.

Awardees

- **Jane C. Burns, University of California, San Diego**

pac-lac

Perinatal Advisory Council:
Leadership, Advocacy and Consultation

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www.paclac.org

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.

Leadership

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.

Diagnosing and predicting risk in children with SARS-CoV-2-related illness

- **Cedric Manlhiot, Johns Hopkins University, Baltimore** Data science approach to MIS-C identification and management associated with SARS
- **Ananth V. Annapragada, Baylor College of Medicine, Houston** AICORE-kids: Artificial intelligence COVID-19 risk assessment for kids
- **Audrey R. Odom John, Children's Hospital of Philadelphia** Diagnosis of MIS-C in febrile children
- **Usha Sethuraman, Central Michigan University, Mount Pleasant** Severity predictors integrating salivary transcriptomics and proteomics with multineural network intelligence in SARS-CoV2 infection in children
- **Juan C. Salazar, Connecticut Children's Medical Center, Hartford** Identifying biomarker signatures of prognostic value for MIS-C
- **Charles Yen Chiu, University of California, San Francisco** Discovery and clinical validation of host biomarkers of disease severity and MIS-C with COVID-19
- **Lawrence Kleinman, Rutgers Robert Wood Johnson Medical School, New Brunswick, New Jersey** COVID-19 network of networks expanding clinical and translational approaches to predict severe illness in children

RADx is a service mark of the U.S. Department of Health and Human Services.

About the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD): NICHD leads research and training to understand human development, improve reproductive health, enhance the lives of children and adolescents, and optimize abilities for all. For more information, visit https://www.nichd.nih.gov.

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Institute/Center

Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD)

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301-496-5133

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, Sunday 11/17/2019 and Friday 11/20/2020

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 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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Mitchell Goldstein, MD, FAAP, Immediate Past Chair, MGoldstein@llu.edu and

Jackie Burke

Sections Manager

AAP Division of Pediatric Practice

Department of Primary Care and Subspecialty Pediatrics

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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

COVID-19 vaccine for children after MIS-C appears safe

Tuesday, January 3, 2023

NIH-supported study finds no serious complications following rare immune condition.

A study of children and adolescents who received a COVID-19 vaccination following multisystem inflammatory syndrome (MIS-C) found that there were no reports of serious complications including myocarditis or MIS-C reoccurrence. About half of participants experienced mild and typical reactions, including arm soreness and fatigue. The study, funded by the National Institutes of Health, demonstrates that it is safe to get a vaccine after having MIS-C. The findings will publish today in *JAMA Network Open*.

The multicenter, observational study, the largest of its kind to examine COVID vaccination in this group, helps resolve a lingering question about whether the COVID vaccine can increase the risk of health problems in young people who have had MIS-C, a rare and potentially fatal immunological reaction that can occur following infection with SARS-CoV-2, the virus that causes COVID-19.

MIS-C is a poorly understood condition that affects 1 in about 3,000 to 4,000 children and adolescents who had COVID-19, ac-

cording to the Centers for Disease Control and Prevention(link is external) (CDC). It occurs a few weeks after COVID infection and can lead to organ failure. Symptoms can range from stomach pain, fever, and rash to inflammation of the heart muscle, a serious condition called myocarditis. The exact causes of MIS-C are unknown, but medications can be given to decrease the inflammation that can damage organs.

Some families and healthcare professionals have questioned whether COVID vaccines could lead to more serious adverse reactions in those with a history of MIS-C, including a recurrence of the disease, but data on this topic were lacking.

The cross-sectional study included 22 medical centers (21 in the United States and 1 in Canada) participating in the NHLBI's Long-Term Outcomes After the Multisystem Inflammatory Syndrome in Children (MUSIC)(link is external) study. It enrolled 385 patients aged 5 years or older with prior MIS-C who were eligible for COVID-19 vaccination. Of this group,185 (48.1%) received at least one vaccine dose. The median age was 12.2 years and 73.5% were male. The participants were racially diverse – 24.3% were Black, 31.9% were Hispanic, and 28.6% were white. The median length of time from their MIS-C diagnosis to their first vaccine dose was 9 months.

Of those who received a COVID vaccination following MIS-C, mild adverse reactions – mostly arm soreness and fatigue – occurred in 49% of them, similar to the general population. There were no reports of serious complications, including myocarditis or recurrence of MIS-C, the researchers said.

"We are very reassured by the results and this safety data should be comforting to families and healthcare professionals when considering and recommending vaccination," said study co-leader Matthew D. Elias, M.D., a pediatric cardiologist at Children's Hospital of Philadelphia and clinical assistant professor of pediatrics at the University of Pennsylvania, Philadelphia. Audrey Dionne, M.D., a pediatric cardiologist at Boston Children's Hospital and assistant professor of pediatrics at Harvard Medical School, Boston, also served as the study's co-leader. The researchers have routinely treated children with MIS-C throughout the pandemic.

Dionne added that the findings provide support for the CDC's recommendation(link is external) that patients with a history of MIS-C receive a COVID vaccine at least 90 days after diagnosis and that it is safe to do so.

"In light of the acute and long-term consequences of COVID-19 it is vital to continue the development, testing, and deployment of preventive as well as therapeutic agents in at-risk groups as well as the general population," said Gary H. Gibbons, M.D., director of the National Heart, Lung, and Blood Institute (NHLBI), part of NIH.

To date, more than 9,000 patients have been diagnosed with MIS-C in the United States, and 74 have died, according to data from the CDC (https://covid.cdc.gov/covid-data-tracker/#mis-national-surveillance(link is external)). However, the disease appears to be on the decline, according to studies by others.

"A big part of that decline is that COVID vaccination has been protective against this rare condition in those who have received it," Dionne said.

While many patients with MIS-C make a full clinical recovery, some studies suggest chronic symptoms linger after MIS-C, which is why long-term outcome studies will be beneficial, the researchers said. The MUSIC study is part of an NIH collaborative research effort called CARING for Children with COVID, which aims to better understand how COVID affects children, who account for roughly 13% of the total cases in the United States.

Research reported in this study was funded by the NHLBI's MUSIC(link is external) study, which was supported by grants HL135680, HL135685, HL135683, HL135689, HL135646, HL135665, HL135678, HL135682, HL135666, HL135691, and HL068270. The study uses the research infrastructure of the Pediatric Heart Network, a pediatric cardiology research consortium funded by the NHLBI, and its data coordinating center, HealthCore Inc.

About the National Heart, Lung, and Blood Institute (NHLBI): *NHLBI is the global leader in conducting and supporting research in heart, lung, and blood diseases and sleep disorders that advances scientific knowledge, improves public health, and saves lives. For more information, visit www.nhlbi.nih.gov.*

About the National Institutes of Health (NIH): NIH, the nation›s medical research agency, includes 27 Institutes and Centers and is a component of the U.S. Department of Health and Human Services. NIH is the primary federal agency conducting and supporting basic, clinical, and translational medical research, and is investigating the causes, treatments, and cures for both common and rare diseases. For more information about NIH and its programs, visit www.nih.gov.

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Study

Examination of adverse reactions after COVID-19 vaccination among patients with a history of multisystem inflammatory syndrome in children. *JAMA Network Open*. DOI: 10.1001/jamanetworkopen.2022.48987

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Contact

NHLBI Engagement and Media Relations Branch(link sends e-mail)

301-496-5449

NT

2023 Virginia Apgar Award in Neonatal Perinatal Medicine. Call for Nominations

Deadline: January 27, 2023

The American Academy of Pediatrics' Section on Neonatal-Perinatal Medicine is now accepting nominations for the 2023 Virginia Apgar Award. This award, widely recognized as the highest honor in our field, is given annually to an individual whose career has had a profound continuing influence on the well being of newborn infants. It is named after Dr. Virginia Apgar, whose eponymous score was but one of her many pioneering achievements in obstetric anesthesiology, academic medicine, neonatal care, and public heath.

All AAP fellows interested in Neonatal - Perinatal Medicine are invited to submit nominations. The nominee need not be a member of the AAP. The nomination should include a cover letter and acurriculum vitae of the nominee. A second letter in support of the nomination is required and up to four support letters will be accepted. Candidates who have been previously nominated in the previous two years but not selected may be re-nominated by a letter indicating renewal of their prior nomination. It is not necessary to resubmit all the paperwork if the original nomination package was complete.

The nominations must be received by January 27, 2023. Please send all nominations to:

Jim Couto, MA

Director, Perinatal & Neonatal Initiatives

American Academy of Pediatrics

345 Park Blvd

Itasca, IL 60143

jcouto@aap.org

630/626-6656

The Virginia Apgar Award is sponsored by a grant from Abbott and will be presented at the meeting of

the Neonatal – Perinatal Medicine Section during the 2023 National Conference & Exhibition of the

American Academy of Pediatrics in Washington, DC.

NT

2023 Avroy Fanaroff Neonatal Education Award

CALL FOR NOMINATIONS

DEADLINE January 27, 2023

The AAP is now accepting nominations for the Section on Neonatal - Perinatal Medicine Avroy Fanaroff Neonatology Education Award. This award will be given annually to an individual who has made

outstanding contributions to education in neonatal-perinatal medicine. It is named after a true pioneer in our field, Dr. Avory Fanaroff, in honor of his decades of commitment to our understanding of newborns-their physiology, and their families.

The candidate's contribution may be one of innovative education technique; original concept; seminal event; an exemplary, effective, high impact program; or a substantial long-term contribution to the highest ideals of education. Preference will be made to educational efforts that have had a demonstrable effect on clinical care.

The recipient is chosen by the SONPM Executive Committee each year at the SONPM Perinatal Spring Workshop. Final AAP Board of Directors approval will be granted in June of 2023 and the recipient will be notified at that time.

If you wish to nominate an individual, or yourself, please submit:

- A letter of interest including justification as to why this individual should receive the award.
- The candidate's curriculum vitae.
- Two supporting letters from two members of the Section on Neonatal-Perinatal Medicine.

If you are interested in re-nominating an individual, please contact Jim Couto before submitting any

materials. (Candidates who have been previously nominated in the previous two years but not selected may be re-nominated by a letter indicating renewal of their prior nomination.)

ALL INFORMATION MUST BE COMPLETE BEFORE MAILING IN YOUR NOMINATION.

Please send all materials no later than January 27, 2023 to:

Jim Couto, MA

Director, Perinatal & Neonatal Initiatives

American Academy of Pediatrics

345 Park Blvd

Itasca, IL 60143

jcouto@aap.org

630/626-6656

The Avroy Fanaroff Neonatal Education Award is sponsored by a grant from Mead Johnson Nutrition and will be presented at the meeting of the Section on Neonatal - Perinatal Medicine during the 2023 National Conference & Exhibition of the American Academy of Pediatrics in Washington, DC.

NT

2023 Neonatal Landmark Award

2023 NEONATAL LANDMARK AWARD

Call for Nominations

Deadline: January 27, 2023

Nominations are now accepted for the Section on Neonatal-Perinatal Medicine Landmark Award. This award is given to an individual in recognition of a seminal contribution which has had a major impact on Neonatal-Perinatal practice. The recipient does not necessarily have to be the author of the original description or publication of the contribution, but could be the individual responsible for dissemination and acceptance of the innovation within/by the profession and/or lay community. To be eligible, the "event" must have occurred at least 15 years ago, and the nominee must not have received the Virginia Apgar Award. The award can be awarded posthumously.

The recipient is chosen each year at the Perinatal Spring Workshop. Final AAP Board of Directors approval will be granted in June of 2023 and the recipient will be notified at that time.

If you wish to nominate an individual, or yourself, please submit:

- A letter of interest including justification as to why this individual should receive the award.
- The candidate's curriculum vitae.
- Two supporting letters from two members of the Section on Neonatal-Perinatal Medicine.

If you are interested in re-nominating an individual, please contact Jim Couto before submitting any materials. (Candidates who have been previously nominated in the previous two years but not selected may be re-nominated by a letter indicating renewal of their prior nomination.)

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Itasca, IL 60143

Phone: 630/626-6656

FAX 847/434-8000

jcouto@aap.org

The Landmark Award is supported by Mead Johnson Nutrition, and will be presented at the meeting of the Section on Neonatal - Perinatal Medicine during the 2023 National Conference & Exhibition of the American Academy of Pediatrics in Washington, DC

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Genetics Corner: Familial Duodenal Atresia Due to Feingold Syndrome

Mindy C. Huynh, MD, Robin D. Clark, MD

"A genetic consultation was requested for a preterm female with duodenal atresia that had been prenatally diagnosed by fetal ultrasound. Her family history was significant for duodenal atresia in her mother, her sister, and a deceased brother, who died in the immediate post-natal period after preterm delivery at 24 weeks gestation."

Case Summary:

A genetic consultation was requested for a preterm female with duodenal atresia that had been prenatally diagnosed by fetal ultrasound. Her family history was significant for duodenal atresia in her mother, her sister, and a deceased brother, who died in the immediate post-natal period after preterm delivery at 24 weeks gestation. She was admitted to the neonatal intensive care unit for surgical repair of her duodenal atresia and further evaluation. The patient was small for gestation age in all parameters: at 36 weeks 4 days gestational age, her birth weight was 1.77 kg. An echocardiogram showed a patent foramen ovale with fenestrations, mild right ventricular dilation, and hypertrophy with mildly elevated pulmonary pressures, but otherwise unremarkable.

The patient underwent exploratory laparotomy to repair a complete duodenal web and duodenoduodenostomy on day 6 of life. Oral feeding was begun on postoperative day 6, with uneventful advancement to full oral feeds and appropriate weight gain. Chromosomal microarray and chromosome analysis were normal. She had asymptomatic thrombocytopenia that was self-resolving. Her hearing screen was normal. Her newborn screen was normal. Cystic Fibrosis was indeterminate, but the California state protocol for *CFTR* gene panel testing identified no mutations.

The genetics team examined the infant after her surgical repair.

"Chromosomal microarray and chromosome analysis were normal. She had asymptomatic thrombocytopenia that was self-resolving. Her hearing screen was normal. Her newborn screen was normal. Cystic Fibrosis was indeterminate, but the California state protocol for CFTR gene panel testing identified no mutations."

Many dysmorphic features were appreciated, including microcephaly, short palpebral fissures, broad nose, thin upper lip, low anterior hairline, high palatal arch, bilateral clinodactyly of the little fingers, brachydactyly of the index and little fingers, each with single flexion creases, diminished distal flexion creases on the middle and ring fingers bilaterally, abnormal fisting with little fingers over-riding the ring fingers, thenar hypoplasia, left Sydney line, and right distal "hockey stick" crease (figures 1-3). The baby's facial and digital phenotype suggested Feingold syndrome in familial duodenal atresia. Maternal gene panel testing (gastrointestinal anomalies) had been sent one month before delivery and was in progress, so genetic testing on the infant was paused until the mother's results returned.

"The patient's mother (MOP) had a first pregnancy with a previous partner that ended in preterm premature rupture of the membranes (PPROM) and delivery of a male at approximately 24 weeks gestation, followed by neonatal demise in the first days of life. "

The family history was significant for the duodenal atresia in the mother and three of her offspring. The patient's mother (MOP) had a first pregnancy with a previous partner that ended in preterm premature rupture of the membranes (PPROM) and delivery of a male at approximately 24 weeks gestation, followed by neonatal demise in the first days of life. MOP's second pregnancy, conceived with her current partner, was also complicated by PPROM with the delivery of a male with duodenal atresia at 24 weeks and 2 days gestation, with neonatal demise on day 3 of life. No genetic testing was performed on either child. MOP's third pregnancy with the current partner was complicated by preterm delivery at 27 weeks, resulting in a female infant with duodenal atresia and microcephaly without other notable dysmorphic features. This child, our patient's full sister, had a surgical repair for duodenal atresia at approximately one month of age. Her chromosomal microarray was normal. She has a mild to moderate learning disability and receives intervention at school. There were no other similarly affected family members with duodenal atresia, dysmorphic features, digital anomalies, or intellectual disability. Both mother and father of the patient are of Hispanic ancestry from Mexico. Parental consanguinity was denied.

"She has a mild to moderate learning disability and receives intervention at school. There were no other similarly affected family members with duodenal atresia, dysmorphic features, digital anomalies, or intellectual disability."

Following the infant's discharge, the mother's genetic test results identified a heterozygous pathogenic variant in *MYCN*: c.302dup (p.Leu102Thrfs*164). This variant caused a frameshift and premature protein truncation. The pathogenic variant in *MYCN* confirmed this family's suspected diagnosis of autosomal dominant Feingold Syndrome. Targeted gene testing for this variant is planned in the infant and her affected sister on an outpatient basis.

Figure 1: Face with dysmorphic features - short palpebral fissures, broad nose, thin upper lip, low anterior hairline.

Figure 2: Ears (left and right, respectively) with minor helical irregularities, pointed superior folding of the ear.

Figure 3: Left hand with abnormal fisting of pinky over the ring finger. Single crease or flexion of pointer and pinky fingers consistent with mesobrachydactyly. Clinodactyly of the pinky finger is observed. Faint distal flexion creases are noted on the middle and ring fingers. Sidney's line is seen on the palm.

Assessment and Counseling:

Duodenal atresia is a congenital absence or complete closure of the first portion of the small intestine (lumen of the duodenum). It is the leading cause of intestinal obstruction in newborns, occurring in approximately 1 in 10,000 live births.[1] Duodenal atresia is usually sporadic, although it can also be reported with genetic and chromosomal syndromes. About 1/3 of individuals with duodenal atresia have Down syndrome. It is also one of the many diabetic embryopathies associated with maternal diabetes.

Isolated, non-syndromic duodenal atresia is usually not inherited in a Mendelian single-gene fashion but given significant dysmorphic features, digital hypoplasia, and microcephaly, with a positive family history of duodenal atresia, our patient's presentation indicated a syndromic and inherited form of duodenal atresia. Her dysmorphic features are compatible with Feingold Syndrome Type 1 (OMIM # 164280): microcephaly, short palpebral fissures, and short index and little fingers.

Differential diagnoses:

- Down syndrome (OMIM # 190685) is highly associated with duodenal atresia; other clinical exam features include upslanting palpebral fissures, Simian creases, widely spaced big toes, hypotonia, etc. A normal NIPT does not completely rule out Trisomy 21; a karyotype is needed to rule out a balanced translocation that the microarray would not detect.
- VACTERL association (or VATER syndrome) should also be considered. There are many different causes of this syndrome, including genetic and environmental factors. It is typically seen as sporadic and nonfamilial; no single gene disorder has been implicated. However, microcephaly and the specific facial features would be atypical for VATER/VACTERL.

- There are also reports of small bowel atresia in other syndromes, such as Fryns syndrome (OMIM % 229850) and Martinez-Frias syndrome (OMIM % 601346). One could also consider Thrombocytopenia-Absent Radii or TAR (OMIM # 274000) given thrombocytopenia, as duodenal atresia has been rarely associated with TAR.

"Feingold syndrome (FS) is a rare, genetic, congenital malformation syndrome characterized by microcephaly, facial dysmorphisms, digital anomalies, and mild-moderate learning disability.2,3 Synonymous names include Brunner-Winter syndrome and Oculo-digito-esophago-duodenal (ODED) syndrome, among many others. "

Feingold syndrome (FS) is a rare, genetic, congenital malformation syndrome characterized by microcephaly, facial dysmorphisms, digital anomalies, and mild-moderate learning disability.[2,3] Synonymous names include Brunner-Winter syndrome and Oculo-digito-esophago-duodenal (ODED) syndrome, among many others. FS can be further categorized into two main subtypes:

- Type 1: the presence of GI atresia
- Type 2 (OMIM # 614326): absence of GI atresia

FS1 is a rare diagnosis, with a prevalence of less than 1 in 1,000,000.[3] To date, 69 families with 116 affected individuals having three or more phenotypic features of FS1 have been reported.[2] Penetrance appears to be 100%; however, expression widely varies. The most consistent phenotypic feature was digital anomalies, including brachymesophalangy and toe syndactyly, found in up to 97-100% of patients, while microcephaly was seen in 89%.[4] GI atresia was the most common significant congenital anomaly seen in 55% of cases; renal and cardiac anomalies were also significantly frequent (18% and 15%, respectively).

Diagnosis of FS is established through clinical findings. A heterozygous pathogenic variant in *MYCN* is identified through molecular genetic testing, single-gene or multigene panel testing, or even comprehensive genomic testing. Celli et al. looked at 4 pedigrees affected by FS, specifically at familial syndromic esophageal atresia.[5] Mapping revealed evidence for haploinsufficiency of genes in 2p24-p23. This locus has also been confirmed by Van Bokhoven et al.[6]

MYCN is part of the MYC proto-oncogene family, a class of transcription favors often implicated in many cancers due to amplification or overexpression through activating the mTOR pathway.[7] Alternatively, the *MYCN* mutation in FS1 is a loss of function resulting in truncation of growth in multiple organ systems. The Li et al. team out of the Koo lab used the zebrafish model to study FS1 and *MYCN* function in organogenesis. *MYCN* was expressed in the central nervous, pharyngeal arches, and digestive systems. Knock-out studies resulted in multiple developmental defects, including a shorter intestine with a narrowed lumen and fewer enteric neurons. This is highly consistent with duodenal atresia in FS1 and our patient. Shortened intestine length and central nervous system expression can help to explain findings of microcephaly and intrauterine growth restriction, as well as the risk of intellectual disability in the future. An important topic addressed in the Li study was using L-leucine and Rheb to activate the mTOR pathway, rescuing intestinal size. This could be a potential in-utero treatment option for patients with FS1.

"Shortened intestine length and central nervous system expression can help to explain findings of microcephaly and intrauterine growth restriction, as well as the risk of intellectual disability in the future. An important topic addressed in the Li study was using L-leucine and Rheb to activate the mTOR pathway, rescuing intestinal size. This could be a potential in-utero treatment option for patients with FS1."

The *MYCN* variant found via MOP's testing is likely inherited by her two daughters in an autosomal dominant fashion, with a recurrence risk is as high as 50% in future pregnancies. Our patient and her sister should be tested for the same variant. MOP should be counseled regarding the high risk of recurrence and how the disease expressivity can range from mild features to the full spectrum of FS1.

"Our patient and her sister should be tested for the same variant. MOP should be counseled regarding the high risk of recurrence and how the disease expressivity can range from mild features to the full spectrum of FS1."

Practical applications:

1. Suspect Feingold syndrome when duodenal atresia or tracheoesophageal fistula occurs in a first-degree relative of an affected infant. Take a careful family history to document any GI atresias in the family. 60% of patients with Feingold syndrome have an affected parent.
2. The clinical presentation of FS includes gastrointestinal atresia, digital anomalies, facial dysmorphisms, symmetric intrauterine growth restriction, and mild to moderate intellectual disability. Gastrointestinal atresia is the most common primary medical concern in FS, warranting immediate surgical intervention.
3. Pay attention to minor anomalies, for example, digital abnormalities. They may be very helpful in establishing a rare diagnosis, especially in the absence of other significant anomalies.

4. Appreciate that many syndromes are underdiagnosed. Suspect a syndromic or genetic etiology when a parent and child have the same anomaly.

5. *GeneReviews* recommends chromosomal microarray analysis to identify large deletions and a combination of gene-targeted testing and comprehensive genomic testing depending on the patient and family phenotype.

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NT

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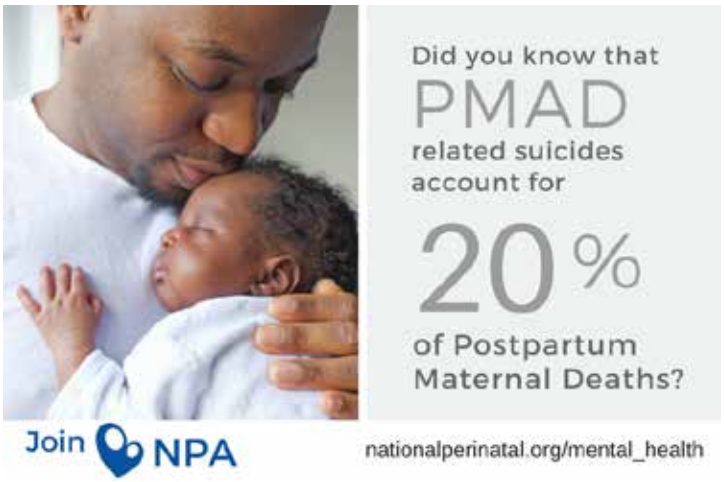
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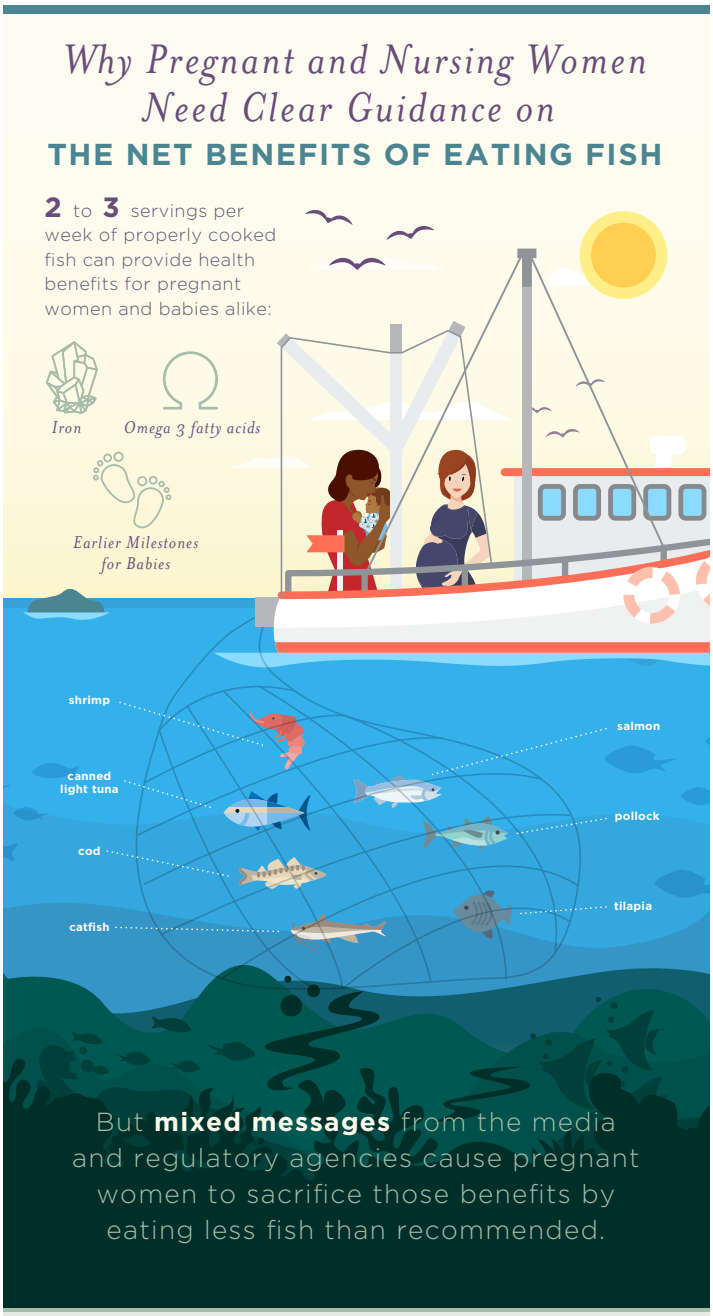
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Medical-Legal Forum: Documentation, Documentation, Documentation

Gilbert I. Martin, MD

The daily progress note has many components, and multiple publications have documented the medical-legal aspects of complete reporting. Initially, progress notes were a means to promote communication between physicians and other caregivers. However, as time has progressed, the daily note is often utilized for what it does not include when reviewed from a legal prospective.

"The daily progress note has many components, and multiple publications have documented the medical-legal aspects of complete reporting. Initially, progress notes were a means to promote communication between physicians and other caregivers."

It is clear that alteration or tampering with the medical record destroys the credibility of a witness, and juries can believe that there is an attempt to "hide the truth." As we have progressed from the handwritten, often incomplete progress note to a more consistent, detailed iteration, the focus of the patient and the observations and plans is sometimes lost.

In addition, the electronic medical record allows for the repopulation of notes, and despite good intentions, the different portions of the daily progress note are frequently repeated and not updated. Therefore, the reader can be left in limbo spending more time in the past than in the present and future.

"In addition, the electronic medical record allows for the repopulation of notes, and despite good intentions, the different portions of the daily progress note are frequently repeated and not updated. Therefore, the reader can be left in limbo spending more time in the past than in the present and future. "

There are legal implications, as well as the repetition of data becomes tedious. I can remember an interaction I experienced as a percipient witness many years ago. I was explaining my progress notes, and the plaintiff's attorney had me read out loud to the court what I had written concerning the baby.

I read to the court, "the baby is resting in the mother's arms." The plaintiff's attorney then asked me to read the initial statement in the following day's progress note.

I read to the court, "the baby is resting in the mother's arms." The plaintiff's attorney had me read three or four more initial lines in the progress notes, which all started the same way.

Finally, the attorney came close to me and said, "Dr. Martin, don't you think that the mother's arms were getting tired after several days of holding the baby?" There was that uncomfortable rustling and giggling sound from the jury as it was evident that the notes were self-populated and not carefully reviewed and updated.

"There was that uncomfortable rustling and giggling sound from the jury as it was evident that the notes were self-populated and not carefully reviewed and updated."

Think about the pros and cons of computerized progress notes. The notes are often redundant. If the copy-and-paste option is utilized, the same information appears daily.

What then represents the perfect written note in a patient's chart? The characteristics remain consistent. The verbiage must be clear, well-organized, and incredibly focused. Our notes become obfuscated if we approach this documentation with a defensive attitude.

If the daily progress note is constructed as a method of communication between all caregivers, the format should be consistent and organized and state the change in the baby's condition or if there is recent laboratory information, if applicable.

In 1994 I penned an editorial entitled "The Perfect Note." I compared the presentation of this perfect note to musical composers (Vivaldi, Mozart, Beethoven, Lloyd Weber, and Elton John). Like a medical progress note, the composer's score must be "clear, organized, directed, and even repetitious).

"Attorneys who do not have a medical background concentrate on the words rather than the meaning as represented by the caregiver. "

Progress notes have now progressed to being an important "legal" document. Attorneys who do not have a medical background concentrate on the words rather than the meaning as represented by the caregiver. If all hospitals and physicians utilized a consistent format, data collection would improve, and these statistical models would positively affect healthcare.

" If all hospitals and physicians utilized a consistent format, data collection would improve, and these statistical models would positively affect healthcare."

The daily progress note needs to be comprehensive, well organized, functional, accurate, and especially practical for all healthcare team members.

To me, the perfect note is the hollow, clear, haunting, consistent "A" that comes from the oboe as the orchestra members tune their instruments.

Disclosure: There are no reported conflicts.

NT

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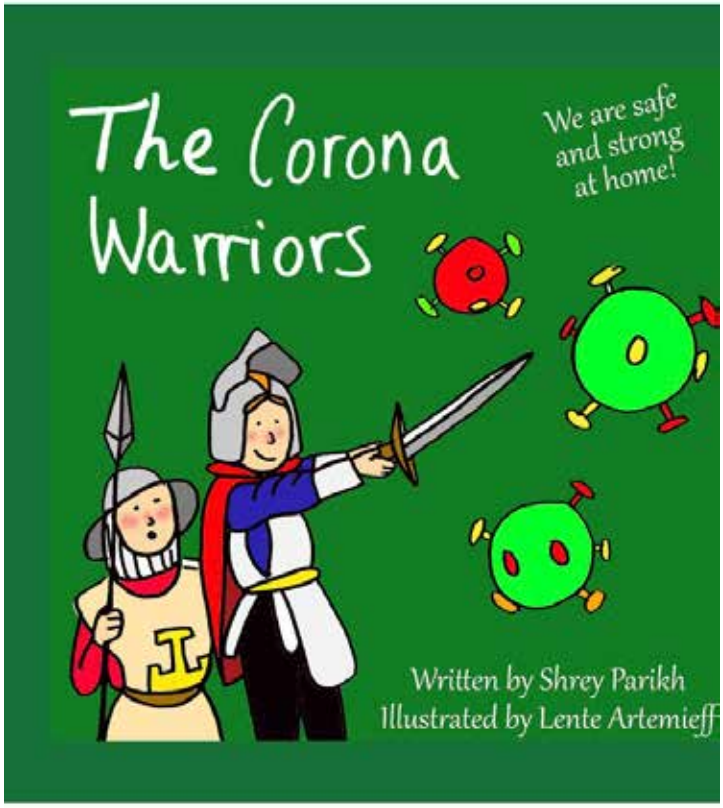

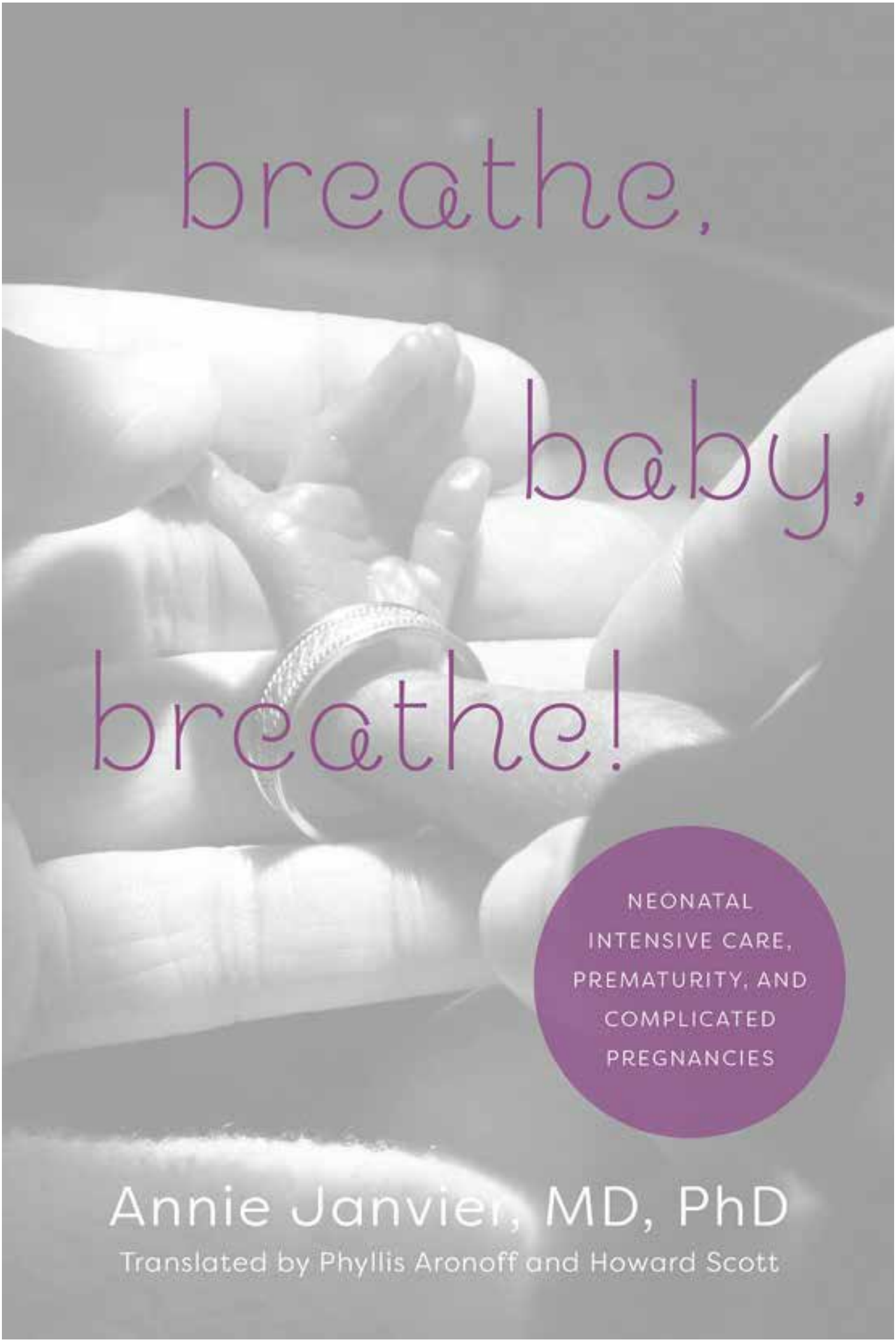
breathe,
baby,
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NEONATAL INTENSIVE CARE, PREMATURITY, AND COMPLICATED PREGNANCIES
Annie Janvier, MD, PhD
Translated by Phyllis Aronoff and Howard Scott

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The Importance of Immunization

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By introducing an inactive piece of a disease or proteins that look like the disease, they trigger an immune response, training the body to create antibodies that defeat the disease.	**How does it work?**	Instead of teaching the body to create antibodies and defenses, they provide antibodies that are readily available.
Both support the immune system's defenses.		
Many vaccines are readily and easily available. The technology behind vaccines has been around for decades.	**What are the benefits?**	Preventive monoclonal antibodies can provide protection for diseases where there isn't an existing vaccine or there isn't an existing vaccine for certain patient groups.
Both protect against disease and provide a public health benefit by decreasing the burden of disease.		
Polio Measles COVID-19 And more	**What can this immunization protect against?**	RSV COVID-19
Both can provide tailored protection from a variety of diseases.		
Yes	**Is it safe?**	Yes

Both vaccines and preventive monoclonal antibodies undergo extensive testing for safety and efficacy.

READ NPA's statement: BLACK LIVES MATTER

Peer Reviewed

Suzanne Staebler , DNP, APRN, NNP-BC, FAANP, FAAN

The Indirect Impact of RSV

RSV PARENT & PROVIDER SURVEY RESULTS

AfPA | Alliance for Patient Access

NCfIH National Coalition for Infant Health

Executive Summary

RSV, or respiratory syncytial virus, is a common, highly contagious seasonal virus that affects 97% of children by the age of 2.[1] Yet despite RSV being common among young children, most parents know little about it.

RSV is the leading cause of hospitalization for babies less than a year old, and nearly 58,000 infants and young children are hospitalized for RSV each year. This dangerous virus doesn't just impact preemies — it affects all babies and young children.[2] In fact, it's also the leading cause of bronchiolitis and pneumonia in children under one. And it can carry significant financial, emotional and social burdens for patients' families.

Now, national survey data from the Alliance for Patient Access and the National Coalition for Infant Health highlight the experiences and opinions of two critical demographics — parents whose babies or children had RSV, and health care providers who take care of babies and children with RSV. Taken together, these surveys offer a glimpse of awareness, successes and ongoing challenges related to RSV. The findings also identify goals that stakeholders and policymakers can pursue going forward.

Parents Struggle as their Child Suffers with RSV

Hospitalization for RSV is not uncommon. Of the 340 surveyed parents:

67%
reported that their child was **hospitalized** for RSV.

The burden of RSV goes well beyond the physical impact on babies and young children.

69%
of parents felt guilty they could not do more to prevent their child's experience with RSV.

68%
of parents said watching their child suffer **affected their mental health.**

More than ⅓
of parents said the burden of RSV placed a **strain on their relationship** with their partner.

Following their child's recovery, parents had to face the medical bills that followed.

More than ⅔
of parents said that RSV also **presented their family with a financial burden** or financial crisis.

Providers Support Families

Health care providers also shoulder the burden of RSV.

48%
of providers said they found it **difficult to decide** whether to send a young RSV patient to the emergency room.

RSV Awareness Lags

Despite the prevalence of RSV, parents' responses emphasize there is a need for greater knowledge of RSV.

43%
of RSV patients' parents **"had never heard of RSV** before their child was sick."

Preventive Immunizations are on the Horizon

> Parents and providers all expressed a **desire to see immunizations and other preventions in the future.**

Up-and-coming preventions will improve care and help prevent the burden from harming infants, young children and their families.

RSV's All-Encompassing **Burden**

The Emotional Toll

It's never easy for parents to see their children suffer. But RSV can leave parents particularly traumatized.

69%

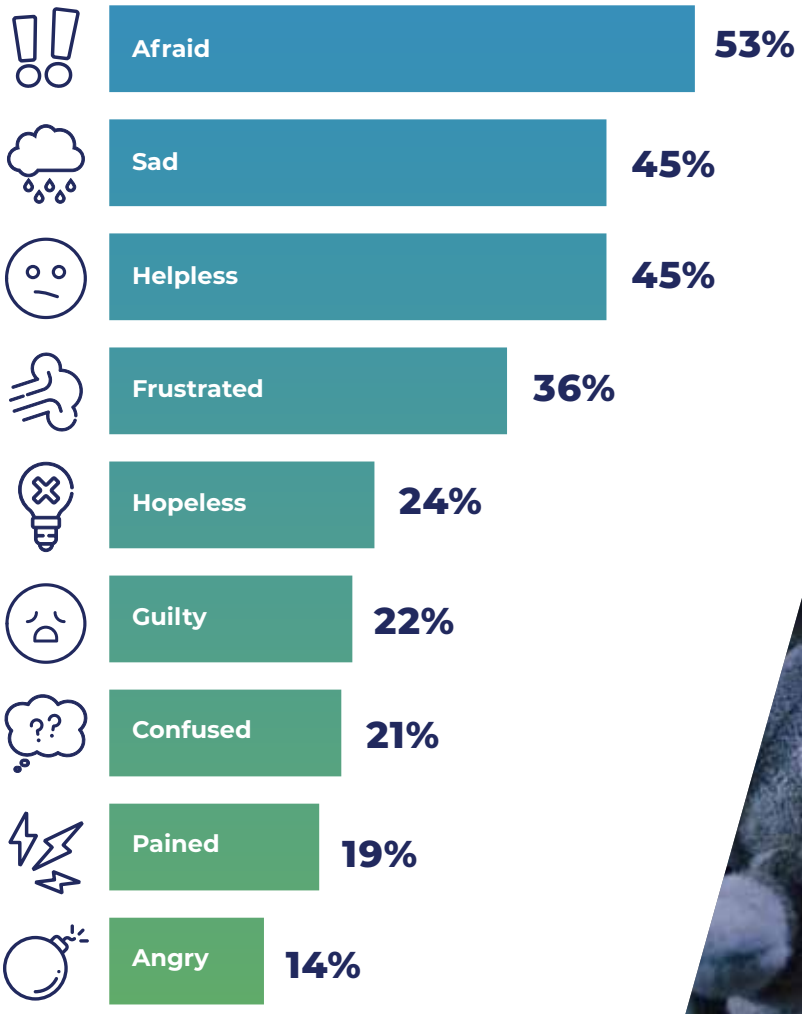
of parents **"felt guilty"** they could not do more to prevent their child's RSV.

68%

said watching their child suffer **"affected their mental health."**

When parents found out there was no treatment for RSV and that only supportive care could be done to help their child, 48% said they felt **angry,** 46% **helpless,** and 37% **frustrated.**

In total, surveyed parents described their feelings throughout their child's illness:



The Financial Burden

More than two-thirds of parents said that RSV also presented their family with a **financial burden** or **financial crisis.**

The RSV-related financial challenges that parents reported included:

39%
Medical bills

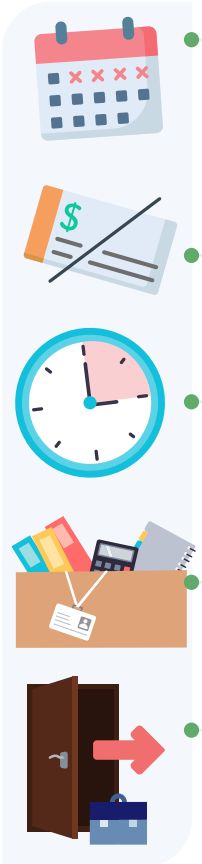
32%
Loss of potential income

27%
Caregiver or child care costs

24%
Transportation costs

14%
Costs for meals or hotels

Additionally, parents reported that their child's illness impacted their ability to work, which for many resulted in a loss of income.



31%
of parents had to take **paid time off** from work.

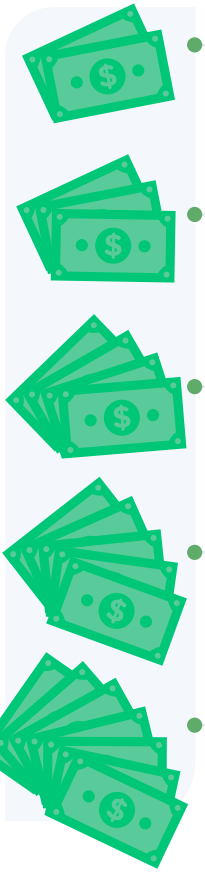
28%
took **unpaid leave.**

22%
had to work **fewer hours.**

10%
left their job.

7%
were **fired** because of the demands of caring for their sick child.

The bottom-line costs of a child's RSV experience represent a significant expense for most families, and a financial crisis for many. Families estimated their total related costs to be:



18%
$501-$1,500

24%
$1,501-$3,000

11%
$3,001-$5,000

5%
$5,001-$8,000

4%
$8,001 or more

The Social Burden

Caring for a young child suffering from RSV often requires help from people outside of the immediate family. In addition to the steep medical costs, there is also the time, energy and attention taken from other aspects of parents' lives.

More than ½

(54%) had to rely on family members and friends to help with child care, transportation and other responsibilities.

More than ⅓

said the stress put a **strain on their relationship** with their partner.

Siblings felt the strain, too.

42%

of parents said they **struggled to care for their other children** when one had RSV.

42%

said their **other children were distressed** watching their sibling struggle with RSV.

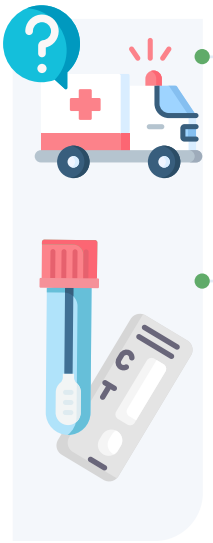
41%

said RSV prevented patients' siblings **from participating in extracurricular activities** or playing with friends.

Caring for Babies and Children with RSV

Tough Calls for Health Care Providers

Because there is no treatment for RSV beyond supportive care, health care providers struggle with decisions about testing and hospitalization.



Almost half

(48%) found it difficult to decide whether to send a young RSV patient to the emergency room.

Nearly ⅓

of providers have been reluctant to test for RSV in the past because the only treatment option is supportive care — and half said their coworkers have expressed reluctance to test because of supportive care being the only course of treatment.

Typical RSV Timelines

According to parents, the most common age for RSV diagnoses was between 7 and 12 months.

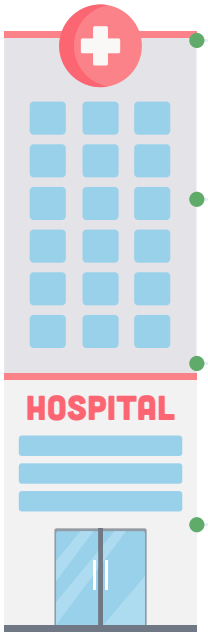
The most common duration of the illness was 4-6 days, during which time the vast majority of parents (89%) took their child to see a medical professional between one and three times.

89%

of parents took their child to see a medical professional between one and three times.

Hospital Stays and Treatments

Of the 340 surveyed parents, 230 had their children hospitalized for RSV. Of these cases:



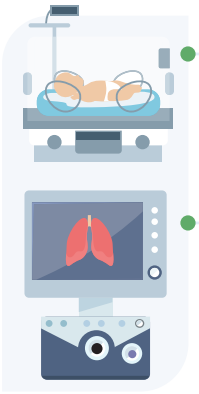
47% were hospitalized for **4-6 days.**

35% were hospitalized for **1-3 days.**

15% were hospitalized for **7-9 days.**

4% were hospitalized for **10 days** or more.

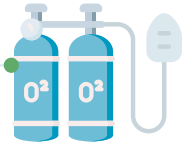
And during their hospitalizations:



49% were admitted to the **intensive care unit.**

40% were put on **ventilators.**

When asked about treatments their children were administered in the hospital, parents answered "oxygen" most often.



Even Afterward, Respiratory Risks Remain

Even after RSV subsides, young patients continue to face heightened risks for other respiratory conditions. RSV is the leading cause of bronchiolitis and pneumonia among infants, and it increases patients' long-term risks of developing asthma.[3]

According to the surveyed parents, their children who recovered from RSV still faced additional health challenges:

28% developed **asthma.**

28% developed **bronchitis.**

19% developed **pneumonia.**

19% developed **respiratory tract infections.**

8% developed **other related conditions.**

Understanding the Virus

The RSV Awareness Gap

Though almost all children contract RSV at least once by their second birthday, most parents are unaware of the disease until their own child is diagnosed.

43%

of RSV patients' parents **"had never heard of RSV** before their child was sick."

Of the 57%

that had heard of RSV, more than half knew **"only a little."**

63%

said they wished their health care providers had **taught them more about RSV** before their child became sick.

This awareness gap persists despite health care providers' regular encounters with the disease.

92%

of health care providers surveyed **see children hospitalized** with RSV.

86%

report including **RSV education** as part of routine care.

90%

feel their **staffs are equipped** to educate parents of RSV patients.

99%

agree that **parents need more information** about RSV.

Not Just a Preemie Problem

> Health care providers emphasize that **all children are at risk for serious RSV disease.**

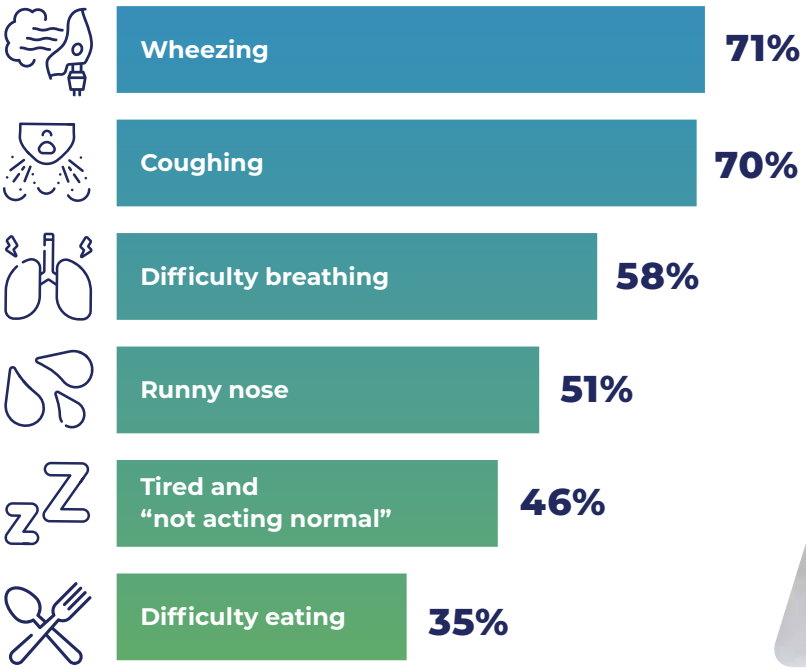
More than half of providers stated that

at least 50%

or more of the babies they see hospitalized for RSV had been **born full term** and didn't have preexisting conditions.

What Symptoms Send RSV Patients to the Doctor?

Parents overwhelmingly reported that their kids' RSV symptoms mimicked those of a cold or flu:



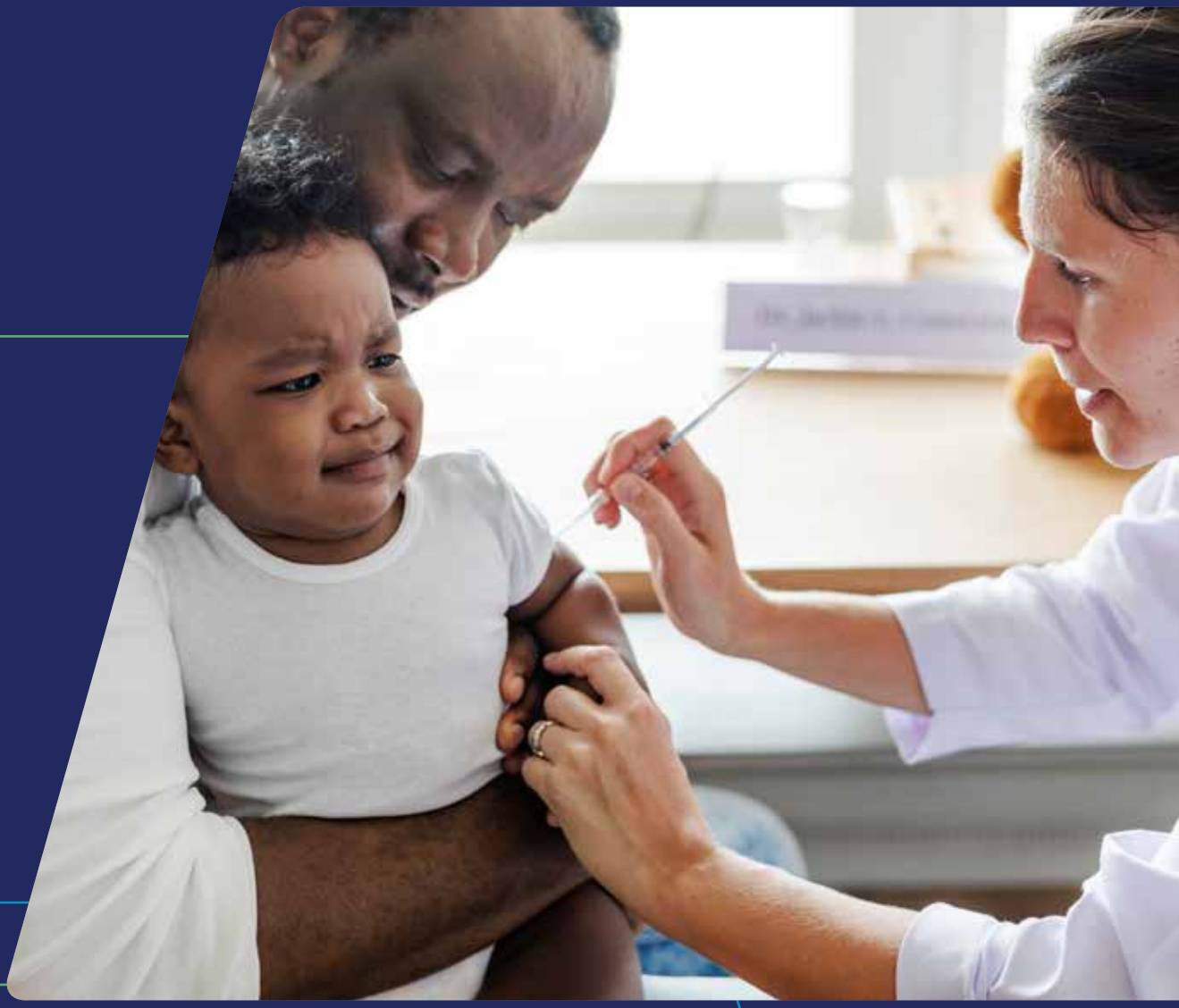
Most parents decided to seek professional medical care when their children's symptoms multiplied or intensified. Parents decided to take their child to a doctor:

54%
When **breathing difficulty** worsened

49%
When the number of **symptoms increased**

39%
When their child developed a **high fever**

26%
When their child **stopped eating, drinking** or **urinating**



The Future of RSV Prevention & Treatment

Providers' Engagement with Patients and Parents

Parents and health care providers were aligned on strategies for fighting RSV now and in the future.

96%

of parents said they **trust their pediatrician** to consider their input while making treatment decisions for their child.

96%

of health care providers agree that they are **responsible for educating parents about RSV,** and 95% of parents agree RSV education should be a routine part of pediatric care.

Health care providers unanimously agree that they have a duty to **stay informed about RSV treatments (100%)** and about RSV's spread in their community (99%).

Policy Recommendations

Health care providers and parents overwhelmingly support greater awareness and improved options to prevent and treat RSV.

97%

of providers said **immunizations and vaccine-like interventions** could help minimize the burden of RSV.

92%

agreed that, if an immunization were available, it should be **added to the Vaccines for Children program's list** of pediatric vaccines.

92%

agreed that **policy should ensure all babies and children get access** to future immunizations or preventive interventions for RSV.

Expert Survey Analysis

Suzanne Staebler
DNP, APRN, NNP-BC, FAANP, FAAN

THE METHODOLOGY

Utilizing "YouGov," a global public opinion and data company, the sample for the study was recruited from a pre-recruited selection of parents who had opted in to YouGov's platform and panel of U.S. physicians. All responses were collected through YouGov's survey platform. The platform utilized an opt-in panel, and sample participants had given prior consent to be contacted for surveys. Respondents to the survey were invited to the study by e-mail invitation. Providers were previously pre-profiled, and their specialty was confirmed and their treatment of babies and children with RSV. Parents were screened in a similar manner, looking for those who had had at least one child with RSV illness.

After completing the study, qualified respondents were compensated with an honorarium.

DISCUSSION AND IMPLICATIONS

While this survey was conducted in conjunction with a market research firm using a convenience sampling methodology, the data further validates the several areas of concern related to RSV disease burden and impact on families and the health care system. The impact of social determinants of health (SDOH) on the mother/baby dyad are well documented. The impact of low socioeconomic status, low maternal education, poverty, food insecurity, obesity, housing and transportation issues are well documented.

This sample of parents had significant emotional, social, and financial impact from their child(ren) having RSV. Yet, based on the limited demographic data collected, one could argue that most of them do not suffer from multiple SDOH. RSV disease burden on parents and families can be anticipated to be more profound for parents that have to navigate/overcome the presence of multiple SDOH.

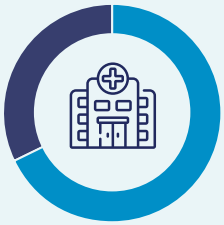
The severity of RSV disease reported in this survey was an unexpected finding. While specific birth gestation and chronological age data was not collected, parents did report hospitalizations of 7 or more days (20%) and of those children (all ages) who were hospitalized, 49% required ICU care and almost all in the ICU required mechanical ventilation (40% of those in the ICU).

Parents and the public need more evidenced-based information about RSV. The health care and public health communities must rally to disseminate information related to RSV prevention and early diagnosis so that the public knows just as much about RSV as they do influenza. But this responsibility cannot be solely on neonatal and pediatric providers. As new preventive immunizations are trialed and receive FDA approval, obstetrical and women's health providers will play a key role, as will public health nurses and local health departments across the country. While this survey was focused on the impact of RSV disease burden in children and their families, it is important to note that RSV also significantly impacts the geriatric population and is a significant contributor to respiratory morbidity and mortality in older adults.

Survey Details

PARENTS SURVEY

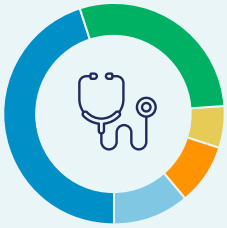
340 parents of at least one child with RSV



67% had at least one child hospitalized for RSV

PROVIDERS SURVEY

175 total providers interviewed



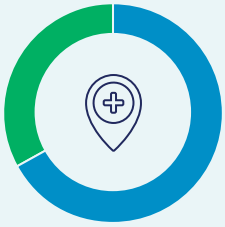
29% Pediatricians

45% Pediatric NP or PA

11% Neonatologist

9% Neonatal NP or PA

6% Pediatric respirologist



67% worked in a hospital

33% worked in an outpatient facility

References

1. https://www.lung.org/blog/about-rsv-and-infants "RSV and Infants: a Respiratory Disease That Can Be Deadly." American Lung Association. October 20, 2021.
2. https://www.cdc.gov/rsv/research/us-surveillance.html Ibid. ("RSV Trends and Surveillance." Centers for Disease Control and Prevention.)
3. https://www.contemporarypediatrics.com/view/there-link-between-rsv-and-asthma-development "Is there a link between RSV and asthma development?" Rachel Zimlich, RN, BSN. *Contemporary Pediatrics,* September 3, 2019.

AfPA | Alliance for Patient Access

The Alliance for Patient Access is a national network of policy-minded health care providers advocating for patient-centered care.

AllianceforPatientAccess.org

NCfIH National Coalition for Infant Health

Protecting Access for Premature Infants through Age Two

The National Coalition for Infant Health educates and advocates on behalf of infants from birth to age two.

InfantHealth.org

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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.

The Signs & Symptoms of RSV

RESPIRATORY SYNCYTIAL VIRUS

Know the Signs & Symptoms of RSV

- Cough
- Runny Nose
- Struggling to Breathe *(breastbone sinks inward when breathing)*
- Difficulty Eating
- Lethargy
- Wheezing

RESPIRATORY SYNCYTIAL VIRUS
is a highly contagious seasonal virus that can lead to hospitalization for some babies and young children.

Know the Signs.

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

LEARN MORE

Peer Reviewed

Gravens By Design: Selected Abstracts from the 35th Annual Gravens Conference on the Environment of Care for High Risk Newborns: Resiliency and Change in the NICU

Robert White, MD, Joy Brown, PhD, Vincent Smith, MD, Mitchell Goldstein, MD, MBA, CML

Selected abstracts from the the 34th Annual Gravens Conference are presented below:

Poster Abstracts Table of Contents:

Gravens2022-19	Maternal self-report of the impact of COVID-19 restrictions on their presence at bedside in a Level IV NICU
Gravens2022-20	Nurses' implementation of skin-to-skin contact in the NICU is related to their perceptions of family-centered care
Gravens2022-21	Health Equity Beyond the NICU: Perspectives from Family, Staff, and National Experts on Improving Accessibility and Experience in NICU Follow-Up Clinic
Gravens2022-22	Multidisciplinary Approach to the Creation of Developmental Neuroprotective Care Guidelines in a Level IV NICU
Gravens2022-23	Mothers' of Preterm Infants Subjective Experiences of a Newborn Behavioral Observations (NBO) Parenting Support Intervention
Gravens2022-24	Adaptation and Integration of the Family Centered Care team in NICU decision making processes during a pandemic and transformational changes in the NICU.
Gravens2022-25	Nutrition Care Team Experience of Novel Human Milk Fortifier in US Neonatal Intensive Care Units
Gravens2022-26	COVID-19 Pandemic Experiences and Maternal Stress in Neonatal Intensive Care Units
Gravens2022-27	A Music-Based Intervention to Reduce Stress in the Hospitalized Preterm Infant
Gravens2022-28	"My Brigham Baby" App: Using Technology to Advance Parent Engagement and Promote Resilience in the Neonatal Intensive Care Unit
Gravens2022-29	"There's No Place Like Home" -- Improving NICU Discharge Education and Preparation
Gravens2022-30	Identifying Barriers to Quality Mother-Infant Interactions in the NICU through Naturalistic Systematic Observations
Gravens2022-31	You've Got Milk: A NICU Lactation Journey
Gravens2022-32	Quality Improvement Project to Achieve Early Full Enteral Feeds in Preterm Infants at a Level IV Neonatal Intensive Care Unit
Gravens2022-33	Skin Integrity: Reducing Diaper Dermatitis in the NICU
Gravens2022-34	Thermoregulation: A Developmentally Focused, Infant-Driven Transition from Isolette to Open Crib
Gravens2022-35	Incubator-based noise control system: quantifying size of attenuation zone
Gravens2022-36	Characteristics and Outcomes of Neonatal Opioid Withdrawal Syndrome in Preterm Infants: A Retrospective Cohort Study in the Current Era
Gravens2022-37	Empowering Parents, Expediting Discharge, and Promoting Long-Term Feeding Success with Cue-Based Feeding and Telehealth Home NG Follow-Up Clinic
Gravens2022-38	An Educational Approach to Increase

	the Use of Kangaroo Care in the Neonatal Intensive Care Unit
Gravens2022-39	Understanding the Couplet Care Environment and its effect on bonding between the mother and infant dyad
Gravens2022-40	Organizational Health Literacy: Information and Environmental Assessments of a NICU Follow-Up Clinic

Gravens2022-1

Abstract Title: Are We Listening: Addressing Health and Racial Equity in the NICU

Author: Ms. Jenne Johns, MPH

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Background and Purpose: Addressing racial equity and implicit bias is now a top national priority. The United States has a long-standing history of health disparities, many of which are expensive, avoidable and preventable. African American women and babies have experienced these health disparities at alarming rates. African American families are also disproportionately impacted by higher rates of infant and maternal morbidity, mortality and premature birth rates. According to the 2019 March of Dimes Report Card, the United States premature birth rate is 10%, and this rate increased four years consecutively. In addition, the preterm birth rate in African American women is reported 49% higher than all other women. Research studies also suggest that African American women and babies in healthcare settings (including the Neonatal Intensive Care Unit) experience higher rates of implicit bias from the clinical care team if they are not culturally congruent. Closing these health and racial gaps in healthcare and in the NICU requires implicit bias training as a first step to transform organizational culture and improve quality of care delivered to African American babies. The purpose of this presentation is to introduce challenges and solutions for addressing training gaps in perinatal and neonatal care.

Materials and Methodology: In 2020, a nationwide virtual survey was launched to explore current health and racial equity training trends in perinatal and neonatal healthcare institutions. The survey remained open for a two-week period, and engaged healthcare professionals, and neonatal family advocates with professional and personal experiences with health disparities. Survey participants voluntarily completed the survey without compensation. Based on the survey responses, a virtual health and racial equity training academy launched November of 2020 for perinatal and neonatal healthcare professionals and offered free continuing education credits.

Results: The virtual health and racial equity training academy offered four training workshops to healthcare professionals nationwide. Nearly 800 professionals attended four one-hour training sessions, and less than half requested the free continuing education credits. Nearly 50% of participants were nurses, over 65% reported experiences or witnessing racial inequities in their healthcare settings, and 65% of participants reported taking action on health equity based on what they learned during the training program. 100% of participants requested opportunities to continue learning more about health and racial inequalities in perinatal and neonatal healthcare.

Conclusion: Given the nations national priority and attention on the black maternal health crisis, and the alarmingly growing rates of prematurity among African American women, the imperative for professional training is now. Action oriented training solutions offer health care professionals opportunities to decrease rates of racial disparities in clinical outcomes, improve patient satisfaction and increase trust among patients and providers. Adopting lessons learned from health care professionals with solutions to addressing systemic and systematic racial injustices, paired with listening to NICU parents are the key steps to moving the needle on improving the delivery of equitable care for all families.

Learning Objectives:

At the conclusion of this participants will (learning objectives include:)

1. Increase awareness of current racial and ethnic disparities data trends in premature birth rates.
2. Explore current health and racial equity training solutions for perinatal and neonatal healthcare professionals.
3. Address the preemie parent lens on ways that healthcare professionals can deliver culturally competent, family centered, and equitable care.

Gravens2022-2

Abstract Title: Mothers' Quality of Sleep during Their Infants' NICU Hospitalization : Influencing factors and associated characteristics

Authors: Valérie Lebel, Nancy Feeley, Stephanie Robins, Robyn Stremler

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Background and Purpose: Mothers commonly experience sleep disturbances and sleep deprivation when their newborn infant is hospitalized in a NICU (Haddad et al., 2019). Sleep disturbances can negatively affect their quality of life (more negative perception of parent-infant relationship; lower attachment scores; fatigue; lower perception of own physical and psychological well-being). Several factors may influence the sleep of mothers with an infant in the NICU. However, few studies have examined these factors. The aim of the present study is to determine if mothers' perceptions of noise and light, their NICU-related stress, symptoms of postpartum depression, presence on the unit, other children at home, and perception of family-centered care were associated with mothers' sleep quality.

Materials and Methodology: This study is a secondary analysis of data from a quasi-experimental pre-post study (Feeley et

al., 2020). Mothers were invited to participate if they could read French or English, lived within an hour of the hospital during hospitalization, and their infant was hospitalized in the NICU for two weeks or more and considered stable by the medical team at the time of recruitment. Recruitment took place in a level 3 NICU in Montreal, Quebec, Canada. Parents could be present at their infants' bedside at all times but could not sleep at the bedside, as space was limited. One room was available for parents to sleep near the unit and had to be reserved by parents who wished to stay overnight. Some parents were transferred to a single-family room with their infant (for step down care) where a recliner chair was available to sleep overnight.

Once mothers provided written informed consent, they completed an online or paper questionnaire. The sociodemographic questionnaire was completed at enrollment and included questions about mothers' characteristics such as age, level of education and number of children. At enrollment, mothers also self-reported their presence in the NICU in hours per day for the previous 7-day period and indicated whether they were expressing breastmilk. In addition, participants completed the General Sleep Disturbance Scale (GSDS), the Parental Stress Scale: Neonatal Intensive Care Unit questionnaire (PSS:NICU), the Edinburgh Postnatal Depression Scale (EPDS), the noise and light (NL) questionnaire and the Family-Centered Care Questionnaire (FCCQ) at enrollment.

Sociodemographic data were analyzed with descriptive statistics. Pearson correlations were performed to identify associations between variables (GSDS, noise and light subscales of the NL questionnaire, PSS: NICU, EPDS, FCCQ, presence in the unit, other children at home, breast milk expression, infant gestational age and length of stay). Subsequently, to explain mothers' quality of sleep, a binary logistic regression model including the following independent variables was conducted: mothers' perception of noise and light; NICU- related stress; symptoms of postpartum depression; presence on the unit (hours per week); having other children; and family-centered care.

Results: A total of 132 mothers were included. Participants had a mean age of 32 years, and for most (59.8%), the infant in the NICU was their first child. Infants' mean gestational age was 29 weeks. A large proportion of mothers had a junior college or university education (74.2%) and a partner (91.7%). The family income for 59.1% of participants was between $25,000 and $104,999. Most participants were Canadian citizens (83.3%) and the mean hospital length of stay for the infants of participating mothers was 58.21 days.

There were significant positive correlations between sleep disturbances and levels of stress, depressive symptoms, and breast milk expression, suggesting that mothers with greater sleep disturbances experience more NICU stress and more depressive symptoms. Mothers expressing their breast milk also had greater sleep disturbances than those not expressing. In addition, a significant negative correlation was detected between sleep disturbances and family-centered care, suggesting that mothers who reported higher family-centered care experienced fewer sleep disturbances. In addition, the odds that a mother has clinically significant sleep disturbance was 3.12 (95% CI 1.08– 9.00, p = .04) times higher for mothers with other children at home compared to mothers without. Moreover, as mothers spend more time in the NICU, the likelihood of clinically significant sleep disturbances increased (OR 1.36, 95% CI 1.02 −1.81, p = .04). Lastly, as depressive symptoms increased, the likelihood of clinically significant sleep disturbances increased (OR 1.18, 95% CI 1.07– 1.32, p = .00).

Conclusion: In conclusion, our results allow further understanding of the factors that may influence the quality of sleep of mothers whose infant is hospitalized in the NICU. In addition, these results allow the identification of mothers having a higher possibility for sleep disturbance, which enables the implementation of targeted interventions to promote adequate sleep.

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Learning Objectives:

1. Recognize the factors influencing mothers' quality of sleep during their infants' hospitalization in a NICU
2. Understand the factors influencing mothers' quality of sleep during their infants' hospitalization in a NICU.

Gravens2022-3

Abstract Title: The value of understanding NICU nurse perspectives on voice use and auditory development in very preterm infants

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Background and Purpose: Exposure to the voice and language during the critical period of auditory development associated with the third trimester is thought to be an essential building block for language. Differences in the auditory experience associated with early life in the NICU may increase the risk of language delays for premature infants. NICU nurses are fundamental in the care premature infants; how they use their voices and what they understand about early auditory development may be important in

understanding auditory experience in the NICU. To investigate nurses' beliefs about voice use and auditory development, as well as their voice use behaviors in the NICU, we conducted a survey of NICU nurses to examine the following research questions: (1) How do nurses use their voice when interacting with premature infants? (2) Do infant characteristics (age, medical stability, behavior state) influence the voice behaviors of NICU nurses? (3) What do NICU nurses perceive to be the auditory needs of premature infants? (4) Do NICU nurse characteristics (age and years of experience) influence their beliefs or voice behaviors?

Materials and Methodology: Our target population was nurses currently working in the NICU in the United States (U.S.). Nurses who met the following criteria were eligible to participate in this survey study: (1) currently employed full-time or part-time in a neonatal intensive care unit in the U.S.; and (2) hold an active license as a registered nurse (RN).

The questionnaire was organized into the following topic areas: (1) demographics and professional background; (2) characteristics of the NICU; (3) voice use in the NICU; (4) beliefs about auditory development; and (5) experiences with music and exposure to music therapy. Prior to its use in the current study, five NICU nurses tested the questionnaire for clarity, ease of use, and estimated completion time (10–15 min) using the online delivery platform. The development process resulted in a 55-item online questionnaire hosted by an online survey platform (Qualtrics©, Provo, UT, U.S.). The questionnaire included ordinal, nominal, and open-ended responses. Participants were able to skip questions and some questions allowed multiple responses.

A convenience sample of neonatal nurses was collected through the use of social media, personal networks of the research team, and snowballing as strategies to survey potential participants using the opt-in online questionnaire. The questionnaire was distributed two times. The first questionnaire was distributed to nurses in the personal network of the researchers through email and Facebook posts. The online link could be shared, and participants were encouraged to send it to others in their own personal network. The first distribution lasted two weeks with a reminder email and Facebook post sent at the beginning of the second week. A preliminary review of the results from the first distribution led the research team to make minor revisions to the questionnaire to improve clarity before additional participants were recruited. Specifically, two questions were changed from a sliding scale to a Likert response option for more consistency across responses. Two additional questions were added to the revised questionnaire to understand the role of parents related to infant auditory needs and to understand nurses' voice interactions with infants compared to adults. The revised questionnaire was then distributed to three Facebook groups designed specifically for NICU nurses: (1) Neonatal ICU Nurses Rock, (2) NICU Professionals, and (3) NICU Nurses. The survey link was posted on each group page. The survey remained open for two weeks and reminder messages were posted to each Facebook page at the start of the second week.

There was a combined total of 82 responses collected between the first and second distribution of the survey. Seven responses were excluded due to the participants working outside the U.S. The remaining 75 responses were included in analyses.

Results: A summary of our results include: Nurses reported using their voice more as the age of infants approached term gestation and speaking to infants was the most common type of voice use compared to singing, whispering or humming. Both infant (stability) and nurse (age and years of experience) factors influenced reported voice use decisions in the NICU. Voice sounds rated by respondents as having the most positive impact on auditory development were live parent voice, recorded parent voice, and live singing. Regardless of unit type, nurses endorsed the belief that premature infants are exposed to a sufficient amount of voice sounds in the NICU to meet early auditory needs of premature infants but did believe that premature infants were exposed to sufficient voice sounds.

Nurses indicated that they would be more likely to advocate for auditory intervention for infants who are moderately premature or term and are more medically stable.

The full data set is complete and will be included in the final presentation.

Conclusion: The results of this study provide an important preliminary understanding of what NICU nurses currently believe about premature infant auditory development and how they report using their voices while in the NICU. There may be specific ways that the voice can be used to maximize exposure to speech sounds that are salient in the intrauterine environment yet absent from the extrauterine environment of the NICU. The reported voice behaviors of NICU nurses suggest the need for further investigation of the relationship between infant responses and different auditory experiences at varying gestational ages and levels of medical stability. Findings indicate a gap in knowledge regarding the importance of early exposure to voice sounds. This study is a preliminary exploration into the need of a targeted auditory intervention from the perspective of NICU nurses and provides an emerging understanding of how nurses may benefit from additional education and training on a targeted intervention that supplements auditory experiences for language development.

Learning Objectives:

1. Participants will identify trends in NICU nurse voice use in the NICU
2. Participants will identify the importance of understanding the perspective of key stakeholders when determining possible interventions for complicated healthcare needs.
3. Participants will discuss findings of this survey in relationship to their own observations and experiences.

Gravens2022-4

Abstract Title: Implementation of A Neurodevelopmental Care Bundle to Promote Optimal Brain Development in the Premature Infant

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Background and Purpose: When an infant is born prematurely, the external environment, routine or emergent nursing care actions performed on the infant can be detrimental. Neonatal nurses are keenly aware the premature infant is at risk for developing behavioral, cognitive, and physical impairments which can be short-term or last a lifetime. Purpose: The purpose of a neuroprotective

care bundle is two-fold: First, for nurses, the bundle optimizes the health and well-being of the infant by incorporating seven core measures: healing environment, partnering with families, positioning, and handling, safeguarding sleep, minimizing stress and pain, protecting skin, and optimizing nutrition. Second, for families, therapeutic touch, and skin-to-skin contact cultivates positive neurodevelopmental outcomes, nurturing and health for the infant as well as enhances the bonding experience for the family. Comprehensive, evidence-based research was conducted looking at the role of developmental care and prematurity and how it can correlate to a healthy environment for the premature infant. Result of that research indicates that decreasing negative effects of extrauterine life, decreasing touch times, and implementing a Neuroprotective care bundle in the neonatal intensive care unit can be modified to simulate an intrauterine environment, thereby promoting optimal brain development and outcomes for that infant.

Materials and Methodology: A quantitative research study was conducted in a level 4 neonatal intensive care unit with an average admission rate between 350-400 infants per year, with approximately 120 of those infants are born prematurely. Research was conducted over a twelve-week period. Eighteen premature infants 23-32 weeks gestation were tracked for the first 7 days of life.

A Pareto chart was developed. Information on the chart included: birthweight, and gestational age. The chart was divided into 4-hour increments for a 24-hour (1day total). A list of variables-disturbances to the infant included such interventions as opening the top of the isolette for CXR, or other medical test, opening the port holes to the isolette for attaining vital signs including blood pressure, diaper change, repositioning, suctioning, heel stick for blood, parental interaction with infant, answering an apnea, bradycardia, or desaturation alarm, consoling a crying infant, and assessment by medical team. The goal of the project was for the nurse to check off each intervention during an identified time slot. Data was collected for 7 days.

At the end of twelve weeks, each variable in the time interval and tic mark for that time was tabulated. Then all interventions were added together for each day. To find out the average number of times an infant was disturbed, the total number of disturbances per day divided by 7 for the total study period was identified. This information indicated the number of times in a day that an infant was disturbed. Further calculation was done to figure out the number of times per day the infant was disturbed by dividing total number of interventions per day by 24 (hours in a day).

Results: Main outcome results indicated an infant was disturbed between 89 to 242 times during the first week of like. Further breakdown indicated that infants were disturbed 3.7 to 10.1 times per hour. Barriers recognized when research study complete included: staff unaware of study so did not complete project, despite education and communication to all staff members. Multiple shifts did not have documentation complete. Documentation of tic mark for variable but no tic mark for opening port holes (assumption made here). No report of position change. No documentation noted on one patient for one shift. One patient did not have documentation for 2.5 days. Not all activities/interventions were captured. Too busy/ high acuity/ did not understand project request. Multiple pts/activities due at the same time. Totally dependent on RN to document data. Some variables were documented but no documentation for opening the port holes or popping the top of isolette that needed to happen first before taking care of the infant (assumption made here when looking at the intervention completed). Despite interventions being missed in the total tabulation of disturbances to the infant, the study was an eye-opening experience for the nurse to see the total number of times an infant is disturbed per day and per hour. The number of disturbances to the premature infant is detrimental to their health and something that is not often thought about when caring for the infant. Based on the limited results of this study, the intensive care unit in which this study was conducted is currently looking at interventions that promote the developing behavioral, cognitive, and physical needs of the premature infant by instituting specific touch times with infant that correlate with the infant's wake cycle, implementation of a neurodevelopmental care bundle and promoting a family centered approach to care. To assimilate the intrauterine environment a neurodevelopmental care bundle ought to be utilized.

Conclusion: A family- care, neuroprotective and d velopmentally supportive care approach, in conjunction with standard of care practices, promote brain development and a healthy environment. The implementation of a neurodevelopmental care bundle provides an opportunity to promote optimal brain development as the infant grows in the intensive care, thereby, fostering a positive experience for the family, decreasing length of stay, decreasing hospital cost, and improving medical outcomes.

Learning Objectives:

At the end of this presentation the learner will be able to:

1. Identify the how the implementation of a neurodevelopmental care bundle promotes the developing behavioral, cognitive, and physical aspects of the premature infant.
2. Identify external environmental factors that are detrimental to the premature infant and how the intrauterine environment can be assimilated in the external environment.
3. Identify the positive outcomes of promoting a neurodevelopmental care bundle.

Gravens2022-5

Abstract Title: Transforming the Culture of Care: Developmental Care Rounds in the Neonatal Intensive Care Unit

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Background and Purpose: The developmental care council in our unit observed the need for continuing education to maintain consistency and best practices in developmental care. Previous educational efforts around cycled lighting, appropriate positioning and use of positioning aids, kangaroo care, and intubated mobility were followed by a period of desired and consistent practice. However, the use, consistency, and appropriate application of these efforts decreased over time. The purpose of developmental care rounds (DCR) was to promote the consistency and imple-

mentation of developmental care practices and to contribute to a unit culture where developmental care is included in every infant and family interaction.

Materials and Methodology: DCR are conducted weekly with the patients' primary rehab therapist, a nurse who is part of the developmental care council, the bedside nurse, and the patients' family, if available. The DCR team meets at the patient's bed space for an average of 15 minutes. There are two nurses from the developmental care council, and each sees an average of 5 patients a week for a total time of 3 hours, during which time they complete paperwork, speak with families, participate in DCR, and educate staff. If parents are not present at the bedside for rounds, the nurse calls them to discuss developmental recommendations and answer any questions they may have.

Staff availability prevents the feasibility of including every patient in DCR, so the most at-risk patients are selected. The criteria for DCR includes infants admitted to the unit less than 28 weeks PMA as well as selected infants referred to the team because of their challenging physiological or anatomical needs.

The framework for DCR is based on Mary Coughlin's five core measures of developmental care: family-centered care, healing environment, developmental activities of daily living, management of pain and stress, and protecting sleep. A form based on these tenets highlights each patient's needs and is reviewed and updated weekly during DCR. The form is placed at the patient's bed space as well as in their EMR.

The Infant Positioning Assessment Tool (IPAT) is used to evaluate the patient's position each week until 38 weeks PMA. After 38 weeks PMA, depending on patient stability, head shape measurements are taken with a caliper to guide positioning recommendations as well as screen for the development of cranial asymmetry using the plagiocephaly severity scale.

In addition to IPAT scores and head shape measurements, parental and staff surveys are also conducted to evaluate satisfaction and perceived value of weekly developmental care rounds. From May 2019 to November 2021 a total of 82 patients were seen for 794 rounds

Results: DCR has helped influence unit culture to ensure that developmental care is a forefront of practice. Staff and parents report high levels of satisfaction with the program when surveyed. Parents expressed feeling up to date on their child's development and reported an improvement with their engagement following DCR. Staff report a better understanding of how to support their patients' development and appropriate use of positioning aids. They appreciated the interdisciplinary collaboration that supports patients' development by providing input and advice to staff. When asked what staff disliked about DCR the most frequent complaint was that not every patient was included. The second most frequently reported complaint was that there are not DCR on night shift. The IPAT was a useful and educational tool for staff, but IPAT scores continued to be variable throughout DCR due to patient acuity, staff inconsistency, and appropriate use and availability of positioning aids. Despite the variable, when staff appropriately used positioning aids patients were found to have "ideal" and "acceptable" IPAT scores. This finding presented a great opportunity to educate staff on positioning aid use and best practices for positioning.

Head shape measuring was also a useful tool for an objective shape assessment. While visually some patients appeared to have asymmetries when measured the results were not as drastically abnormal as predicted. Conversely, some patients appeared to be symmetric but the caliper measurements contradicted this. DCR was a great way to raise awareness of head shape, and positioning plans were created to address asymmetries as well as work to prevent them. Because of early intervention many patients went from abnormal head shape measurements to normal in as short as one week.

Conclusions: DCR is a staff-led initiative that was implemented to improve the consistency of developmental care practices in the unit. It has been successful in raising awareness and providing education for both staff and families. For staff it has been a helpful reminder to address the tenets of developmental care when interacting with patients, which helps embed it into their daily routine. For families we found that the most important things that happened as a result of DCR were personal and deeply impactful to each infant and their caregivers:

- struggling parents were connected with support

- parents looked forward to DCR and actively sought out updates from the team

- patients were fitted for cranial remolding helmets prior to discharge to reduce a delay in care

- for some families, the DCR team was a familiar and trusted face during lengthy hospital stays

- a mom held her baby for the first time after encouragement from the DCR team

The more patients and families have these experiences as a result of DCR the more developmental care transforms the culture of care in the unit.

Learning Objectives:

1. Discuss the benefits of a DCR program
2. Address the challenges of maintaining a DCR program

Gravens2022-6

Abstract Title: The STEP Program-A Qualitative Study of Perception & Experience with Supportive Therapeutic Excursion Program

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Background and Purpose: The birth of a child is a sentinel moment for a family. As the child is born, parents are born with new roles assumed. Early days thereafter are ones of discovery, with the parents learning about their newborn and the newborn discovering new sounds, sights, touches, and experiences. In these moments, attachment is secured and parents quickly become ex-

perts in their child(1). With extreme preterm birth, however, this essential period of discovery is interrupted. While parents are welcomed as partners in the NICU, parents describe feelings of loss, grief, and anxiety(2). This aberrant parenting experience has been described as traumatizing and role altering(2). As the infant approaches discharge, parents assume a greater degree of the care, practicing with experienced team members available to support emerging skills. The limitation with this approach is that there are never moments of time truly alone with their child, those windows of time for a parent to get to know their child and become the experts(1). There is always an 'expert' outside the door. This phenomenon contributes to the seismic nature of discharge, when that supportive presence is withdrawn leaving parents with fledging skills but no certainty of capacity. The Supportive Therapeutic Excursion Program (STEP), was developed for parents to take their baby for walks in a stroller.

The program allows parents to have independent time to practice parenting and to foster parental capacity, with an extending distance of support, starting with walks around the NICU and advancing to walks on the hospital property. Anecdotally, parents described these walks as transformative, some becoming tearful as they stepped into the sunshine with their baby for the first time. As there is no reported program of this nature, the purpose of this qualitative study was to explore parental and staff perceptions. We aimed to learn about barriers, facilitators and the overall experience. Determining the impact is critical as this may identify an inexpensive but safe and needed intervention to better facilitate transition to home.

Materials and Methodology: This was an observational qualitative interview study (REB approved) with ten parents and ten NICU staff members to examine the experiences around the STEP program, 2016-2021.

Protocol: STEP was initiated in 2016 with parents after significant barriers addressed by input from Infection Prevention and Control, Risk Management, and Legal (these will be articulated in more detail).

Eligibility for STEP include: no longer require invasive ventilation, greater than 35 weeks corrected gestational age, no longer have clinically significant apneic or bradycardia events, covered stroller with a flat pram.

Sanitizer and portable cardiac/respiratory monitor are sent with the parent. For those infants on supplemental oxygen, portable oxygen provided. Tours initiated in NICU, advanced to the hospital and outside, weather permitting.

Methods: Invitations to parents and staff through social media, clinic advertising, and emails. Interviews were audio recorded and transcribed. Thematic analysis was employed for interview data.

Results: Throughout the interviews, the following themes emerged consistently:

1. Normalcy: Both staff and parents consistently conveyed the normalcy of a walk with the parents. "I was just a regular mom walking through the halls." "A regular activity like going out for a walk was so like magical." "It was some small semblance of normalcy."

2. Autonomy: Both staff and parents identified the experience of emerging independence from the NICU associated with the walks. "Like I didn't know how to be a parent, right? It was a bit of a necessary push for me to take ownership." "I was in charge of my child." "The walks empower them…Lord knows that they need that when they go home because for most of their child's life, they have not been a huge part, as much as we try to have them involved."

3. Freedom: Parents and staff independently acknowledged the benefit of taking a break from the NICU. "It feels good that the medical professionals are putting their faith and confidence in you as a parent to be alone with your kid." "Benefits to staff are the benefits to parents…freedom to breathe."

4. Shift of control: Parents expressed gratitude to have the faith of the providers to go outside. Staff did express mixed feelings about giving up control with the walks but acknowledged the need to do so.

5. Concerns: Parents and staff conveyed concerns of disparate nature. Parental concerns were mainly around navigation of the hospital and weather not being optimal at times. Staff concerns were around equity as some parents may not be able to afford a stroller. For both, infection prevention was raised but acknowledged to be manageable. Lastly, both parents and staff acknowledged the concern around the extra time to go for a walk, with the nurses busy schedules. Both, however, reported communication and a commitment to making it work as strategies to manage this.

Conclusion: The simple act of taking a child for a walk, even in the NICU, appears to be therapeutic for parental mental health, autonomy, and capacity. There were shared concerns around infection control but the protocol developed appeared to be effective at prevention and safety. While more work for staff, it was consistently reported that strategies to divide the workload were feasible and staff articulated the observed benefits, outweighing the added work. The main obstacle is the barrier of risk management and infection control but this was minimized with a safety protocol developed. More research on this important and simple intervention is warranted.

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Learning Objectives:

1. Explore parental perception on the impact of stroller walks as well as that which they found helpful or barriers

2. Explore NICU staff perception on the impact of the stroller walks, the potential barriers and facilitators to these walks

Gravens2022-7

Abstract Title: Implementation of an Infant Massage Program in a Community Level 3 NICU

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Background and Purpose: Massage therapy is a cost-effective intervention that has a positive impact on the health of infants and their parents. Greater weight gain, better feeding tolerance, lower incidence of gastro-esophageal reflux and earlier discharge are frequently reported positive effects. Researchers found preterm infants massaged by their mothers had higher cognitive scores at 12 months' corrected age.1 Parents who performed massage in the NICU reported experiencing less stress, anxiety, and depression.2-4 It has been noted that the massager (therapist, parents and nurses) can benefit as much as the massagee.4

Materials and Methodology: Setting: Our 20-bed, community level 3 NICU is located on the Mountain View campus of the El Camino Health system in Santa Clara County, California. The hospital has approximately 4500 newborn deliveries and 400 NICU admissions per year. Our NICU provides care to infants less than 1000 g at birth, less than 28 weeks gestational age, and/or those with severe or complex illnesses. The unit is staffed by board-certified neonatologists and does not utilize advanced practice providers or pediatric trainees. Three neonatal physical therapists are on staff. Methods: The main output of this project was the development of an "Infant Massage Program." An interdisciplinary team of neonatologists, clinical nurse specialist, physical therapist, parents, and nurses developed an educational video and parent informational handout. The program focused on empowering parents' participation in their infants' care by educating caregivers about the importance of massage therapy and the techniques to perform massage. Figure 1 shows the PDSA cycles for the development of our Infant Massage Program.

The Infant Massage Program was initially created for infants less than 35 weeks' gestational age at birth and included massage performed by physical therapy (PT) and/or parents at least twice a week on medically stable infants once they were 32 weeks' corrected gestational age. PT provides a hands-on learning demonstration of infant massage to parents. We created an instructional video, in English with Spanish subtitles, for parents to review as a supplemental part of the training. The informational handout described the benefits of infant massage in both English and Spanish. The handout was ultimately incorporated into the electronic health record (EHR) education available in the hospital's patient portal, MyChart Bedside, with a link to the video on our private YouTube channel (Figure 2). With expansion of the education to MyChart Bedside, parents of all NICU infants have access to the video and can also learn the technique, practice and ask questions.

Procedure: Our massage technique is very simple due to the sensitivity of preterm infants' skin. During training, PT discusses the types of oil to use and determining the best time for massage. Parents learn to assess the infant for readiness to ensure that they are in a quiet, alert state, and well positioned in the crib/isolette. Parents are trained to monitor their baby's response to the massage. Babies might withdraw during the first few strokes, but ultimately, they should relax and settle down. Massage therapy is a slow, and even rhythm stroke from head to toe, while maintaining contact on the body. The appropriate level of pressure is described as their hand resting on the part being massaged with relaxation of the fingers to give full, even tactile input. Pressure should not be either light, like a tickle, or heavy, like pushing into the skin. During training, PT demonstrates the stroke and observes the parent's performance to provide suggestions. Each massage session is done on the back and extremities for about 10 minutes.

Results: Impact: We implemented the Infant Massage Program successfully in our community Level 3 NICU in one year. We doubled the parental viewing of the infant massage video within eight months (Figure 3). As a part of our Family Centered Care program, we do follow-up phone calls where we learned that parents continued the massage even after discharge.

Barriers: Time commitment to create and subtitle the video, disseminating information to staff and parents about the benefits of massage, difficulties tracking video viewing in MyChart Bedside portal, delay in obtaining EHR flowsheet access for PT to document massage provision on their own instead of relying on nurses.

Conclusion: Parents verbalized improved knowledge of this practice and slowly increased their comfort level with infant massage. Next steps: Begin more regular documentation of massage provision in the EHR, which will allow tracking the number of massages performed during an infant's hospital stay. Then, evaluate short-term outcomes such as weight gain, feeding tolerance, and length of stay in relation to quantity of massage received.

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Learning Objectives:

1. To increase caregivers' knowledge of infant massage, including how and when to implement these practices
2. To enhance parental bonding with their infants while in the NICU and at home

Gravens2022-8

Abstract Title: Infant Massage as a Stress Management Technique for Parents of Extremely Preterm Infants

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Background and Purpose: Research has previously indicated that parents, especially mothers, of preterm infants, experience increased stress and anxiety as a result of their child's condition and that stress/anxiety is associated with worse infant neurobehavioral outcomes.1-3 Small pilot studies have shown that teaching mothers to perform infant massage on their preterm infants decreases stress, as reported by the mother, and improves parent-infant interaction.4-8 The aim of this study was to compare mother's salivary cortisol, a biomarker for stress, immediately before and after maternally-administered massage.

Materials and Methodology: This data was collected as part of the TEMPO (Therapist Education and Massage for Parent-Infant Outcomes) Study, which was a prospective single group, non-randomized study completed in the Neonatal Critical Care Center at UNC Children's Hospital funded by the National Center for Complementary and Integrative Health (NCCIH) (3KL2TR002490-02S1). Only infants who were born extremely preterm (<28 weeks gestation) were eligible for inclusion. Infants were excluded if they had a medical condition that made massage not feasible. All infants meeting the appropriate criteria were screened for inclusion when a PT referral was received, and families were approached by the principal investigator in the study for consent. Infant massage was one of the main interventions provided in this study and is the focus of this investigation.

All TEMPO interventions were provided in addition to therapy standard care, which does not currently include infant massage. Standard therapy includes 1-2 sessions of physical therapy per week and parent education if the parent is available during sessions. While the TEMPO study primarily focused on enrolling mothers, fathers were also invited to participate in the study. In the TEMPO intervention, education sessions were planned in advance with parents, and multiple modes of instruction were used (eg. demonstration, handouts). Based on our experience in this study, infants were generally able to tolerate infant massage at 33-34 weeks postmenstrual age and approximately 1500 grams, in addition to being able to regulate their temperature outside of an incubator during the massage. Bedside nurses and therapists leading the intervention monitored vitals throughout in order to ensure that the infant remained physiologically stable and appropriate for massage. While the therapist demonstrated how to perform massage on a doll and provided verbal cues, parents followed along and massaged their infants. The massage techniques consisted of moderately firm effleurage strokes to the extremities and gentle passive muscle elongation lasting 10-20 minutes in accordance with the White-Traut ATVV protocol.9 After 2 educational sessions, parents were encouraged to complete infant massage on their own when they visited their babies and were asked to record any massage they performed on a card at the bedside.

Salivary cortisol levels were collected by research personnel via buccal swab immediately before and after the second of two massage education sessions. For parents of twins, the first salivary cortisol sample was collected before massage with the first child, and the second salivary cortisol sample was collected after massage with both infants was completed.

Of the 32 parent-infant dyads enrolled, 6 were transferred to outside hospitals and 2 infants died prior to massage education intervention. One mother declined salivary cortisol testing and one mother could not be present for massage session. Within the remaining 21 mothers and 1 father, the average change of salivary cortisol from pre to post massage administration was 18.01 ng/dl. Results of a paired t-test revealed a significant difference in salivary cortisol levels from before and after massage administration (p=0.02).

Results: The average change in salivary cortisol levels was 18.01 ng/dL, although changes ranged from an increase of 55 ng/dL to a decrease of 108 ng/dL. Samples from mothers of twins were only counted once in all analyses. The test for salivary cortisol did not distinguish levels below 50 ng/dL, so some changes may not have been detected, potentially leading to an underestimation of the true change in salivary cortisol. T-test analyses demonstrated that there was a significant decrease in salivary cortisol levels after participating in infant massage (p = 0.02). Given these preliminary findings, results from studies examining salivary cortisol changes during skin-to-skin care,10 and studies demonstrating altered cortisol levels in parents of children with chronic health needs,11 we anticipate that regular maternally-administered massage will result in reduced salivary cortisol, which will, in turn, contribute to reduced maternal anxiety and depressive symptoms.

Conclusion: Infant massage is a feasible and safe parent education intervention in the NICU with established benefits for preterm infants.4 Emerging evidence suggests that when administered by the parent, that there may be additional benefits to the parent's mental health. Significant changes in salivary cortisol, a biomarker for stress, were observed pre and post massage in a small cohort of parents administering infant massage. Additional research is needed to establish a correlation between salivary cortisol level changes and clinical symptoms of stress in parents of preterm infants.

Learning Objectives:

Upon completion of this presentation:

1. Participants will be able to discuss the potential parent psychological benefits of implementing infant massage.
2. Participants will be able to describe a protocol for implementing infant massage in a NICU and educating parents on the technique.

Gravens2022-9

Abstract Title: Family resilience in the NICU: Preliminary evidence of a rapid metasummary

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Background and Purpose: Every day, worldwide, more than 15 million infants are born preterm (WHO, 2018). In most cases, infants born before 37 completed weeks of gestation need neonatal intensive care (NICU) until their development and growth reach the anticipated level of maturity to be discharged home. This hospitalization can be highly stressful, as many as 2 out of 3 parents report symptoms of psychological distress during their time in the NICU (Greene and al., 2015). These symptoms of anxiety, depression and stress can influence parent-infant attachment and the preterm infant's neurodevelopment in the long term (Kingston and al., 2015). Some studies have found a significant relationship between family resilience and a decrease in psychological symptoms when facing an adverse situation (Kukihara et al., 2020). Family resilience can be defined as "the ability of families, as functional systems, to withstand and rebound from adversity" (Walsh, 2016). According to Walsh's Family Resilience Model, the concept can be observed through specific resilience-promoting processes, namely shared belief systems, communication, and organizational processes (Walsh, 2003). In neonatology, some qualitative studies indirectly report on these family resilience domains through the participants' discourse (Wilson and Cook, 2018). Therefore, this rapid metasummary aims to evaluate the presence family resilience in qualitative scientific literature to answer the following question: Of what nature are the family resilience domains depicted in the NICU setting?

Materials and Methodology: A rapid metasummary methodology was undertaken by our research team. A total of 5143 articles published between 2016 and 2022 were retrieved from four databases (CINAHL, PubMed, PsychInfo, PubPsych). All were imported into Covidence © for selection and extraction. To be included, articles had to be primary qualitative studies in which participants were exclusively parents of preterm infants who discussed their NICU hospitalization experience. Other types of papers, as well as quantitative or mixed-methods studies, were disregarded. Qualitative studies exploring healthcare provider viewpoints, parents' discharge experiences, at-home experiences, or bereavement experiences were also excluded. A total of 55 publications were selected for analysis. Selection and extraction were undertaken by one reviewer, whereas coding of findings will be completed by one reviewer and revised by a second reviewer. Based on Sandelowski and Barroso's suggested methodology, qualitative findings will be extracted from the retained articles. Directed coding will be completed using the family resilience domains identified in Walsh's Family Resilience model as the initial codebook. Other emerging themes will also be coded and further analyzed as needed to allow for conceptual advancement. As the coding process is finalized, intensity effect size and frequency effect size will be calculated, and results will be presented in a metasummary table.

Results: This analysis will shed new light on the most recent qualitative evidence of parents' experiences in the NICU by analyzing it through the lens of family resilience. This study is the first known to formally identify family resilience domains in NICU families. This will provide empirical evidence to guide future development of instruments and interventions to support family resilience within a family-centered care philosophy. At the clinical level, new insight on the resilience of families of preterm infants could help promote healthy coping in the NICU and reduce the negative effects of high psychological distress as reported by parents during their infant's hospitalization.

Conclusion: Family resilience can be found in qualitative studies reporting on families' experiences during their NICU stay. As it is an increasingly promising concept due to the predominance of the family-centered care philosophy in neonatal units, these findings can encourage researchers and clinicians to consider family resilience in further research and clinical inquiries.

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Learning Objectives:

1. Define the concept of family resilience
2. Understand the metasummary method as a novel strategy for analyzing qualitative studies
3. Recognize that family resilience is a central concept in neonatology

Gravens2022-10

Abstract Title: Improving communication in the NICU: a qualitative descriptive study of parent and NICU clinician perspectives

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Background and Purpose: Decision making in the Neonatal Intensive Care Unit (NICU) has oscillated between the extremes of paternalism and patient autonomy and now appears to have settled in-between, with a preference for individualized decision making1. The individualized decision-making process is based on clinicians better understanding of the specific context of families and provides them with the flexibility to individualize guidance2. Despite guidelines advocating this type of decision making, there is no literature guiding its practical application by a multi-disciplinary inter-professional team. Of the guidelines that exist for individual clinicians, the first step is eliciting families' context, hopes, fears and values3,4. However, the NICU environment is often frenetic and reactive, with limited time for this process to occur. Even when a few members of the team sit down with a family, the information learned from families in those meetings are at risk of being lost through the 'broken telephone' of handover and are often minimally documented in the chart. The purpose of this descriptive qualitative study is to explore the experience of families and NICU clinicians with information sharing around the families' context and values, and how that applies to decision making in the NICU. Understanding how this is currently happening in our NICU will inform the development of a quality improvement (QI) process aimed at improving communication between families and NICU clinicians.

Materials and Methodology: Using purposive sampling, families of varying cultural backgrounds and educational levels were recruited. We conducted semi-structured interviews with 11 parents from 8 families (3 couples chose to be interviewed together) and 13 NICU clinicians. All families had infants born at less than 27 weeks of gestation and birth weights less than 1000 grams. The NICU clinicians interviewed included social workers (n=1), nurse practitioners (n=3), nurses (n=3), respiratory therapist (n=1), and neonatologists (n=4). Most NICU clinicians had more than 15 years of experience (81%) and were predominantly Caucasian (64%). We performed a thematic analysis on the interviews. Two authors (MD+LR) read the transcripts of the first four interviews of each group and performed a preliminary analysis to develop a coding structure. This coding structure was then used by one author (MD) to code the remainder of the transcripts.

Results: Four interconnected themes were identified both in the staff and family interviews: 1) the experience of sharing information, 2) the 'broken telephone' noted between NICU clinicians, 3) a strong desire to control information and 4) the positive impact of information sharing on care provided and received.

The experience of sharing information captured when, how, with whom and why information was shared between families and staff. Families spoke about their experiences with different providers (nurses, physicians, and social workers) and the opportunities they had to share information. Staff spoke about how they engaged with families (informally at the bedside versus more formally in family meetings) and how certain enablers and barriers shaped that experience. Multiple families mentioned one of their reasons for sharing information about themselves was to forge relationships with those caring for their infants. Staff members spoke about wanting to better understand families to be better able to support them.

Both families and staff spoke about the 'broken telephone' of handover noted between care team members despite having many opportunities to share from antenatal consultation and throughout the admission. Father A spoke about the need for developing an "efficient narrative, otherwise, you're just exhausted" because of the constant turnover of staff and the lack of handover. Staff members repeatedly noted gaps in the collection and documentation of information around a family's context. Staff spoke about the inconsistency of understanding what values are most important to families especially in the context of goals of care discussions or for example not knowing a family's religious beliefs at the time of a baby's death. The third theme is the strong desire to control information. Parents express both the desire to create the narrative about their context and to have control over its evolution. Staff also described wanting to access that narrative to better understand families and to be able to contribute to it in their own way, independent of their professional role. This desire to understand the family context is heightened in medically fragile infants. Fourthly, both families and medical staff perceive strong benefit in sharing information, and no one reported any negative impacts of participating in the information sharing process. Reported benefits included building relationships and trust, improvement in care and personalization of support. Staff members spoke of the positive impacts on the inner dynamics of the medical team when the shared mental model extended from the medical condition of the neonate to include a shared mental model of family's context. One interesting difference elucidated in the interviews was that parents and staff placed different importance on certain decisions. Staff perceived important decisions as being those around goals of care, such as redirection of care decisions. Parents viewed decisions like planning the timing of extubation (parents C) or choosing their infant's first outfit once graduated to a crib (parents B) as decisions that they would like to be more involved in. This highlights opportunities for supporting parenting efficacy and building trust with families.

Conclusion: This descriptive qualitative study serves as a first step in a larger quality improvement initiative aimed at improving communication between clinicians and families. These findings provide us with a better understanding of the dynamics of information sharing around a family's context in our NICU and will help us target interventions to improve the experience for everyone involved. Improving this step will allow our NICU to engage in more family centered and individualized decision making.

Gravens2022-11

Abstract Title: Daily Graphing of %PO To Guide Feeding Management in the NICU

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Background and Purpose: Variable PO (per os, by mouth) feeding management practices in the Newborn Intensive Care Unit (NICU) can affect patient safety, contribute to delays in achieving early feeding milestones, prolong length of stay, impact family experience, and potentially contribute to long-term feeding difficulties. Graphing an infant's %PO allows clinicians to observe trends in feeding progress over time (e.g. days, weeks) versus over a single feed or shift, as well as the impact of changes in a feeding plan (e.g. slower/ faster bottle nipple, number of PO feeds per day). We aimed to describe how daily plotting of an infant's %PO, and review of this information in medical rounds, helps guide timing of objective swallow evaluation (i.e. modified barium swallow, MBS) and/or the decision to discharge home with enteral tube feeds.

Materials and Methodology: A chart review was conducted for infants admitted to a large Level III NICU in 2020-2021. We reviewed charts for infants who received MBS (approx. 100 p.a.), as well as those who went home on enteral tube feeds (approx. 15-20p.a.). We looked at the rationale documented for feeding management decisions and determined the proportion of infants in whom failure to progress with %PO was listed as a primary or secondary factor for proceeding with imaging. Results of these MBS studies were reviewed. Furthermore, we examined the proportion of infants in whom slow advancement of %PO was listed as a factor for proceeding with discharge home with enteral tube feeds.

Results: For many infants, overt clinical signs and symptoms of aspiration (e.g. SpO2 desaturation, apnea, bradycardia) are listed as the reason for proceeding with MBS. However, in approximately 25% of infants who received MBS, failure to progress with %PO was listed as the primary factor for proceeding with imaging. In >50% of these cases, the infant was found to be aspirating on MBS. In a further 15% of cases, failure to progress with %PO was listed as a secondary factor for proceeding with imaging, and affected how soon the study was performed. In >90% of infants who discharged home on enteral tube feeds, slow advancement of %PO was listed as a factor for proceeding with this pathway. This initiative enhances the interdisciplinary care model. Group results will be discussed, and individual case examples will be used to demonstrate clinical utility of this information.

Conclusion: Daily graphing of an infant's %PO helps clinicians to identify when an infant's PO feeding is not advancing as anticipated and/or is getting worse, and helps guide management plans. In some cases, failure to progress with %PO is the main indicator of an underlying swallow impairment, versus adverse respiratory events (e.g. 'spells'), that are typically relied on to guide recommendations and timing of objective swallow evaluations.

Learning Objectives:

At the end of this talk, participants will be able to:

1. List 3 potential benefits of graphing an infant's %PO to guide PO management
2. List 3 potential reasons an infant may stall in %PO intake
3. List 3 ways to measure the success of feeding practices

Gravens2022-12

Abstract Title: Utilizing An Infant Feeding Scale to Track Feeding Progress in the NICU Population

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Background and Purpose: Preterm and other high-risk infants often display difficulty establishing oral (per os, PO) feeding in the NICU. Most initially require enteral tube (per gavage, PG) feeds. Then, as they transition to PO feeds, many require the use of therapeutic compensations (e.g. special bottle nipples, positioning, strategies) to assist them to feed safely and efficiently. Some infants continue to require therapeutic compensations +/- PG feeds post-discharge from the NICU. These infants continue to require input and guidance from feeding therapy. The FOIS P is a 6 point feeding scale that allows an infant's feeding skills to be categorized across a functional continuum (1 = all PG feeds, no PO; 6 = all PO with no therapeutic compensations required). We aimed to track the corrected age when infants admitted to the NICU reach key feeding milestones, including age at start of PO feeds, full PO feeds, and PO feeds without requiring therapeutic compensations.

Materials and Methodology: We utilized the Functional Oral Intake Scale- Pediatric (FOIS-P) to track PO progress in infants during their NICU stay and across the first year at home. Within- and between- rater reliability were established. A retrospective chart review was performed for infants admitted to a large Level III NICU 2018-2021.

Results: Approximately 25% of our NICU population continue to display immature feeding skills at the time of discharge; 2% require PG feeding (FOIS 1-3); the remainder are fully PO fed, but require therapeutic compensations (FOIS 4-5). Age at attainment of age-appropriate feeding skills (i.e. not requiring therapeutic compensations – FOIS 6) is correlated with gestational age at birth and the presence of certain illnesses during the NICU stay.

Conclusion: Evidence-based reporting tools assist in monitoring of patient outcomes. Through implementation of the feeding scale, we are better able to guide staff and parent expectations regarding age at attainment of PO feeding milestones, and plan appropriate support services for infants continuing to need therapeutic compensations to feed safely.

Learning Objectives:

1. List 3 major PO feeding milestones for preterm and other

high-risk infants.

2. List 3 evidence-based therapeutic compensations used to assist preterm and other high-risk infants while establishing functional PO feeding.
3. List 3 potential benefits of using a formal PO feeding outcome tool

Gravens2022-13

Abstract Title: Improving the Patient Experience in the NICU by Enhancing Parent Education

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Background and Purpose: This session addresses the vital importance of how we communicate and educate NICU parents in a meaningful way, while making a lasting, positive impression of their NICU experience. This session will highlight specific educational tools and tips that you can incorporate into your own practice.

Materials and Methodology: Materials: -Data on the efficiency and effectiveness of NICU parent education by establishing consistency, improving quality and identifying best practice. Collected from an 18 month study developed and implemented across 81 NICUs and nearly 10,000 parents and caregivers. Findings were published in the Feb 2020 issue of Advances in Neonatal Care.

-Background and data on health literacy. Collected from the CDC: https://www.cdc.gov/healthliteracy/learn/UnderstandingLiteracy.html ; retrieved 8/19/19 -Wolf, J. (2017). A report on the Beryl Institute benchmarking study, the state of patient experience 2017: A return to purpose. Retrieved from http://www.theberylinstitute.org/?page=PXBENCHMARKING2017

Methodology: This session will provide an overview of the impact providing parent education has on the patient experience. Focus will be given to understanding different learning styles, recognizing barriers to learning, an introduction to health literacy and an explanation on designing curriculum based on what was learned. Using data from nurses and NICU families via surveys and evaluations, we will help professionals recognize strategies to improve parent education towards the broader goal of improving the patient experience.

Results: Major accomplishment of program, i.e. qualitative or quantitative data; evidence-based results; impact on staff and/or families; Both qualitative and quantitative data from the evaluation and publication will be shared, along with lessons learned, in order to present the effectiveness of parent education on patient experience.

Conclusion: Effective parent education is a large component of a positive patient experience. The strategies presented will help to ensure that staff are making the most of each teaching opportunity to support parents throughout their NICU journey and leave them feeling satisfied with the care provided to both their baby and the family unit.

Learning Objectives:

At the end of this presentation the learner will be able to:

1. Identify ways in which parent education relates to patient experience
2. Describe effective education techniques that help empower families to care for their baby
3. Identify solutions to common barriers to learning.

Gravens2022-14

Abstract Title: Body Wrap Devices and Their Effects on Skin-to-Skin Care in the Neonatal Population: A Pilot Study

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Background and Purpose: Skin-to-skin care (SSC) has been shown to improve infant cardiorespiratory stability, promote growth, reduce infections and positively impact parental mental health among others. Barriers to skin to SSC include concerns about infant safety as well as, caregiver and staff discomfort. Body wraps have been developed in an effort to overcome perceived barriers related to SSC, but limited evidence exists on their overall impact. The purpose of this safety and feasibility pilot study was to discover whether the use of a body wrap used to support SSC in the Neonatal Intensive Care Unit (NICU) would increase duration of SSC, decrease caregiver stress during SSC, and minimize adverse events. The authors hypothesized that when a body wrap was appropriately used to support SSC for preterm infants, the caregiver's level of stress would decrease and the duration of SSC would increase, and adverse events would decrease when compared to SSC without using the body wrap.

Materials and Methodology: Materials: Donated Zaky Zak body wraps were available for the intervention group.

Methods: This pilot study was conducted at a level four NICU in a tertiary-level pediatric hospital. Eligible participants included preterm infants at less than 34 weeks postmenstrual age (PMA) and who qualified for SSC per the unit's holding algorithm. The first 15 participants to meet inclusion criteria were enrolled into the standard of care (SOC) group which did not include the use of a body wrap during SSC. The remaining 14 participants were enrolled into the intervention group, performing SSC with the body wrap. Both groups received the same education on the benefits of SSC by the research team. Caregivers in the intervention group were

measured for proper fit for the body wrap by the research study team members and instructed to utilize the wrap during two SSC holds. Each infant/caregiver dyad performed two separate SSC holds, completed the Parent Stressor Scale and Parent Feedback form after each SSC hold, and completed a demographics questionnaire. Adverse events were documented by the research team with assistance from the nurse, parent, and retrospective chart review of the electronic medical record. Descriptive statistics were applied for analysis of the data.

Results: A total of 29 participants were enrolled in this pilot study. The mean gestational age (GA) at birth for enrolled participants was 29.0 weeks (std = 3.0). The mean PMA for participants at time of enrollment was 32.1 weeks (std = 2.4). Participants in the intervention group were on average younger (PMA during first SSC hold of 31.0 weeks vs. 33.1 weeks; d=-0.93), their caregivers were less experienced at performing SSC (57.2% had done 3 or fewer holds vs. 26.7% in the SOC group), and they were less likely to be on room air (28.6% vs. 66.7%; d=0.80). Despite this difference in the two cohorts, no significant differences between the two groups in terms of primary outcomes were observed. Total SSC time was not statistically significant between the two groups (p = 0.33), neither was the number of adverse events (p=0.31 for major events; p=0.38 for minor), the average parental stress (p=0.22) and confidence levels (p=0.18).

Conclusion: This was a small feasibility study to assess the impact a body wrap can have on infants and their caregivers while performing SSC in the NICU. The small sample size (n=29) was a significant limitation of this study, as it meant we were only powered to detect very large effects. The data did demonstrate that the body wrap group was more immature, on more ventilatory support and had less experience with SSC, yet did not experience any significant differences in adverse events or parental confidence. Given these findings, data from this feasibility study can be used to inform future research with larger sample sizes to evaluate the safety, efficacy, and cost-effectiveness of using body wraps during SSC for infants in the NICU.

Learning Objectives:

1. List at least two benefits of SSC for the preterm infant and/or their caregiver
2. Recall at least one perceived barrier to SSC holding with preterm infants in the NICU.
3. Accurately explain the findings from this pilot study conducted on the use of body wraps during SSC with preterm infants and the implications for future research.

Gravens2022-15

Abstract Title: Single family rooms in the NICU: parents in the lead!

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Background and Purpose: In the last decade there is increasing attention for Family Centered Care in the neonatal intensive care unit (NICU). In order to facilitate the presence of parents, more and more NICUs replace open bay units (OBUs) by single family rooms (SFRs). A similar trend is seen in the Netherlands. Multiple studies have shown the benefits of SFRs in the NICU. Neonates show less physiological stress, less pain and are less likely to develop sepsis[1]. Due to better regulation of light and sound, SFRs have a positive influence on their neurological development[2]. Furthermore, the amount of skin-to-skin contact rises significantly when parents have the opportunity to stay overnight, which has positive effects on breastfeeding, neonatal growth, neonatal development and parental stress[3]. On the other hand, the absence of parents in SFRs might negatively influence neurodevelopment and speech development in particular[4]. Several studies indicate parents are more isolated from other parents and medical staff and experience more hospital-related stress[1,5]. Therefore, Erdei et all proposes that the choice for OBU or SFR should be determined per child, parents and phase of the disease[6]. In order to be able to offer this in a NICU, both an OBU and SFRs must be available. A flexible architecture of the NICU, as suggested by Robson, can help to adapt to these shifting needs[7]. In this study, we examined the parents' views on the NICU design. What are the needs and wishes and what would the NICU look like if parents were in the lead?

Materials and Methodology: Explorative, quantitative research through online questionnaires. All parents with a child admitted to the NICU in Isala Zwolle in 2020 were invited by letter, except the parents from deceased children (278 invitations send). Currently the questionnaire was fully completed by 132 parents on which this research is based. Most important outcome measurements were: 1) number of parents who want to stay in SFRs (and if so, during the whole stay or at specific moments); 2) expectation of privacy and tranquility in an SFR (rating from 1 to 5); 3) Current and expecting levels of parental stress in SFRs compared to OBUs (rating from 1 to 5); 4) Current and expected visiting time in both and 5) the influence of SFRs on the use of the Ronald McDonald (RMD) house. Descriptive statistics were used. To compare these numeric (non-continous) and categorical outcomes, the Wilcoxon Signed Rank Test was used.

Results: Almost all parents (92%, 122/132) want to make use of SFRs at some point of hospital admission. However only 52% (68/132) want to make use of an SFR during the whole stay. Parents prefer SFRs when their child is stable (36%, 47/132) or when their child is critically ill (16%, 21/132). Only 8% (10/132) of the parents do not want to make use of SFRs at all (Figure 1). Benefits of SFRs mentioned by parents are more privacy (69%) and tranquility for themselves (63%). Objections are less contact with other parents and less visibility of their child to the care providers when they are not in the SFR themselves. Parents can relax better if they are present in the hospital using an SFR (mean SFR=3,70, mean OBU=3,54, Z=-2,180, p=0,029) but leave their child with less confidence when going home then when using an OBU (mean SFR=4,05, mean OBU=4,34, Z=-3,291, p=0,001) (Table 1). Parents expect to be 447 minutes a day longer on an SFR then on an OBU. In addition to an SFR, 15% of parents want to continue the use of the RMD house for their own tranquility and to be able to distance themselves from the hospital. In the current situation with an OBU 25% (33/132) of parents make use of the RMD house.

Conclusion: Most of the parents, but not all, favor an SFR at

some point of the hospital admission in the NICU, especially when their child is stable or critically ill. SFRs provides more privacy and tranquility for parents. The presence of parents is expected to be much longer in SFRs than in OBUs. However, parents do need opportunities for relaxation and tranquility outside the hospital. Therefore, parents think that during the NICU period a combination of OBUs and SFRs in tune with the condition of their child and the wishes and opportunities of the parents would be preferable than offering SFRs alone

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Learning Objectives:

1. SFRs have great advantages but are not in every situation superior to OBUs in the NICU.
2. Flexible NICU design is needed to provide optimal clinical and family-centered care.
3. Based on parents opinion, a hybrid model of SFRs and OBU should be offered during the NICU period to meet the needs of parents and child.

Gravens2022-16

Abstract Title: Development of a Multidisciplinary Parent Mental Health Program during NICU Hospitalization

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Background and Purpose: Up to 40-50% of parents of very preterm infants have been shown to experience elevated depressive and anxiety symptoms. While efforts have been made to assess parents' mental health and to refer them to services, an ongoing challenge is ensuring that the delivery of services and appropriate referrals take place during the infants' hospitalization.

Materials and Methodology: This is a descriptive analysis of the development and implementation of the Parent Mental Health (PMH) Program at Brigham and Women's Hospital, a 66-bed level III NICU. Composed of a multidisciplinary collaboration involving social work, psychology, psychiatry, and newborn medicine, the program was developed to provide timely and consistent mental health services for parents and caregivers during their infants' hospitalization in the NICU through services embedded in the milieu itself. Program elements include: universal screening and surveillance of parent mental health, the provision of individual and group therapy, and psychopharmacological treatment during the infants' NICU hospitalization.

Results: The NICU PMH Program was conceived in 2020 and developed throughout 2021. The hiring of a full time social worker in fall of 2021 was subsequently followed by the first phase of the program rollout which focused on screening and services for a subset of the NICU families. These included mental health screening for registered parents and caregivers of NICU infants under <32 weeks, and referrals for individual therapy and psychopharmacological treatment among those screened through the Edinburgh Postnatal Depression Scale (EPDS) with scores >10, or otherwise through their history. Individual and group interventions encompasses modalities including cognitive behavioral therapy (CBT), acceptance-based therapy (ABT), and includes skill-based development (e.g., mindfulness-based strategies) to reduce parent distress tolerance and increase emotion regulation during the NICU hospitalization. The service is intended to promote caregiver self-efficacy and readiness at discharge, during which referrals to outside mental health providers are made as needed. We expect the number of mental health screenings to gradually increase over the next several months and subsequently reach case-load capacity for the full-time therapist. Challenges to the development and implementation largely center on the multidisciplinary nature of the endeavor. These range from administrative concerns such as involving billing and documentation, determining role expectations and establishing norms for referrals and communication between the NICU team and the PMH team, in addition to the supervisors and leadership for the program.

Conclusion: The program provides relief and assurance not just to families, but to NICU providers who have long been engaged in efforts in supporting the emotional needs of distressed and grieving parents. Our efforts to develop and implement a NICU parent mental health program can serve as an example and an encouragement for other hospitals interested in providing treatment for families during the NICU hospitalization.

Learning Objectives:

1. To identify sources of stress and protective factors that contribute to parent mental health in the NICU.
2. To understand approaches to implementing parenting mental health screening and treatment within the NICU milieu.

Gravens2022-17

Abstract Title: Feasibility and Acceptability of a Motivational Interviewing Intervention to Increase Maternal Presence in a Level IV Neonatal Intensive Care Unit

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Background and Purpose: Maternal presence is critical to health and development of neonates, particularly among those in a neonatal intensive care unit (NICU). However, the literature suggests that maternal presence at bedside is highly variable. The aim of this study was to assess feasibility and acceptability of a motivational interviewing intervention (MI) to increase maternal presence in a Level IV NICU. We also evaluated study design feasibility to inform a future, larger randomized controlled trial (RCT). This study was conducted in two phases: pre-COVID-19 and during the COVID-19 pandemic. Preliminary phase 1 acceptability data demonstrated that the MI intervention and study randomization were acceptable.

Materials and Methodology: Budget and Resources: The study was supported by a grant from the Jerry M. Lewis, M.D. Mental Health Research Foundation (grant number GA-2017-013). Methodology: All patients admitted to the Level IV NICU were screened for the following inclusion criteria: 1) infant in legal custody of biological mother, 2) infant in the care of the biological mother, 3) the mother speaks English or Spanish, 4) no maternal cognitive impairment, and 5) the infant was expected to stay in the NICU for at least 2 weeks. Participants were randomly assigned to one of two study groups, the motivational interviewing (MI) group, or the treatment-as-usual (TAU) group. Each participant completed up to 6 study visits in addition to a discharge visit. During the baseline and final visits, participants were administered an assessment battery that included questionnaires on parenting stress (PSS:NICU), depressive symptoms (EPDS), bonding (MIBS), COVID-19 related concerns (in phase two of the study), and motivation to visit. All study MI visits assessed for mother's motivation to visit and MI satisfaction. Maternal presence data were collected from visitation data in the patient's EPIC flowsheets documented by bedside nurses and verified through the check-in processes for visitors when mothers entered the hospital.

Results: This study recently completed data collection. Here, we present preliminary findings (time 1 measures, feasibility data) and full data analyses (N=96) will be presented at the meeting. A total of 343 infants were identified for the study, and 123 infants were eligible for inclusion in the study. Of those who were eligible and approached (n=123), 78% (n=96) enrolled in the study. An equal number of participants were randomized into the MI group (intervention: one weekly MI session for up to six sessions) and to the TAU group (control: supportive sessions as needed), with a total of 48 participants in each study arm. We present the relevant central tendency estimate (e.g., Mean, Median) based on variable distribution and outliers. At baseline, the average gestational age of infants enrolled in the study was 33 weeks (SD=5.32) gestational age (GA). Median length of stay was 38 days (Q1=17, Q2=38, Q3=85; Range=3-328). Our study sample is representative of the larger ethnically and racially diverse NICU population we serve: 16.7% (n=16) Black, 46.9% (n=45) non-White, and 57.3% (n=55) Latinx. Indeed, 17.7% (n=17) mothers identified Spanish as their primary language. Additionally, 38.5% (n=37) of mothers in the study reported marital status as single, and 50% (n=48) reported formal education as greater than a high school education. Mothers reported a wide range of visitation barriers: 24.2% (n=22) care for patient's sibling(s); 8.8% (n=8) distance; 8.8% (n=8) transportation; and 5.5% (n=5) work or school. 23% (n=21) of mothers reported a prior mental health history. At baseline, mothers reported elevated parenting stress (M(SD)=4.4(1.16)) and elevated depressive symptoms (M(SD)=18.8(6.9)). In a subsequent measure of mother-infant bonding (n=78), mothers reported clinically significant bonding challenges (M(SD)=2.87(.19)).

Preliminary findings from Phase 1 of the study demonstrated that the MI intervention was acceptable. We assessed MI acceptability by the rate of enrollment, willingness to participate in more than one MI session, and MI satisfaction ratings. In the first phase of the study, 78% of participants approached for the study agreed to participate, and all the mothers who participated in at least one MI session reported being willing to participate in a subsequent session. Of those who completed study visit one, 91% found the intervention as supportive, 86% found it helpful in managing their problems, and 94% found it motivating to visit their infant in the hospital.

Phase 1 analysis of the group showed a significant negative correlation between number of days mothers were present at the bedside and length of NICU stay. This finding is consistent with the broader literature that suggests that parental presence tends to decrease with longer NICU days hospitalized. In our presentation, we will analyze the MI and TAU groups separately to determine whether the MI intervention mitigated NICU presence decline over time. We will also evaluate whether maternal depressive symptoms decreased for the MI intervention group compared to the TAU group. Mediators for any group differences will be worthy of investigation, as maternal depressive symptoms are associated with a wide range of negative infant outcomes.

Conclusion: The goal of this study was to assess feasibility and acceptability of a motivational interviewing intervention (MI) to increase maternal presence in a Level IV NICU. The study was supported by a grant, and data collection was recently completed. Preliminary phase 1 acceptability data demonstrated that the MI intervention and study randomization were acceptable, and full data analyses will be presented at meeting; preliminary findings are included in this abstract. We also evaluated study design feasibility to inform a future, larger randomized controlled trial (RCT).

Learning Objectives:

1. Evaluate and describe feasibility of a motivational interviewing intervention in a Level IV NICU.
2. Evaluate and describe acceptability of a motivational interviewing intervention in a Level IV NICU

Gravens2022-18

Abstract Title: Barriers to long durations of kangaroo care in neonatal units in the United States

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Background and Purpose: Over forty years of research has revealed numerous benefits of prolonged skin-to-skin contact (SSC), also known as Kangaroo Care (KC), for neonates. However, safety concerns and other barriers to KC have hindered its implementation.1–3 This study aims to assess the common barriers to long durations of KC and evaluate the use of assistive KC devices in neonatal units in the United States.

Materials and Methodology: This secondary data analysis was part of a larger, national survey of neonatal clinicians' opinions and practices of KC. The Institutional Review Board considered this study "exempt," as the survey responses were anonymous, meant to describe existing practice, and did not collect any identifiable information.

A cross-sectional descriptive study was conducted with an electronic survey distributed to neonatal clinicians across the United States. Registered nurses, physicians, respiratory therapists, occupational/physical therapists, and other neonatal care providers completed an online survey made available through online neonatal community groups and organization websites. We also posted the survey on professional organizations' social media pages; this along with encouraging the survey respondents to share the post with other eligible participants led to snowball recruitment. To be eligible, the participant must have clinically cared for newborns in the United States or had a significant role in newborn care. Inclusion criteria questions were asked in the survey to identify and exclude ineligible participants. The survey was originally developed by Author YJ in partnership with key stakeholders, including parents, ergonomists, experts in the field of neonatology, and neonatal clinicians from a variety of disciplines. The survey included questions regarding demographic information, such as age, gender, and work environment. Questions regarding Kangaroo Care policies in hospitals were also asked; these questions determined which settings Kangaroo Care is used, including in the delivery room, when transporting mother and newborn to the postpartum unit, and in the NICU. Hospital policies regarding breastfeeding and sleeping during Kangaroo Care were also evaluated using the survey. Finally, questions were asked pertaining to barriers surrounding the implementation of long durations of Kangaroo Care. The survey contained multiple choice, select all that apply, and free text response. For the multiple choice and select all that apply, frequencies and percentages were calculated for each survey question. Fisher's exact tests were used to analyze relationships between categorical variables when the number of respondents in a cell was less than five. Independent t-tests and One-way Analysis of Variance (ANOVA) were used to analyze dependent continuous variables. Descriptive and summary statistics, including frequencies, percentages, means, and standard deviations, were used to quantify the data.

Results: The majority of respondents (N=148) were nurses (n=78, 52.7%) working full-time (n=111, 75.0%) in a level II, III, or IV NICU (n=109, 79.73%). Respondents overwhelmingly reported familiarity with KC, with 58.1% (n=86) considering themselves experts in this practice. Respondents generally described KC as either "standard practice" or "consistently practiced" in several circumstances: at birth for vaginal deliveries (n=116, 78.3%), at birth for c-sections (n=76, 51.3%), in post-partum (n=100, 67.5%), and in the NICU (n=111, 75.0%). A majority reported that parents were not allowed to sleep (n=106, 71.6%), or breastfeed/pump (n=87, 60.4%) while engaging in KC. Respondents reported the greatest barriers to KC as parents' willingness (M=0.53, SD=0.5), risk of dislodging medical devices (M=0.50, SD=0.5), and the units threshold of stability for KC (M=0.45, SD=0.5) When asked about standardized use of KC assistive devices, 44.7% (n=67) stated that their hospital had no specific policy or protocol in place, while an additional 11.3% (n=17) were unsure of their hospital's policy. However, a majority of respondents said that a hospital-provided ergonomic KC device would be either very beneficial (n=89, 60.1%) or somewhat beneficial (n=38, 25.7%).
Among respondents who were familiar with at least one of the KC devices assessed in this study, a majority either agreed or strongly agreed that the device increased the safety of the infant (n=27, 84.4%). In addition, they endorsed that the use of KC devices increased the duration (n=23, 71.9%), and frequency (n=23, 71.9%). They reported increased satisfaction of mothers (n=23, 71.9%), fathers (n=20, 62.5%), and clinicians (n=21, 65.6%) who engaged in KC with a device. Furthermore, respondents stated that these devices decreased unplanned dislodging of medical equipment (n=19, 59.4%) and that they could be used to keep infants warm in skin-to-skin in the case of a warmer/incubator malfunction (n=23, 71.9%).

Conclusion: Our results are important because we found several new barriers to long durations of KC, such policies that do not allow parents to sleep or pump/breastfeed during KC. Our results highlight that, despite recommendations from the Developmental Care Standards for Infants in Intensive Care to use assistive KC devices,4,5 many NICUs in the United States do not have specific protocols for the use of devices to increase the comfort and safety of Kangaroo Care. Clinicians who did use KC devices in our study suggest a subjective increase in both the duration and frequency of KC sessions with the use of KC devices, as well as added protection against falls and dislodging of equipment. Our results suggest that the use of assistive KC devices can serve a dual purpose of increasing comfort and convenience for parents and increasing safety for infants, to better allow all infants to reap the benefits of Kangaroo Care.

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Learning Objectives:

1. Previously documented barriers to KC include parent willingness, risk of dislodging devices, infant instability, and lack of clear hospital policy.
2. Assistive KC devices may increase the practice of KC by improving parent comfort and infant safety.

Gravens2022-19

Abstract Title: Maternal self-report of the impact of COVID-19 restrictions on their presence at bedside in a Level IV NICU

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Background and Purpose: Maternal neonatal intensive care unit (NICU) presence is critical for infants' medical recovery and overall neurodevelopmental trajectory (Reynolds et al., 2013). Studies conducted in the United States suggest that caregivers' NICU presence vary significantly (Greene et al., 2015). Since March 2020, many NICUs have enacted policies that restrict caregiver presence because of COVID-19, and ease of restrictions have varied over time. This study evaluated mothers' perceptions of COVID-19 impact on their NICU presence.

Budget and Resources: The study was supported by a grant from the Jerry M. Lewis, M.D. Mental Health Research Foundation (grant number GA-2017-013).

Materials and Methodology: Data were collected as part of a larger, funded study evaluating a motivational interviewing intervention to increase maternal NICU presence. Phase two of the study began during the COVID-19 pandemic, during which time we enrolled a diverse and representative sample of 62 NICU mothers (age M(SD)=28(7.6), 46% Hispanic, 20% Spanish-speaking, 80% government subsidized insurance). From this sample, 10% of mothers reported testing COVID-19 positive during pregnancy and 8% of mothers reported testing COVID-19 positive at the time of infant's NICU admission. All patients admitted to the Level IV NICU were screened for the following inclusion criteria: 1) infant in legal custody of biological mother, 2) infant in the care of the biological mother, 3) the mother speak English or Spanish, 4) no maternal cognitive impairment, and 5) the infant was expected to stay in the NICU for at least 2 weeks. Participants were randomized into the motivational interviewing intervention (MI) group (N = 29) or a treatment-as-usual control (TAU) group (N = 33). In this phase of the study, prior to randomization, participants completed an assessment battery that included whether they tested COVID-19 positive during or after pregnancy. At the time of their infant's NICU discharge, participants completed the COVID-19 NICU Visitation Impact Scale, a 20-item self-report measure developed in English and Spanish for this study. Themes included understanding visitation restrictions and guidelines, availability and engagement at bedside, perceived distress, and socioeconomic resources. Participants reported the impact of COVID-19 visitation restrictions on a 4-point Likert-type scale (1=Not true at all, 4=Very true), with higher scores indicating greater impact. We determined maternal visitation rate using concierge electronic visitation data as well as electronic medical record flowsheets where nursing staff document visitation information.

Results: For participants who completed discharge measures (N=56), the most commonly endorsed barrier to NICU presence was having other children in the home. A subset of mothers reported that COVID-19-related stressors caused them to visit the NICU more than they may have otherwise – citing a desire to protect their baby from COVID-19 and noting that being present with their baby in the NICU made them feel less stressed about COVID-19. Conversely, the least common COVID-related barrier included being unsure about the hospital's COVID-19 policies. In summary, these findings suggest greater maternal concern around COVID-19 infection and the desire to protect their baby from infection, while issues related to understanding of COVID-19 related visitation policies and worries about breaking hospital's COVID-19 policies did not appear to influence maternal presence at bedside as much

Conclusion: To our knowledge, this is one of the first studies to develop a self-report measure to assess maternally reported COVID-19 impact on NICU presence at bedside. Preliminary findings suggest mothers may continue to benefit from additional resources during the COVID-19 pandemic, especially related to mitigating COVID-19 related stress in the context of a NICU stay.

Learning Objectives:

1. Describe COVID-19 NICU Visitation Impact Scale, a 20-item self-report measure developed in English and Spanish for this study.
2. Discuss findings related to self-reported COVID-19 impact on maternal presence in the NICU.

Gravens2022-20

Abstract Title: Nurses' implementation of skin-to-skin contact in the NICU is related to their perceptions of family-centered care

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Background and Purpose: Skin to skin contact (SSC) is a common developmental care (DC) practice in neonatal nursing care with established benefits for preterm infants and their parents. SSC is rooted in the philosophy of family-centered care (FCC)1 since it can promote parental presence and involvement at the bedside from the earliest hours of the preterm infants' life2. FCC is also documented as a DC intervention improving health outcomes of preterm infants as well as psychological well-being of the parent3,4. Driven by the philosophy of DC, nurses should provide opportunities for collaboration and involvement for parents in the NICU to encourage both FCC and SSC. As an optimal implementation of FCC and SSC may depend on the nurses' perceptions of developmental care practices, the goal of these secondary analysis was to explore the relationship between NICU nurses' perceptions of FCC as well as SSC.

Materials and Methodology: Secondary analysis was conducted from a larger comparative international study5 where 202 nurses working in level III universities affiliated neonatal units in Canada and France completed questionnaires on their perceptions about FCC and SSC. The FCC questionnaire had 20 items including 3 subscales (support, collaboration and respect) where higher scores indicated more favorable perceptions of FCC6. The SSC questionnaire contained 20 items separated in four distinct subscales (knowledge, beliefs and attitudes, education and training implementation)7. Higher scores were also indicative of favorable perception towards SSC.

Results: The nurses' FFC total score was significantly but weakly correlated with all SSC subscales scores, ranging from 0.17 to 0.30. More precisely, SSC education and training (subscale 3) and implementation of SSC (subscale 4) were correlated with nearly all FCC subscales (respect, collaboration, and support). These results may suggest that the nurses' perceptions of their care being family-centered would be higher with greater SCC training and education and implementation of SSC in the NICU.

Conclusion: Our results suggest that the FFC is associated to the implementation of SSC in the NICU. These results shed a light on the association of these practices and might highlight a theoretical and practical perspective to better understand developmental care as an integrated concept. Thus, considering these findings, it seems possible that encouraging the practice of SSC among nurses, through the adoption of practice guidelines, training and education, and adequate implementation on the unit, would lead to a better perception of FCC, which translates into positive outcomes for preterm infants and their parents.

Learning Objectives:

1. Comprehend how SCC and FCC as DC practices may be related.
2. Recognize that the adoption of SCC practice guidelines, training and education, and adequate implementation in the NICU lead to better perceptions of FCC by nurses.

Gravens2022-21

Abstract Title: Health Equity Beyond the NICU: Perspectives from Family, Staff, and National Experts on Improving Accessibility and Experience in NICU Follow-Up Clinic

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Background and Purpose: Racial and socioeconomic inequities have well-known impacts on healthcare outcomes, especially for families with preterm or medically-complex infants.1,2 These include impacts on long-term neurodevelopment, access to specialty services, and family experience.3,4,5 Such inequities persist throughout childhood and therefore have important, long-term implications for public health and health equity.3 As such, the goal of this study was to understand barriers to health equity in our own NICU follow-up clinic, and consider how other programs can do the same.

Materials and Methodology: Our study setting was an urban quaternary-care medical center with a specialized follow-up clinic for NICU graduates. Our study population included three key groups: 1. primary caregivers of patients currently enrolled or recently enrolled in our NICU follow-up program (n=6), 2. current staff members working in the clinic across various disciplines, including neonatology, psychology, nursing, social work, and physical therapy (n=9), and 3. national experts in the field of public health and healthy equity (n=4). We conducted semi-structured interviews to explore best practices, barriers, facilitators, clinic purpose, and other areas of patient experience. A grounded theory approach was used to guide thematic analysis. Coding was performed by trained research assistants with multiple reliability checks using a third coder to ensure inter-rater reliability. Themes are reported if a majority (50% of more) of the group highlighted the theme. Analyses were facilitated by Dedoose, Version 9.0.17.

Results: Strengths: Among primary caregivers, the most recurring strengths identified via thematic analysis were the continuity of care with staff members, both in the transition from NICU to follow-up as well as within follow-up clinic. Thematic analysis of staff interviews identified empathy of providers as the most common strength. National experts did not comment on clinic-specific strengths as they were not familiar with our follow-up program or hospital system. Common strengths across all groups included

the general expertise of follow-up clinic staff in treating medically and developmentally-complex infants and the opportunity for subspecialty referrals within the same hospital network.

Improvement Needs: Each group identified unique areas for clinic improvement. Among primary caregivers, thematic analysis revealed a desire for increased social-emotional support for parents and improved care coordination between specialists outside of the clinic. Thematic analysis of staff interviews identified weaknesses surrounding social work resources, and the importance of setting clear limitations regarding what follow-up clinics can and should provide. National expert interviews highlighted the importance of employing systems-level public health frameworks to ensure equitable outcomes. All groups noted a lack of clarity in how the purpose of follow-up is communicated to families, especially regarding Early Intervention.

Conclusion: Taken together, key themes for focusing systems-level improvement work include augmenting strengths, considering new communication strategies and ideas, and using health equity frameworks to guide improvement cycles. A clinic taskforce (staff, families, and other relevant experts) is reflecting together as it drives this work, which explicitly uses systems change frameworks.

Learning Objectives:

1. Identify the relationship between racial and socioeconomic inequities and health outcomes, particularly for preterm or medically-complex infants.
2. Explain common themes about strengths and weakness of infant follow-up between families, staff, and national experts.
3. Explore how these themes might be used to create interventions for reducing health inequities using an equity-informed quality improvement approach.

Gravens2022-22

Abstract Title: Multidisciplinary Approach to the Creation of Developmental Neuroprotective Care Guidelines in a Level IV NICU

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Background and Purpose:

For consideration as oral presentation

Over the years, our Level IV NICU has been relying on individual policies and guidelines developed independently to guide clinical practice in the unit. However, recently, there was an opportunity to develop and utilize a unified theoretical framework of interventions tailored specifically for a high-risk, medically complex Level IV unit. The goal of this oral presentation is to describe the development of a comprehensive and evidence-based document outlining a set of neuroprotective guidelines that will serve as the foundational and educational guide to developmental care in our unit. The professions represented by the three authors of the document include: speech-language pathologist, occupational therapist, and psychologist.

Materials and Methodology: For the purposes of creating the NICU developmental care guidelines, content was organized following the seven broad core measures outlined by Altimier & Phillips (2016). The seven core measures are as follows:

1) Healing Environment

2) Partnering with Families

3) Positioning and Handling

4) Safeguarding Sleep

5) Minimizing pain and stress

6) Protecting Skin

7) Optimizing Nutrition

This model allowed for integration of all relevant areas of developmental neuroprotective care in a medical center. It was also deemed a good model to follow for our specific NICU as it mapped nicely onto various committees and workgroups already established within our unit, several of which were subsumed under the Developmental Care Steering Committee. The endeavor was highly structured and collaborative, with many checks and balances, and elicited consultation, educational resources, and input from content experts and NICU leadership to guide the process.

Results: For the purposes of our NICU's guidelines, each core measure included: standards of care, goals, background, and evidence-based interventions specifically tailored for our Level IV unit based on up-to-date literature and research. References for each section were included at the end of section for easy review. The full, comprehensive document is 95 pages, including references. It has been reviewed by NICU content experts.

Conclusion: Moving forward, the goal is to continue refining the developmental care guidelines, educating and disseminating relevant materials and information, and developing and prioritizing unit initiatives that will support evaluation and reflection of current NICU practices in order to advance their alignment with evidence-based practices outlined in the NICU Developmental Neuroprotective Care Guidelines.

Learning Objectives:

1. Describe multidisciplinary approach and process for creating developmental care guidelines within a care team and within our unit structure and culture.
2. Describe content of the new document developed: NICU Developmental Neuroprotective Care Guidelines.
3. Discuss opportunities, challenges, and benefits of cre-

ating comprehensive developmental care guidelines for a Level IV unit; emphasis on importance of multidisciplinary collaboration.

Gravens2022-23

Abstract Title: Mothers' of Preterm Infants Subjective Experiences of a Newborn Behavioral Observations (NBO) Parenting Support Intervention

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Background and Purpose: Mothers of preterm infants have heightened risk of postpartum mental health problems compared to mothers of full-term infants. Preterm newborns present additional challenges due to their neurobehavioral and physiological immaturity and the stress of prolonged hospitalization after birth. Previous research has shown that parents of preterm infants report higher rates of anxiety and depression and lower levels of parenting confidence than parents of healthy, full-term newborns (Frello Roque et al., 2017). A Newborn Behavioral Observations (NBO)-based parenting support intervention has been shown to improve maternal confidence and to decrease symptoms of depression and anxiety in new mothers (McManus et al., 2020; Nugent et al., 2014). The NBO is an infant-focused, family centered, relationship-based intervention, designed to sensitize parents to their baby's competencies and individuality, to foster positive parent-infant interactions, and to contribute to the development of a positive parent-infant relationship from the start. The NBO consists of 18 neurobehavioral observations, which together capture the infant's unique capacities and challenges in self-regulation in four key domains: autonomic, motor, and state regulation, and responsiveness to social and non-social stimuli (Nugent et al., 2007). The Baby AMOR Study is a randomized controlled trial of the NBO intervention for moderate and late preterm (gestational age 32 to 36 6/7 weeks) infants and their mothers aimed at improving maternal mental health outcomes and supporting sensitive early parenting and optimal healthcare behaviors. We hypothesize that this intervention will improve postpartum maternal mental health and mother-infant relationships and that mothers will find the NBO to be an acceptable and useful intervention.

Materials and Methodology: One hundred ninety-nine mother-baby dyads have been randomized either to the NBO-based parenting support intervention delivered in three sessions during the first 6 weeks post discharge from birth hospitalization, or to a control group. Data addressing demographic information, mental health measures, parenting confidence, and infant feeding and health care practices are being gathered at three time points: baseline (Time 1), 6 weeks post hospital discharge (Time 2), and a follow-up interview at infant's four months corrected gestational age (Time 3). A mother-infant play session is videotaped at Time 3 for scoring using the Emotional Availability Scales. After Time 3 data collection is complete, intervention group mothers participate in a brief end-of-study interview addressing their perceptions of the value and impact of the NBO sessions. This preliminary analysis reports on findings from 57 final study interviews (Time 3) conducted to date.

Results: A total of 91.23% of mothers reported that the NBO intervention was helpful; 92.86% of mothers reported a positive impact of the NBO on their confidence as parents; 91.23% of mothers reported a positive impact of the NBO on their understanding of "who their baby is as a person;" 91.23% of mothers reported a positive impact of the NBO on their parenting; 87.72% of mothers reported a positive impact of the NBO on their relationship with their baby; and 87.72% of mothers reported a positive impact of the NBO on their emotional well-being. Coding of open-ended responses corroborate these dominant themes. Mothers reported that the NBO sessions were educational and informative, helping them to notice and interpret their baby's behaviors and cues so that they could respond accordingly. Mothers' comments indicated that the three NBO sessions provided reassurance, helping them to negotiate the challenges of prematurity, to manage expectations, and to be more confident during their infants' first weeks of life at home after hospital discharge.

Conclusion: This interim analysis offers evidence that the NBO intervention is subjectively helpful to mothers in supporting their early parenting of preterm infants. We expect analysis of complete study data to further elucidate these findings, including results of standardized measures on maternal mental health and confidence, maternal health practices with their infants, and moderating and mediating factors that help explain the underlying the impacts of the NBO and study outcomes.

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Gravens2022-24

Abstract Title: Adaptation and Integration of the Family Centered Care team in NICU decision making processes during a pandemic and transformational changes in the NICU.

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Background and Purpose: Family Centered Care (FCC) prepares family members for decision-making and caregiving roles, with the goal of reducing family members' stress during and after neonatal intensive care unit (NICU) hospitalization of an infant. FCC has been associated with numerous benefits including decreased length of stay, improved well-being of pre-term infants, and greater family satisfaction. Physical or social distancing used to reduce infection transmission during COVID-19 pandemic has a profound impact on the delivery of family-centered inpatient care in NICU due to visitation restriction policies. How do we adapt such a program to maintain the core of the family centered care concept in the service of families? This presentation describes the various ways in which the FCC program in a level IV NICU was adapted to continue to serve our families during the pandemic and the ways in which that adaptation and integration of the team into NICU decision-making led to certain transformational changes in NICU family centered care practices.

Budget and Resources: The Family Centered Care Program consisted of staff funded by First 5 Santa Clara County. Family support specialists (paid staff) consisted of 3 ex-NICU mothers that helped other NICU parents by proving peer support through their journey in NICU. The Director of the FCC program helped oversee and grow the program. A Family Education Specialist was responsible for family CPR and discharge preparedness education in addition to bedside staff teaching.

Materials and Methodology: This is a retrospective, observational single-center study conducted at a public safety-net hospital in California with a regional level IV NICU. This study included infants born and admitted to our NICU between July 2019 and October 2020. We compared the demographics and FCC program measures during the "pre-pandemic phase" (July 2019 - February 2020, N=192), and "pandemic phase" (March 2020 -October 2020, N=227). In addition, we qualitatively describe FCC team processes that were existent pre-pandemic in the NICU and further highlight how those were modified and expanded during the pandemic after the team was fully integrated in NICU decision making leading to transformational change in certain family centered practices in the NICU.

Results: There was no difference in the demographics between the "pre-pandemic" and "pandemic" groups. Overall, the median birth weight and gestational age were 2753 grams and 37 weeks; 58 percent were males, 65 percent of Hispanic origin and 21 percent of caregivers had substance use disorders. There were several modifications of the FCC program during the pandemic that were transformational to NICU family centered care practices.

Conclusions: In the pre-pandemic phase, the FCC team: 1) connected with families in person at bedside 1-2 times a week, 2) provided language support in person, 3) held onsite parent education classes twice a week and scrapbooking once a week.

During the pandemic, they : 1) connected with families mostly via phone 1-2 times per week, 2) communicated changes in visitor policy to families actively, 3) provided phone language support, 4) gave family related feedback to the NICU team during weekly multidisciplinary meetings and in real time to charge nurses, 5) provided onsite parent education in small groups twice a week with social distancing rules, 6) added a parent educator for CPR and special discharge teaching, 7) suggested the idea of initiating psychosocial rounds with NICU staff to review any psychosocial issues NICU families could encounter on a weekly basis which then got implemented by NICU leadership 8) suggested to NICU staff to strengthen language translation services in the NICU due to which a translator was hired and 7) initiated discharge preparedness quality improvement efforts.

Following the pandemic, while the FCC team onsite hours decreased, virtual (e.g. phone calls) support activities increased significantly. NICU families continued to receive FCC care regularly on a weekly basis. Proactive virtual adaptation of the FCC program in a timely fashion in response to the dynamic changes of pandemic polices allowed the FCC team to maintain their connectivity with the NICU families. Despite working remotely, daily phone calls and information exchange between the FCC team and NICU staff enabled them to advocate for the families effectively. Furthermore, the FCC team was able to expand their responsibilities during the pandemic by suggesting and helping implement psychosocial rounds as well as suggesting strengthening language translation services in the NICU with the help of leadership. All these activities in unison helped NICU FCC program adapt effectively to continue serving the needs of our NICU families despite the constraints imposed by the COVID-19 pandemic.

Learning Objectives:

1. To understand how a family centered care program adapted itself during the pandemic to continue to serve NICU families.
2. To understand how the FCC team was able to effectively advocate on behalf of families and help add additional family centered processes in NICU decision making to help NICU staff better support families.
3. To see if there were any differences in the demographics of NICU babies pre pandemic and during the pandemic.

Gravens2022-25

Abstract Title: Nutrition Care Team Experience of Novel Human

Milk Fortifier in US Neonatal Intensive Care Units

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Background and Purpose: Human milk fortification for the high-risk infant is crucial for growth and development, but the process is not uniform. Historically, human milk fortifier (HMF) was only available in premeasured, volume-restricted amounts. Fortification with small volume packaging required multiple steps, additional staff time, lacked flexibility, and led to inaccuracies. In 2020, a novel sterile bottle containing 5.5 oz of HMF was designed by neonatal practitioners to ensure accurate and safe fortification. Staff can aseptically remove the exact amount of fortifier needed for volume and caloric density. Nutrition Care Team (NCT) awareness of a safer and more efficient strategy is needed. This study aimed to cross-sectionally examine the experience of Nutrition Care Team members using the novel sterile bottle of HMF.

Materials and Methodology: Clinicians at United States (US) hospitals that evaluated the HMF from June 1, 2020, through April 30, 2021 (n=108), were sent an email containing an anonymous survey link to share with the NCT. Investigators were blinded to whom completed the survey, and no identifying information was collected. After obtaining consent, survey respondents were asked 29 questions about the preparation of human milk, growth, feeding tolerance, and nutritional status in their Neonatal Intensive Care Unit (NICU). The protocol was IRB approved.

Results: The response rate to the survey was 36% (n=124). Of those that responded, 99.2% (n=123) consented to participate. Of those that consented, 84.2% (n=113) responded that they had used the HMF for at least one patient. Most of the respondents were registered dietitians (RD) (32.4%), nurses with direct patient care responsibilities (26.1%), and formula room technicians (17.1%) (Table 1). Most respondents (76.6%, n=82) indicated that human milk was prepared in a milk preparation room, followed by 18.7% (n=20) at a designated space in the NICU. Respondents responsible for the preparation of human milk reported the novel sterile bottle of HMF was better than their previous practice for reduction in time to prepare (71.7%, n=33), accuracy of fortified human milk (69.6%, n=32), aseptic preparation (52.2%, n=24), reducing waste of human milk (58.7%, n=27), and ease of use (65.2%, n=30). Of those that were responsible for evaluation of nutritional status, feeding tolerance was better (38.5%, n=27) or the same (58.6%, n=45) with the novel HMF when compared to their previous practice. The majority of respondents indicated that growth parameters were the same as previous practice for weight (67.1%, n=47), head circumference (81.2%, n=56), and length (76.8%, n=53) with use of the novel HMF (Table 2).

Conclusions: A novel sterile bottle of human milk fortifier was perceived favorably by NICU Nutrition Care Teams. The HMF bottle may reduce preparation time and waste of human milk while maintaining growth and tolerance.

Profession	n	%
Formula or Milk Room Technician	19	17.1%
Lactation Consultant	0	0.0%
Neonatal Nurse Practitioner, Advanced Practice Nurse, or Physician Assistant	6	5.4%
Nurse Manager or Assistant Nurse Manager	7	6.3%
Nurse with direct patient care responsibilities	29	26.1%
Nurse without direct patient care responsibilities	0	0.0%
Patient Care Technician or Nursing Assistant with direct patient care responsibilities	0	0.0%
Physician	16	14.4%
Registered Dietitian	36	32.4%
Total	**111**	**100.0%**

Table 1 Participants by Profession

Values are number (%)

	Better Than		The Same		Worse Than		Total
	n	%	n	%	n	%	n
Breastmilk Preparation							
Easy to use	30	65.2%	15	32.6%	1	2.2%	46
Ensures aseptic preparation	24	52.2%	15	32.6%	7	15.2%	46
Reduces time to fortify breastmilk	33	71.7%	13	28.3%	0	0.0%	46
Reduces breastmilk waste	27	58.7%	17	37.0%	2	4.4%	46
Reduces the number of steps needed to prepare fortified breastmilk	25	54.4%	18	39.1%	3	6.5%	46
Ensures accuracy of fortified breastmilk	32	69.6%	12	26.1%	2	4.4%	46
Feeding Outcomes							
Feeding tolerance	27	38.5%	41	58.6%	2	2.9%	70
Weight gain	20	28.6%	47	67.1%	3	4.3%	70
Head growth	12	17.4%	56	81.2%	1	1.5%	69
Length growth	15	21.7%	53	76.8%	1	1.5%	69

Table 2 Compared to the human milk fortifier(s) you have used before, how does the new HMF compare?

Values are number (%)

Learning Objectives:

1. Learner will explore potential impacts of human milk fortifier selection on nutrition order preparation practices in the NICU.
2. Learner will be able to compare their experiences to a nationwide sample of NICU Nutrition Care Team experiences in regards to patient nutrition outcomes.

Gravens2022-26

Abstract Title: COVID-19 Pandemic Experiences and Maternal Stress in Neonatal Intensive Care Units

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Background and Purpose: The Coronavirus Disease 2019 (COVID-19) pandemic has been a major disruption for individuals across the world, with elevated rates of mental health symptoms observed since March of 2020 when the U.S. outbreak first occurred. These increased mental health concerns have been observed in the general population, as well as in high-risk populations such as perinatal women. Parents of infants hospitalized in the Neonatal Intensive Care Unit (NICU) are a particularly vulnerable population, and they experience increased rates of psychological distress and mental health problems in the perinatal period.

Materials and Methodology: We conducted a cross-sectional analysis based on nationwide online survey responses to understand the relationship between the COVID-19-related experiences and the stress experienced by mothers of infants admitted to US NICUs (n=108) during the pandemic. The sample of NICU mothers used for this analysis were drawn from the Perinatal Experiences and COVID-19 Effects (PEACE) Study where online survey data was collected among postpartum women across the U.S. from May 21, 2020 and June 23, 2021. Participants were recruited from email listservs, social media, word of mouth, and Facebook support groups. Predictors included: COVID-19 pandemic related health worries using the Coronavirus Health Impact Survey, COVID-19 worries about resources, and COVID-19 related grief. To assess parenting stress experience within the NICU, we administered the Parental Stressor Scale: Neonatal Intensive Care Unit (PSS:NICU). We examined all covariates listed above in relation to the three subscales of the PSS:NICU (parental role, infant appearance and behavior, and sights and sounds). We utilized infant gestational age, pre-existing maternal anxiety, and whether the infant was admitted in the NICU at the time of the survey as covariates in the hierarchical multiple regression models.

Results: The majority (61.9%) of surveyed mothers reported experiencing high levels of stress in our study, with a total mean score of 3.2 on the PSS:NICU. (Table 1) COVID-19-related grief was significantly associated with higher levels of maternal stress as it related to seeing the baby's appearance and behavior in the NICU, and exposure to sights and sounds within the NICU environment. (Table 2) No significant associations were noted between parental stress and COVID-related health worries or worries about resources.

Key Variables	Means (SD, range)
COVID-19 related experiences	
Health worries	12.9 (3.6, 4.0-20.0)
Worries about resources	13.6 (4.7, 6.0-25.0)
Grief	19.2 (3.7, 6.0-27.0)
PSS: NICU	
Total	3.2 (0.8, 1.5-5.0)
Parental role alteration	3.9 (0.6, 1.2-3.9)
Infant appearance and behavior	2.7 (0.9, 1.1-5.0)
Sights and sounds	3.0 (1.0, 1.0-5.0)

N = 97-107

Table 1. Maternal mental health and other psychosocial experiences from Wave I of the PEACE Study, data collected between May 21, 2020 to June 23, 2021.

	Parental role alteration			Infant appearance and behavior			Sights and sounds		
Blocks of variables entered in three steps	β	R^2	ΔR^2	β	R^2	ΔR^2	β	R^2	ΔR^2
1. Covariates		.062	.062		.104	.104*		.042	.042
Gestational age	-.165			-.204†			-.015		
Currently in NICU (ref=no)	-.228†			-.077			-.071		
Maternal pre-pregnancy GAD	.095			.197†			.179		
2. COVID-19 related experiences		.101	.040		.178	.075†		.125	.083*
Health worries	.042			.095			.129		
Resource worries	.048			-.064			-.210†		
Grief	.156			.254*			.260*		

N = 95-99, †*p*<0.1, **p*<.05

Table 2. Multiple regression predicting parent stress in the NICU in three domains based on COVID-19 related experiences.

Conclusion: Hospitals should consider parental COVID-19-related experiences when weighing the risks and benefits of family presence and involvement in the NICU. Enhanced psychosocial support is necessary to mitigate the long-term consequences of heightened stress during and after the COVID-19 pandemic for NICU families.

Learning Objectives:

1. Describe the rates of NICU-related parent stress levels during the COVID-19 pandemic.
2. Determine how COVID-19-related experiences, inclusive of health worries, worries about resources, and grief of lost experiences might relate with high levels of stress experienced by mothers of infants hospitalized in the Neonatal Intensive Care Unit (NICU).

Gravens2022-27

Abstract Title: A Music-Based Intervention to Reduce Stress in the Hospitalized Preterm Infant

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Background and Purpose: Preterm infants experience stress while hospitalized in the sensory-atypical environment of the Neonatal Intensive care Unit (NICU). (1) Such stress can perturb infant physiological state, contributing to later developmental impairments. (1,2) Music-based interventions may reduce stress, enriching the auditory environment in the NICU to improve infant neurodevelopment. (3-5) Little is known about which music conditions and stimulus characteristics correlate with improvement of physiologic measures of stress in preterm infants. (3) This study investigated the relationships between different three different types of musical segments and physiologic and behavioral responses in hospitalized preterm infants.

Materials and Methodology: Three 15-minute original pieces of music, composed by Bose Corporation Company, were employed. 13 preterm infants, with postmenstrual ages between 30 weeks and 35 weeks, 6 days participated in the study (Table 1). Each participant was exposed to 12 interventions in a randomized order (three exposures for each music condition and silence); study staff remained blinded to the music condition. Outcomes included continuous recordings of heart rate, respiratory rate, oxygen saturation, infant behavioral state organization, and regional cerebral oxygen saturation (rSO2). A repeated measures ANOVA (Linear Mixed Model) was used to analyze vital sign evolution after each music exposure compared with silence (Condition 4).

Results: No statistically significant changes were observed in vital sign patterns after each type of exposure (music or silence) when compared with baseline vital signs patterns pre-exposure (Table 1). Respiratory rates tended to decrease after each music condition (Condition 1, 2, or 3) when compared with silence (Figure 1), however differences were small and did not reach statistical significance. Further, when analyzing the respiratory rate pattern during and 5 minutes after each Condition, we observed a significant reduction with Condition 2 compared with silence (Tukey Post-Hoc p= 0.056*). Infant behavioral state regulation ratings trended in the desired (lower) direction one hour after all Conditions (1, 2, 3, and 4), and remained most stable at the lowest (desired) rating after exposure to Condition 2. This Condition consists of a low, repetitive, and rhythmically consistent entrainment stimulus. Further statistical analyses inclusive of modeling and multivariate regressions will be conducted on a larger sample in further stages to inform more conclusive results.

Conclusion: This study provides insight into the characteristics of music associated with reduced stress. This will permit NICU professionals to tailor music experiences in the NICU to achieve optimal therapeutic effects.

Learning Objectives:

1. Meaningful auditory exposure is important for the brain development of premature infants. Excessive noise can overstimulate the brain, while not enough high-quality auditory exposure and silence can also hinder progress. Achieving the right balance is important to support optimal brain development.
2. This study seeks to understand how to use composed music most effectively to help babies soothe and better regulate their physiologic functions after stressful instances.
3. Preliminary results suggest that there were no statistically significant changes observed 5 to 15 minutes before and up to after 60 minutes after the exposure. Respiratory rate tended to decrease after all music conditions (Conditions 1, 2, and 3) when compared to silence.

Variables (Average response of 45-75minutes)	Total (N=156 sessions)	Music 1 (39)	Music 2 (39)	Music 3 (39)	Music 4 (39)	P-Value*
Heart Rate (BPM)						0.423
Missing	0	0	0	0	0	
Mean±SD	158.5 ± 11.6	160.9 ± 10.7	157.6 ± 11.4	160.3 ± 12.6	155.3 ± 11.3	
Min–Max	130.0 - 184.0	134.5 - 179.8	131.5 - 179.3	135.0 - 184.0	130.0 - 175.5	
Median (IQR)	159.5 (16.4)	160.0 (14.8)	159.0 (19.3)	160.3 (19.8)	156.3 (14.0)	
Respiratory Rate (BPM)						0.559
Missing	0	0	0	0	0	
Mean±SD	54.0 ± 13.0	53.2 ± 12.1	52.2 ± 12.2	56.9 ± 15.4	53.8 ± 11.7	
Min–Max	15.5 - 92.3	23.5 - 80.8	15.5 - 73.8	27.8 - 92.3	32.8 - 83.3	
Median (IQR)	52.6 (18.1)	52.0 (13.3)	52.5 (14.0)	56.5 (26.8)	52.3 (16.8)	
Delta Regional Cerebral Oxygen Saturation (%)						
Missing	2	0	1	0	1	0.875
Mean±SD	72.7 ± 10.3	73.0 ± 10.0	71.9 ± 9.7	71.5 ± 10.9	74.4 ± 10.7	
Min–Max	46.5 - 92.0	55.0 - 88.0	53.0 - 92.0	46.5 - 91.5	50.3 - 92.0	
Median (IQR)	74.8 (15.0)	75.8 (17.5)	72.0 (14.6)	73.5 (16.0)	76.4 (15.1)	
Delta Oxygen Saturation (%)						0.960
Missing	1	1	0	0	0	
Mean±SD	96.3 ± 2.0	96.2 ± 2.2	96.4 ± 1.6	96.2 ± 2.1	96.4 ± 2.1	
Min–Max	89.3 - 100.0	89.3 - 100.0	93.5 - 100.0	90.3 - 100.0	93.0 - 100.0	
Median (IQR)	96.0 (2.8)	96.0 (2.9)	96.3 (2.8)	96.0 (1.8)	97.0 (3.3)	

Table 1. Variables during the studies among N=156

sessions (13 infants x 12 exposures); Linear mixed model was used to account for repeated exposures of each music in each baby; No other covariates were included.

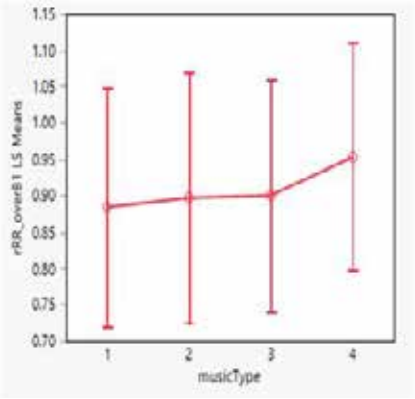

Figure 1: Least Squares Means Plot of Respiratory Response Rate over Baseline

Gravens2022-28

Abstract Title: "My Brigham Baby" App: Using Technology to Advance Parent Engagement and Promote Resilience in the Neonatal Intensive Care Unit

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Background and Purpose: Parents of infants who require hospitalization in the Neonatal Intensive Care Unit (NICU) often experience psychosocial distress which can impact infant and family outcomes. Technology-based interventions may enhance parent experience and discharge readiness and promote family-centered developmental care in the NICU. An interdisciplinary clinical team has partnered with a developing team to create a smartphone application (App) called "My Brigham Baby", to better support parents of infants admitted to a level III NICU. The objective of this study was to describe the family psychosocial experience in the NICU and assess how it evolved after rollout of an educational smartphone application (App).

Materials and Methodology: Responses to questionnaires regarding parental NICU experience were obtained from parents (25 pre- and 25 post-App rollout). Post-App data collection occurred during the COVID-19 pandemic (Pre-app: Spring/Summer 2020, Post-App: Summer-Winter 2020/Spring 2021). Data included self-reported:

1. Discharge readiness. Using a 7-Point Likert Scale, parents were deemed not ready for discharge if they reported a score of 1-4, somewhat ready for discharge if they reported a 5, and very ready for discharge if they reported 6-7.

2. Symptoms of stress. To assess stress, the Parental Stressor Scale: NICU was implemented. Total scores between 0-28 indicated no stress symptoms, 29-84 suggested moderate stress symptoms, and 85-140 indicated very high stress symptoms.

3. Anxiety. Parenting anxiety was measured using the Generalized Anxiety Disorder Scale-7. A score of 1-4 indicated minimal anxiety, 5-9 implied mild anxiety, and above 10 correlated to moderate-severe anxiety symptoms experienced.

4. Parenting skill confidence. Parenting self-efficacy was measured using the Parenting Sense of Competence Scale. Parents were not confident in their skills if their reported scores were between 45-60, moderately confident if between 61-70, and very confident if between 70-102.

Descriptive statistics of the demographic and clinical characteristics of the sample were evaluated by pre-App/post-App rollout group status. Data were organized by family- (n = 40), parent- (n = 50 [n = 40 mothers and n = 10 fathers]), and infant- (n = 45) level, as appropriate. Parents (n = 50) participating in the study completed study surveys and their data was evaluated overall and by pre- and post-App rollout status and parent sex. Differences in demographic and clinical characteristics by rollout status were assessed using chi square or Wilcoxon rank sum tests.

Results: The demographics (parent) and clinical (infant) characteristics for the pre- and post-App rollout groups indicated that there were no significant differences between groups, suggesting that the pre- and post-App cohorts were comparable in terms of medical and family-social characteristics. Of the measured outcomes, frequency of "very ready" discharge readiness responses significantly increased in the post-App rollout group (56% v. 20%, p =0.02*) (Table 1). There were no statistically significant differences between continuous scores of parent stress, anxiety symptoms, and parenting skills between the pre- and post-App cohorts (Table 1). When scores for each outcome were categorized by severity, pre-App rollout parent experience data suggested that many of surveyed parents felt ill-prepared for discharge (36%), reported symptoms of stress (28%) and anxiety (40%) in the severe range, and were not confident in their parenting skills (8%). Post-App rollout survey results indicated that a higher proportion of parents reported experiences in the optimal categories discharge readiness (56%), anxiety symptoms (44%), and parenting skills (25%) (Figure 1 and Table 1). There was a moderate correlation between anxiety, stress, and parenting competence, and a weak correlation between discharge readiness and parenting competence. No correlations were observed between discharge readiness and symptoms of stress or anxiety reported by NICU parents in this study.

Conclusion: In conclusion, the pilot project presented here suggests that technology applications can increase parent discharge readiness, and have the potential to modify NICU parent psychosocial experiences in the context of external stressors.

Learning Objectives:

1. Parent discharge readiness, stress and anxiety, and parenting skills confidence were assessed before and after the rollout of an educational smartphone application.
2. Results indicated that parents in the post-App rollout group reported significantly higher discharge readiness scores, parenting confidence shifted towards improvement, and feelings of stress and anxiety remained stable.
3. Technology applications have the potential to positively impact NICU parental experiences despite external stressors.

Table 1. Self-Reported Responses to Standardized Questionnaires Based on Group Status

Variables	Total (N=50)	Pre-Intervention (N=25)	Post-Intervention (N=25)	P - Value
GAD7 Total Scores				0.4472
Mean±SD	8.0±5.6	8.6±5.7	7.4±5.6	
Min-Max	0.0–21.0	0.0–21.0	0.0–19.0	
Median (IQR)	7.0 (4.0–12.0)	7.0 (4.0–14.0)	7.0 (4.0–9.0)	
GAD7 Category				0.2823
Minimal (0–4)	17 (34.0)	6 (24.0)	11 (44.0)	
Mild (5–9)	17 (34.0)	9 (36.0)	8 (32.0)	
Moderate-Severe (10 ≥)	16 (32.0)	10 (40.0)	6 (24.0)	
PSCS Total Scores				0.4232
Mean±SD	74.0±10.6	73.5±9.1	74.6±12.1	
Min-Max	37.0–94.0	56.0–94.0	37.0–91.0	
Median (IQR)	75.0 (68.0–82.0)	75.0 (68.0–79.0)	76.5 (66.5–84.5)	
PSCS Category				0.8617
Missing	1 (2.0)		1 (4.0)	
Not confident (45–60)	4 (8.2)	2 (8.0)	2 (8.3)	
Moderately confident (61–70)	14 (28.6)	8 (32.0)	6 (25.0)	
Very confident (70–102)	31 (63.3)	15 (60.0)	16 (66.7)	
PSS: NICU Total Scores				0.3985
Mean±SD	63.7±26.7	60.4±29.0	66.9±24.4	
Min-Max	7.0–119.0	13.0–111.0	7.0–119.0	
Median (IQR)	68.5 (42.0–85.0)	65.0 (34.0–85.0)	70.0 (57.0–80.0)	
PSS: NICU Category				0.9469
Not stressed (0–28)	6 (12.0)	3 (12.0)	3 (12.0)	
Moderate stressed (29–84)	31 (62.0)	15 (60.0)	16 (64.0)	
Very stressed (85–140)	13 (26.0)	7 (28.0)	6 (24.0)	
PSS: NICU Scaled Scores				0.51965
Parental Role Alteration	2.8	2.1	2.4	
Infant Appearance and Behavior	2.7	2.3	2.2	
Sights and Sounds	2.9	1.9	2.6	
DC Readiness Total Scores				0.1705
Mean±SD	5.0±1.4	4.8±1.4	5.2±1.5	
Min-Max	1.0–7.0	1.0–7.0	2.0–7.0	
Median (IQR)	5.0 (4.0–6.0)	5.0 (4.0–5.0)	6.0 (4.0–6.0)	
Discharge Readiness Category				0.0204
Not Ready (1–4)	16 (32.0)	9 (36.0)	7 (28.0)	
Somewhat Ready (5)	15 (30.0)	11 (44.0)	4 (16.0)	
Very Ready (6–7)	19 (38.0)	5 (20.0)	14 (56.0)	

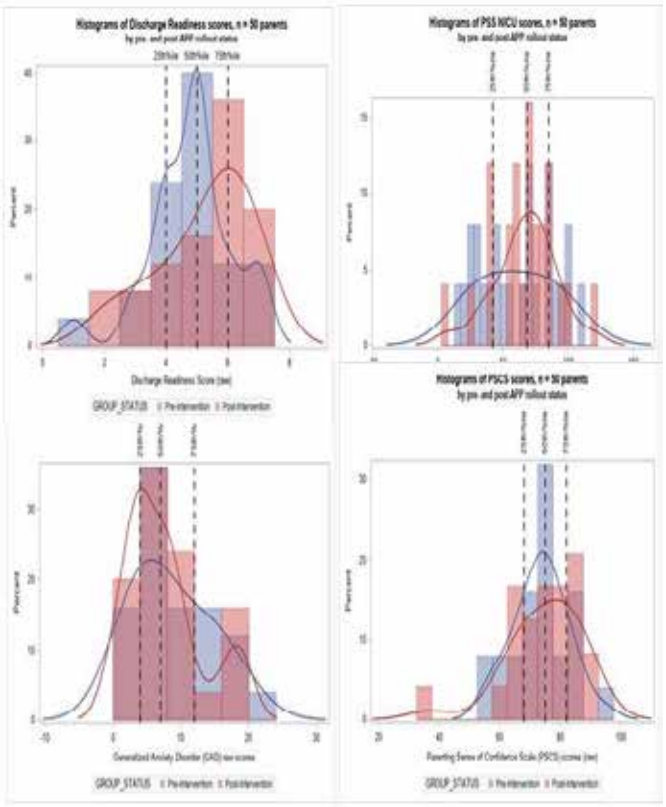

Figure 1: Distribution of Survey Scores Among n = 50 parents by pre- and post- App rollout status

Gravens2022-29

Abstract Title: "There's No Place Like Home" -- Improving NICU Discharge Education and Preparation

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Background and Purpose: Often, families feel that they are not adequately prepared to "click their heels" and bring their high-risk infant home from the Neonatal Intensive Care Unit (NICU). We will describe the design and implementation of an education program for NICU families, making specific use of digital technologies, in order to create a process that is more effective and efficient, increases parent satisfaction, and saves nursing time.

Materials and Methodology: Aim: Improve "prepared for discharge" top-box responses (responses that reflect the highest possible rating) on post-discharge patient satisfaction surveys from only 47% in 2017

How: Using technology to improve the consistency of discharge teaching

When: Starting on admission rather than waiting until the last few days of hospitalization Setting: Our 20-bed, community level 3 NICU is located on the Mountain View campus of the El Camino Health system in Santa Clara County, California. The hospital has approximately 4200 newborn deliveries and 450 NICU admissions per year. Our NICU provides care to infants less than 1000 g at birth, less than 28 weeks of gestational age (GA), and/or those with severe or complex illnesses. The unit is staffed by board-certified neonatologists from the Division of Neonatal & Developmental Medicine at Stanford University and does not utilize advanced practice providers or pediatric trainees. We will share the process we implemented for developing our NICU Discharge Education Program (Figure 1). Neonatal intensive care unit staff and former NICU parents developed a task force to create technology-based discharge education content. The content was originally uploaded to an e-book and later transferred to the electronic health record (EHR) inpatient portal (MyChart Bedside) during Intervention 3. Families were able to view discharge teaching content at their own convenience and pace and review topics as needed with the NICU staff. After reading the education, parents could indicate "I Understand" or "I Have Questions" in the tablet-based MyChart Bedside app, and these responses automatically flowed into the EHR for staff to visualize what parents needed to review (Figure 2). With automatic documentation of parents' understanding, nurses were able to tailor education to family needs, making it more effective and efficient, and saving nursing time. As a part of Intervention 5, post-discharge follow-up phone calls were initiated and provided insight into parental reaction to the new education format.

Figure 1

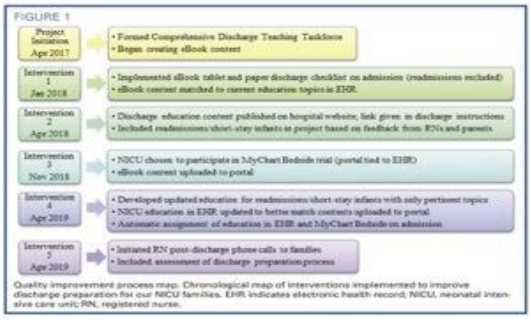

Figure 2

Figure 3

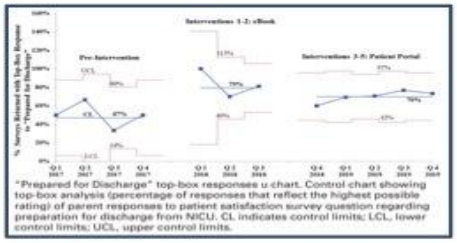

Figure 1, Figure 2, Figure 3

Figure 4

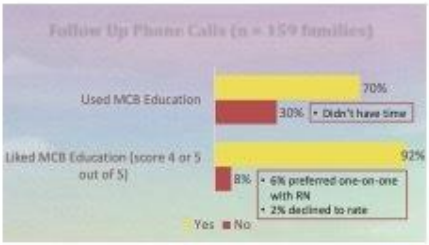

Figure 5

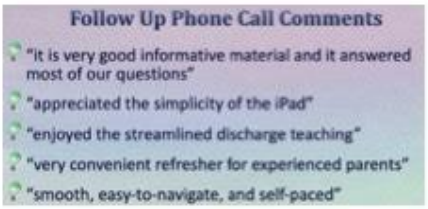

Figure 6

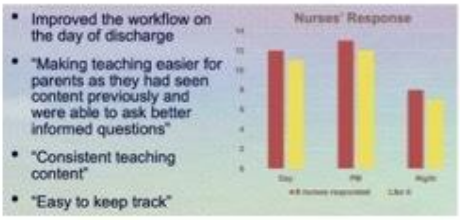

Figure 7

Figure 4, Figure 5, Figure 6, Figure 7

Results: Parent satisfaction top-box scores, reflecting the highest rating in the "Prepared for Discharge" category of the patient satisfaction survey, improved from a baseline of 47% in 2017 to 70% in 2019 (Figure 3) after implementation of the discharge education program. Overwhelmingly, 92% of families (Figure 4) highly rated the tablet-based discharge teaching during post-discharge phone calls. Some of the parents' qualitative comments about the tablet-based education are listed in Figure 5.

Greater than 90% of nurses surveyed liked the new tablet-based discharge education (Figure 6) and commented on its consistency, ease of use, and improvement in workflow. We were able to achieve sustainability in parent completion of the tablet-based discharge education in part due to our unit clerks becoming champions for activating the tablets and demonstrating their use to the NICU families. After two years, over 80% of the education topics assigned are read by families on the tablets, and over 90% of those topics read have a parent response (> 90% "I Understand") (Figure 7).

Limitations: A benefit of using the mailed post-discharge patient satisfaction surveys as the main outcome measure was that they provided anonymous answers to sensitive questions. Low response rate to our parent satisfaction surveys was one of the limitations of our results. To encourage responses, we started adding information about the surveys in our hospital discharge instructions. The discharging physician also reminded families during their face-to-face meeting, and the RNs again encouraged parents to complete the survey during their follow-up phone call after discharge. Another limitation to our QI project was the lack of ability to track readmissions or emergency department (ED) visits because there are multiple healthcare systems in our local area and not all infants return to us. However, anecdotally, during the follow-up phone calls with the 159 families we reached, no readmissions or ED visits were reported.

Conclusion: A comprehensive, consistent, and early discharge program using technology can lead to more effective and efficient NICU discharge education and improved parent satisfaction.

Acknowledgments: Discharge Taskforce team members, Stanford El Camino Health (ECH) Neonatologists, NICU Clinical Nurse Specialist, ECH NICU staff, nursing manager and leadership team, unit administrative support, Patient Experience, Marketing, IT Department, Family Advisory Board members, Follow-up phone call team members.

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Learning Objectives:

Learners will walk along the "yellow brick road" of the steps to success in NICU discharge education, including:

1. Understanding the importance of discharge preparation for NICU families
2. Selecting and/or creating education materials
3. Using technology to support discharge education
4. Measuring the success of the education program.

Gravens2022-30

Abstract Title: Identifying Barriers to Quality Mother-Infant Inter-

actions in the NICU through Naturalistic Systematic Observations

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Background and Purpose: Relationship development between mothers and their premature infants in the NICU are influenced by the frequency and duration of dyadic interactions as well as factors that may facilitate or hinder interaction quality. This study aims to identify patterns of maternal proximity in the NICU and identify contexts that facilitate, deter, or disrupt focused dyadic engagement during context-specific activities (e.g., routine cares, feeding, nurturing).

Materials and Methodology: Trained field observers conducted systematic observations in a Level-IV open bay NICU over a period of four months recording maternal presence, proximity to infant, unfocused versus focused engagement and the dyadic social contexts within which they occurred, utilizing a coding scheme grounded in theory and specified to the aims of this study. Observations occurred at different times of the day and days of the week for approximately 1-hour intervals to minimize observer fatigue. Coding included frequency counts of maternal presence as well as recording onset and offset times of maternal presence, focus versus unfocused engagement, and duration of interaction and non-interaction for each engagement context. In addition, observers documented qualitative description upon observing occurrences of maternal non-engagement or unfocused engagement, such as talking to a nurse, using a personal mobile device, or other alternate activity. Likewise, observers documented what mothers were doing when they were engaged with their infant (e.g., holding the infant) but not focusing on their infant due to attention to an alternate activity. Analyses included both quantitative and qualitative strategies. Quantitative analysis included calculating frequency and mean duration for each of the timed-event codes to determine differences in how long mothers were engaged with their infants in each interaction context and compare them to the time mothers were not engaged or not focused on their infants. Qualitative analysis included summarizing and synthesizing the descriptive notes on maternal alternate activities and applying an iterative approach to identify thematic categories. Interpretive analysis including linking thematic categories with information obtained from the extant literature.

Results: Over a period four months (52 hours of observation), most infants (N=353) did not have a caregiver present, and an additional cluster (N=64) had obstructed view (e.g., privacy curtain was pulled) during the time when the observer was present in the NICU. Results include observational data coded for 88 mother-infant dyads with 83% (N=73) observed during periods of maternal proximity without engagement, 97% (N=85) observed during periods of maternal focused engagement, and 65% (N=57) observed during periods of maternal unfocused engagement. Mothers were observed spending most time in focused engagement with their infants during nurturing contexts (M=9.48 minutes; N=83) followed by feeding (M=3.56 minutes; N=25), and routine cares (M=2.98 minutes; N=51). Unfocused engagement occurrences were most frequently observed during nurturing contexts (M=6.50 minutes; N=48) and ranged between 1-38 cumulative minutes. Table 1 displays the summary statistics for when mothers were in proximity to their infants but not engaging with their infants. Mothers were most frequently observed using a personal mobile device followed by talking to a member of the healthcare staff. Table 2 displays the summary statistics for when mothers displayed unfocused engagement with their infants due to their attention diverted to another activity. Again, mothers were most frequently observed using a personal mobile device followed by talking to healthcare staff. Interestingly, occurrences of unfocused engagement due to mothers using a personal mobile device occurred primarily during nurturing contexts (N=27) and ranged from 1 to 32 cumulative minutes (M=3.5 minutes). Of those mothers, 44% (N=12) immersed their attention for ten minutes or longer to their mobile devices versus to their infant.

Table 1. Summary Statistics on Alternate Activities for Proximity without Engagement

Alternate Activity	N	Relative Proportion	Frequency Observed	Relative Frequency	Cumulative Minutes	Mean Minutes	Range Minutes
Using cell phone	36	.49	70	.33	634	8.7	0-59
Talking with healthcare staff	33	.45	48	.22	184	2.5	0-29
Prepping/Organizing	21	.29	22	.10	75	1.1	0-19
Sitting quietly	12	.16	17	.08	71	1.0	0-14
Engaging with twin	8	.11	22	.10	156	2.1	0-35
Talking to another parent	8	.11	11	.05	38	0.5	0-9
Doing crafts	6	.08	6	.03	71	1.0	0-34
Observing nurse/partner	5	.07	5	.02	50	0.7	0-23
Other	13	.18	13	.06	25	0.4	0-9

Figure 1

Note: 73/88 dyads observed in proximity without engagement; Relative proportion is relative to the number of mothers observed in proximity without engagement; Frequency is the number of distinct occurrences observed; Relative frequency is the ratio of frequency to the total number of proximity without engagement occurrences; Cumulative minutes is the total time dyads were observed in proximity without engagement; Mean minutes is the average duration mothers were engaged in that alternate activity; Range is the minimum to maximum cumulative minutes a mother was observed engaging in that alternate activity

Table 2. Summary Statistics on Alternate Activities during Unfocused Engagement

Alternate Activity	N	Relative Proportion	Frequency Observed	Relative Frequency	Cumulative Minutes	Mean Minutes	Range Minutes
Using cell phone	27	.47	71	.30	307	3.50	0-32
Talking with healthcare staff	38	.67	90	.38	202	2.30	0-28
Talking to partner	21	.37	46	.19	108	1.23	0-13
Sitting quietly	7	.12	15	.06	32	.40	0-10
Talking to another parent	5	.09	5	.02	20	.23	0-13
Observing other activity on unit	3	.05	13	.05	12	1.40	0-10

Figure 2

Note: 57/88 dyads observed in unfocused engagement; Relative proportion is relative to the number of mothers observed in unfocused engagement; Frequency is the number of distinct occurrences observed; Relative frequency is the ratio of frequency to the total number of unfocused engagement occurrences; Cumulative minutes is the total time dyads were observed in proximity without engagement; Mean minutes is the average duration mothers were engaged in that alternate activity; Range is the minimum to maximum cumulative minutes a mother was observed engaging in that alternate activity

Conclusion: While it is expected that interruptions to mother-infant interaction in the NICU will occasionally happen, the frequency and duration that some mothers spent on their personal mobile devices is concerning. This phenomenon, termed "technoference" in the emerging empirical literature, poses risks to both facilitating and maintaining quality interactions due to limits on intentional engagement where mothers may miss critical communicative signals from their infants. More research in this area is necessary to determine the underlying rationale for prolonged cell phone use by mothers in the NICU as well as the short- and long-term impact this behavior may have on the early development on maternal sensitivity and contingent responsiveness during the NICU hospitalization and beyond discharge.

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Learning Objectives:

1. Participants will identify barriers and facilitators to quality mother-infant interactions in the NICU and develop potential mitigation strategies to address these barriers.

2. Participants will learn how using systematic observational methods can be used to understand familial interaction processes in the NICU.

Gravens2022-31

Abstract Title: You've Got Milk: A NICU Lactation Journey

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Background and Purpose: The benefits of human milk feedings have been well established, particularly in preterm infants. However, establishing optimal milk supply for mothers of infants admitted to the NICU comes with unique challenges. Evidence suggests that many mothers of preterm infants have health problems and/or birth complications that impact lactation outcomes such as milk supply and early involution.1,2 These mothers have specific barriers to the initiation and maintenance of lactation 1,2 and may benefit from the specialized skills of a certified lactation consultant (LC). Dedicated NICU LCs have the potential to improve parent satisfaction and maternal well-being.3,4 Historically, despite having access to lactation services via the postpartum unit, our NICU did not have a specialized, dedicated NICU LC. We received direct feedback regarding the lack of lactation support from our Family Advisory Board (former NICU parents). Thus, our Family Centered Care Program initiated a quality improvement project to improve lactation support and the initial lactation consultant visit.

Materials and Methodology: Our 20-bed, community level 3 NICU is located on the Mountain View campus of the El Camino Health system in Santa Clara County, California. The hospital has approximately 4200 newborn deliveries and 450 NICU admissions per year. Our NICU provides care to infants less than 1000g at birth, less than 28 weeks gestational age (GA), and/or those with severe or complex illnesses. The unit is staffed by board-certified neonatologists and does not regularly utilize advanced practice providers. Aim: Our primary aim was to improve the proportion of NICU Mothers being seen by a Lactation Consultant within 24 hours after delivery by 20% from the baseline average of 26% in one year. The secondary aim was for all NICU mothers to be seen by an LC within 48 hours of delivery. Methodology: We recruited a NICU LC with the aim of creating a lactation program. Special emphasis was placed on the timeliness and quality of the initial visit to better support establishment of the mothers' milk supply. Standardized education focused on use of a hospital grade pump to establish optimal milk supply and return demonstration of hand

expression technique to initiate colostrum expression. Follow up visits were then arranged on average twice weekly while the neonate was inpatient. LC reviewed target volumes, infant driven feeding cues, and building skills on latching during this visit. The final visit involved lactation-specific discharge teaching and provision of breastfeeding community resources, including outpatient lactation services. Documentation in the electronic health record (EHR) was completed for each baby. There was an emphasis on team communication in EHR. Data was generated from reports in the EHR, with the timing of "Initial Visit" documentation.

Results: Barriers: Partners of NICU mothers requesting a delay in initial LC consult due to NICU mothers' medical status, inconsistent LC coverage when NICU LC is unavailable, as well as NICU staff and MBU staff adjusting to the new role and new system.

Results: Since the start of this program in June 2021, we have noted an increase in the proportion of NICU mothers being seen within 24 hours of delivery from 26% to 43% (Figure 1) Lactation Consultants were able to see 87-96% of the moms within 48 hours of delivery in the past four months (Figure 2). Mothers were not seen by an LC within 48 hours of delivery due to the barriers listed above. Parents have provided positive verbal feedback about the impact of this project in post discharge follow up phone calls.

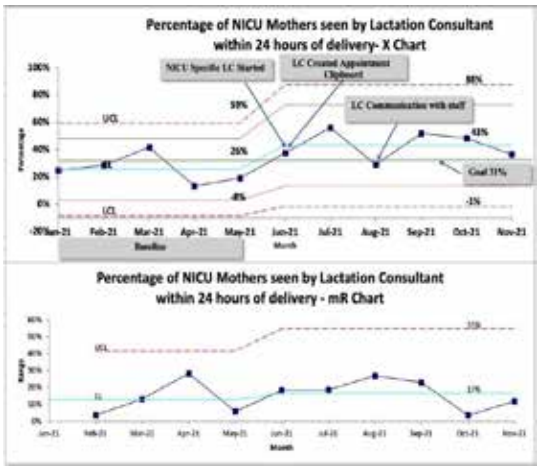

Figure 1

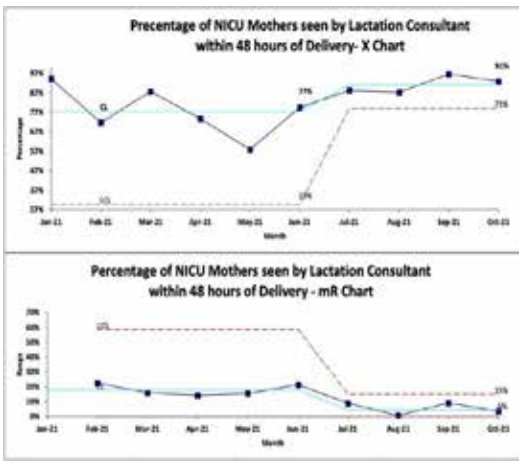

Figure 2

Conclusion: In the first 6 months of establishing a dedicated NICU lactation program we have exceeded our aim of increasing lactation support by a certified LC within the first 24 hours of delivery. Evidence suggests that by improving lactation support during that initial 24 hours and providing consistent follow up during baby's inpatient stay we can optimize parent satisfaction, self-reported maternal well-being, increase milk volumes, and increase the percentage of neonates breastfeeding upon discharge.4,5

Next steps: We have observed a need for staff and family education while initiating this project. Next steps would be to assess their self-reported educational needs regarding lactation services, potentially via survey. Another opportunity for improvement would be to facilitate coordination of El Camino Outpatient Lactation services for all NICU mothers within 7-10 days of their baby's discharge.

Special Acknowledgements: El Camino Health Stanford Neonatology team, NICU Nursing staff, Lactation Services Department, NICU Clinical Nurse Specialist, NICU Nursing Manager, NICU administrative support, Maternal Child Health Director, Family Advisory Board Members, Family Centered Care Committee Members, Gopal Vedartham (EPIC Reporter).

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Learning Objectives:

1. To recognize the importance of providing early lactation support for NICU mothers
2. To learn how to create a NICU-specific lactation program and its benefits

Gravens2022-32

Abstract Title: Quality Improvement Project to Achieve Early Full Enteral Feeds in Preterm Infants at a Level IV Neonatal Intensive Care Unit

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Background and Purpose: In preterm infants early introduction of enteral nutrition has been shown to promote gastrointestinal growth. In the past, early initiation and advancement of enteral feeds was thought to be associated with an increased risk of necrotizing enterocolitis (NEC). However, recent studies support early achievement of full enteral feeds to be safe and associated with reduction in central line and total parental nutrition (TPN) days. The aim of this quality improvement (QI) project was to achieve full enteral feeds 20% sooner (from average 13.3 days to 10.6 days) in preterm infants at Connecticut Children's Medical Center Level IV Neonatal Intensive Care Unit (NICU) by December 2021.

Materials and Methodology: A multidisciplinary team identified key drivers to improve time to full enteral feeds. The primary drivers were (1) obtaining early donor human milk (DHM) consent, within 9 hours of life (HOL); (2) initiating early trophic feeds within 12 HOL; and (3) modifying enteral feeding guideline by reducing trophic feeds duration and faster advancement to full enteral feeds.

Prior to initiation of this QI project, in our unit preterm infants' enteral feeds were initiated within 24-48 HOL with a conservative feeding advancement guideline. In our NICU, DHM usage criteria include BW<1.8 kg and/or gestational age <32 weeks. The inclusion criteria for our project were inborn infants with BW<1.8 kg. The exclusion criteria were infants with congenital anomalies, transferred out prior to achievement of full enteral feeds or expired prior to initiation of enteral feeds.

The primary outcome measure was time to achievement of full enteral feeds and secondary outcome measures were total central line and TPN days. The process measures were time in hours to obtain DHM consent and initiation of trophic feed within 12 HOL. The balancing measures included DHM not used in infants where consent was obtained; incidence of feeding intolerance determined by feeds switched from bolus to continuous gastric feeds and the number of abdominal x-rays obtained within the first 30 days; and incidence of NEC (>stage 2).

Baseline data were collected retrospectively for 6 months prior to initiation of our QI project, from 5/1/2020 to 11/23/2020. Prospective data were collected from 11/24/2020 to 10/31/2021.

Results: There was a total of 175 infants. 159 infants data were analyzed; 58 infants in baseline group; and 101 in post-intervention group. 16 infants were excluded. Special cause variation (SCV) was detected for DHM consent time and time to full enteral feeds (Figures 1 and 2). There was a 23% improvement in achievement of full enteral feeds from baseline 13.3 days to 10.3 days post-intervention and DHM consent time improved from 7 hours prior to birth (HPB) to 35 HPB post-intervention. Although SCV was not detected, a 21% improvement in central line days from 16.3 days to 12.9 days post-intervention and a 44% improvement in trophic feeds initiation from 32 HOL to 18 HOL was noted. There was no improvement in TPN days. For our balancing measures, DHM consents obtained but not used decreased from 19% (11/58) to 4% (4/101) and continuous gastric feeds slightly increased from 34% (20/58) to 39% (39/101) post-intervention. There was an increase in number of abdominal x-rays obtained from 3 to 3.3 and incidence of NEC from 3 (5.2%) to 8 (8.9%) post-intervention.

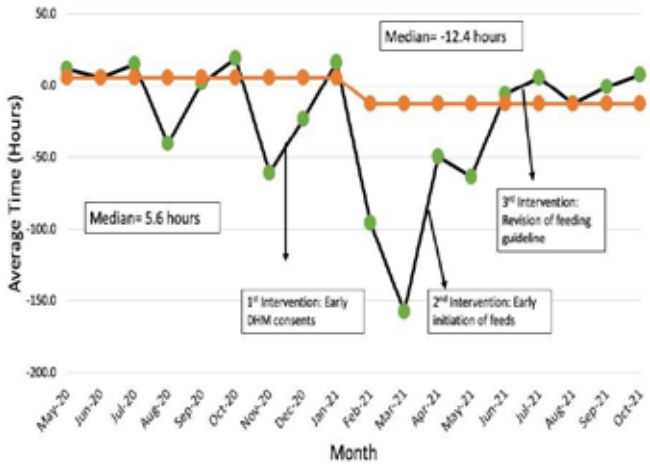

Figure 1. Time to Donor Human Milk Consent in Preterm Infants

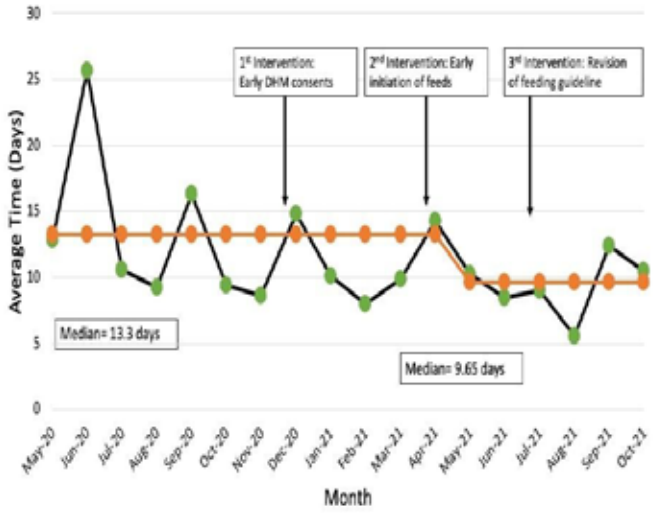

Figure 2. Days to Full Enteral Feeds

Conclusion: Our QI project in preterm infants at the level IV NICU showed that optimization of DHM consents, early trophic feeds initiation and modification of our feeding guideline led to earlier

achievement of full enteral feeds. Our next interventions will focus on improvement in TPN days while monitoring our balancing measures.

Learning Objectives:

1. To achieve early full enteral feeds (150 ml/k/day) in preterm infants born with birth weight (BW) less than 1.8 kg in our NICU.
2. To reduce central line and total parental nutrition (TPN) days in preterm infants born with BW<1.8 kg.

Gravens2022-33

Abstract Title: Skin Integrity: Reducing Diaper Dermatitis in the NICU

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Background and Purpose: Although it is difficult to determine the exact prevalence of diaper dermatitis, it is a common occurrence during infancy with published prevalence ranging from 7 percent to 65 percent of infants1,2 and 17 to fifty percent of infants requiring medical intervention3. Diaper dermatitis exists on a continuum with most infants (58%) having a slight rash, 34% having a moderate rash and 8% having a severe rash2. It is found equally among genders and in all ethic groups. Maintaining skin integrity is a vital aspect of neonatal care and remains a common concern in the Neonatal Intensive Care Unit (NICU) at St. Luke's Baptist Hospital with 30% of patients experiencing severe diaper dermatitis during their hospital course. Historically, this NICU has not had specific guidelines to assess severity and treatment and there has been no tracking system used in the unit other than a basic, objective section in the EMR. Each case of diaper dermatitis has been managed by the nurse taking care of the infant. The NICU would have Sensi-Care diaper ointment stocked to use at the nurse's discretion. However, once actual breakdown occurs, the provider would decide the course of action and whether or not to consult wound care. Overall, these practices have led to inconsistent identification and management of diaper dermatitis throughout the unit and subsequently, this has had a negative impact on parent satisfaction regarding the quality of care they perceive their infant to be receiving.

AIM #1: To create a diaper dermatitis algorithm based on evidence-based skin care guidelines and best practices and ensure 100% of the NICU nursing staff is educated and trained on the guidelines and scales being utilized in the algorithm.

AIM #2: To reduce the incidence and severity of diaper dermatitis by utilizing the diaper dermatitis algorithm.

Materials and Methodology: Baseline data revealed that 30% of patients in the NICU at St. Luke's Baptist Hospital experience severe diaper dermatitis during their hospital course. In an effort to reduce the incidence and severity of diaper dermatitis, a multidisciplinary team is currently collaborating to standardize the identification and management of diaper dermatitis. A visual tool illustrating rashes from mild to severe was created by wound care staff and an algorithm based on evidence-based skin care guidelines was created to standardize the management of each stage of diaper dermatitis (FIGURE 1). Further efforts to determine factors contributing to skin breakdown and to develop intervention strategies to treat/prevent diaper rashes are currently underway. After initial implementation of the algorithm, there was confusion regarding how each stage of rash was to be treated. In addition, shortly after implementing the algorithm, there was a supply shortage of a few of the treatment modalities being utilized (including Desitin). It was quickly determined that the team must be proactive with ordering supplies in order to ensure ample supply of topical agents is available due to ongoing warehouse shortages during COVID-19. The algorithm had to be revised to clarify treatment protocols and account for supply shortages. Also, an unexpected obstacle encountered during the project has been an increase number of float nurses staffing the unit due to increase in census. It has proven to be especially difficult to implement a new protocol and collect data without consistent staff.

Baseline: "Assessment of Current Practices, Development of Skin Assessment Tool, and Baseline Data Collection" (April 2021)

• Visual tool created by wound care staff illustrating rashes from mild to severe

Inclusion: • Infants admitted to NICU with stay of >48 hours

Exclusion: • Dermatological conditions or major malformation

PDSA Cycle 1: "Development & Implementation of Algorithm" (April 2021 - August 2021)

• Development of algorithm describing each stage of rash and providing corresponding treatment options

• Provide simple education to all nursing and therapy staff for categorizing skin rashes & using algorithm

• Placement of visual aids on all rolling computers used by nursing staff

PDSA Cycle 2: "Algorithm Revision & Accounting for Supply Shortages" (August 2021 – Current)

• Revision of algorithm based on feedback from nursing and therapy staff and to account for supply shortages of certain treatment modalities

• Creation of back up treatment plans for staff to follow when specific topical agents are backordered

FUTURE: "Ensuring Compliance and Trialing Other Products"

• Ensure algorithm is being utilized from admission until discharge by conducting chart audits to determine how well nursing staff is complying with new protocol

• Assess potential benefits of trialing different brands of diapers and wipes

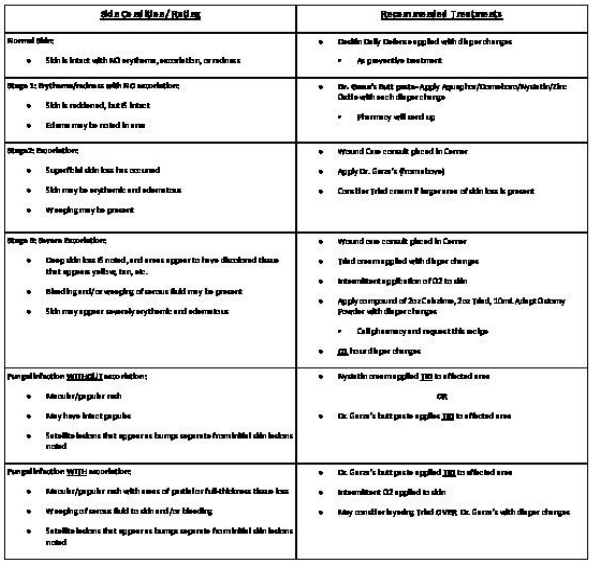

FIGURE 1: Algorithm for Management for Diaper Dermatitis

FIGURE 1: Algorithm for Management of Diaper Dermatitis

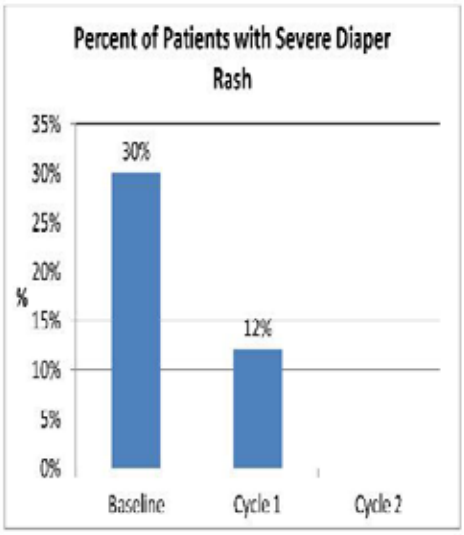

FIGURE 2: Percent of Patients with Severe Diaper Rash

FIGURE 2: Percent of Patients with Severe Diaper Rash

Results: Overall, since implementing the algorithm, the process of evaluating and treating diaper dermatitis has become more streamlined and consistent. In addition, after PDSA cycle 1, the incidence of severe diaper rash has decreased from 30% to 12% (FIGURE 2).

IMPACT: The project unified our unit and showed strengths in our teamwork by using a multidisciplinary approach to implement the algorithm. Obtaining staff feedback during the revision process also facilitated ongoing dialogue between providers and staff members. The project has also revealed that visual tools are more successful at educating nursing staff than verbal education which is information we will be able to take into account during future projects. Ideally, this project will continue to encourage standardized management of diaper dermatitis which will lead to reduced incidence and severity of skin breakdown, improved outcomes, and decreased treatment times.

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2. *Blume-Peytavi, U., & Kanti, V. (2018). Prevention and treatment of diaper dermatitis. Pediatric Dermatology, 35:s19-23. http://doi.org/10.1111pde.13495*
3. *Esser, M.S & Johnson, T. S. (2019). An integrative review of clinical characteristics of infants with diaper dermatitis. Advances in Neonatal Care. 00 (0). 1-10. Doi: 10.1097/ANC.0000000000000682*

Learning Objectives:

1. Be able to differentiate between the three stages of diaper dermatitis.
2. Identify one topical agent used to treat or prevent diaper dermatitis.

Gravens2022-34

Abstract Title: Thermoregulation: A Developmentally Focused, Infant-Driven Transition from Isolette to Open Crib

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Background and Purpose: The timing of weaning from the incubator is important; weaning too early leads to cold stress and increased energy expenditure, whereas a delay in weaning may prolong hospital stay1. In addition, it has been shown that brain

maturity is the primary criteria to predict a successful transfer from the isolette to an open crib rather than weight or postmenstrual age (PMA)2. Historically, in the Neonatal Intensive Care Unit (NICU) at St. Luke's Baptist Hospital, there has been no standardized process for weaning infants from isolette to open crib. Nurses would typically wait for a provider to initiate the wean which led to large variability of transition time depending on provider preference. This caused infants to be weaned too early, lose weight, not maintain temperature, and/or demonstrate a regression in oral feeding cues likely due to sensory overload. At times, variable weaning also led to confusion and frustration amongst families/caregivers as they tend to view transitioning to an open crib as a step towards discharge.

AIM #1: To create a standardized, infant-driven protocol of transition from isolette to open crib that includes thermoregulation, developmental readiness, and weight gain.

AIM #2: To establish a standardized process for thermoregulation practice in the unit that includes a guideline for use of sensory/developmental support systems (positioning devices and grading sensory exposures) for infants during the transition from isolette to open crib.

Materials and Methodology: Based on the initial survey of unit nurses, it was determined that nurses were weaning their patients to open cribs in a variety of ways and most were under the assumption that a provider had to initiate the process. In an effort to ensure a more successful transition from isolette to open crib, a multidisciplinary team of healthcare providers and support staff created an infant-guided transition protocol that considers thermoregulation, developmental readiness, and weight gain.

The project revealed that thermoregulation and feeding readiness did not always occur simultaneously. Many patients were ready to thermoregulate prior to showing consistent signs of feeding readiness and the transition protocol had to be revised to account for this. Also, an unexpected obstacle encountered during the project has been an increase number of float nurses staffing the unit due to increase in census. It has proven to be especially difficult to implement a new protocol and collect data without consistent staff.

In addition, feeding readiness scoring is one of the developmental markers the project is utilizing, but the scoring process is very new and subjective and more staff education may be necessary for it to be a reliable indication of developmental maturity.

Baseline: "Assessment of Current Practices & Baseline Data Collection" (September 2020 – February 2021)

• Assessment of current practices of transition

• Surveyed nurses to assess knowledge regarding current transition practices

PDSA Cycle 1: "Development & Implementation of Transition Protocol" (March 2021 – June 2021)

• Creation of an infant driven transition guideline to establish unit wide change in practices, including:

- Grading of sensory exposures (light and sound)

- Consistent use of new positioning support systems during transition

- Feeding readiness cues as a measure for neurodevelopmental readiness for transition

• Placement of laminated flow charts and data collection sheets at each bedside

• Identification of areas that need adjustment in protocol:

- Infants becoming too hot before meeting feeding readiness criteria

• Established a requirement for providers to place an order for infants to be weaned in order to account for special populations/outliers

PDSA Cycle 2: "Protocol Revision & Implementation of 2- step Protocol" (August 2021 – Current)

• Development of a Two-Step protocol of transition to include thermoregulation readiness followed by developmental readiness prior to transition to open crib (FIGURE 1)

Future: • Reassessment of nursing knowledge (follow up survey)

• Improve bedside signage to guide individualized transition of isolette cover (for graded light/sound) of outliers that don't follow the general protocol

• Develop guidelines to address sensory/developmental needs for special populations requiring longer stay in isolette (IUGR, multiple gestation, BPD, etc)

• Develop criteria for which infants are placed in an isolette on admission

• Determine whether or not average PMA at discharge is affected by transition protocol

Results: Overall, since implementing the protocol, the process of transition has become more streamlined and consistent. Infants are demonstrating greater improvement in oral feeding readiness scores after transitioning to open crib (FIGURE 2). In addition, weight gain after transition remained unchanged after PDSA cycle 1, but may have decreased during cycle 2, which is currently under analysis (FIGURE 3). Lastly, average PMA at time of transition has gradually increased by 2-3 days per cycle (FIGURE 4), but it is unclear if the PMA at time of discharge has been affected.

IMPACT: The project is unifying our unit and showing strengths in our teamwork by using a multidisciplinary approach to implement the transition protocol. Obtaining staff feedback during the revision process is also allowing for ongoing dialogue between providers and staff members. In addition, the project is facilitating family involvement in the unit as the protocol provides nurses with objective criteria to discuss with caregivers when questions regarding weaning arise. Overall, the project is teaching us that an infant's ability to transition to an open crib is a developmental

milestone and should be evaluated as such.

FIGURE 1: Two-Step Transition Protocol

FIGURE 1: Two-Step Transition Protocol

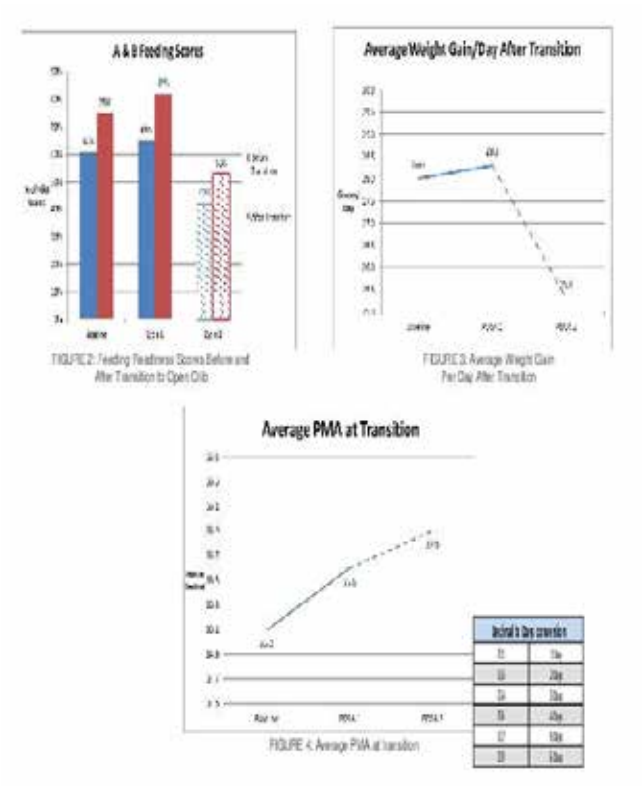

FIGURE 2: Feeding Readiness Scores Before and After Transition to Open Crib FIGURE 3: Average Weight Gain Per Day After Transition FIGURE 4: Average PMA at Transition

References:

1. *Shankaran, Seetha et al. "Weaning of Moderately Preterm Infants from the Incubator to the Crib: A Randomized Clinical Trial." The Journal of pediatrics vol. 204 (2019): 96-102.e4. doi:10.1016/j.jpeds.2018.08.079*

2. *Jacoba, Ani & Casatelli, Joanne. "Developing a guideline for transferring premature infants from an incubator to an open crib." Journal of Neonatal Nursing vol. 26, issue 3 (June 2020): 162-166.*

Learning Objectives:

1. Identify a potential consequence of weaning an infant from an isolette to an open crib too early.

2. Identify a potential consequence of delaying the weaning process.

Gravens2022-35

Abstract Title: Incubator-based noise control system: quantifying size of attenuation zone

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Background and Purpose: The aural stimulation of the hospitalized infant in the neonatal intensive care unit (NICU) from alarms, ventilators, phones, conversations, and air handling system is linked to negative effects on sleep hygiene, weight gain, sensitivity to pain, and vital signs in the short term and in the long term with neural development. Quieter environments have shown improvement in the ratio of quiet to active sleep and weight gain, even over a short study period.

Materials and Methodology: In a realistic NICU environment, this study evaluated performance metrics of a novel incubator-based active noise control (ANC) system. Three measures of the attenuation performance of a non-contact ANC device (Neoasis, Invictus Medical) were conducted. (1) The amount of attenuation produced by the ANC device was compared to the attenuation achieved by adhesive-affixed earmuffs (MiniMuffs, Natus Medical) in response to 11 alarm and voice sound sequences (Table 1). (2) The sound attenuation zone size of the ANC device was measured in response to these 11 sound sequences. (3) Sound attenuation of the ANC device was evaluated in three different NICU room configurations with the 11 sound sequences to determine the flexibility of the device to work in different conditions. Attenuation measurements were reported for the louder of the two ears under all test conditions.

Testing was conducted in a NICU simulator training room at the Children's Hospital of San Antonio. The ANC device was deployed in a Giraffe Omnibed incubator (GE Healthcare) and the 11 sound sequences were generated by a recorded male and female voice, a patient monitor (Philips Healthcare), a ventilator (Maquet Medical Systems), and a syringe pump (Medfusion), either singularly or in combinations. A worst case sound sequence was defined in which a high priority alarm from all three devices occurred simultaneously. To ensure testing represented appropriate frequencies, bedside device alarms were selected to represent the expected spectral range of a NICU environment. The preponderance of NICU sound energy is found in the 500 and 1k Hz octave bands. In addition to the alarm and voice signals, all sound sequences included sound from the hospital air handling systems, highway noise through the windows of the NICU room simulator, and occasional voice noise from an adjacent hallway.

A mannequin was placed inside the incubator, the mannequin being equipped with two general purpose array microphones (Model 40PP, GRAS Sound and Vibration A/S) embedded in its head such that the sensing element of each microphone is positioned at the opening of the mannequin's molded ear. The microphones were interfaced to a computer equipped with LabVIEW Development System with the Sound and Vibration Toolkit via a CompactDAQ Chassis containing a Sound and Vibration Input Module (National Instruments).

Using the 11 sound sequences, a comparison was made between the performance of the earmuffs and the ANC device. Sound pressure level (SPL) measurements were made under four test conditions including (1) no attenuation (control), (2) ANC device, (3) earmuffs, and (4) earmuffs positioned on hair. A-weighted SPLs for seven octave bands were calculated for each sound sequence.

To evaluate the sensitivity of the ANC device to positioning or movement of the infant in an incubator, measurements were made with the test mannequin place in six positions within a 24cm by 8cm region.

The attenuation performance of the ANC device was evaluated with the incubator and bedside devices arrayed in three different room configurations for all 11 sound sequences.

Results: For seven of the 10 alarm-based sound scenarios, the ANC device had better attenuation than the earmuffs (Table 2). For the remaining three alarm-based sound scenarios, neither earmuffs or the ANC device provided attenuation greater than a just noticeable difference. These three sound scenarios consisted of a primary frequency in either the high end of the 1kHz octave band or the 2kHz octave band. These tones are passively attenuated by the walls of the incubator, resulting in less needed active attenuation. The earmuffs provided 4.7dB attenuation for voice signals, greater than that provided by the ANC device.

Of the 11 sound sequences, alarm sounds with a primary frequency below 500 Hz were well attenuated throughout the 24cm by 8cm measurement region (6.5dB to 10.6dB). For border frequencies (500Hz to 1kHz), the two measurement locations nearest the ANC device provided better attenuation than measurement points further away (average of 5.4dB vs 1.0dB). For frequencies above 2kHz, the ANC device provides no further attenuation; however, the SPL inside the incubator for these sound sequences is consistently below 39dBA, perhaps due to the passive attenuation of the incubator wall.

For all three room configurations, frequency alarm components 1kHz and below were consistently better attenuated than components of 2kHz and above. For all room configurations, any octave bands whose unattenuated SPLs were 35dBA or lower were not meaningfully further attenuated by the Neoasis. For instance, focusing on the worst case sound scenario (simultaneous high priority alarms from a patient monitor, ventilator, and syringe pump) attenuation of 6dB, 8dB, and 8dB was achieved for room configurations 1, 2, and 3, respectively for octave bands of 1kHz and below while for octave bands of 2kHz and above, no further attenuation was provided.

	Device	Brand	Alarm Priority
1	Patient Monitor	Philips	Medium
2	Patient Monitor	Philips	High
3	Ventilator	Maquet	Medium
4	Ventilator	Maquet	High
5	Syringe Pump	Medfusion	Low
6	Syringe Pump	Medfusion	High
7	(1) Syringe Pump (2) Ventilator	Medfusion Maquet	High High
8	(1) Syringe Pump (2) Ventilator	Medfusion Maquet	Low High
9	(1) Syringe Pump (2) Patient Monitor	Medfusion Philips	High Medium
10	(1) Syringe Pump (2) Ventilator (3) Patient Monitor	Medfusion Maquet Philips	High High High
11	Male and Female Voices	N/A	N/A

Table 1. Sound sequences used in performance testing

	Attenuation (dB)	
Sound Sequence	ANC Device	Earmuffs
2	11.7	3.5
3	9.4	7.4
4	8.6	2.6
7	7.0	4.4
10	6.5	5.0
8	5.1	0.2
9	3.3	2.7

Table 2. Highest attenuation of the worst ear for ANC device and earmuffs

Conclusion: A non-contact ANC system provides sound attenuation at least as good as earmuffs and therefore may provide similar clinical benefits as achieved by earmuffs.

Learning Objectives:

1. Potential utility of a non-contact active noise controlA non-contact ANC system provides sound attenuation at least as good as earmuffs and therefore may provide similar clinical benefits as achieved by earmuffs system in a NICU incubator.
2. Clinical benefits of quieter environment within a NICU incubator.

Gravens2022-36

Abstract Title: Characteristics and Outcomes of Neonatal Opioid Withdrawal Syndrome in Preterm Infants: A Retrospective Cohort Study in the Current Era

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Background and Purpose: Opioid use in pregnancy has increased exponentially since the early 2000's, resulting in rising rates of Neonatal Opioid Withdrawal Syndrome (NOWS) and NICU admissions. Characteristics of opioid withdrawal has been well described for term infants, however, data is lacking for preterm infants affected by in-utero opioid exposure. The few existing studies reflect neonates born before 2010, the early phase of this current opioid epidemic, and likely do not reflect current prenatal exposures including increasing fentanyl and polydrug use.

The objective of this study is to describe symptomatology, presentation and treatment of NOWS in preterm (PT) and late preterm (LPT) infants compared to term infants. We hypothesized preterm and late preterm infants will express a different spectrum of withdrawal symptoms, different timing and peak of symptoms, and lower rates of pharmacologic treatment compared to term infants.

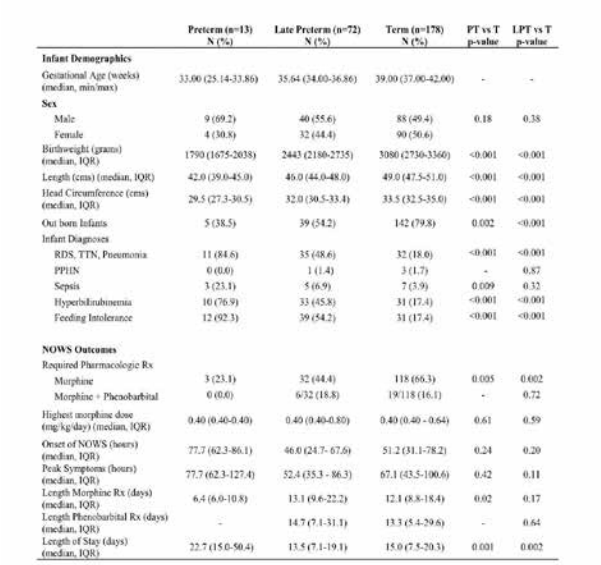
Understanding the timing and presentation of NOWS in the late preterm population is important not only for practitioners in NICU's but in newborn nurseries as well since neonates born as early as 34-35 weeks gestational age can remain with mom and be discharged home shortly after birth. Our hope is to provide more information that will help guide physicians and practitioners caring for preterm and late preterm neonates with in-utero opioid exposure.

Materials and Methodology: This was a retrospective chart review of 340 mother-infant diads' admitted to a single tertiary care center between January 2014 and December 2019, with IRB approval. Infants were categorized by gestational age: term (>37 weeks), LPT (34 and 0/7 weeks to 36 and 6/7 weeks) and PT (< 34 weeks). Inclusion criteria: admission within the first 7 days of life with a history of maternal opioid use during pregnancy and/or positive maternal or infant toxicology screen. Exclusion criteria: received opioids prior to transfer or for any treatment other than NOWS, Grade 3-4 intraventricular hemorrhage, neonatal encephalopathy, and any congenital anomalies affecting the central nervous system (CNS). Modified Finnegan Scores were used to assess withdrawal symptoms and were obtained on admission per protocol. Only scores obtained from our NICU or step-down unit beginning with admission were included in the analysis. The single highest total Modified Finnegan score was used for analysis, if treatment was initiated the highest score prior to treatment was used. Our primary outcome was to describe the symptomatology and timing of NOWS in preterm and late preterm infants compared to term infants. Our secondary outcomes were to describe timing of peak symptoms and rate of pharmacologic treatment in preterm and late preterm infants compared to term infants. A limitation encountered was ensuring the identification of all in-utero opioid exposed infants. To increase the identification of infants both a unit database of infants with opioid exposure and medical record searches using International Classification of Diseases, Ninth Revision (ICD-9) and International Classification of Diseases, Tenth Revision (ICD-10) codes were utilized. Another limitation was the small number of preterm infants in our study, due to a large number of preterm infants being excluded as they were not monitored for NOWS.

Results: There were 263 infants who met criteria: 13 preterm, 72 late preterm, and 178 term infants, with 77 infants excluded based on the defined criteria. A similar onset of NOWS (46 vs 51.2 hours, p=0.20) and peak symptoms (52.4 vs 67.1 hours, p=0.11) was observed in late preterm infants compared to term. Highest total Finnegan scores were lower in late preterm infants compared to term infants, (9 vs 12 p<0.001), with LPT infants scoring less frequently for increased muscle tone (85.5 vs 96.6%, p=0.006), excoriations (18.8 vs 34.5%, p=0.02), fever (63.8 vs 91.2%, p<0.001) and sucking (65.2 vs 77.7%, p=0.05). PT and LPT infants received less pharmacologic treatment when compared to term (23.1 and 45.7 vs 70.1%, p=0.003 and p<0.001, respectively). Duration of treatment, adjunctive medication use, and maximum morphine dose were similar in LPT and term infants.

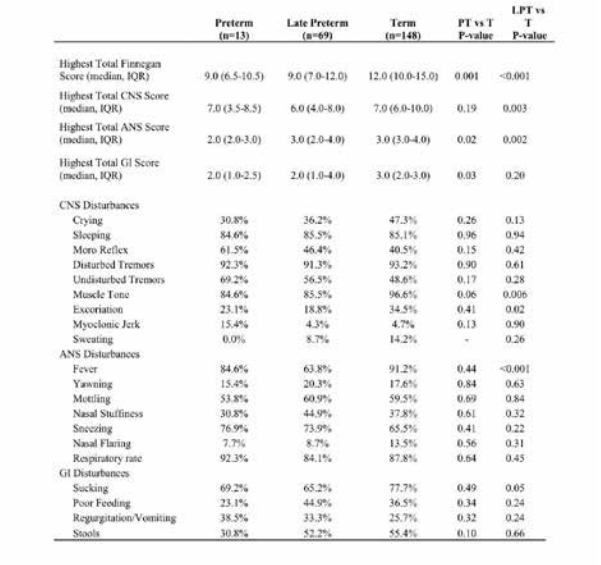
Conclusion: Understanding the timing and presentation of NOWS in LPT infants is important as discharge can occur in the first few days of life. The onset of NOWS in LPT infants was similar to term, allowing for the same duration of monitoring for withdrawal. PT and LPT infants received less pharmacologic treatment and exhibited lower CNS, ANS and overall Finnegan scores compared to term. We believe this is related to the infants' physiologic im-

maturity which has been suggested by previous investigators, but also brings to question the ability of current opioid withdrawal tools' to accurately assess withdrawal in preterm infants.



	Preterm (n=13) N (%)	Late Preterm (n=72) N (%)	Term (n=178) N (%)	PT vs T p-value	LPT vs T p-value
Infant Demographics					
Gestational Age (weeks) (median, min/max)	33.00 (25.14-33.86)	35.64 (34.00-36.86)	39.00 (37.00-42.00)	-	-
Sex					
Male	9 (69.2)	40 (55.6)	88 (49.4)	0.18	0.38
Female	4 (30.8)	32 (44.4)	90 (50.6)		
Birthweight (grams) (median, IQR)	1790 (1675-2038)	2443 (2180-2735)	3080 (2730-3360)	<0.001	<0.001
Length (cms) (median, IQR)	42.0 (39.0-45.0)	46.0 (44.0-48.0)	49.0 (47.5-51.0)	<0.001	<0.001
Head Circumference (cms) (median, IQR)	29.5 (27.3-30.5)	32.0 (30.5-33.4)	33.5 (32.5-35.0)	<0.001	<0.001
Out born Infants	5 (38.5)	39 (54.2)	142 (79.8)	0.002	<0.001
Infant Diagnoses					
RDS, TTN, Pneumonia	11 (84.6)	35 (48.6)	32 (18.0)	<0.001	<0.001
PPHN	0 (0.0)	1 (1.4)	3 (1.7)	-	0.87
Sepsis	3 (23.1)	5 (6.9)	7 (3.9)	0.009	0.32
Hyperbilirubinemia	10 (76.9)	33 (45.8)	31 (17.4)	<0.001	<0.001
Feeding Intolerance	12 (92.3)	39 (54.2)	31 (17.4)	<0.001	<0.001
NOWS Outcomes					
Required Pharmacologic Rx					
Morphine	3 (23.1)	32 (44.4)	118 (66.3)	0.005	0.002
Morphine + Phenobarbital	0 (0.0)	6/32 (18.8)	19/118 (16.1)	-	0.72
Highest morphine dose (mg/kg/day) (median, IQR)	0.40 (0.40-0.40)	0.40 (0.40-0.80)	0.40 (0.40 - 0.64)	0.61	0.59
Onset of NOWS (hours) (median, IQR)	77.7 (62.3-86.1)	46.0 (24.7- 67.6)	51.2 (31.1-78.2)	0.24	0.20
Peak Symptoms (hours) (median, IQR)	77.7 (62.3-127.4)	52.4 (35.3 - 86.3)	67.1 (43.5-100.6)	0.42	0.11
Length Morphine Rx (days) (median, IQR)	6.4 (6.0-10.8)	13.1 (9.6-22.2)	12.1 (8.8-18.4)	0.02	0.17
Length Phenobarbital Rx (days) (median, IQR)	-	14.7 (7.1-31.1)	13.3 (5.4-29.6)	-	0.64
Length of Stay (days) (median, IQR)	22.7 (15.0-50.4)	13.5 (7.1-19.1)	15.0 (7.5-20.3)	0.001	0.002

Table 1. Infant Demographics and NOWS Outcomes To compare group differences in continuous measures, Kruskal-Wallis tests were performed and, when significant, followed up by Dunn post-hoc tests, when not significant, followed by Mann-Whitney U tests (between pairs of groups). Logistic regression was used to determine group differences in the presence/absence of dichotomous measures. Key: PT= Preterm, LPT= Late Preterm, T=Term, IQR= Interquartile Range 25-75, RDS = Respiratory Distress Syndrome, TTN= Transient Tachypnea of Newborn, PPHN= Persistent Pulmonary, Hypertension, Rx= Treatment



	Preterm (n=13)	Late Preterm (n=69)	Term (n=148)	PT vs T P-value	LPT vs T P-value
Highest Total Finnegan Score (median, IQR)	9.0 (6.5-10.5)	9.0 (7.0-12.0)	12.0 (10.0-15.0)	0.001	<0.001
Highest Total CNS Score (median, IQR)	7.0 (3.5-8.5)	6.0 (4.0-8.0)	7.0 (6.0-10.0)	0.19	0.003
Highest Total ANS Score (median, IQR)	2.0 (2.0-3.0)	3.0 (2.0-4.0)	3.0 (3.0-4.0)	0.02	0.002
Highest Total GI Score (median, IQR)	2.0 (1.0-2.5)	2.0 (1.0-4.0)	3.0 (2.0-3.0)	0.03	0.20
CNS Disturbances					
Crying	30.8%	36.2%	47.3%	0.26	0.13
Sleeping	84.6%	85.5%	85.1%	0.96	0.94
Moro Reflex	61.5%	46.4%	40.5%	0.15	0.42
Disturbed Tremors	92.3%	91.3%	93.2%	0.90	0.61
Undisturbed Tremors	69.2%	56.5%	48.6%	0.17	0.28
Muscle Tone	84.6%	85.5%	96.6%	0.06	0.006
Excoriation	23.1%	18.8%	34.5%	0.41	0.02
Myoclonic Jerk	15.4%	4.3%	4.7%	0.13	0.90
Sweating	0.0%	8.7%	14.2%	-	0.26
ANS Disturbances					
Fever	84.6%	63.8%	91.2%	0.44	<0.001
Yawning	15.4%	20.3%	17.6%	0.84	0.63
Mottling	53.8%	60.9%	59.5%	0.69	0.84
Nasal Stuffiness	30.8%	44.9%	37.8%	0.61	0.32
Sneezing	76.9%	73.9%	65.5%	0.41	0.22
Nasal Flaring	7.7%	8.7%	13.5%	0.56	0.31
Respiratory rate	92.3%	84.1%	87.8%	0.64	0.45
GI Disturbances					
Sucking	69.2%	65.2%	77.7%	0.49	0.05
Poor Feeding	23.1%	44.9%	36.5%	0.34	0.24
Regurgitation/Vomiting	38.5%	33.3%	25.7%	0.32	0.24
Stools	30.8%	52.2%	55.4%	0.10	0.66

Table 2. Comparison of Modified Finnegan Scores Kruskal-Wallis tests were used to compare groups on Finnegan scores. Logistic regression was used to determine group differences in the presence/absence of individual items. Key: PT= Preterm, T= Term, LPT= Late Preterm, CNS= Central Nervous System, ANS= Autonomic Nervous System, GI= Gastrointestinal

Learning Objectives:

1. Compare the symptomatology of NOWS in preterm and late preterm infants to term infants.
2. Compare the timing of presentation in preterm and late preterm infants to term infants.
3. Compare the need and length of treatment in preterm and late preterm infants to term infants.

Gravens2022-37

Abstract Title: Empowering Parents, Expediting Discharge, and Promoting Long-Term Feeding Success with Cue-Based Feeding and Telehealth Home NG Follow-Up Clinic

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Background and Purpose: Infants born prematurely and with medical illness experience disruptions and delays to oral feeding skill acquisition resulting in prolonged hospitalization, increased parental stress, and risk of iatrogenic infection. When this occurs, providers and parents feel pressure to speed up the oral feeding acquisition process by using volume-driven feeding strategies that ultimately lead to unsafe and uncomfortable feeding experiences and often result in feeding problems that persist and worsen after discharge.

Materials and Methodology: Our institution established an inpatient and outpatient Cue-Based Feeding program that expanded infant cue-based feeding hospital-wide and established an outpatient telehealth Home NG Follow Up clinic. The outpatient clinic is a multidisciplinary clinic staffed by infant feeding and development experts (pediatric psychologist, speech and language pathologist, registered dietitian, and lactation consultant). It is designed to 1) improve transition of care from inpatient to outpatient, 2) expedite discharge as early as 30% PO, once infants are medically ready,

3) support parents to use evidence-based feeding practices within the comfort of their home to promote safe, efficient, and successful oral feeding skill acquisition and tube weaning, and 4) increase access to specialized feeding support statewide through telehealth services. An inpatient Cue-Based Feeding Team was also established, consisting of pediatric psychologists, a pediatric hospitalist, inpatient speech-language pathologists, infant cue-based feeding technicians, and a registered dietitian. A speech-language pathologist and inpatient cue-based feeding technicians monitor and support parents and staff to implement cue-based feeding practices. The inpatient and outpatient teams coordinate closely to identify infants who meet criteria for expedited discharge to the outpatient Home NG Follow Up Clinic. As soon as these infants are medically ready for discharge and reach 30-40% PO, they are discharged home with weekly telehealth follow-up appointments until they are weaned from the tube. Parent-collected data are reviewed during each appointment including daily oral intake and tube feeding volumes, adverse feeding events and medical/feeding issues that lead to conditioned aversion, and feeding strategies used. Growth is monitored with weekly weights obtained by home nursing, parent scales, or data obtained from PCP visits. Parents are provided with education to continue evidence-based oral feeding techniques and a cue-based approach, redefining success as quality of oral feeding experiences over quantity to advance oral feeding skills and prevent feeding problems. There is a strong emphasis on setting appropriate expectations to minimize feeding-related stress and pressure. Parents are provided breastfeeding support if desired, and they are provided guidance throughout the transition from NG tube feeds to 100% oral feeds. Feeding plans are adjusted to maintain appropriate growth and advance oral intake as needed. To date, we have had 31 infants and families discharged to our clinic. Outcome data are collected via chart review and parent satisfaction surveys administered at discharge. The main outcomes gathered for the clinic include number of bed days saved (decreased length of stay), number of tubes weaned, weight, g-tube placement, feeding-related readmissions, and parent satisfaction.

Results: As shown in Table 1, 31 patients have been discharged to the outpatient Home NG Follow-Up clinic, resulting in 393 total bed days saved (average of 7 bed days per patient when outliers are excluded). Average weight gain was 30.6 grams/day, and all have had tubes weaned, or are on track to be weaned at the time of this submission. One hundred percent (5/5) g-tubes have been prevented for those who were at risk. Twenty-three percent of the patients lived over 50 miles from the institution. All families who responded to the satisfaction survey reported high levels of satisfaction. The following reasons were endorsed by families as the highest contributors to their satisfaction: 1) early discharge from the hospital, 2) more time at home with family and bonding better with their baby, 3) increased confidence with feeding their baby, and 4) reduced stress due to increased support from feeding team.

Conclusion: This model of care provides increased access to specialized multidisciplinary care that facilitates decreased length of stay and promotes efficient, successful tube weaning, prevention of conditioned aversion, high levels of parent satisfaction, and long term feeding success after discharge for families who otherwise would not have access to such services.

Table 1. Home NG Program Outcomes

Total number of patients discharged to clinic to date	31
Total bed days saved`	393
Avg bed days saved (minus outliers)	7
Avg weight change	+30.6 g/day
Total number of tubes weaned	25*
Percentage of g-tubes prevented (of those at risk)	100%
Average length of time followed in clinic (minus outliers)	19 days
Number of feeding-related readmissions	0
Distance from clinic	
0-25 miles	10 (32%)
26-50 miles	14 (45%)
51+ miles	7 (23%)

* those that are not weaned yet are on track to be weaned from tube

Table 1. Home NG Program Outcomes

Table 2. Home NG Follow Up Clinic Satisfaction Survey Results

	Total "Yes" (%)
Are you satisfied with the help you received in the NG Follow-Up Clinic?	6 (100%)
Would you recommend the NG Follow Up Clinic to other families?	6 (100%)
Factors endorsed that contributed to parent satisfaction	
Discharged sooner from hospital	5 (83%)
Able to spend more time caring for my baby	3 (50%)
Able to spend more time at home with other family members	4 (67%)
Able to breast feed more/more easily	2 (33%)
Less financial strain (less gas, lodging, hospital cost, etc)	1 (17%)
Able to bond better with my baby than in the hospital	4 (67%)
More confident feeding my baby	4 (67%)
Less stress because I had a team helping us feed my baby	5 (83%)

Additional comments about the clinic:

"It was great! It was wonderful being able to take my baby home early and give him 100% of his feeds at home. I was able to heal faster, and I think he was able to wean from his tube faster because he was with his parents getting consistent feedings"

Table 2. Home NG Follow Up Clinic Satisfaction Survey Results

Learning Objectives:

1. Understand how long-term feeding problems develop with premature and medically ill infants during and after discharge from the hospital.
2. Describe an inpatient and outpatient cue-based feeding model that promotes safe, efficient oral feeding skill acquisition, decreases length of stay, and prevents long-term feeding disorders and tube dependency.

Gravens2022-38

Abstract Title: An Educational Approach to Increase the Use of Kangaroo Care in the Neonatal Intensive Care Unit

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Background and Purpose: Kangaroo care (KC) is associated with better quality outcomes during hospitalization.1 This project examined prevalence of KC in the neonatal intensive care unit (NICU) of Cincinnati Children's Hospital Medical Center (CCHMC). A needs assessment determined that the unit goal was to have 20% of patients receive KC at least once during their stay and the rate was only 6.4%. PURPOSE: The purpose of this project was to asynchronously educate nurses on KC practice and monitor for an observable change in the prevalence of KC following the education.

Materials and Methodology: A quality improvement (QI) project was conducted at CCHMC. The target population were NICU nurses who were hired to staff the private room pods. The intervention was an educational video portraying proper KC for eligible NICU patients. Quantitative and qualitative data were collected.

Results: Twenty-four nurses from the NICU participated. The rate of eligible patients who received KC increased by 5.9%. The total number of occurrences of KC increased by 56.2%. Nurses who offered KC 1 to 3 times per week increased by 13%.

Conclusion: IMPLICATIONS FOR PRACTICE AND RESEARCH: Providing asynchronous video learning increased KC in the setting of this project. The results support the use of continuing education. Results are not generalizable to other institutions and therefore further effort is needed to determine if continuing education will yield similar outcomes in other NICUs.

Figure 1.

Learning Objective:

Of the objectives of this project, perhaps the main ones were to educate nurses regarding best practice when teaching parents about kangaroo care as well as to give nurses the tools they need to assist families with kangaroo care based on the hospital guideline. Through this education, the goal was to increase the number of nurse-documented occurrences of kangaroo care. The documentation of kangaroo care is key to knowing if the intervention is being utilized within the NICU.

Gravens2022-39

Abstract Title: Understanding the Couplet Care Environment and its effect on bonding between the mother and infant dyad

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Background and Purpose: The evolution of neonatology began with small rooms carved out from newborn nurseries, then evolved into bright, noisy, crowded, and sometimes windowless units. More recently, hospitals are providing single-family rooms (SFR) where the parents can reside with their babies, with evidence that SFRs are associated with increased family-centered care, breastfeeding, and parent visitation (Lester et al., 2014). There is an emerging model of care for the mother-baby dyad called 'couplet care' that lays even further along the spectrum of family integration. Instead of separating the mother and baby, the guiding principle is to keep the mother and baby together after delivery. It is a novel approach that aims to deliver intensive care to relatively low needs newborns and their postpartum mothers in a shared room (White, 2016).

Couplet care has been introduced in a few healthcare facilities in the United States and there is ongoing research on the outcomes. Two such facilities are Yale-New Haven Hospital in Connecticut and Memorial Hospital in South Bend, Indiana, the latter of which will serve as the site for data collection and tool validation in this study. Providing a mother with postpartum care in the same room where her infant receives NICU care provides physical proximity that increases opportunities for skin-to-skin time, breastfeeding, and bonding, three interrelated activities that enhance short- and long-term physical and emotional well-being for mother and infant. Recent literature suggests that SFR design is associated with more skin-to-skin time as well as longer duration of breastfeeding compared to an open bay layout (Tandberg et al., 2018; Domanico et al., 2011). In addition, skin-to-skin contact is associated with improved maternal-infant attachment (Cho et al., 2016), a greater maternal sense of confidence and competence in caring for her infant (Jaafar, Ho & Lee, 2016), higher levels of breastfeeding after hospital discharge which is associated with decreased rates of postpartum depression in mothers (Kuhnly, 2018). Increased parental stress in the Neonatal ICU has been associated with sever-

al undesirable outcomes in infants such as delayed lactogenesis and decreased rates of breastfeeding (Dimitraki et al., 2016; Catala, Peñacoba, Carmona, & Marin, 2018), delayed mother-infant bonding (Feldman et al., 1999; Bystrova et al., 2009), decreased parental confidence (Ong et al., 2019) and comfort with parenting roles (Al Maghaireh et al., 2016)

Purpose: The overall aim of the study is to identify the outcomes associated with the Neonatal Intensive Care Unit (NICU) and the Couplet Care Experience (CCE). The primary aim of this study is to validate the tool developed at Yale New Haven Hospital (YNHH) that measures the effect of exposure to CCE on maternal-infant bonding during hospitalization. Secondary aims are to determine associations between elements of the CCE (degree of infant holding, kangaroo care or skin-to-skin contact, and breastfeeding), maternal stress, and hospital stay satisfaction.

Materials and Methodology: Hypothesis: The primary hypothesis is that the CCE at Memorial Hospital will be comparable to the NICU at YNHH in terms of a positive association with maternal-infant bonding, hospital stay satisfaction, and lower maternal stress while in-hospital. The secondary hypothesis is that certain elements of the couplet care experience such as noise, lighting, proximity, and equipment will have stronger positive associations with maternal infant-bonding, hospital stay satisfaction, and a negative association with maternal stress.

Research question: What is the effect of the couplet care environment on bonding between mother and child as compared to bonding in other NICU models?

Independent variables: Physical proximity between mother and baby, acoustics, lighting, illness of mother and baby

Dependent variables: Skin-to-skin contact, length of stay, hospital stay satisfaction

Methodology: This is a prospective, cohort study involving a mixed methods approach to collecting qualitative and quantitative data. Eligible mothers will be screened upon their infants' admission to the NICU at Memorial Hospital, South Bend and will be presented the study poster by nursing staff as a means of recruitment. Targeted enrollment is 30 participants for the survey and 10 participants for the follow-up interview. Primary outcomes of interest will include scores on a neonatal experience survey and a qualitative interview. These outcomes will be compared between mothers who are exposed to couplet care and those who are not, controlling for baseline characteristics. Surveys will be administered during birth hospitalization. Interested participants will be invited to participate in a follow-up interview where they will be asked to describe their experience with the CCE model in detail.

Results: Outcome measurements: Primary outcomes of interest included scores on several self-report surveys as well as time spent engaged in kangaroo care, parent satisfaction with their hospital experience, as well as amount of education received from nursing. These outcomes were compared between mothers who are exposed to couplet care and those who are not, controlling for baseline characteristics. Surveys were administered during birth hospitalization and interested participants were invited to participate in a follow-up interview where they were asked to describe their CCE experience in detail.

Impact: Although there have been several studies on associated stressors in a traditional NICU, it has not been studied in mother-infant dyads who receive co-care. NICU couplet care is a novel approach that is seeing an increase in adoption rates in numerous hospitals across the United States. To our knowledge, very few studies exist that examine the outcomes associated with this type of NICU design.

Barriers to implementation: Due to the COVID-19 pandemic, data collection was primarily conducted remotely in coordinating with the care team at Memorial Hospital, South Bend.

Conclusion: This study identifies the strength and weaknesses of NICU models. The results from this study will provide an evidence-base case for medical planners to develop facility guidelines as well as for clinicians to perform clinical practice improvements in their NICUs.

Figure 1. Understanding the physical NICU environment: the relationship between constructs and variables.

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Learning Objectives:

1. Understanding the need for future iterations in NICU design
2. Understanding the CCE from the perspective of the patient and extended family through qualitative interviews
3. Validating an existing tool and understanding the process of conducting design research

Gravens2022-40

Abstract Title: Organizational Health Literacy: Information and Environmental Assessments of a NICU Follow-Up Clinic

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Background and Purpose: Organizational health literacy is defined by Healthy People 2030 as the degree to which organizations equitably enable individuals to find, understand, and use information and services in informing health-related decisions and actions for themselves and others.1 Growing attention has been given to the role of literacy in health and health care, and the related responsibility of health organizations to improve organizational health literacy, given that the average U.S. adult has 7th grade reading skills.2,3 This is particularly salient in medically and developmentally complex populations, such as NICU graduates, due to the significant additional burden placed on families to navigate multiple levels and types of health services.4 However, little research has been published on the gaps in organizational health literacy for medically and developmentally complex children.

Materials and Methodology: We performed an organizational health literacy assessment in the setting of a follow-up clinic at an urban, quaternary children's hospital that provides medical and developmental evaluation and support post-NICU stay. We completed information (a) and environmental (b) assessments. Trained research assistants performed all assessments and engaged in multiple reliability checks with a third coder to ensure inter-rater reliability.

(a) We evaluated clinic information items [n=9] with the following assessments to gauge reading level, complexity, usability, and actionability.

SMOG (readability) [n=9]

PMOSE/IKIRSCH (document complexity) [n=3]

PEMAT (usability & actionability) [n=7]

(b) We evaluated the clinic environment with the Walking Interview (Health Literacy Environment Activity Packet) [n=2] and the HLE2 (Health Literacy Environment of Hospitals and Health Centers) [n=1].

Results: Overall, assessments revealed that to interact with clinic information items, literacy skills comparable to those of someone with skills at the high school level or beyond were required. SMOG scores indicated a high readability demand [e.g. website, email], requiring 9th-15th grade-level reading skills. PMOSE/IKIRSCH scores indicated a high complexity demand [e.g. charts, tables], requiring 4th-12th grade-level skills. PEMAT scores ranged from 38-75% [usability] and 0-83% [actionability], demonstrating a great range of information usability and actionability. Overall, environmental assessments revealed a mismatch between organizational demands and population literacy skills. Environmental assessment revealed facilitators [i.e. ease of reaching clinic by phone, hospital entryway well-marked] and barriers [i.e. challenging to navigate within hospital to clinic: signage inadequacies, crowded, overwhelming spaces] to navigating processes and physical space. HLE2 scores in 4 areas [i.e. institutional practices, navigation, culture and language, communication] ranged from 0-60%, indicating a need for health literacy to be prioritized at a hospital-systems level.

	Information Assessment Tool			
Material	SMOG (corresponds to Reading Grade Level) *Count NICU GraDS once	PMOSE / IKIRSCH Document Complexity Score (Grade Level)	PEMAT Usability (0-100%)	PEMAT Actionability (0-100%)
	N=9	N=3	N=7	
1. NICU GraDS Welcome Letter	14 (13*)	--	38	0
2. NICU GraDS Q&A	15 (13*)	--	69	60
3. NICU GraDS Website	16 (15*)	--	45	0
4. March of Dimes, Milestones	9	4 (4^{th}-8^{th})	75	83
5. Tips on Communicating	10	--	69	60
6. Oral Health Early Start	10	--	60	60
7. NICU GraDS Family Feedback Form	12	5 (4^{th}-8^{th})	--	--
8. NICU GraDS Referral Contact Sheet	11	6 (8th-12^{th})	--	--
9. NICU GraDS Appointment Email Reminder	11	--	73	60

Figure 1. Clinic informational materials scored by various assessment tools (SMOG, PMOSE/IKRSCH, and PEMAT).

Conclusion: Poor organizational health literacy reduces access for families of medically and developmentally complex children. Addressing barriers to organizational health literacy can improve health equity. As such, organizational health literacy assessment is a crucial aspect of addressing multi-level barriers to optimal outcomes. Assessment results provide concrete ways to address systems-level problems, including structural racism, via quality improvement and policy changes.

Learning Objectives:

1. Explain the relationship between health inequities and organizational health literacy

2. Identify and explore information and environmental health literacy assessment
3. Explore how organizational health literacy assessment can create opportunities for improving health equity, especially among medically and developmental complex children and their families

Health Literacy Environment of Hospitals and Health Centers [0-100%]	
Institutional Practices	**44%**
Part 1: Resources	80%
Part 2: Orientation, Development & Expectations	32%
Orientation	
Development	25%
Expectations	0%
	63%
Navigation	**60%**
Part 1: Arrival	60%
Part 2: Wayfinding	61%
Staff Assistance	84%
Hallways & Navigation Ease	50%
Services & Specialty Areas	13%
Culture & Language	**56%**
Communication	
Print Materials	58%
Forms	0%
Websites	1%
Patient Portals	71%

Figure 2. Health Literacy Environment of Hospitals and Health Centers (HLE-2) scoring of clinic, broken down by section (institutional practices, navigation, culture & language, and communication).

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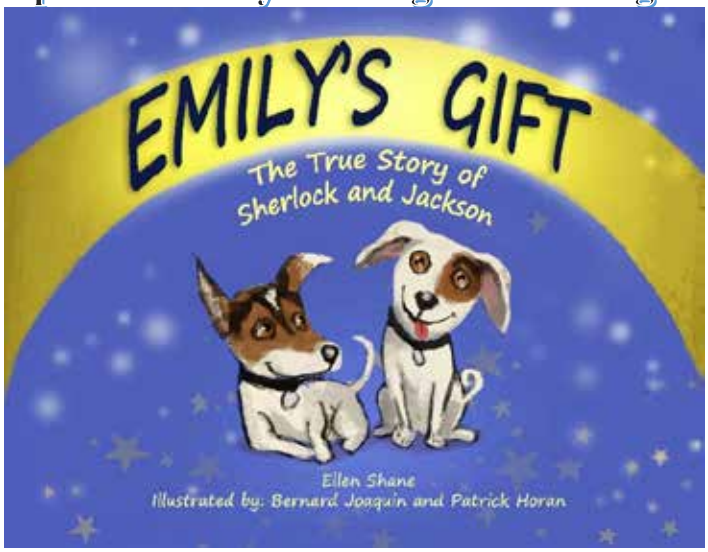

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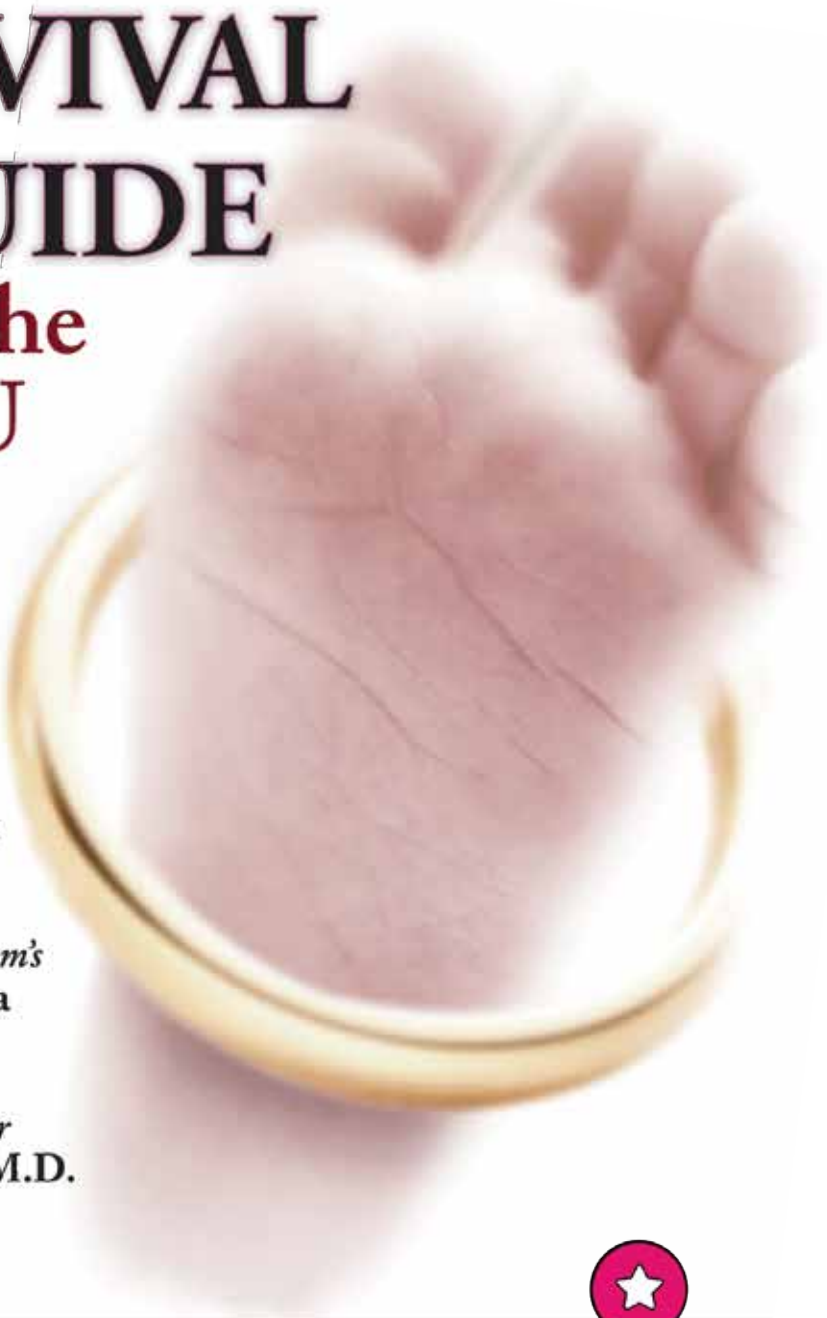
The Preemie Parent's SURVIVAL GUIDE to the NICU



By

little man's
Nicole Conn

&

PreemieWorld.com's
Deb Discenza

with

Medical Editor
Alan R. Spitzer, M.D.

HOW TO MAINTAIN YOUR SANITY & CREATE A NEW NORMAL

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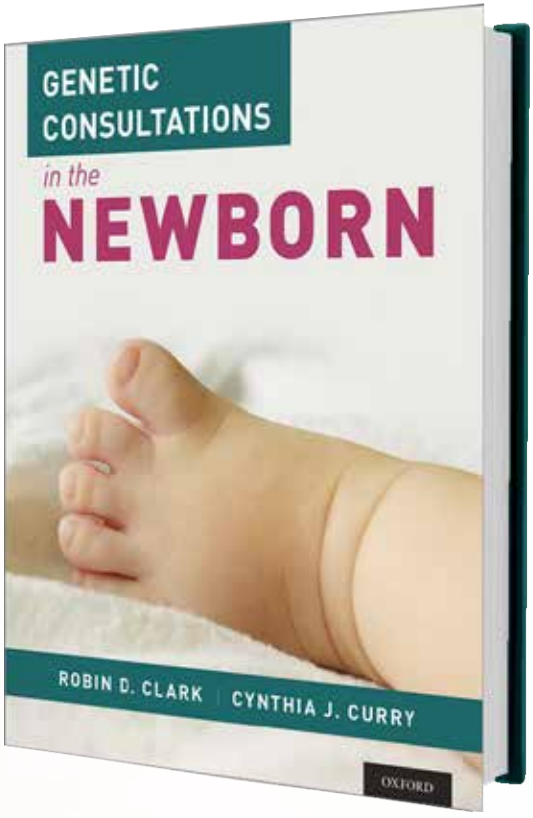

Robin D. Clark | Cynthia J. Curry

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Clinical Pearl: The Clinical Utility of the Kaiser Sepsis Calculator (KSC)

Joseph R. Hageman, MD , Walid Hussein, MD

"It is interesting to talk with my colleagues in the neonatal intensive care unit (NICU) re their feelings about the clinical utility of the KSC."

It is interesting to talk with my colleagues in the neonatal intensive care unit (NICU) re their feelings about the clinical utility of the KSC. I am clinically retired as the NICU Quality Improvement (QI) neonatologist. However, I have reviewed over 1000 babies who received antibiotics in the first 72 hours of their postnatal life between October 2020 and December 2022 in our Illinois Perinatal Quality Collaborative (ILPQC) BASIC Antibiotic Stewardship initiative (1). The KSC was only used in about 1/2 dozen babies thus far in our baseline period out of 1098 babies (J Hageman, personal communication 1/9/2023). However, after my most recent presentation at our Thursday conference, our new QI neonatologist, Dr. Wally Hussain, who has had a lot of experience using the KSC, will start the part of the initiative with a KSC presentation. We will encourage our clinical providers, including our neonatal nurse practitioners and residents, neonatal fellows, and attending neonatologists, to begin to use the KSC in the evaluation of early-onset sepsis (EOS).

"However, after my most recent presentation at our Thursday conference, our new QI neonatologist, Dr. Wally Hussain, who has had a lot of experience using the KSC, will start the part of the initiative with a KSC presentation. We will encourage our clinical providers, including our neonatal nurse practitioners and residents, neonatal fellows, and attending neonatologists, to begin to use the KSC in the evaluation of early-onset sepsis (EOS). "

This is a good segue way to summarize the results of a paper by Hadfield and colleagues in a recent issue of *Hospital Pediatrics* about a nurse-initiated QI project. The venue was a level I nursery and level IV NICU at a County hospital. The KSC was implemented in 53 infants born ≥ 35 weeks gestation preintervention and 51 infants post-intervention, whose mothers had chorioamnionitis (2). The pre-intervention time was six months (August 2020-January 2021), and the protocol implementation period was seven months (March 2021-September 2021) (2). While comparing these periods, complete blood count (CBC) utilization decreased from 96% to 27%, blood culture utilization dropped from 98% to 37%, and antibiotic usage decreased from 25% to 16% (2). In addition, no antibiotics were used against the KSC, and no early onset sepsis was missed, according to the investigators (2).

"While comparing these periods, complete blood count (CBC) utilization decreased from 96% to 27%, blood culture utilization dropped from 98% to 37%, and antibiotic usage decreased from 25% to 16% (2). In addition, no antibiotics were used against the KSC, and no early onset sepsis was missed, according to the investigators (2)."

The KSC is a validated tool that has been successfully utilized in many studies and is recommended as a potential EOS risk assessment tool along with categorical risk assessment and enhanced observation (2). As a result of the utilization of these approaches, there is a significant decrease in broad-spectrum antibiotic utilization, which decreases the separation of the mother-baby dyad, decreased dysbiosis, and decreases antibiotic resistance in newborn infants (2).

"As a result of the utilization of these approaches, there is a significant decrease in broad-spectrum antibiotic utilization, which decreases the separation of the mother-baby dyad, decreased dysbiosis, and decreases antibiotic resistance in newborn infants (2)."

References

1. *www.ILPQC.org.*
2. *Hadfield BR, Rowley J, Puyol F, Johnson MA, et al. Quality improvement through nurse-initiated Kaiser Sepsis Calculator at a County hospital. Hospital Pediatrics 2023; 13(1):*

31-38.

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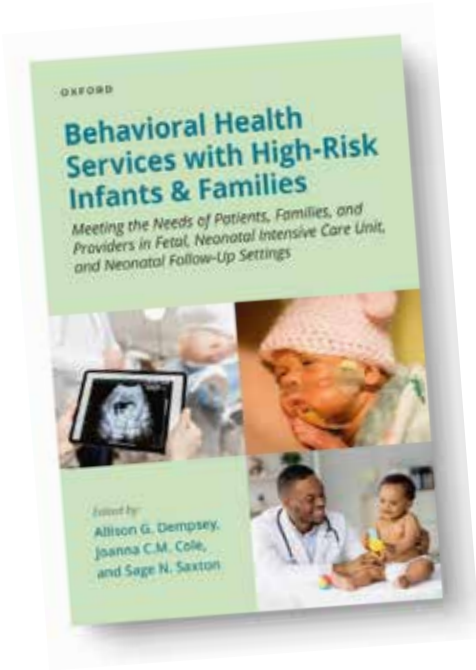
National Network of NICU Psychologists

Education, Resources, and Support for Perinatal Mental Health Professionals



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National Perinatal Association

NATIONALPERINATAL.ORG/PSYCHOLOGISTS

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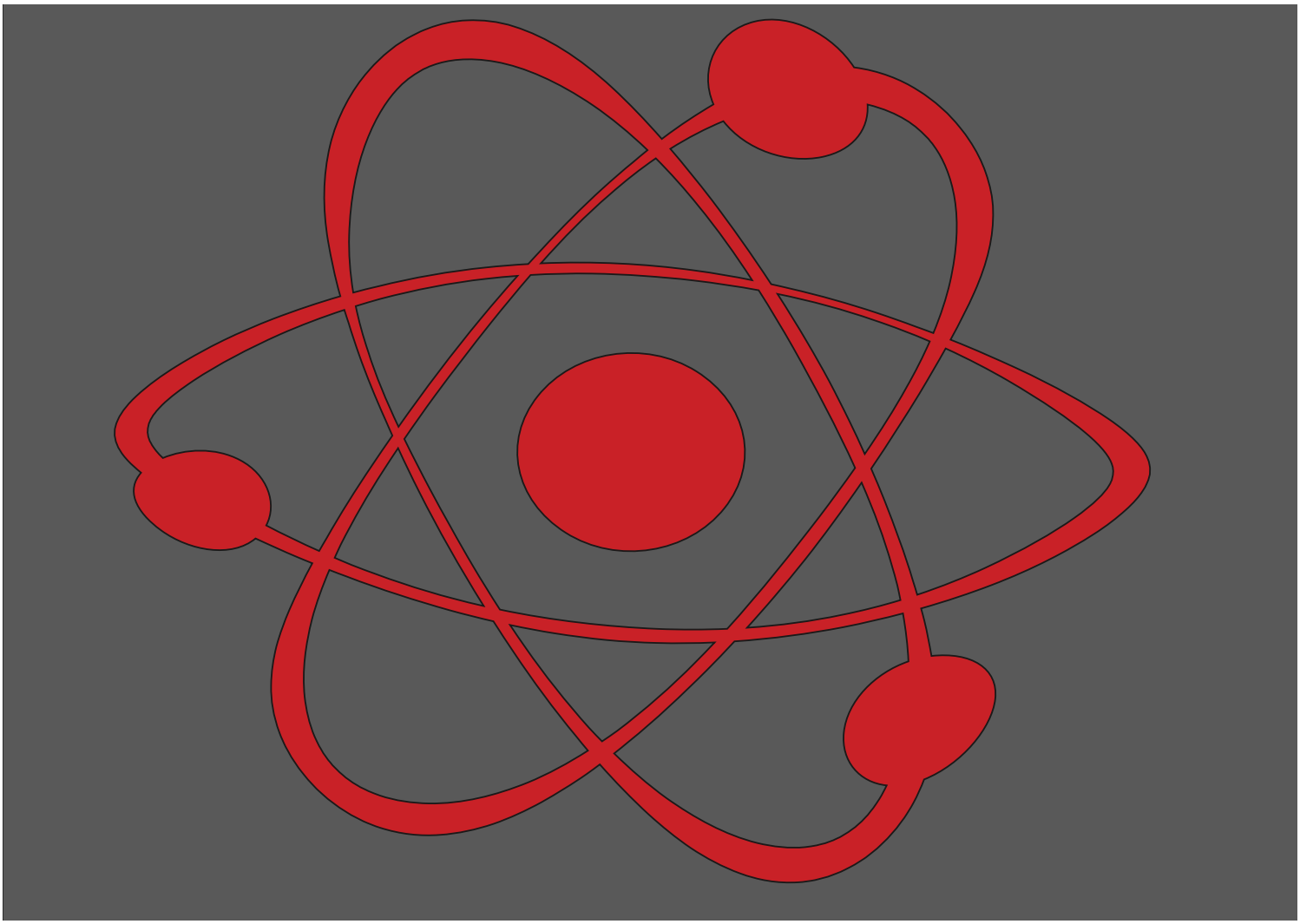

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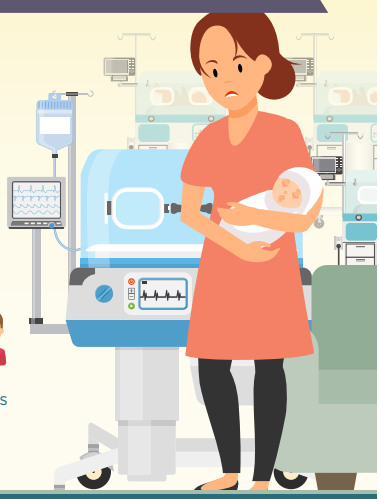
Will your **PRETERM INFANT** *need* **EARLY INTERVENTION** *services?*

Preterm infants are:

2x more likely to have developmental delays

5x more likely to have learning challenges

1 in **3** preterm infants will require support services at school

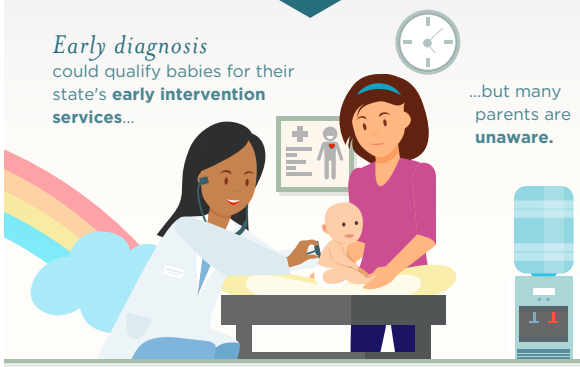


Early intervention can help preterm infants:

- Enhance language and communication skills
- Build more effective learning techniques
- Process social and emotional situations
- Address physical challenges
- Prevent mild difficulties from developing into major problems

Early diagnosis could qualify babies for their state's **early intervention services**...

...but many parents are **unaware.**



NICU staff, nurses, pediatricians and social workers **should talk** with NICU families about the challenges their baby may face.

Awareness, referral & timely enrollment in early intervention programs can help **infants thrive** and grow.

NCFIH National Coalition for Infant Health
Protecting Access for Premature Infants through Age Two
www.infanthealth.org

Visit **CDC.gov** to find contact information for your state's early intervention program.

Las nuevas mamás necesitan acceso a la detección y tratamiento para **LA DEPRESIÓN POSPARTO**

1 DE CADA **7** MADRES AFRONTA LA DEPRESIÓN POSPARTO, *experimentando*

- Llanto incontrolable
- Sueño interrumpido
- Ansiedad
- Desplazamientos en los patrones de alimentación
- Ideas de hacerse daño a sí mismas o al bebé
- Distanciamiento de amigos y familiares

Sin embargo, sólo el 15% recibe tratamiento[1]

LA DEPRESIÓN POSTPARTO **NO TRATADA** PUEDE AFECTAR:

La salud de la madre

El sueño, la alimentación y el comportamiento del bebé a medida que crece[2]

La capacidad para cuidar de un bebé y sus hermanos

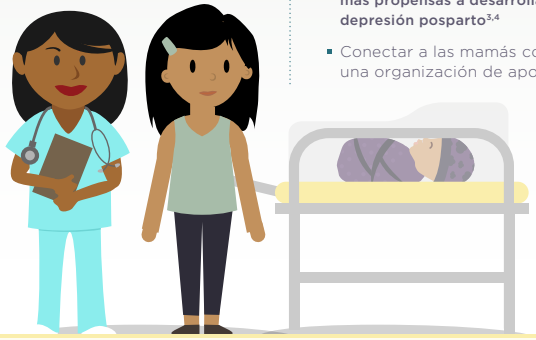
PARA AYUDAR **A LAS MADRES A ENFRENTAR LA DEPRESIÓN POSPARTO**

LOS ENCARGADOS DE FORMULAR POLÍTICAS PUEDEN:

- Financiar los esfuerzos de despistaje y diagnostico
- 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. Accesible en: http://www.apa.org/pi/women/resources/reports/postpartum-depression.aspx
[2] National Institute of Mental Health. Accesible en: https://www.nimh.nih.gov/health/publications/postpartum-depression-facts/index.shtml
[3] Journal of Perinatology (2015) 35, 529–536; doi:10.1038/jp.2015.147.
[4] Prevalence and risk factors for postpartum depression among women with preterm and low-birth-weight infants: a systematic review. Vigod SN, Villegas L, Dennis CL, Ross LE BJOG. 2010 Apr; 117(5):540-50.

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- **February** — Why Neonatologists get Sued
- **March** — Diagnosis and Management of the Patent Ductus Arteriosus: The Current State of Confusion
- **April** — Diagnosis, Evaluation and Management of ROP*
- **May** — Lessons Learned from the HEAL Trial

*The April webinar date has been adjusted in observance of Passover

Upcoming Medical Meetings

AAP Workshop on Perinatal Strategies
February 3-5, 2023
Scottsdale, AZ
https://shop.aap.org/2023-workshop-on-neonatal-perinatal-practice-strategies-scottsdale-az/

NEO: The Conference for Neonatology
February 22-24, 2023
Las Vegas, NV
https://www.mednax.com/neo-conference/

California Association of Neonatologists (CAN) Annual Conference
San Diego, CA
March 3-5, 2023
https://canneo.org

36th Annual Gravens Conference on the Environment of Care for High Risk Infants
The Future is Now for Babies, Families, and Systems
Sand Key, FL
March 8-11, 2023
https://paclac.org/https-paclac-org-gravens-conference/

Southeastern Association of Neonatologists (SAN)
Marco Island, FL
May 25-28, 2023
www.southeastneo.com

Perinatal District 8 Conference
June 1-4, 2023
San Diego, CA
https://district8sonpm.org/

Perinatal District 6 Conference
Date: TBA
Chicago, IL
https://www.d6an.org

For up to date Meeting Information, visit NeonatologyToday.net and click on the events tab.

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Outstanding BC/BE Neonatologist Opportunities in Florida's Collier County

Nicklaus Children's Health System and Nicklaus Children's Pediatric Specialists (NCPS), the health system's physician-led multispecialty group practice, have three exceptional opportunities for board-certified or board-eligible (BC/BE) fellowship-trained neonatologists with a minimum of three years of experience (preferred) for a 19-bed Level II NICU located on Florida's Gulf Coast in Collier County.

Each position will be part of a comprehensive perinatal and neonatal program for babies in a Level II NICU. These roles present a unique and exciting opportunity for motivated candidates to flourish in a burgeoning market. Applicants should possess a passion for advocacy and improving care for all children. The BC/BE neonatologists will be responsible for attending deliveries, providing prenatal consultations to high-risk babies, resuscitating and stabilizing newborns in the delivery room, rounding on well babies, as well as provide leadership, oversight and supervision in the Level II nursery. Candidates should be proficient in newborn resuscitation, including neonatal intubation, umbilical line placement and peripheral cannulation, lumbar punctures, etc. These roles offer salaries that are competitive and commensurate with experience.

Nicklaus Children's neonatology program is consecutively ranked among the best in the nation by *U.S. News & World Report*. It was the first of its kind in South Florida and receives referrals of the most critically ill neonates from hospitals throughout Florida, Latin America and the Caribbean. The Level II NICU will be a part of the NCPS Section of Neonatology and the neonatologists will have access to the educational and professional development resources of Nicklaus Children's Health System.

Founded in 1950, the rebranded Nicklaus Children's Hospital, a 309-bed freestanding children's hospital and Level I trauma center, is renowned for excellence in all aspects of pediatric medicine and has numerous subspecialty programs that are routinely ranked among the best in the nation. It is also home to the largest pediatric teaching program in the southeastern U.S. Many of our physicians have trained or worked at other leading medical institutions. Join a phenomenal team that brings lifelong health and hope to children and their families through innovative and compassionate care.

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Joyce Berger, Physician Recruiter

joyce.berger@nicklaushealth.org or 786-624-3510

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The Loma Linda University Health's Clinical Trial Center is actively seeking and recruiting top clinical research coordinator talent.

Our mission is to participate in Jesus Christ's ministry, bringing health, healing, and wholeness to humanity by Creating a supportive faculty practice framework that allows Loma Linda University School of Medicine physicians and surgeons to educate, conduct research, and deliver quality health care with optimum efficiency, deploying a motivated and competent workforce trained in customer service and whole-person care principles and providing safe, seamless and satisfying health care encounters for patients while upholding the highest standards of fiscal integrity and clinical ethics. Our core values are compassion, integrity, humility, excellence, justice, teamwork, and wholeness.

Able to read, write and speak with professional quality; use computer and software programs necessary to the position, e.g., Word, Excel, PowerPoint, Access; operate/troubleshoot basic office equipment required for the position. Able to relate and communicate positively, effectively, and professionally with others; provide leadership; be assertive and consistent in enforcing policies; work calmly and respond courteously when under pressure; lead, supervise, teach, and collaborate; accept direction. Able to communicate effectively in English in person, in writing, and on the telephone; think critically; work independently; perform basic math and statistical functions; manage multiple assignments; compose written material; work well under pressure; problem solve; organize and prioritize workload; recall information with accuracy; pay close attention to detail. Must have documented successful research administration experience focused on managing clinical trials function. Able to distinguish colors as necessary; hear sufficiently for general conversation in person and on the telephone; identify and distinguish various sounds associated with the workplace; see adequately to read computer screens and written documents necessary to the position. Active California Registered Nurse (RN) licensure preferred. Valid Driver's License required at time of hire.

The Clinical Trial Center is actively involved in many multi-center global pediatric trials, which span different Phases of research to advance health care in children. Please reach out to Jaclyn Lopez at 909-558-5830 or JANLopez@llu.edu with further interest. We would love to discuss the exciting research coordinator opportunities at our Clinical Trials Center.

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For more information, please contact:

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BEST CHILDREN'S HOSPITALS U.S.News & World Report NEONATOLOGY 2022-23

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https://www.nc3rs.org.uk/arrive-guidelines

http://www.icmje.org

https://olaw.nih.gov/policies-laws/phs-policy.htm

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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.

This month we continue to feature artistic works created by our readers on one page as well as photographs of birds on another. This month's original artwork again features Paula Whiteman, MD who submitted a very inspiared drawing of the great Martin Luther King, Jr.. Our bird of the month is submitted by Mita Shah, MD. This is Prize Winning

Mita Shah, MD,
Neonatal Intensive Care Medical Director
Queen of the Valley Campus
Emanate Health, West Covina, CA

NT

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, SVG, or pdf) for each figure. Preferred formats are ai, SVG, psd, or pdf. tif and jpg images with 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.

3. There is no charge for submission, publication (regardless of number of graphics and charts), use of color, or length. Published content will be freely available after publication. There is no charge for your manuscript to be published. NT does maintain a copyright of your published manuscript.

4. The title page should contain a brief title and full names of all authors, their professional degrees, their institutional affiliations, and any conflict of interest relevant to the manuscript. The principal author should be identified as the first author. Contact information for the principal author including phone number, fax number, e-mail address, and mailing address should be included.

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 10,000 words. Abbreviations which are commonplace in neonatology or in the lay literature may be used.

8. References should be included in standard "NLM" format (APA 7th is no longer acceptable). 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.

10. Only manuscripts that have not been published previously will be considered for publication except under special circumstances. Prior publication must be disclosed on submission. Published articles become the property of the Neonatology Today and may not be published, copied or reproduced elsewhere without permission from Neonatology Today.

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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.

Please submit your manuscript to: LomaLindaPublishingCompany@gmail.com

NICU Baby's Bill of Rights

1- The Right to Advocacy
My parents know me well. They are my voice and my best advocates. They need to be knowledgeable about my progress, medical records, and prognosis, so they celebrate my achievements and support me when things get challenging.

2- The Right to My Parents' Care
In order to meet my unique needs, my parents need to learn about my developmental needs. Be patient with them and teach them well. Make sure hospital policies and protocols, including visiting hours and rounding, are as inclusive as possible.

3- The Right to Bond with My Family
Bonding is crucial for my sleep and neuroprotection. Encourage my parents to practice skin-to-skin contact as soon as and as often as possible and to read, sing, and talk to me each time they visit.

4- The Right to Neuroprotective Care
Protect me from things that startle, stress, or overwhelm me and my brain. Support things that calm me. Ensure I get as much sleep as possible. My brain is developing for the first time and faster than it ever will again. The way I am cared for today will help my brain when I grow up. Connect me with my parents for the best opportunities to help my brain develop.

5- The Right to be Nourished
Encourage my parents to feed me at the breast or by bottle, whichever way works for us both. Also, let my parents know that donor milk may be an option for me.

6- The Right to Personhood
Address me by my name when possible, communicate with me before touching me, and if I or one of my siblings pass away while in the NICU, continue referring to us as multiples (twin/triplets/quads, and more). It is important to acknowledge our lives.

7- The Right to Confident and Competent Care Giving
The NICU may be a traumatic place for my parents. Ensure that they receive tender loving care, information, education, and as many resources as possible to help educate them about my unique needs, development, diagnoses, and more.

8- The Right to Family-Centered Care
Help me feel that I am a part of my own family. Teach my parents, grandparents, and siblings how to read my cues, how to care for me, and how to meet my needs. Encourage them to participate in or perform my daily care activities, such as bathing and diaper changes.

9- The Right to Healthy and Supported Parents
My parents may be experiencing a range of new and challenging emotions. Be patient, listen to them, and lend your support. Share information with my parents about resources such as peer-to-peer support programs, support groups, and counseling, which can help reduce PMAD, PPD, PTSD, anxiety and depression, and more.

10- The Right to Inclusion and Belonging
Celebrate my family's diversity and mine; including our religion, race, and culture. Ensure that my parents, grandparents, and siblings feel accepted and welcomed in the NICU, and respected and valued in all forms of engagement and communication.

Presented by:

NPN
NICU PARENT NETWORK

NICU Parent Network

Visit nicuparentnetwork.org to identify national, state, and local NICU family support programs.

*** The information provided on the NICU Baby's Bill of Rights does not, and is not intended to, constitute legal or medical advice. Always consult with your NICU care team for all matters concerning the care of your baby.**

NANT 13 - Call for Abstracts

Presented by the National Association of Neonatal Therapists (NANT)

Conference Dates:

Main Conference: April 14-15, 2023

Pre-Conference: April 13

Location: Tucson, AZ USA*

*Barring any restrictions to the contrary, NANT 13 is scheduled to be held in- person. However, in the event such restrictions occur, the event will be hosted online including all accepted sessions/posters.

The theme for NANT 13 is ***Inspiring Competence & Confidence***.

NANT and our Members aim to deliver best practices for NICU babies and parents all over the world. This advanced practice area requires a high level of competence, fueled by interprofessional collaboration and research.

Competence is not finite—it is an ongoing commitment to the pursuit of scientific knowledge and skill proficiency. We never arrive or are experts in all areas of practice. We rely on each other and use our unique professional lenses and experiences to advance the field of neonatal therapy.

We are calling upon you to share your research and clinical expertise. What can you contribute to the standard of care? How can you fill the gaps in neonatal therapy competency?

NANT intends to develop attendees' confidence to serve, lead, and implement collaboratively. We seek the right individuals, research, and tools to make that happen.

Sharing your valuable work in this internationally attended conference is a powerful way to inspire new levels of competence and confidence in this specialty.

We invite you to submit an abstract to present an oral or poster presentation at NANT 13.

Click here to submit an abstract.

Abstract Submission Deadline: Monday, August 15, 2022

Save the Date for the Second Fragile Infant Forum for the Implementation of Standards (FIFI-S)

January 18-20, 2023

"Implementing Evidence Based Strategies to Alleviate Stress in the Baby and Family in Intensive Care"

For more information contact

PACLAC.org

"Storyteller" painting by Sharron Montague Loree, 1982


MARTIN LUTHER KING JR.
DJW
6/2020