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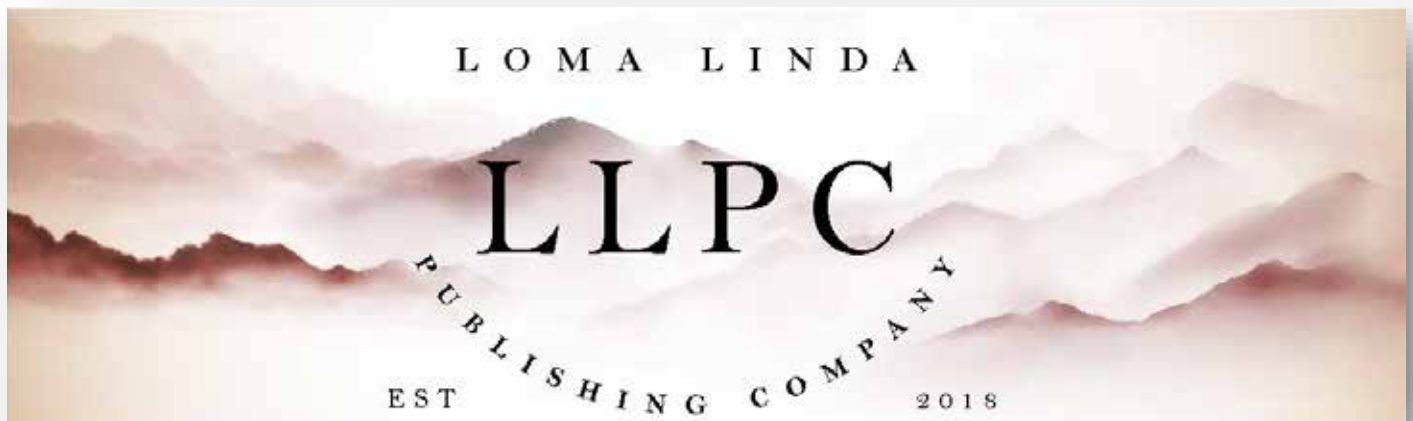
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The Neonatal Early-Onset Sepsis Calculator and Its Impact at a Single Center: A Retrospective Cohort Study

Pooja Rangan MBBS, MPH, Christine Wade, BSN, Becky Micetic, BSN, Suma Rao, MD

Abstract

Objective: To determine whether usage of the Neonatal Early-Onset Sepsis (EOS) Calculator decreases sepsis evaluations, antibiotic administration, length of stay (LOS), and resource utilization when caring for newborns whose mothers were diagnosed with confirmed chorioamnionitis (CAM).

Study Design: This retrospective cohort study enrolled 236 dyads of mothers and newborns (≥ 35 weeks gestation). De-identified data, including newborn antibiotic usage, complete blood counts (CBC), blood cultures, and LOS, were collected one year before and after the 2019 implementation of the EOS calculator. To summarize the data for all study variables, descriptive statistics were utilized. All categorical variables were compared using the Fisher exact or χ^2 test, and the Wilcoxon Rank Sum test was applied for continuous variables.

Results: A significant reduction was seen in the incidence of sepsis evaluations ($P < 0.001$) and antibiotic use ($P < 0.001$) after the implementation of the EOS calculator. An Arizona Medicare reimbursement rate estimation revealed that the median expense of EOS-related care decreased by \$257.89 in infants whose mothers were diagnosed with confirmed CAM ($P < 0.0001$).

Conclusion: The frequency of sepsis evaluations and antibiotic utilization in newborns of mothers diagnosed with confirmed CAM was significantly reduced with the use of the EOS calculator, resulting in decreased resource utilization.

Keywords: Newborn, Infant, Neonatal Sepsis, Blood Cell Count, Reimbursement Rates, Chorioamnionitis, Blood Culture, Length of Stay, Anti-bacterial Agents

“Early onset sepsis (EOS) is a severe neonatal condition occurring within the first 72 hours of life, and its certain diagnosis can be difficult. (1) The vague symptoms can include poor feeding, hypoglycemia, respiratory distress, and apnea.”

Introduction

Early onset sepsis (EOS) is a severe neonatal condition occurring within the first 72 hours of life, and its certain diagnosis can be difficult. (1) The vague symptoms can include poor feeding, hypo-

glycemia, respiratory distress, and apnea. Among upper-income countries, the United States has the highest neonatal mortality rates (4/1000 live births). (2) Sepsis is a predominant contributing factor to neonatal morbidity and mortality. (3,4) Often, chorioamnionitis (CAM), the acute inflammation of amniotic/chorionic membranes, and the fluid surrounding the fetus during pregnancy cause EOS. (5) The presence of one or more of the following maternal risk factors; Group B *Streptococcus* (GBS) colonization, fever (temperature > 38.0 C), and prolonged rupture of membranes (≥ 18 hours) may also result in CAM. (3,6-8)

“Several risk stratification schemes for EOS are recommended by the American Academy of Pediatrics (AAP). The Kaiser Permanente Neonatal EOS Calculator(9) uses its multivariate approach to assess maternal risk factors and the infant’s clinical presentation. (10) ”

Several risk stratification schemes for EOS are recommended by the American Academy of Pediatrics (AAP). The Kaiser Permanente Neonatal EOS Calculator(9) uses its multivariate approach to assess maternal risk factors and the infant’s clinical presentation. (10) Some institutions report the screening and treatment of up to 15% of all newborns for EOS despite the true low incidence at 0.5-1.2 per 1,000 live births. (1) The methods used to screen for sepsis have been extensively evaluated, and the complete blood count (CBC) components are proven to be neither very sensitive nor specific for EOS. (4,11,12) Blood cultures are reliable only when the volume of blood collected is adequate for analysis. Schelonka et al. (13) found it is necessary to have a minimum of 1 to 2 milliliters (mL) of blood collected to detect less than four colony-forming units/mL to ensure sepsis is detected. Up to 60% of cultures will be falsely negative if only a half mL of blood is collected. (13) Additionally, it may take 24 hours or longer for results to return from the laboratory making the timely and accurate diagnosis of EOS difficult. (14) All of these factors may ultimately lead to practitioners prescribing antibiotic therapy in the newborn without the presence of a truly positive blood culture. (3,6)

There are many types of adverse effects associated with early antibiotic administration. A correlation between the development of resistant bacteria and antibiotic overuse has been identified. (3) Antibiotics alter the intestinal microbiome and can be linked to inflammatory bowel disease, obesity, and respiratory disorders later in childhood. (15-17) Also, infants who need intravenous antibiotic administration will likely be cared for in the nursery, thus separated from their mothers for prolonged periods. This may affect the initiation and/or maintenance of breastfeeding and, ultimately,

Table 1 Demographic Characteristics

	Pre (n=111)	Post (n=125)	P-value
Gestational age (weeks)(a)	39 (38-40)	39 (39-40)	0.997
Birth Weight (grams)(a)	3400 (3090-3680)	3440 (3210-3610)	0.503
Race (b)			0.875
American Indian	2 (2)	4 (3)	
Black	11 (10)	13 (10)	
Other/Unknown	6 (5)	5 (4)	
White	92 (83)	103 (83)	
Ethnicity (b)			0.057
Hispanic	61 (55)	63 (50)	

(a) Median (Interquartile Range); (b) n (Percentage)

bonding. (5) For the above reasons, a practitioner must be judicious when prescribing antibiotics for infants with negative blood cultures. (3)

“Recent prospective studies have shown that using an EOS calculator can safely decrease the need for empiric antibiotic treatment, laboratory tests, and unnecessary nursery admissions, which may ultimately decrease the length of stay (LOS) and costs.(1,5,15)”

A uniform treatment plan of EOS for the term and near-term infants whose mothers were diagnosed with CAM was lacking in clinical practice. The Neonatal Early-Onset Sepsis Calculator was created by Kaiser Permanente, which guides medical management by measuring maternal risk factors and reviewing their newborn’s clinical presentation. (10) The non-subjective tool was developed to minimize unnecessary interventions. In 2018, the AAP’s Committee on Fetus and Newborn published a report supporting the use of Kaiser Permanente’s EOS Calculator as an acceptable approach to manage suspected or proven bacterial sepsis in infants > 35 weeks of age. (10) Recent prospective studies have shown that using an EOS calculator can safely decrease the need for empiric antibiotic treatment, laboratory tests, and unnecessary nursery admissions, which may ultimately decrease the length of stay (LOS) and costs.(1,5,15)

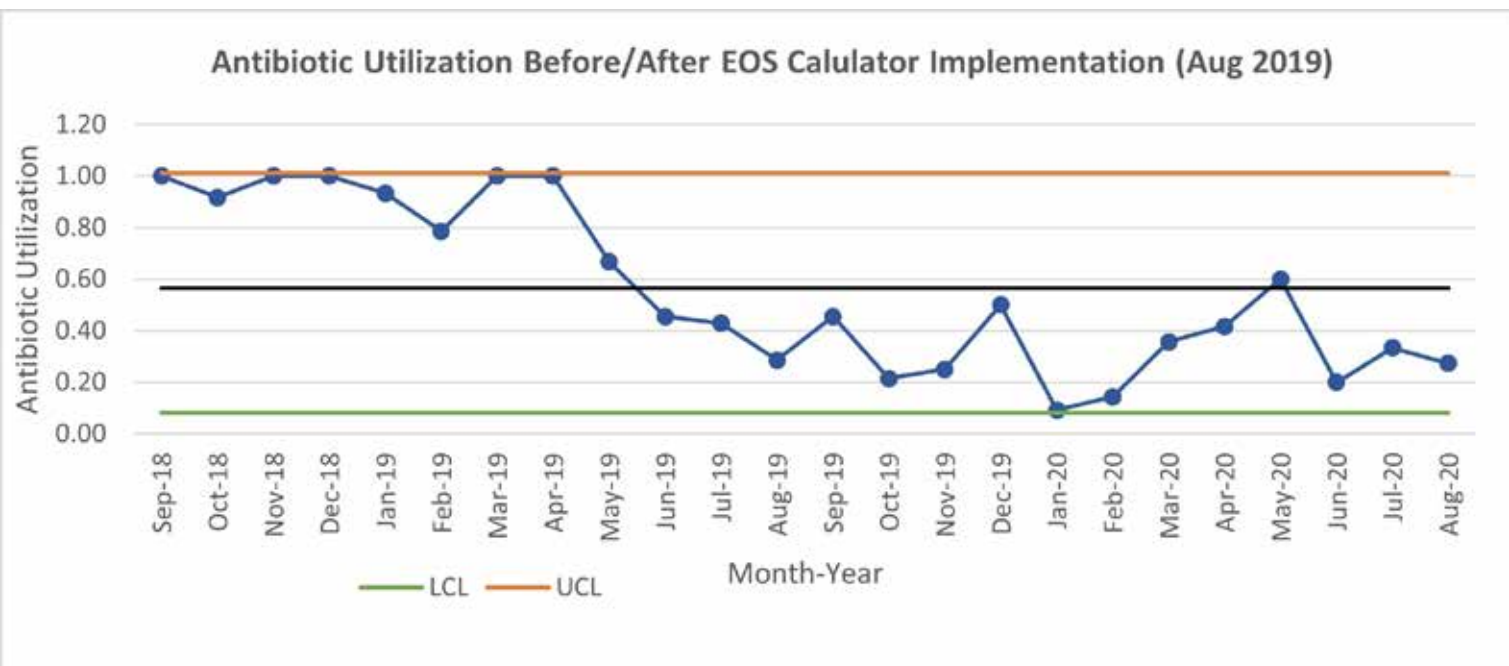


Table 2 EOS Healthcare Utilization and Associated Costs per Newborn

	Pre (n=111)	Post (n=125)	P-value
EOS Healthcare Utilization			
Laboratory Tests (a)	97 (87)	81 (65)	<0.001
Empiric Antibiotic Courses(a)	89 (80)	40 (32)	<0.001
Antibiotic Days (b)	2 (2-3)	0 (0-2)	<0.0001
Length of Stay in Days (b)	2.3 (2.1-2.6)	2.3 (2.0-2.7)	0.875
EOS Costs (b)			
Laboratory Tests	\$34.34 (34.34-34.34)	\$34.34 (0-34.34)	<0.0001
Antibiotic Treatment	\$257.89 (257.89-257.89)	\$0 (0-257.89)	<0.0001
Combined (Tests & Antibiotics)	\$292.23 (292.23-292.23)	\$34.34 (0-292.53)	<0.0001

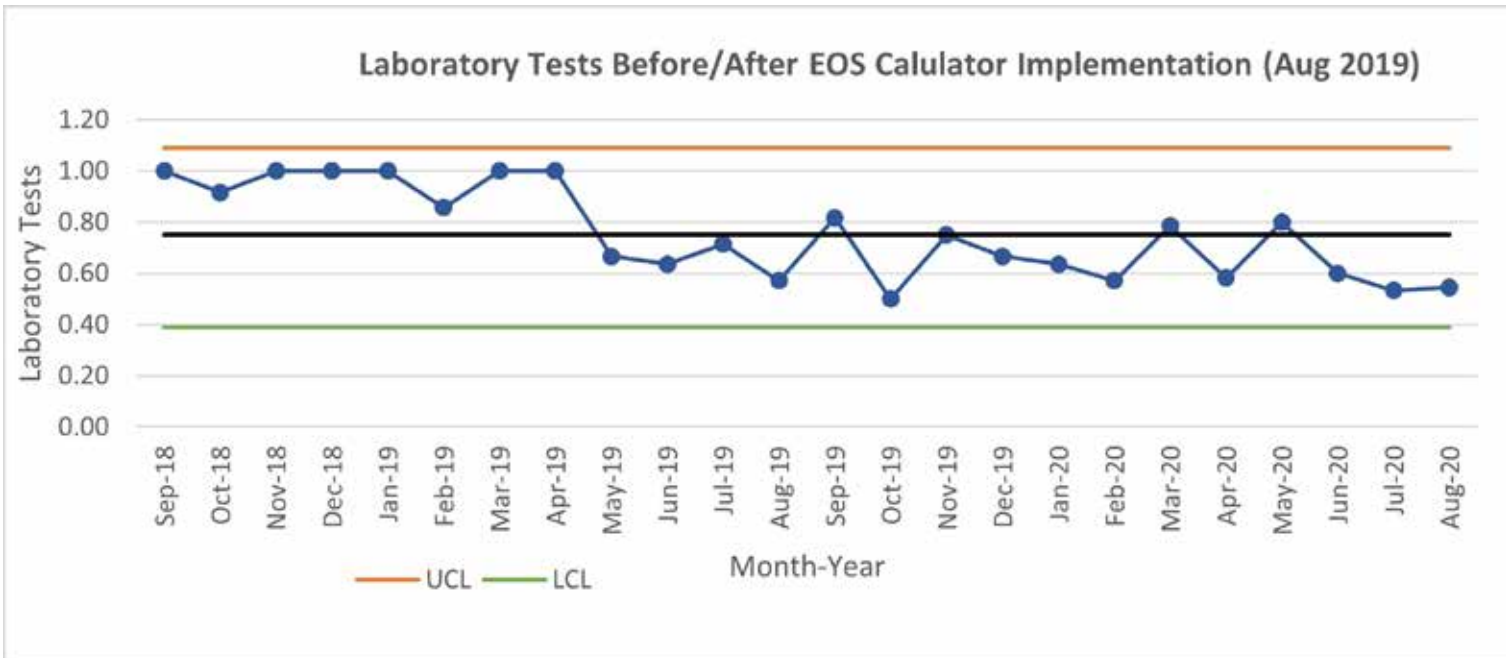
(a) n (Percentage); (b) Median (Interquartile range)

With all types of sepsis, the average reported LOS was 24 to 72 days in high-income countries. (18) The United States, in particular, has the highest treatment costs worldwide, spending almost twice as much on medical care as ten other high-income countries with comparatively worse healthcare outcomes. (2) This study sought to determine whether using the EOS calculator decreases sepsis evaluations, antibiotic utilization, and hospital LOS for newborns whose mothers were diagnosed with confirmed chorioamnionitis (CAM) and its cost implications at our facility.

“With all types of sepsis, the average reported LOS was 24 to 72 days in high-income countries. (18)”

Methods

A retrospective observational cohort study was conducted at a metropolitan area hospital with approximately 6 000 deliveries annually. Any mother with a pregnancy ≥ 35 weeks gestation diagnosed with CAM was screened for inclusion (N = 249). ICD-10-CM codes for chorioamnionitis (041.1230, 041.1290) were used to extract information from the hospital data warehouse. Direct admissions to the neonatal intensive care unit (NICU) were excluded as these infants likely would have been symptomatic for sepsis and would require antibiotic therapy, thus eliminating the need for the EOS calculator. De-identified information, including demographic and clinical characteristics, antibiotic usage (initiation, number of days), EOS-related laboratory tests (CBC and blood culture), and LOS, were collected one year before and after the August 28, 2019, EOS calculator implementation. In our unit, we currently



use the Center for Disease Control's national incidence of EOS (0.5/1000 live births) when computing the probability of sepsis. Our current antibiotic regimen for a newborn at risk for early infection is, at minimum, treatment with 48 hours of IV antibiotics. Ampicillin is prescribed at 100mg/kg every 8 hours for six doses and Gentamicin 4 mg/kg every 24 hours for two doses. Readmissions throughout the hospital system within 14 days of discharge were reviewed for any diagnosis of sepsis. The estimated hospital reimbursement associated with EOS-related laboratory tests and antibiotic treatment (IV antibiotic administration and physician fee) was calculated for each cohort using the Arizona Medicare reimbursement rates for 2018-2020.

Human protection oversight was obtained from the Banner Health Institutional Review Board, and the study can be found on Clinicaltrials.gov as NCT04513691. Due to the retrospective nature of this study, the data retrieval did not undergo independent monitoring.

Statistical Analysis

Descriptive statistics were used to summarize the data for all study variables. Continuous variables were reported as means and standard deviation values. Categorical variables were reported as numbers and percentages. All categorical variables were compared using the Fisher exact or χ^2 test, and the Wilcoxon Rank Sum test was applied for continuous variables. In addition, monthly charts were plotted for labs and antibiotic usage. By using an estimated 40% and 23% antibiotic usage rate for pre/post-intervention, respectively, a sample size of at least 234 subjects was needed, assuming an alpha level of 0.05 and 80% power. STATA® Version 17 (StataCorp, College Station, TX) was used for all statistical analyses. A P value < 0.05 was considered significant.

“There were no significant differences in the demographics between the two cohorts; however, more than half of the mothers in both groups identified as Hispanic (Table 1). Both cohorts had a median gestational age of 39 weeks; the median birthweight in grams was 3400 vs. 3440.”

Results

Of the 249 mother and baby dyads reviewed, 236 were included in this study. There were 111 newborns in the pre-EOS calculator cohort and 125 in the post-cohort. There were no significant differences in the demographics between the two cohorts; however, more than half of the mothers in both groups identified as Hispanic (Table 1). Both cohorts had a median gestational age of 39 weeks; the median birthweight in grams was 3400 vs. 3440. As expected, there was a significant decrease in EOS-related laboratory tests after implementing the calculator (97 vs. 87, $P < 0.001$). Additionally, antibiotic usage was significantly lower, with the number of courses decreasing by over 50% (89 vs. 40, $P < 0.001$). This re-

sulted in a reduction of median antibiotic days in the post-implementation cohort (2 vs. 0, $P < 0.0001$) (Table 2). When graphed by month (Figures 1, 2), a decrease in the proportion of laboratory tests and antibiotic usage is apparent after calculator implementation antibiotics usage (\$210.60 vs. \$85.20; $P < 0.0001$) was significantly reduced. There was a statistically significant reduction in the median combined estimated reimbursement associated with EOS-related care per baby (\$292.23 vs. \$34.34; $P < 0.0001$) (Table 2). When reviewing for readmissions to the hospital network for missed EOS cases, none were present.

“As expected, there was a significant decrease in EOS-related laboratory tests after implementing the calculator (97 vs. 87, $P < 0.001$). Additionally, antibiotic usage was significantly lower, with the number of courses decreasing by over 50% (89 vs. 40, $P < 0.001$).”

Discussion

As mirrored elsewhere in the literature, using the EOS calculator has proven beneficial to our hospital. We observed a significant reduction in laboratory tests and antibiotic usage by adopting the EOS calculator, ultimately decreasing the cost burden. The large meta-analysis conducted by Achten et al. (19) supports our findings, which reviewed over 175,000 neonates. They confirmed that using the EOS calculator results in a substantial reduction in empirical antibiotics. (19) The change in practice is especially beneficial to newborns whose mothers were diagnosed with CAM placing them at the highest risk of receiving EOS treatment. Eliminating prophylactic treatment when the risk of EOS is low allows the newborn and mother to remain together to establish breastfeeding and bond. It also decreases the economic burden on the hospital system when well-appearing infants do not need to receive antibiotic treatment. (1)

“We observed only a slight reduction in LOS, which was not statistically significant. Nevertheless, in a similar study to ours, Achten et al. (20) found that the mean LOS for EOS was significantly shorter for their post-implementation cohort (0.37 days, $P = 0.005$).”

Another advantage of utilizing the calculator is its effect on hospital LOS. We observed only a slight reduction in LOS, which was not statistically significant. Nevertheless, in a similar study to ours, Achten et al. (20) found that the mean LOS for EOS was significantly shorter for their post-implementation cohort (0.37 days, P

= 0.005).

We used the actual Arizona Medicare reimbursement rates to determine our facility's estimated compensation for EOS. Reducing the number of laboratory tests and antibiotic usage decreased the median cost burden by \$257.89 ultimately. Gong et al. (21) performed a cost-benefit analysis in which usage of the EOS calculator showed a net monetary benefit of \$3998 per infant, which may largely be attributed to the 67% reduction in antibiotic therapy.

Athen et al. (19) further found that using the EOS calculator did not lead to an increase in missed cases of EOS, overall EOS incidence, readmissions, delay in antibiotic therapy, or EOS-related morbidity or mortality. Leonardi et al. (1) found similar results regarding the lack of hospital readmissions due to sepsis, similar to our study. Likewise, we showed the absence of readmissions for EOS and any sepsis 14 days after the newborn's initial discharge.

“As is true for any dataset, errors in coding or labeling may have inadvertently caused some patients to be omitted. Our sample size did not demonstrate a significant reduction in LOS, but a more extensive study may detect improvement.”

Limitations

Although our results are in line with many other publications, this study was conducted at a single hospital in a higher-income country, and thus, Arizona Medicare reimbursement rates may not be generalizable to other sites worldwide. In contrast to individual chart reviews, we could access the hospital's databases and review the de-identified information quickly. However, we could not explore individual medical records to gather specific details of interest. As is true for any dataset, errors in coding or labeling may have inadvertently caused some patients to be omitted. Our sample size did not demonstrate a significant reduction in LOS, but a more extensive study may detect improvement.

Additionally, the delivery mode may have impacted the infant's total LOS. As we did not evaluate infants admitted to the NICU, our hospital's true incidence of EOS was not captured. Prenatal antibiotic administration was not collected; therefore, it is unknown what effect it may have had on a newborn's clinical course.

Conclusion

This study contributes to the currently available literature advocating using the EOS Calculator. The judicious clinical observation of the newborn and calculator use safely reduces sepsis evaluations, antibiotic administration, and resource utilization.

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RSV:

The leading cause of
infant hospitalization.

**All infants
need protection.**

Reference: Suh M, et al. *J Infect Dis.* 2022;226(Suppl 2):S154-S163.

MAT-US-2300724 V1.0 January 2023

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



nicuparentnetwork.org
nationalperinatal.org/skin-to-skin



Which Infants are More Vulnerable to Respiratory Syncytial Virus?

RSV is a respiratory virus with cold-like symptoms that causes 90,000 hospitalizations and 4,500 deaths per year in children 5 and younger. It's 10 times more deadly than the flu. For premature babies with fragile immune systems and underdeveloped lungs, RSV proves especially dangerous.

But risk factors associated with RSV don't touch all infants equally.*

*Source: Respirator Syncytial Virus and African Americans

Caucasian Babies	Risk Factor	African American Babies
11.6%	Prematurity	18.3%
58.1%	Breastfeeding	50.2%
7.3%	Low Birth Weight	11.8%
60.1%	Siblings	71.6%
1%	Crowded Living Conditions	3%



AFRICAN AMERICAN BABIES bear the brunt of RSV. Yet the American Academy of Pediatrics' restrictive new guidelines limit their access to RSV preventative treatment, increasing these babies' risk.



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Letters to the Editor

Letter to the Editor: Fragile Infant Forums for Implementation of IFCDC Standards: Neuroprotection - Protecting the Developing Brain

Dear Editor:

We found “Fragile Infant Forums for Implementation of IFCDC Standards: Neuroprotection - Protecting the Developing Brain” interesting and insightful. This piece from the December 2022 issue discussed the importance of neuroprotective measures in the neonatal intensive care unit, exploring how certain interventions performed in the NICU are neuroprotective while others may lead to brain injury. The authors also explained how neuroprotective strategies present the opportunity to improve health equity and increase cultural competence in the NICU. We agree with the authors that neurodevelopmental measures in the NICU are crucial because they impact the patient’s time beyond the NICU. As such, we would like to expand upon different frameworks supporting neurodevelopment, explore potential hurdles to making improvements, and re-emphasize the benefits of implementing neuroprotective care.

“In a 2015 study by Altimier, L. et al. (1), a sample of 82 NICU sites, including ones in the US, Belgium, and the Netherlands, demonstrated improvement across multiple neuroprotective core measures by adopting the Wee Care Program. Core measures included: providing a healing environment, partnering with families, positioning, and handling, safeguarding sleep, minimizing stress and pain, protecting skin, and optimizing nutrition.”

The Wee Care Neuroprotective NICU program is a management-based program designed to improve NICU outcomes by optimizing the caregiving environment and practices. The program includes a pre-survey that identifies a NICU’s strengths and weaknesses. Through interactive and didactic on-site training, the Wee Care program provides site-specific training to all staff at a given NICU. In a 2015 study by Altimier, L. et al. (1), a sample of 82 NICU sites, including ones in the US, Belgium, and the Netherlands, demonstrated improvement across multiple neuroprotective core measures by adopting the Wee Care Program. Core measures included: providing a healing environment, partnering with families, positioning, and handling, safeguarding sleep, minimizing stress

and pain, protecting skin, and optimizing nutrition. On the other hand, Reeces Messner’s 2021 quality-improvement project (2) found that many NICU nurses already provided and championed neuroprotective care without a formal training program. Her project suggested a better way to improve neurodevelopment care by providing tangible items to support ongoing neuroprotective practices, such as bedside IPAT (Infant Positioning Assessment Tools) scoring sheets and positioning educational pamphlets to reference for educating parents.

“The Fragile Infant Forums piece posited that “unlimited parental presence is neuroprotective.” In recognizing the importance of this statement, we also acknowledge that visiting the NICU and being active members of a newborn’s care is difficult for parents with jobs, long commutes, family members to take care of, and other barriers.”

The Fragile Infant Forums piece posited that “unlimited parental presence is neuroprotective.” In recognizing the importance of this statement, we also acknowledge that visiting the NICU and being active members of a newborn’s care is difficult for parents with jobs, long commutes, family members to take care of, and other barriers. While the frameworks described above focused on care provided at the NICU by healthcare providers, another framework of neuroprotective care could emphasize healthcare providers supporting parents so they can be present. In a 2020 study by Pauda et al. (3), researchers found that families of lower socioeconomic status and racial minorities spend less time with babies in the NICU because of transportation barriers, time constrictions, and other life stressors. With this understanding, providing neuroprotective care might look like providing more support to parents by aiding transportation to the hospital, childcare for the other children in the family, and remote access to the NICU through video chats or pictures. Each NICU has unique strengths and challenges. As such, implementing neuroprotective care will look different at each hospital, but all should take an intersectional approach with considerations for the staff, parents, and patient.

“Regardless of how neuroprotective care is implemented, the evidence shows an array of benefits, including fewer behavioral problems, better language skills, and increased health-related quality of life (4).”

Regardless of how neuroprotective care is implemented, the evidence shows an array of benefits, including fewer behavioral problems, better language skills, and increased health-related quality

of life (4). The early days of life are an important and malleable time for infants in the NICU. Extensive steps should be taken to ensure the safest and most supportive environment for NICU babies. We agree with McGrath and Vance that infants in the NICU should be given every opportunity to thrive.

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Sincerely,

Avis Ko, OMS-3, Elissa Port, OMS-3, Taryn Kawashima, OMS-3, Vivian Yu, OMS-3

Western University of Health Sciences, COMP, Pomona, CA

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Dear Drs. To Be Ko, Port, Kawashima, and Yu,

Thank you for your comments. Often in caring for the most at-risk fragile infants, the neurodevelopmental aspects of care are underappreciated. Whether it is the fact that technology dominates the NICU, often to the detriment of the most at-risk infants, or that the time involved in caring for these most at-risk infants may be perceived as excessive, this does not obviate the need.

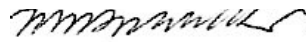
“Regardless of how neuroprotective care is implemented, the evidence shows an array of benefits, including fewer behavioral problems, better language skills, and increased health-related quality of life (4).”

Data are quite compelling when analyzed for their long-term benefits. Performance metrics, behavioral indices, language skills, and raw intelligence all result from more informed neuroprotective care. Babies must gestate, and if that environment is not avail-

able to them because they have been born prematurely or require a prolonged stay in the NICU for other reasons, we must approximate the experience that they would have had if they had not been born early or if their disease process did not require the prolonged NICU stay. A failure to thrive diagnosis is not merely not gaining weight.

The successes of the Wee Care program and its prevalence demonstrate the need for developmentally appropriate neuroprotective care regardless of location. Certain babies at risk for myriad socioeconomic issues may benefit more from developmentally appropriate care. Especially where parental involvement is not guaranteed or not feasible, these programs can help bridge the gap.

The Fragile Infant Forums column is a regular monthly column in Neonatology Today. Recommendations derive from evidenced-based practice were presented at the Gravens meeting in South Florida this coming month and other published studies.



Mitchell Goldstein, MD, MBA, CML

Editor in Chief

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Letters to the Editor

Letter to the Editor: Comment on “Health Equity Column: What is your Definition of Health Equity?”

Dear Dr. Goldstein: ”

I have a deep appreciation for this interview and for the ideas so clearly captured. I believe the continued lack of real, honest health equity demands immediate change, and organizations like Once Upon a Preemie have outlined the simple, effective solution: “Mandatory training and classes. That is the call to action. No questions. No way around that” (2). Equitable health care is a human right, and without proper training, no doctor can fully provide the care every person deserves. I wish the organization continued success and hope others are inspired to implement similar changes. I am writing this letter to expand on some thoughts they have inspired in me.

“Equitable health care is a human right, and without proper training, no doctor can fully provide the care every person deserves. I wish the organization continued success and hope others are inspired to implement similar changes.”

When reading about how a judgemental NICU doctor could not communicate with the interviewee appropriately, I was reminded of similar stories from people in my own family. I am a first-generation immigrant and often worry when my mother goes to a new doctor’s appointment alone. She speaks English well enough but becomes nervous about medical issues. Healthcare language barriers reduce patient and provider satisfaction (1). While perfecting systems for translator access may seem like the best solution, interpreter services often contribute indirectly to increased cost and length of treatment visits without improving patient satisfaction. One study showed that implementing online translation tools such as Google Translate and MediBabble in hospitals greatly increased the satisfaction of both medical providers and patients and improved the overall quality of healthcare delivery and patient safety (1). As these services continue to improve, the direct responsibility of delivering culturally competent care increasingly falls to the provider. Because all providers are reasonably limited in their full understanding of other cultures by their own background, implementing training programs like those conducted by Once Upon a Preemie is a top priority for improving access to equitable health care for all.

Cultural competency training is becoming a standard part of medical education, and though more methodical, quantifiable studies are warranted, studies show a generally positive relationship between cultural competency training and improved patient outcomes [4]. Especially in recent years, long-due awareness of the severe disparities in access to health care across different races,

and socioeconomic backgrounds has risen. As a current medical student, I know that most of my peers and I are ready to learn and improve. Participants of cultural competency training programs tend to report “not only an enhanced understanding of the health care experiences of patients with diverse backgrounds but also an improvement in their skills to effectively work in cross-cultural situations” (3). I hope for more providers to be able to feel this type of confidence in the future.

“Participants of cultural competency training programs tend to report “not only an enhanced understanding of the health care experiences of patients with diverse backgrounds but also an improvement in their skills to effectively work in cross-cultural situations” (3). I hope for more providers to be able to feel this type of confidence in the future.”

The next steps are to continue encouraging training programs to better cultural competence and the deliverance of equitable health care while studying and identifying the best methods (4). More patients and families can feel heard, comfortable, and adequately cared for with further work.

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Dear Doctor to Be Lankireddy,

Efforts such as those undertaken by “Once Upon a Preemie” are a direct response to the inequity in healthcare. More so than simply looking at the issues involved in achieving cultural competency, healthcare equity is on a different plane. When we interact with patients regardless of their background, we must not only sympa-

thize but also emphasize. We cannot begin to understand without being a part of the solution. When we make efforts to understand but use that understanding to separate and isolate patients from the other patients we serve, this does not impart compassion and increases the rift between the provider and the patient. Arguably, it is not equitable care. Most who fall into this category are completely unaware of our patients' angst and frustration by being pointed out as different. These barriers have no place in medicine.

“When we make efforts to understand but use that understanding to separate and isolate patients from the other patients we serve, this does not impart compassion and increases the rift between the provider and the patient. Arguably, it is not equitable care.”

The analogy of the universal translation tool is an interesting one. As technology improves, the world becomes increasingly smaller. At one point, Spanish-speaking patients provided a significant challenge to healthcare systems. Now, we can offer resources to patients who speak dialects of much less prevalent languages in real time. There is a significant difference, however. There is still the influence of technology, which serves as the equalizer. Both parties come to the technology, and the technology provides equity in their experience. No language is given superiority, and the interaction is on an equitable plane.

“In trying to approach equitable care, it is not uncommon for people to say that they do not see differences in skin color, language, and other nuances between people and cultures when providing care. This is a serious shortcoming, the problem is in this attitude, but it need not be. Education and teaching how to interact and react to these differences are desperately needed.”

In contrast, as pointed out, we are limited by our own backgrounds in complete understanding of ethnic and cultural determinators. In trying to approach equitable care, it is not uncommon for people to say that they do not see differences in skin color, language, and other nuances between people and cultures when providing care. This is a serious shortcoming, the problem is in this attitude, but it need not be. Education and teaching how to interact and react to these differences are desperately needed. Moreover, what appears consistent across the larger group is often not. Those who are part of one culture may come to understand that their differences are not necessarily unlike those experienced by their patients. Inequity can hide in plain sight.

Yes, some are more aware and better able to deal with inequities in healthcare, but we can all do better. The sooner we recognize this, the more success we will have in eliminating these barriers.



Mitchell Goldstein, MD, MBA, CML

Editor in Chief

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Erratum (Neonatology Today January, 2023)

Neonatology Today is not aware of the erratum affecting the January, 2023 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.

NT

Should Infants Be Separated from Mothers with COVID-19?

FIRST DO NO HARM

SEPARATION
may not prevent
INFECTION.



SKIN to SKIN CARE
supports newborns' physiology.



SEPARATION
stresses parents and babies.



SEPARATION
weakens immune protections.



SEPARATION
disrupts breastfeeding putting babies' health at risk.

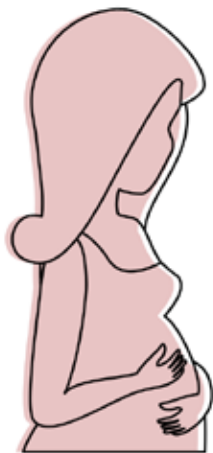


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BASED ON THE ARTICLE:

Should Infants Be Separated from Mothers with COVID-19?
First, Do No Harm

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Fellow's Column: Diagnostic and Treatment Challenges in Multisystem Inflammatory Syndrome in Neonates (MIS-N): A Success Story with Anakinra

Kaydeen Morris-Whyte, MD, Robert Reid, MD

“Multisystem inflammatory syndrome in neonates (MIS-N) associated with COVID-19 remains a unique diagnostic challenge as the exact pathogenesis is uncertain. The spectrum of possible manifestations has only been reported in a few cases. There is not yet an expert consensus on a case definition for MIS-N, which adds to the diagnostic difficulty.”

Introduction

Multisystem inflammatory syndrome in neonates (MIS-N) associated with COVID-19 remains a unique diagnostic challenge as the exact pathogenesis is uncertain. The spectrum of possible manifestations has only been reported in a few cases. There is not yet an expert consensus on a case definition for MIS-N, which adds to the diagnostic difficulty. MIS-N management is informed by recommendations for multisystem inflammatory syndrome in children (MIS-C) as outlined by the American College of Rheumatology (ACR) (1). The mainstay of treatment is intravenous immunoglobulin (IVIG) and corticosteroid with a role for biologics in refractory disease.

“We are reporting a case of MIS-N that required treatment intensification with anakinra and had a favorable outcome.”

We are reporting a case of MIS-N that required treatment intensification with anakinra and had a favorable outcome.

Case Presentation

A 1-hour-old male neonate born at 39 weeks gestation weighing 4125 grams was admitted to the Neonatal Intensive Care Unit (NICU) for hypoglycemia. The neonate was delivered vaginally to a woman with a history of gestational diabetes, limited antenatal care, unknown GBS status, and incidental positive severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) by reverse transcription polymerase chain reaction (RT-PCR). The mother had no prior SARS-CoV-2 vaccination. The mother's membranes ruptured 8 minutes before delivery, and no intrapartum antibiotics

were administered. APGAR scores were 9 and 9 at 1 and 5 minutes, respectively. The patient transitioned to the newborn nursery with the mother, and hypoglycemia protocol was initiated per our institution guidelines for an infant of diabetic mother and large-for-gestational age.

At one hour of age, the neonate developed hypoglycemia (blood glucose 20mg/dl), associated with increased breathing work. He was transferred to the NICU and isolated due to maternal-positive SARS-CoV-2 RT-PCR. Initial vital signs were significant for a respiratory rate of 75 breaths/min with room air oxygen saturation of 89%. Physical examination was remarkable for an active, tremulous male infant with bilateral coarse breath sounds on auscultation. Investigations revealed a C-reactive protein (CRP) of 3.79mg/dl and borderline cardiomegaly on a chest radiograph (Figure 1). He stabilized on a high-flow nasal cannula on 21% oxygen and maintenance intravenous fluid with 10% Dextrose.

“At 18 hours, the neonate developed grunting respirations, abdominal distension, and decreased urine output. Examination revealed a fever with a temperature of 38.8 (0)C. He had clinical features of hypotensive shock, indicating repeated intravenous crystalloid and albumin boluses and the addition of dopamine and hydrocortisone.”

At 18 hours, the neonate developed grunting respirations, abdominal distension, and decreased urine output. Examination revealed a fever with a temperature of 38.8 (0)C. He had clinical features of hypotensive shock, indicating repeated intravenous crystalloid and albumin boluses and the addition of dopamine and hydrocortisone. Simultaneously, he experienced a rapid decline in respiratory status, requiring intubation. The neonate now required glucose infusion greater than 25 mg/kg/min to maintain euglycemia. Laboratory results were remarkable for white blood cell of 10,000 /uL with 12% bands, platelet 115,000/uL, creatinine 1.30 mg/dl (at birth was 0.81 mg/dl), PTT 49.7s, PT 22.3s, AST 107 U/L, ALT 144 U/L, indirect bilirubin 10.69 mg/dL and ionized calcium 0.95 mmol/L. Babygram showed mild pulmonary interstitial infiltrates and dilated bowel loops (Figure 2). An echocardiogram showed asymmetric septal hypertrophy consistent with hypertrophic cardiomyopathy observed in IDM, moderate RVH, hyperdynamic global LV systolic function, very small PDA and mild TR but normal coronary arteries. Ultrasound of the head was normal. Abdominal ultrasound demonstrated trace bilateral pelviectasis and gall bladder sludge but no sign of primary intraabdominal pathology. He received a second dose of Vitamin K for coagulopathy and was initiated on phototherapy. The respiratory pathogen panel and blood culture performed on admission were negative.

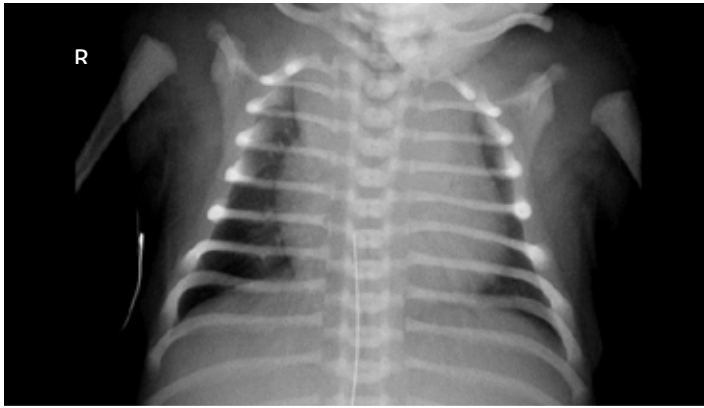


Figure 1. Anterior-posterior chest radiograph of patient showing mild cardiomegaly

A repeat blood culture was taken. He was started on ampicillin, gentamicin and cefepime due to the rapid decompensation.

At three days of age, he continued with persistent hypoglycemia, refractory hypotension, and hypotonia. Norepinephrine was added with the resultant stabilization of blood pressure. Laboratory investigations showed a lactate of 1.60mmol/L, platelet 70,000/uL, CRP 15 mg/dl, NT-proBNP 57,700 pg/mL, and troponin I 0.71ng/mL. Additional investigations included negative SARS-CoV-2 RT-PCR and normal ferritin, triglycerides, lymphocyte subset, and gamma globulins. Brain MRI had findings consistent with Grade 1A Neonatal Hypoxic Ischemic Encephalopathy (NIE) and trace intraventricular hemorrhage. Video EEG revealed no epileptiform activity.

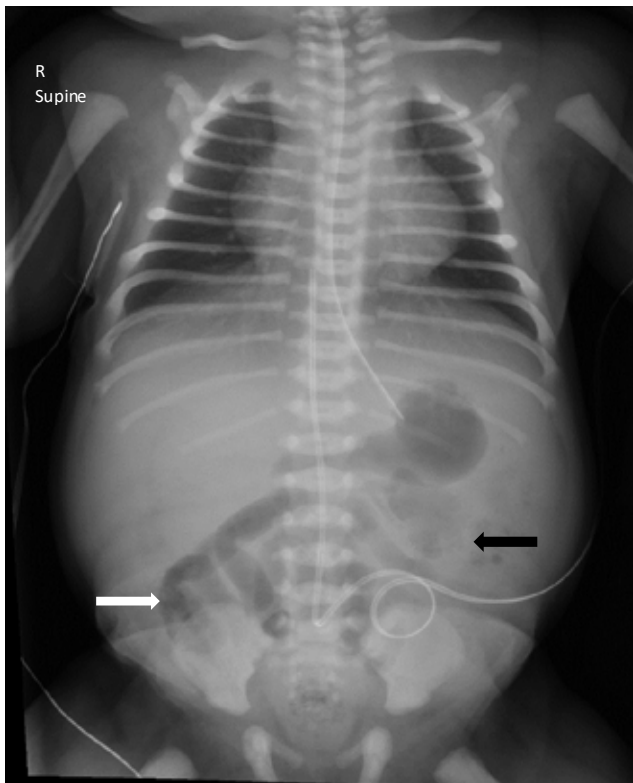


Figure 2. Supine chest and abdomen radiograph showing mild pulmonary interstitial infiltrates, paucity of bowel gas in left hemi abdomen (black arrow) and distension of loops of bowel in the right

At four days of age, the neonate's SARS-CoV-2 antibodies were detected for spike and nucleocapsid proteins. Repeat echocardiogram was significant for prominent coronary arteries, diffuse ectasia of LAD measuring 1.75mm (Z score +2.6), and trivial lateral pericardial effusion. Due to concern for MIS-N, he was managed with IVIG at 2mg/kg and methylprednisolone at 2 mg/kg once daily for three days. He had a transient response, was weaned off inotropes, and extubated to N-CPAP, with resolving abdominal distension, recovering thrombocytopenia, and improved CRP. At day 6 of age, on day 3 of methylprednisolone at 2mg/kg/day, fever recurred, and CRP rebounded. Cerebrospinal fluid and blood cultures were obtained. Methylprednisolone was increased to 10mg/kg/day for two doses; then, a slow taper was started. He responded well with improved activity level, decreasing CRP and cardiac enzymes. At day 14 of age, on corticosteroid taper at 2mg/kg/day, he had a breakthrough fever and an upward trend in the CRP level. Anakinra was started at 2mg/kg/day and discontinued after six doses. At day 38 of age, after corticosteroid taper, the patient remained afebrile with normal CRP, cardiac enzymes, and resolution of all abnormalities seen on the previous echocardiogram.

The patient was discharged home at nine weeks of age.

“SARS-CoV-2 in neonates and children, although frequently asymptomatic or manifesting with only mild symptoms (2), a severe Coronavirus disease 2019 (COVID-19) complication may occur in children called MIS-C. MIS-C presents within 2-6 weeks following COVID-19 infection. MIS-C is theorized to result from post-infectious antibody-mediated immune dysregulation, manifesting predominantly with cardiac involvement, and has a reported mortality rate of 1-2% (3).”

Discussion

SARS-CoV-2 in neonates and children, although frequently asymptomatic or manifesting with only mild symptoms (2), a severe Coronavirus disease 2019 (COVID-19) complication may occur in children called MIS-C. MIS-C presents within 2-6 weeks following COVID-19 infection. MIS-C is theorized to result from post-infectious antibody-mediated immune dysregulation, manifesting predominantly with cardiac involvement, and has a reported mortality rate of 1-2% (3). There have been published cases of a similar disease entity in neonates born to mothers with a history of COVID-19 infection. It is being termed MIS-N by the medical community, though it is not yet characterized by the Centers for Disease Control and Prevention (CDC) or World Health Organization. MIS-N manifests mainly with cardiovascular involvement (hypotensive shock with or without cardiac dysfunction, coronary abnormalities, and arrhythmias), respiratory distress (requiring re-

Figure 3. Proposed inclusion criteria for neonatal multisystem inflammatory syndrome (MIS-N) secondary to maternal SARS-CoV-2 exposure or infection

(1) A neonate aged <28 days at the time of presentation
(2) Laboratory or epidemiologic evidence of SARS-CoV-2 infection in the mother <ul style="list-style-type: none"> • Positive SARS-CoV-2 testing by RT-PCR, serology (IgG or IgM—and not secondary to immunization), or antigen during pregnancy OR • Symptoms consistent with SARS-CoV-2 infection during pregnancy OR • COVID-19 exposure during pregnancy with a confirmed case of SARS-CoV-2 infection • Serological evidence (positive IgG specific to SARS-CoV-2 but not IgM) in the neonate (and not secondary to maternal immunization)
(3) Clinical criteria <ul style="list-style-type: none"> • Meet clinical criteria in MIS-C⁹(except for fever)
(4) Laboratory evidence of inflammation <ul style="list-style-type: none"> • Meet inflammatory marker criteria in MIS-C⁹
(5) No alternative diagnosis (viral or bacterial sepsis; birth asphyxia; maternal lupus etc.) that can explain the clinical features

Molloy et al. Modified from Pawar et al.

spiratory support), and fever (4-8). It has a reported mortality rate of 11% (4), significantly higher than MIS-C. The CDC case definition informs the diagnosis of MIS-N for MIS-C (9) with well-cited inclusion criteria specific for MIS-N proposed by Pawar et al. and modified by Molloy et al. (Fig. 3) (2).

“The pathophysiology of MIS-N remains unclear, but experts have made postulations based on the presentation in the early or late neonatal period (2, 5, 7). The proposed pathogenesis for neonates who present within the first week of life is due to the transplacental transfer of maternal antibodies that target neonatal autoantigens.”

The pathophysiology of MIS-N remains unclear, but experts have made postulations based on the presentation in the early or late neonatal period (2, 5, 7). The proposed pathogenesis for neonates who present within the first week of life is due to the transplacental transfer of maternal antibodies that target neonatal autoantigens. This process triggers the release of inflammatory cytokines that mediate organ dysfunction (2,5,7). Diagnosing MIS-N secondary to this proposed mechanism requires laboratory or epidemiologic evidence of COVID-19 infection in the mother (2). Importantly, it has to be differentiated from an acute COVID-19 infection in the neonate. The other theory is a post-infectious inflammatory cascade induced by neonatal antibodies. These antibodies are produced 2-3 weeks after seroconversion in response to an acute COVID-19 infection and are observed in the later neonatal period.

This case highlights both the diagnostic and treatment challenges in MIS-N. Using the proposed criteria for MIS-N (2), the patient

satisfied the case criteria on day 4 of age. Though time sensitive, establishing the diagnosis of MIS-N has to be differentiated from alternative diagnoses (9).

The mother has a history of gestational diabetes, which was believed to contribute to the neonate’s initial hypoglycemia and respiratory distress. However, septicemia became the working diagnosis with the onset of multiorgan failure on the background of maternal history of limited prenatal care and unknown GBS status. Multiple repeat cultures were negative, and the patient remained critically ill despite broad-spectrum antibiotics.

“The differential diagnosis broadened to include immunodeficiencies such as Severe Combined Immunodeficiency Deficiency which was less likely given the normal lymphocyte subset and gamma globulin. Given the neonate’s hyperinflammatory state, hemophagocytic lymphohistiocytosis (HLH) was also entertained.”

The differential diagnosis broadened to include immunodeficiencies such as Severe Combined Immunodeficiency Deficiency which was less likely given the normal lymphocyte subset and gamma globulin. Given the neonate’s hyperinflammatory state, hemophagocytic lymphohistiocytosis (HLH) was also entertained. The patient had fever and thrombocytopenia but lacked other cardinal features of HLH, such as organomegaly, hyperfibrinogenemia, and hypertriglyceridemia (10). It was later discovered that the febrile episodes and concomitant uptrend in CRP were associated with corticosteroid taper (Fig. 4). The brain MRI had findings consistent with Grade 1 NIE- which may explain perinatal depres-

Temperature and CRP Trend with IVIG Methylprednisolone and Anakinra

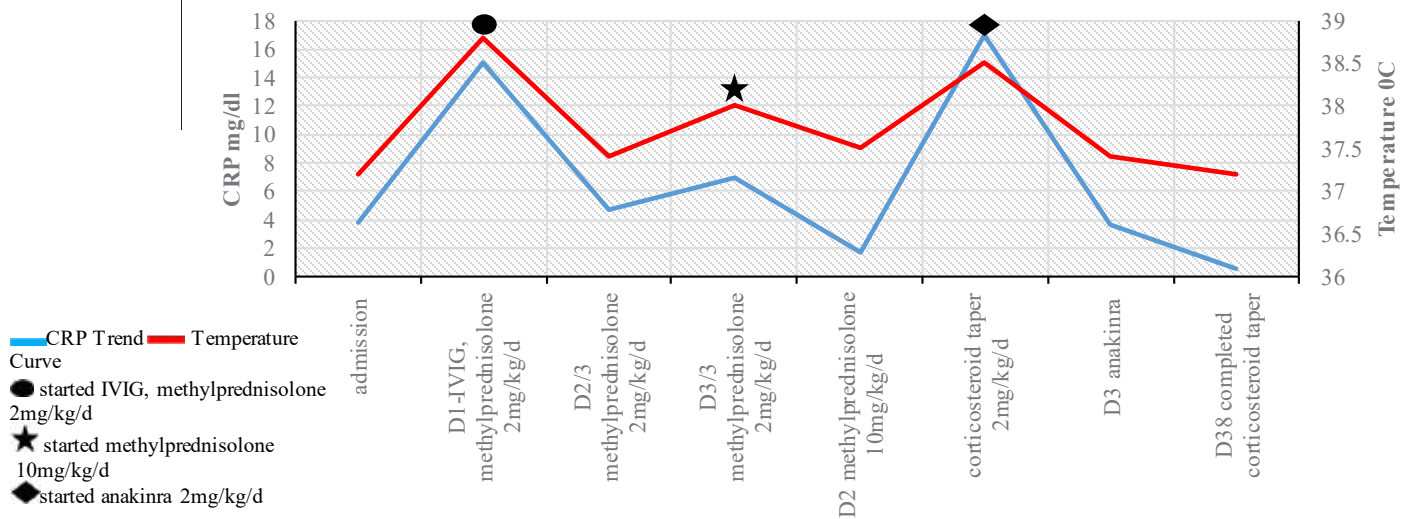


Figure 4. Temperature and CRP Trend with IVIG, methylprednisolone at 2mg/kg/day, methylprednisolone at 10mg/kg/day and anakinra 2mg/kg/day
Abbreviations: IVIG, intravenous immunoglobulin; D, day

sion and multiorgan injury but does not account for the coronary artery dilation. The review of placenta pathology (which became available on day 4 of age) identified no features of vascular insults contributing to perinatal asphyxia. Additionally, the placenta had no viral pathogenic changes or other histologic features of infectious villitis to suggest congenital infection.

MIS-N is a diagnosis of exclusion, but it mimics several disease states making it difficult to diagnose. According to the CDC, 225,656 pregnant women in the United States tested positive for COVID-19 from January 22, 2020 – July 25, 2022 (11). Re-infection is possible, and the high rate of maternal SARS-CoV-2 vaccination during pregnancy adds complexity to the interpretation of antibody tests in neonates.

Specific treatment of MIS-N follows a tiered approach starting with IVIG and methylprednisolone at 1-2mg/kg/day for three days with slow tapering over 14 days. Most cases report favorable responses with IVIG and corticosteroids (4-6). Our patient had a transient response to IVIG and methylprednisolone at 2mg/kg/day. Using the ACR recommendations for refractory disease in MIS-C (1,) we added high-dose IV pulse methylprednisolone at 10mg/kg/day, with relapse during tapering; we then escalated to anakinra, IL-1 receptor antagonist. On anakinra, the neonate experienced sustained clinical and biochemical response, likely due to the inhibition of pro-inflammatory cytokines that potentiate multiorgan injury. In a case series published by Kumar et al. of three neonates meeting the proposed classification criteria for MIS-N, anakinra was used in two patients with favorable outcomes in one case. The other succumbed to the illness (12). The use of high-dose

corticosteroids and biologics in MIS-N is based on clinical evidence and information extrapolated from Kawasaki Disease (KD), given similar pathogenesis of immune dysregulation (1). Postnatal corticosteroid use is not benign. Therefore, further studies are warranted on the pharmacodynamics of high-dose corticosteroids in MIS-N.

“In this case, it is difficult to determine the additional benefit of anakinra to pulse corticosteroids. However, it allowed us to taper steroid use quickly (Fig. 4). MIS-N is a new disease, and the immune response of neonates to this syndrome is still unknown, and clinical trials are needed to determine optimal treatment and long-term safety data for potential sequelae.”

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Conclusion

MIS-N is a life-threatening disease requiring a high suspicion index in neonates with SARS-CoV-2 exposure. It is anticipated that as new variants of SARS-CoV-2 emerge and cases of COVID-19 rise, we may see more cases of MIS-N. This report is meant to disseminate information about the clinical and laboratory features of MIS-N and contribute to clinical evidence to guide future studies.

We successfully managed our patient using high-dose corticosteroids and anakinra; however, long-term evidence regarding the safety of the above medications is lacking.

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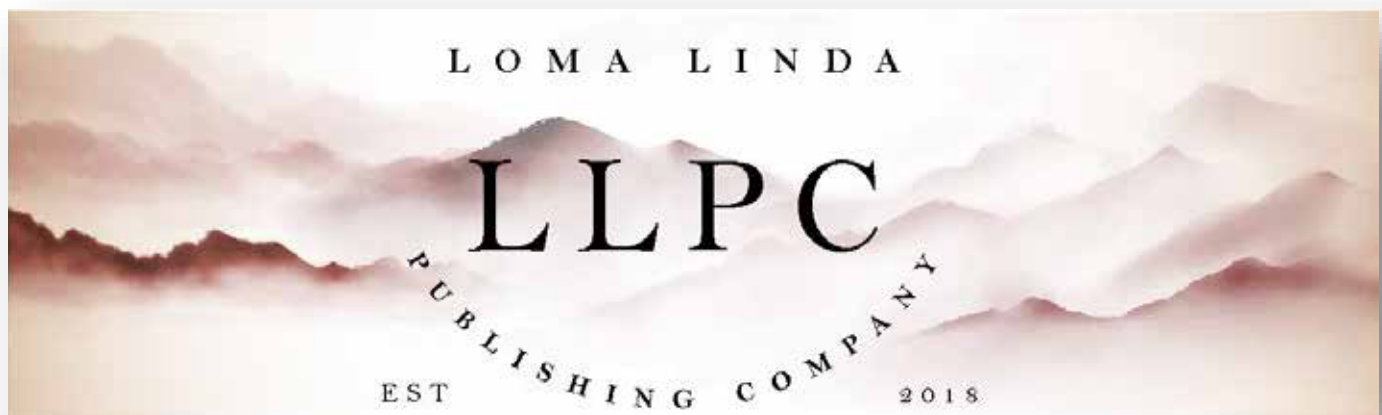
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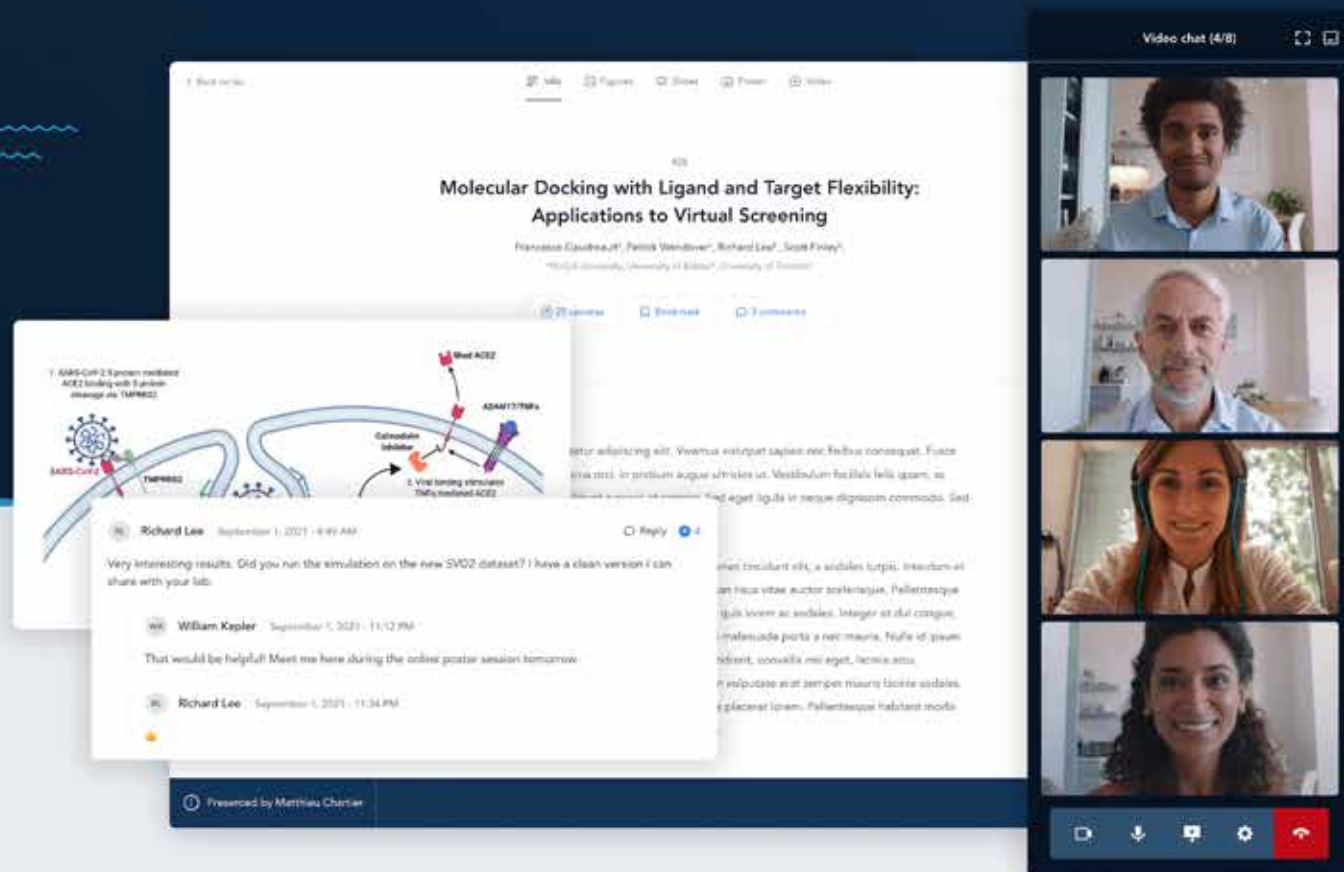
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- Describe rationale and evidence to keep parents and babies consistently together from delivery to discharge
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Engagement in High Reliability Organizing (HRO): The Individual Matters

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

Abstract

Understanding and engagement have a strange relationship with a situation. We fit the situation into our understanding, then use the situation to extend our understanding. We do this through engagement. Engagement is what bridges the gaps between objective knowledge and subjective experience. The situations we engage in are moving toward disorder. Engagement creates structure as it generates information. However, this is information in flux, meaning that engagement constantly updates our information as we continually revise our understanding—information changes in salience, meaning, and relevance. Effective engagement relies on attitudes, values, and reciprocal decision-making. Up close and engaged, the fog of war is the starting point for creating the structure.

“Effective engagement relies on attitudes, values, and reciprocal decision making. Up close, and engaged, the fog of war is the starting point for the creation of structure.”

Introduction

There is a strange relation between how we understand and engage in a situation. Engagement can extend our understanding. Alternatively, our understanding can constrain engagement. In both relations, we use our understanding to engage. It would seem prudent to match the situation to a category, classification, standard, or plan – a concept to some. The person can then *objectively* know what to do and will gain a sense of security and confidence. The individual is developing *the confidence of belief* to encounter the unexpected. To others, confidence comes from the real-time ability to update information and revise beliefs for a changing situation. The person *subjectively* knows what to do, having *the confidence of action* when encountering the unexpected.

To be clear, the confidence of belief develops from knowledge by description. It is a measure of firmly held beliefs and/or thorough study of the process yet not tested in a dangerous context. The confidence of action more closely aligns with High-Reliability Organizing (HRO); it emerges from experience. Not the experience of repeated events but the experience of active sensemaking and action prevents negative consequences (1, 2). The experience is

not only of continuous learning but of continuous *unlearning*. Perhaps this latter trait prevents motivated reasoning and narcissism from developing in the HRO individual – we continuously unlearn as we learn. It is more than a deference to expertise. The leader develops in subordinates the expertise to which the leader will later defer (J. Douglas Orton, Center for Resilience Leadership, University of Michigan, personal communication, DvS).

“[The confidence of belief] is a measure of strongly held beliefs and/or thorough study of the process yet not tested in a dangerous context. The confidence of action more closely aligns with High Reliability Organizing (HRO), it emerges from experience.”

The difference in approaches is more than a division between objective and subjective knowledge, theory and practice (3), scientific rationality and practical experience (actual world) (4), discrete concepts and continuous perception (5), and the normative and pragmatic stances (6). The events that we engage in are made up of many small interactions (complexity science) and a few nonlinear rate-dependent interactions (deterministic chaos (7)). Novel properties then emerge from these interacting interactions. We have entered or have been put into place we do not seem to belong. However, we must respond to these emerging exigencies.

The last two sentences, our place and exigencies, describe how the emergence of novel properties makes an everyday space into one in which we do not belong. Our familiar everyday space has become a liminal space.

“The emergence of novel properties makes an everyday space into one in which we don’t belong. Our familiar everyday space has become a liminal space.”

Engagement bridges the gaps between objective knowledge and subjective experience, theory and practice, scientific rationality and the logic of practice, and the pragmatic and normative stance.

Complexity and deterministic chaos may seem to happen spontaneously or represent our loss of control over the system. They can

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Table 1: Defined Terms

Term	Definition
Complexity	Many small linear interactions
Deterministic chaos	Rate-dependent nonlinear interactions between a few elements [7]
Self-organization	Structure from internal nonlinear processes [9]
Novel properties emerge	Dissipation of energy [10] and stochastic resonance [11]
Exigency	Urgent demand
Liminal space	Where we feel we don't belong
Red noise	Low frequency (f) events have greater power
Pink noise	$1/f$ oscillations produce abrupt, rapid fluctuations and catastrophic failure

be described as contingent or stochastic, having apparent randomness, though with probabilistic functions. While unexpected events emerge from complexity and deterministic chaos, they are products of internal feedback from ordinary fluctuations in human behavior and the environment. This makes up everyday experience. They each develop from the red noise of human behavior and reddened noise from the environment. So, they are not new. They are the same thing but have a different order of magnitude and time course (8) (See Table 1).

“While unexpected events emerge from complexity and deterministic chaos, they are products of internal feedback from normal fluctuations in human behavior and the environment. This makes up everyday experience.”

The introduction to this article describes two uses of our understanding for engagement of gaps. We can extend our knowledge or better understand the event (they are not mutually exclusive). When we allow gaps to interfere with our understanding, we gratuitously create stress responses that impair cognition or engender fear circuits that induce protective mechanisms (12, 13). Failure to understand the situation can be interpreted as a problem with knowledge and education, which leads to remedial education and training. Alternatively, we interpret failure to understand the situation as due to external circumstances, which we explain through complexity science, fractals, or deterministic chaos. Using this stance, the organization will develop objective education, training, preparation, and planning measures.

Another approach, one that draws on the use of understanding to extend knowledge, will prepare the organization for red or pink noise events. These organizations use engagement to bridge gaps. Because “organizations don’t engage, people engage” (14), the focus moves away from the organization’s structure and toward the individual’s actions. It is the individual who identifies a discrepancy or disruption, and it is the individual who decides to engage. This is a subjective process, yet academic and organizational research focuses on measurable objective measures.

People act in a way that makes sense to them *at the moment*; no system or leader can prevent this. People have firmly held beliefs

and operate in a stochastic environment. They must enter the liminal space where they do not belong, equipped only with observation and action (15). “I don’t know what is happening, but I know what to do” – a Los Angeles Fire Department firefighter.” HRO uniquely shapes the engagement that moves through and out of a liminal period” Karl Weick (personal communication).

“People act in a way that makes sense to them at the moment, no system or leader can prevent this. People have strongly held beliefs and operate in a stochastic environment.”

We reduce negative consequences and act to prevent an undesired outcome. This is the basis of pragmatism as philosophy (16), common sense decision-making (2), stress-induced symptoms, fear circuitry behaviors, amygdala-driven behaviors (12, 13), and current neuroscience research on how the brain works (17).

“When a person must act in a liminal space, they act to avoid consequences. In the HRO, they act to avoid hidden consequences for immediate results.”

When a person must act in a liminal space, they act to avoid consequences. In the HRO, they act to avoid *hidden* consequences for *immediate* results. Describing robots and artificial intelligence, John McCarthy (18) wrote, “We shall therefore say that a program has common sense if it automatically deduces for itself a sufficiently wide class of immediate consequences of anything it is told and what it already knows.” The central reference for HRO activity is constantly referencing reality as it is experienced (1). HRO is “working in practice, not in theory” Todd R. LaPorte and Paula M. Consolini (19). *Reality drives action*.

Numerous disciplines discuss common sense as an entity: high-risk occupations (20), philosophy (21, 22), science (23), psychiatry (24), psychology (25, 26), anthropology (27), sociology (28),

29), social psychology (30), logic (18), reasoning (31), artificial intelligence (32), and robotics (33). We will use "practical common sense" to differentiate this academic entity from its colloquial use.

“Practical common sense is a form of practical intelligence for adaptation. In this usage, practical common sense better predicts success in everyday experiences, if not real-world survival.”

Practical common sense is a form of practical intelligence for adaptation. In this usage, practical common sense better predicts success in everyday experiences, if not real-world survival. We can discuss practical common sense for high-risk situations with five components – motivation, intention, knowledge, heuristic processes, and action (2).

- *Motivation* – responsiveness to phenomena, specifically, pressure to correct disruptions and prevent failures
- *Intention* – to immediately act and adjust those actions, referencing an immediate, concrete goal
- *Knowledge* – tacit, concrete, background knowledge from experience that crosses domains
- *Heuristic processes* – intuition, insight, and learning from experience (34)
- *Action* – bridge gaps with engagement (6), think with motor cognition (1)

It now becomes clear that practical common sense forms engagement. That is, we do not necessarily need special training. This engagement also explains why many people have spontaneously acted in the fashion of the HRO.

“It now becomes clear that practical common sense forms engagement. That is, we do not necessarily need special training. This also explains why many people have spontaneously acted in the fashion of the HRO.”

In this article, we describe the subjective elements of engagement that individuals can readily learn at any level of knowledge and experience:

- Structure of the situation
 - o Identification of structures
 - o Generation of stable structures
- Information in flux
 - o Use of imperfect information
 - o Inference of new information

- o Generation of new information
- Attitudes and Values
 - o HRO attitudes
 - o HRO values
 - o Value shift
- Decision-making
 - o Feedback loops
 - o Heuristics
 - o Biases
- Stress responses
 - o Demands versus expectations
 - o Attributes and resources

We previously introduced Four Domains of Engagement (35) that we identified from our experience developing HROs (36). This article describes the practical *action* of engagement. The contents encompass the four domains, even if not specifically identified:

- categorization
- methods of decision making
- the significance of affective processes
- modulation of the stress and fear responses

The HRO considers potential outcomes and consequences, supporting engagement that reduces consequences. We then make a confident guess as to the *consequences* of our decisions, including the consequences of *not* acting. Not acting *is* an action, just as not deciding is a decision. Both are dangerous as those with less experience too quickly believe the situation has been resolved.

“Not acting is an action, just as not deciding is a decision. Both are dangerous as those with less experience too easily come to believe the situation has resolved.”

The introduction of trauma centers in the late 1970s raised the question of resource utilization – does an overnight stay in the ICU indicate a patient who did not need admission? One of the authors (DvS) reviewed sequential admissions of trauma patients with a trauma surgeon. The question was not “Did the patient need operative management” but “Did *non-operative* management prevent an operation” admission to a trauma center with skilled nursing management allowed surgeons to avoid exploratory laparotomies. (This was before routine CT scans for internal injuries.) It has been the personal experience of the three authors that not acting while others urge active intervention is one of the more challenging aspects of managing a crisis.

This differs from failure to act in Karl Weick’s model of *enactment*, which is more disregarding the consequences of not acting. Failure to act as enactment then becomes organizational knowledge that does not permit questioning (37).

Mastery in HRO comes not from a body of knowledge but from experienced sensemaking for consequences with the ability to solve problems never before encountered (38). Engagement puts that ability into action.

“Mastery in HRO comes not from a body of knowledge but from experienced sensemaking for consequences with the ability to solve problems never before encountered. Engagement puts that ability into action.”

People Make Sense through Engagement

Regardless of what people are taught or what the science of decision-making supports, *how people make sense of situations drives their decisions*. After the crisis has passed, however, they often describe their actions differently to help themselves understand or, in non-HRO organizations, to justify their decisions or actions (36).

“During a crisis, there is not time to think about each specific bit of knowledge or experience that we depend on to make sense of imperfect information and ambiguity. But having those resources immediately accessible in our minds, we use them in a conceptual decision-making process to frame the decision. We essentially quickly come up with a paradigm of how to solve the problem. It is after the fact that we retrospectively begin to attribute specific reasons for the decisions that we made.”

- Capt. Chesley “Sully” Sullenberger (personal communication)

Perhaps the best identification of an HRO is engagement, and the hallmark of that engagement is the engagement of the outlier. While we more readily focus on the catastrophic “pink noise” event, the reddened noise-forcing function will more often damage the organization’s operations. Forcing functions can self-resolve or respond to actions taken by actors on the line. This diminishes the importance of forcing functions as a threat – minor events are misinterpreted as non-consequential *probabilities* rather than displays of *possibilities*. In the HRO, any individual who encounters an outlier of any magnitude will engage because all outliers are indicators of destabilization. Engagement works to restore stability.

“In the HRO, any individual who encounters an outlier of any magnitude will engage because all outliers are indicators of destabilization. Engagement works to restore stability.”

While the brain engages to reduce the negative effect of consequences, the HRO directs engagement toward generating information and creating structure. We are not acting to reduce randomness or to select an action most likely to work. We act to identify what influences the system. That is why experienced operators focus less on “doing the right thing,” that is, what will work,

and focus instead on “doing it right,” that is, moving the system toward resolution. Karlene Roberts used this idea to give the title for the first international HRO conference – “The Blue Collar Ivory Tower: Doing the Right Thing or Doing It Right” (DvS, personal communication).

“We are not acting to reduce randomness or to select an action most likely to work. We act to identify what influences the system. That is why experienced moderators focus less on “doing the right thing,” that is, what will work, and focus instead on “doing it right,” that is, moving the system toward resolution.”

Probability measures have little contribution to accuracy. We can only combine probability distributions when the data comes from the same probability space. The High-Reliability Situation (HRS) becomes entangled with various probability spaces; we do not have joint probability distributions. In quantum theory and quantum cognition, this inability to combine probabilities is known as *contextuality* (39). Concepts change continuously under the influence of context, ‘the change of state of the concept.’ Concepts, then, can be modeled as a quantum entity influenced by the contexts of measurement (40).

Contextualization of concepts is not specific to quantum cognition:

- John Boyd, a US Air Force officer and strategist who created the OODA (Observe, Orient, Decide, and Act) Loop (41), described the contextualization of concepts as creation (synthesis of concepts by constructive induction) while separating the particulars from their previous domains (analysis of context through destructive deduction).
- Mike Zundel and Panagiotis Kokkalis (3) describe how we use concepts (theory) to work towards particular ends. Practical engagement comes from how we use an object (concepts), its function, and its purpose in context. We engage in “practical dealings with the world constitutive of our environment.” Engagement does not come from the rational deliberation of concepts because concepts as “*scientific a priori understandings delimit the ‘region’ of what is there to be investigated*” (emphasis by the authors).
- Jörgen Sandberg and Haridimos Tsoukas (42) placed concepts as enactments determined through particular practices drawn from local contexts. Concepts are partly emergent properties, open-ended, that are created by our actions. This is similar to Boyd’s creation of mental concepts during contextual synthesis.
- Karl Weick (5) warns against losing our perceptual contextual order by substituting an *a priori* conceptual order. The operator takes this warning as support for engagement: protect the perceptual contextual order we experience within the flow of events from the *a priori* conceptual order of the spectator, executive, administrator, or regulator (6). The continuous perceptual flow of context is knowledge by an acquaintance, while conceptualization in the interest of coordination and communication devolves into knowledge by

description.

“The continuous perceptual flow of context is knowledge by acquaintance while conceptualization in the interest of coordination and communication devolves into knowledge by description.”

Operators have long resisted conceptualization. Conceptualization of contexts has consequences. Our brain engages to prevent the adverse effects of consequences. Vanessa Heggie captured this concern when she described the use of models to guide high-altitude mountain climbing: “Predicting what would happen to the first human beings to climb that high [27,000 feet] was therefore literally a matter of life or death – here inaccurate models could kill” (43). Operators hold tightly to engagement for safety reasons – engagement is the *contextualization* of concepts. Engagement makes models accurate.

Action as Information

A system is in an indefinite (dispersed) state *until a measurement or action is performed* on the system. All possible definite states have the potential for being actualized, but only one of them will become actual *upon measurement* when an action is taken. Such actions as a series of short action-response feedback loops create measurements. We can communicate these transient measurements as accurate “action responses,” thereby converting our actions into information (44).

In a dynamic situation with an unstable structure, we cannot know the direction of our actions until we act. The sequence of those actions can affect the trajectory of events. Generated events from the sequence of our actions and responses have a transient existence. Because information plays a fundamental role in the unfolding of reality, the meaning of that information gives coherence to events. Thus, the reality emerges from the series of actual occasions (45).

“Because information plays a fundamental role in the unfolding of reality, it is the meaning of that information that gives coherence among events. Reality, thus, emerges out of the series of actual occasions.”

In quantum cognition, the act of deciding *creates* the cognitive state. In other words, *engagement creates the cognitive state that supports engagement*.

Structure of the situation

We engage a system that is moving toward disorder – increasing entropy. Information becomes disordered as it is transmitted (46). This flux creates uncertainty. Our observations will shape the concepts we formulate, while our concepts shape our observations and inquiries (41). Accepting the uncertainty and incompleteness

of our concepts reduces surprises (47).

Concepts, as described in the previous section, change continuously under the influence of context. John Boyd, a US Air Force officer and strategist who created the OODA (Observe, Orient, Decide, and Act) Loop, posited that “according to Gödel, we cannot—in general—determine the consistency, hence the character or nature, of an abstract system within itself.” Analysis differentiates elements within the system, while synthesis with outside information integrates a solution from outside the system (41).

However, concepts are how we access the world. What Boyd describes is empiricism as engagement. He moves beyond the Kantian approach of *conceptual structuring* – facts must correspond to concepts allowing us to connect the world to those concepts (1, 48). While the Kantian approach gives us causality, we are concerned about consequences during the engagement.

“[Boyd] moves beyond the Kantian approach of conceptual structuring – facts must correspond to concepts allowing us to connect the world to those concepts. While the Kantian approach gives us causality, during engagement we are concerned about consequences.”

“How do we generate or create the mental concepts to support this decision-making activity?” John Boyd (41). Boyd’s response to a disruption of observed reality parallels Karl Weick’s sense-making perspective that operators create what they focus on through repeated cycles. For Weick’s sensemaking, the operator distinguishes cues within an ambiguous event to use for enactment toward a resolution that restores the disrupted activity (37, 49).

“Creativity is related to induction, synthesis, and integration since we proceed from unstructured bits and pieces to a new general pattern or concept. We call such action a creative or *constructive induction*...this creative induction is the separation of the particulars from their previous domains by the *destructive deduction*. Without this unstructuring, a new structure cannot be created—since the bits and pieces are still tied together as meaning within unchallenged domains or concepts, John Boyd (41).

“During an engagement, we follow many lines of simultaneous engagement as events unfold across a full spectrum of possible actions. Multiple challenges can best be solved in an integrated fashion to create synergy among disparate domains.”

Boyd (41) considered these problems a dynamic *mystery* rather than a static puzzle. Adrian Wolfberg demonstrated this as “mys-

tery-solving,” which relies on “full spectrum analysis.” During an engagement, we follow many lines of simultaneous engagement as events unfold across a full spectrum of possible actions. Multiple challenges can best be solved in an integrated fashion to create synergy among disparate domains. “In full-spectrum analysis, the analyst examines not only multiple, possibly interrelated intelligence problems simultaneously but also considers contextual and influential factors that could affect the interim analysis of information and its interpretation” (50).

Practical Structuring

When coming on PICU service, one of the authors (DvS) observed that bedside staff had difficulty coherently presenting an unstable patient. The solution was quick and effective: create a list of *all* problems and measurements. Consistently, the first items most *salient* to bedside staff were “fluids, electrolytes, and nutrition,” elements common to all hospitalized patients. This was due to the availability construct; the first things we think of are the most available to the brain, not the most important.

The team would then delete those elements that were measured with different methods. About one-quarter of the list was usually lined through. The team then grouped the remaining elements by the physiological system. One or two groupings could cause death, another two or three would keep the child in the PICU, and a few more would resolve with routine medical care.

After a few such cases, the residents learned to identify problems necessary for immediate engagement rapidly. Bedside staff no longer used conceptual ordering for their coordination and communication. Instead, they began to respond to relevant signals, whether the signal strength was strong or weak. That is, consequences contributed to the salience of a signal, relevance brought staff into engagement, and they gave meaning to information that supported engagement.

“They began to respond to relevant signals whether the signal strength was strong or weak. That is, consequences contributed to the salience of a signal, relevance brought staff into engagement, and they gave meaning to information that supported engagement.”

In a resource-poor system, the individual who engages creates the structure...and makes the difference.

Information in flux

Reddened or pink-noise environments are information *insensitive*. More information (or data) makes the data messier or reveals covert, unexpected influences. With events in flux, current information quickly becomes antecedent information, entrained energy changes circumstances, and what was relevant becomes irrelevant.

We generate information through our actions. There is no wrong action, as every action creates a response, and every response changes an element from uncertain to certain. This uncovering of information and the generation of information is Shannon’s Infor-

mation (46). Claude Shannon laid the groundwork for the digital revolution by describing signals as having one of two values – certain OR uncertain. Information is the conversion of uncertainty to certainty. “Being certain” carries no information, but changing from uncertain to certain creates information.

“There is no wrong action as every action creates a response and every response changes an element from uncertain to certain.”

In this sense, there is no error during an HRS (the High-Reliability Situation), as even what some would consider an error converts uncertainty to certainty. For the HRO, “error” has functions to identify boundaries of performance and operations, the “envelope” that HROs seek to expand. “Error” identifies a mismatch between what is known and uncertain or ambiguous. “Error” identifies an unexpected or unrecognized change in conditions or the environment.

“During an HRS, information is contextual, even ephemeral. What makes information different is how it is valued, not as weak signals but by its salience, relevance, and meaning.”

Information during the HRS is imperfect but necessary. During an HRS, information is contextual, even ephemeral. What makes information different is its value, not as weak signals but by its *salience*, *relevance*, and *meaning*. The operator in the flux of a trajectory learns the salience of subtle and nuanced signals, identifies the relevance of information and gives meaning to changing information. Experience teaches us to change the level of salience, work with partial or contingent relevance, and shift the meaning of information as events evolve.

- The *salience* of signs and information prevents distraction when approaching an emergency.
- The *meaning* of information changes during events and also among participants. There is no useless information in an emergency.
- The *relevance* of information and how you use it is also situational.

“When you pay attention to the plan, you are ignoring information and become frustrated when the plan does not work,” Chris Flowers, Training Officer, San Bernardino (California) Police Department, describing his experience responding to a terrorist incident and a school shooting (personal communication, DvS).

Salience, relevance, and meaning of information can be taught and learned. Salience, relevance, and meaning initiate engagement are produced by engagement and drive engagement.

Attitudes and Values

Attitudes represent predispositions in favor of or against an ele-

Table 2: The Attitudes of HRO

Characteristic [53]	Attitudes [36]
Preoccupation with failure	Attitude toward failure
Reluctance to simplify	Acceptance of the complexity of even simple events
Sensitivity to operations	Awareness of how one fits into the scheme of life Situation-centric versus person-centric
Commitment to resilience	Perseverance
Deference to expertise	Respect for the knowledge and experience of others

ment; attitudes *influence* behavior (51). While beliefs strongly influence behavior, their greater specificity limits their adaptability in uncertain and ambiguous situations. Attitudes have the notion of evaluation at their core (52) and are generalizable and less specific. Attitudes are adaptive to varying contexts. Conversely, values have a more substantial, more consistent effect on behaviors and are less context-dependence.

Attitudes

The generalizable character of attitudes gives the organization adaptability for varying contexts. The strength of values and their consistency makes organizational performance less context-dependent. The HRO uses this paradox to adapt to environmental change while maintaining organizational *stability* rapidly. The Five Characteristics of HRO (53) can be better understood as attitudes [Table 2] (36), but the values necessary for HRO (36) have not been discussed as well.

“The strength of values and their consistency makes organizational performance less context dependent. The HRO uses this paradox to rapidly adapt to environmental change while maintaining stability within the organization.”

Values (36)

From their operational experience, two of the authors (DvS and TAM) identified five values that enable an HRO to perform and that are shared with its members through acculturation:

- *Dignity*. This means acknowledging the value of everybody’s contribution.
- *Honesty*. What someone says represents the circumstances.
- *Humility*. The unexpected can happen to any of us; we can all fail. Humility can be learned, and it is the team’s responsibility to discourage arrogance because no one is impervious to error actively. When an error or complication occurs, we immediately help: there is no reason to find someone to blame.
- *Empathy*. HROs work in challenging situations where people

will fail, and it could be any of us doing the failing—there, but for the grace of God, go I. Empathy refers to our internal belief system toward the plight of others. People make the best decisions they can at the time; when things do not work out, we can support the person even if we disagree.

- *Duty*. We will not disappoint others; we have a duty to our larger community. Duty has a more significant, deeply held spiritual component that is internalized and comes from within. We engage to help others do their jobs; often, little things we can do will make someone else’s work more challenging or straightforward.

Rapid Shifting of Values (36)

HROs work in two environments: the structured environments of routine operations, where preventing system failure is the priority, and the unstructured environments of a crisis, where an emergency response is a priority. Some values found in HROs seem to oppose each other, such as initiative and obedience. Others appear to be situational: what helps us one minute may have to be quickly discarded when circumstances change.

“Some values found in HROs seem to oppose each other, such as initiative and obedience. Others appear to be situational: what helps us one minute may have to be quickly discarded when circumstances change.”

Obedience and authority are part of preventing system failure, but creative problem-solving and the initiative to engage are necessary during an emergency. Having the ability to shift between values smoothly is one of the hallmarks of the HRO. This ability to rapidly develop initiative and creativity in an unstructured situation creates the “leader-leader” construct we desire for HROs. A “leader-follower” construct too quickly creates a docile member who awaits instructions.

Values are also situational. Our evaluation of what will help us and ensure safety will change as circumstances change. We must rely on people with a sense of duty toward the larger organization, a virtue, and their judgment during the event.

Decision-making

One of the authors (DvS), while creating a PICU residency program with ward and NICU nurses, noted that staff collected in-

formation and tended to make only minor decisions. To help in decision-making, the author offered several directives:

- *If it is reversible, then take action.* This required staff to know not only the desired effects but also the undesired effects.
- *Did the action make the situation better, worse, or no change?* This is a corollary from the above directive. Roughly, if better, then continue. If worse, stop – this gives new information about the situation. If there is no change, then evaluate whether it is the right dose, drug, or diagnosis.
- *Think from a decision box: What would happen if you acted too soon or too late?* What would happen if you give too much or too little? Acting within that box is relatively safe.

When considering intubating a child with severe status asthmaticus, Mark Rogers, RCP, RRT-NPS, suggested using a helium-oxygen mixture. Helium had not been used in the children's hospital, and the adult ICU had little, if any, experience using helium. One of the authors (DvS) asked Rogers how he would know it would work. He immediately described how he would know it worked or failed and gave a trial time that limited administration. This demonstrated to staff how to discuss introducing a new therapy and reassured the author that staff would neither stop the therapy before it could help nor push the therapy to where it could cause harm. Helium-oxygen therapy for status asthmaticus became standard in the PICU (54).

“This demonstrated to staff how to discuss introducing a new therapy and reassured the author that staff would neither stop the therapy before it could help nor push the therapy to where it could cause harm.”

Basic Problem Structure (36, 44)

Duncan Dieterly (55) described the three elements of a problem: the situation, intervention, and objective (Figure 1). Knowing all three makes the problem trivial; the situation defines the problem, which can be solved with rules and protocols. This is a matter of selecting the appropriate decision tree, algorithm, or clinical pathway.

In the HRO, we prepare for uncertain or unknown situations. Collecting data is unproductive because the problem changes. We approach these situations by developing a concrete objective. George Orr (56) expanded Dieterly's work by describing conditions with multiple situations, interventions, and objectives. At first, this may appear unclear, but by correlating these conditions with your experience, you readily expand decision-making for complex, chaos-driven situations.

Decomposing the Problem (36, 57)

If we cannot identify or reach an objective, we can decompose it into smaller, achievable objectives. For example, we can decompose the airway problem in resuscitation by manually acquiring the airway, identifying any obstruction in the mouth, identifying any obstruction in the upper or lower airway, and then protecting the airway.

It is common in an emergency to have two simultaneous objectives. We strive for the desired objective while striving for a less-desired, more readily achieved objective. In a sense, we hedge our bets. In high-risk situations, we work to achieve success while avoiding failure; this is a critical operational approach represented by the HRO principle of “preoccupation with failure.” Avoiding failure is more than redundancy; it means being vigilant for things that can go wrong and responding to weak signals others miss or ignore. We work to increase our chances of success while decreasing our chances of failure. A French fighter pilot once described this to one of the authors (DvS): “If I can't accomplish my mission, I continue and support the other pilot; I work to increase the chance of success for his mission.”

“Avoiding failure is more than redundancy; it means being vigilant for things that can go wrong and responding to weak signals others miss or ignore.”

The OODA Loop

In 1968, John Boyd, a US Air Force officer and strategist who created the OODA (Observe, Orient, Decide, and Act) Loop, presented his concept of the OODA loop (Figure 2) (58).

We use the OODA loop in healthcare to outmaneuver a rapidly changing disease state (36, 57).

The OODA loop is a rapid, real-time interactive hypothesis development and testing cycle. To create the loop, the person **Ob**serve, **O**rient, **D**ecides, and **A**cts then loops back to observe the effect of the action. The action creates the loop for a continuous cycle and gives the OODA loop its power and agility.

“The OODA loop is a rapid, real-time interactive hypothesis development and testing cycle. To create the loop, the person Observes, Orients, Decides, and Acts, then loops back to observe the effect of the action.”

There need not be a consistent starting element. Weick observed that “one can start this sequence anywhere and move either in a clockwise or counterclockwise direction” (personal communication). Weick has described the utility of Boyd's OODA loop (in either sensemaking or enactment) by starting at A, the act phase (personal communication). Acting is the first step in engagement and is part of Weick's sensemaking.

Observe. An *attention* function for discrepancies, disruptions, and outliers does not require a complete analysis of the situation. The observe function also notices the responses to our just-completed action and whether we received the results we expected.

Orient. “Shapes the way we interact with the environment...The way we *observe*, the way we *decide*, the way we *act*.” “Seen as

Decision-Problem Condition Models

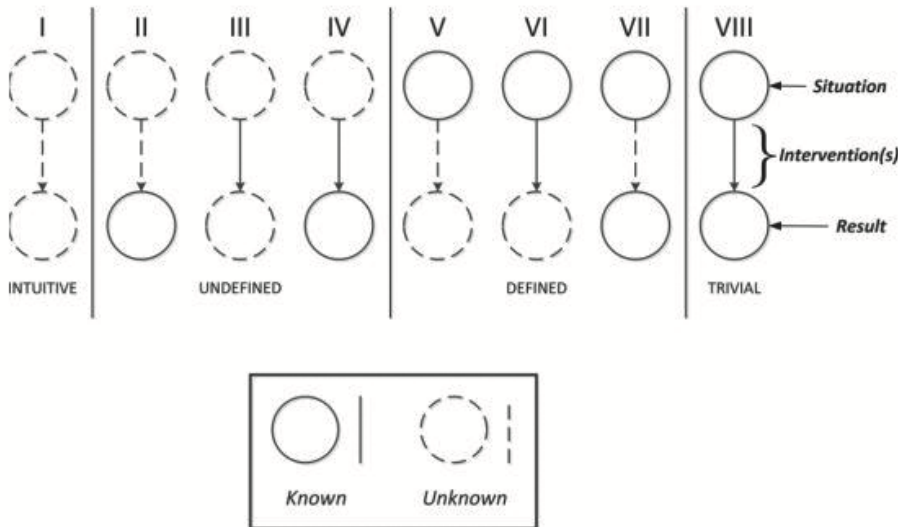
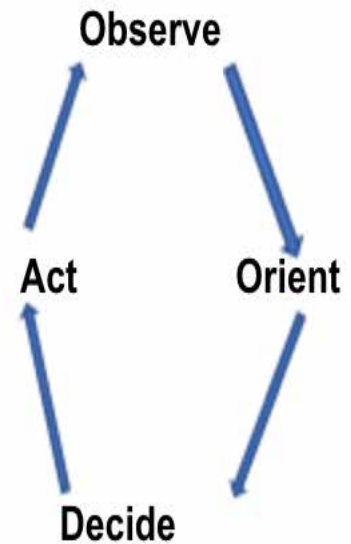


Figure 1 (left): Decision-problem condition models [55]
Figure 2 (right): Boyd's OODA Loop



a result, represents images, views, or impressions of the world shaped by *genetic heritage, cultural tradition, previous experiences, and unfolding circumstances*" John Boyd (58). In this functioning, we synthesize new information and build support for our decisions. (Some consider this an orientation to the circumstances, but the orientation function is much richer.) (59).

Decide. Rapidly generate a hypothesis. From the circumstances, it is operating in the affective domain of emotion, values, attitudes, and personal evaluation. Create new repertoires (59).

Act. Initiates the *loop action*, which acts like a control mechanism operating on the environment while changing people's perceptions of the environment. The loop action is a method to explore the situation while exploiting any path of least resistance. When we encounter friction as part of the feedback, we can observe whether we should pursue another path with less friction or identify the friction point as something significant that should remain in focus (56). The use of positive feedback through the loop action directs focus and actions toward paths of success, while negative feedback marks practical and safety boundaries that can act as a safety function.

"Boyd described the methods and benefits of a faster tempo: the ability to transition more rapidly than events change, develop more repertoires of action, free and open communication, interactive support, increased information sources to select from, and generation of new ideas that can be rapidly tested."

Loop. We calibrate our mental model with the actuality and re-

sponsiveness of the environment. Encountering resistance or friction, we rapidly resolve whether to change our approach or seek resources. This is not through speed or shortcuts but by increasing our tempo. Boyd described the methods and benefits of a faster tempo: the ability to transition more rapidly than events change, develop more repertoires of action, free and open communication, interactive support, increased information sources to select from, and generation of new ideas that can be rapidly tested (60).

Connecticut Paramedics (36)

Two paramedics arrived to find a woman in her late sixties lying face down in the street. They saw she was nonresponsive and pale. Her skin felt damp, and her oxygen saturation was in the low eighties, with a slow, weak heartbeat in the forties. On the EKG, they identified a regular electrical pattern except for premature ventricular contractions. The first thought was that she had had a cardiac event, so they began considering cardiac protocols. The two paramedics were unsure which protocol to use, but each paramedic had 15 years of experience and could see that she was dying. They began to feel helpless to stop her death.

While accomplishing this evaluation, they also made a rapid visual respiratory exam and observed very shallow breathing; they identified lower airway obstruction from the prolonged expiratory phase. This indicated treatment with a bronchodilator drug, something they would not have considered without the rapid five-point visual respiratory exam (61). They were not sure, however, if they should treat what could be a second disease, if the bronchodilator would work, or if the bronchodilator might stimulate the heart and cause the extra beats to fibrillate, creating cardiac arrest.

They decided to administer the drug and observe the response, which is something they would not have considered without the use of Boyd's OODA loop decision-making. After the bronchodilator treatment, the woman's chest expansion increased, the expiratory phase shortened, her oxygen saturation increased above 90 percent without supplemental oxygen, and she became alert. Most critically, her heart rate increased, and the premature ventricular contractions resolved. This woman's life was saved by treatment the paramedics had learned four months earlier.

Table 3. OODA Loop functions

Function	Description
Observe	Observe the situation Match prediction to response
Orient	Process and synthesis of observations Actual world function Culture, experience, physiology
Decide	Develop hypothesis; decide action
Act	Test hypothesis Interface between operator and environment
Loop	Effect of action

Reciprocal decision-making (44)

We have no time to vet information or evaluate events in a dynamic situation. We can rapidly observe feedback that is *directly associated with immediate action*. That is, we respond to the environment responding to us. Reciprocal decision-making describes how we act and observe the response to our action and how that response guides our following action. We learn what works through action. Decisions linked to action are probes to learn structure, redirect trajectory, create structure, and engage the threat. This is not simple feedback, a component of decision trees and algorithms.

“We have no time to vet information or evaluate events in a dynamic situation. We can rapidly observe feedback that is directly associated with immediate action. That is, we respond to the environment responding to us.

Feedback. This feedback is HRO trial-and-error learning. In this way, the environment acts upon the individual and organization, described by Bob Bea, Professor Emeritus, Civil Engineering, University of California, Berkeley (62), as *interactive, real-time risk assessment and management*.

Short feedback loops are more specific to our action and more readily accepted, rightly or wrongly, as causative. For example, instrumental anger or intimidation to gain staff control has a short feedback loop and is used for that effect in movies. The long and indirect feedback is disastrous and may be hidden, for example, with high staff attrition.

The time compression inherent to the flux of rapid, dynamic events confounds the real-time use of long or indirect feedback loops. To obtain short feedback loops, we must closely approach the environment, even entwining with the environment. Entering the situation shortens feedback loops, thus improving accuracy.

Negative and positive feedback. Feedback maintains homeostasis for stable operations within the environment, supports safety, and generates self-organization WHILE simultaneously bringing resolution to the event.

- Negative feedback corrects deviations from our desired state, ensuring safety; negative feedback marks our bound-

aries for safe operations.

- Positive feedback builds structure and supports our strength and resilience.

Heuristics and Biases

We have found four predominate heuristics that cause consequential bias and interfere with effective decision-making: availability, representativeness, confirmation bias, and over-conservative revision heuristics (Table 4). Motivated reasoning, a fifth bias but not from a heuristic, overly scrutinizes information that conflicts with closely held beliefs. This is not confirmation bias (36, 63).

Availability, called frequency bias, leads us to accept our first impression. Availability bias also occurs when redundant measurements of variables influence our perceptions. Availability also biases us toward precision and using numbers as quantitative information over qualitative values.

Acceptance of our first impression simplifies the situation. We too quickly stop developing more structure. Mentally listing 3-4 causes of the situation helps discipline the mind to continue thinking after the first acceptable answer.

Representativeness, closely tied in with complexity and “reluctance to simplify,” leads us to regard partial information as complete information: what you see represents what is happening. This is difficult to break because practical common-sense problem-solving uses partial information (2), which is also all we have when we begin to engage. When we recognize the bias of representativeness, we can reevaluate the situation and update and revise our beliefs.

Confirmation bias derives from cognitive dissonance. To reduce dissonance, we search for confirming information. We look for evidence supporting our conclusions while ignoring disconfirming, discrepant data. Confirmation and availability biases are insidiously dangerous; an individual stops considering alternatives.

Overconservative revision biases us to require more information to stop an action than we initially required to start. We continue treatments long past when we would not have initiated the treatment. Once we start a treatment, we find it hard to stop, even when the reason for treating it is gone.

Error corrects heuristic bias. Though counterintuitive, the individual in these situations considers every action could be wrong. The author (DvS) served on a fire rescue ambulance in South Los Angeles ten years after the Watts Riots. The Crips and Pirus (later the Bloods) were expanding northward. Recognizing a gang member by clothing, behavior, stance, and countenance influenced our approach. The gang ‘uniform’ had yet to form. However, we had

Table 4: Heuristics and Biases

Heuristic	Bias
<i>Availability</i>	What you think of first is most important
<i>Representativeness</i>	What you see represents events
<i>Confirmation bias</i>	Seek supporting evidence
<i>Overconservative revision</i>	More information to stop than start
<i>Motivated reasoning</i>	Overly scrutinize evidence against strongly held beliefs

to discern the gang member from the ‘wannabe’ attempting to join or the youth adopting the gang appearance for their protection. Each needed to be treated differently. It was the feedback during our interactions that guided us. Sticking with the wrong approach could lead to injury or mistreatment of a youth trying to get by and stay in school. Every word and behavior could instantly be wrong.

“Error corrects heuristic bias. Though counterintuitive, the individual in these situations considers every action could be wrong.”

Motivated reasoning is the automatic default mechanism for a person to defend their prior attitudes and actively challenge arguments incongruent with their firmly held beliefs. People are unaware of their use of motivated reasoning, which comes from motives to achieve an accurate conclusion or maintain a specific conclusion (64).

“Motivated reasoning is the automatic default mechanism for a person to defend their prior attitudes and actively challenge arguments incongruent with their strongly held beliefs.”

Individuals protect cherished beliefs for several reasons (64, 65). Motivated reasoning enhances self-efficacy against a problem of self-control or gives utility for beliefs to counter a perceived weakness in a desired trait. Motivated reasoning also protects personal and social identity. Selective updating by information avoidance and asymmetric processing of good and bad information protects these beliefs (65).

Stress responses

Engagement is driven by the idea that “a failure *is* an option.” The well-known stress and threat responses are commonly viewed as debilitating. This belief ignores their function during a crisis. Abstract thought distracts from focusing on new relevant information. Disregarding the proximity of a threat, whether temporally or spatially, reduces the time for effective action. This action is the

inherent vice of stress (66).

“Engagement is driven by the idea that “failure is an option.” The well-known stress and threat responses are commonly viewed as debilitating. This belief ignores their function during a crisis.”

Threat identified through the sympathetic-adrenal-medullary axis (SAM) stimulates the paraventricular nucleus of the hypothalamus to release corticotropin-releasing factor (CRF) into the anterior pituitary *and* the locus coeruleus (LC). This release activates the hypothalamic-pituitary-adrenal (HPA) axis and the locus coeruleus-norepinephrine (LC-NE) system. The HPA axis suppresses the executive functions to support engagement, while the LC-NE system supports the cognition and behaviors necessary for engagement. CRF from the central nucleus of the amygdala may also activate the LC.

Do not get lost in the apparent complexity. Neuroscience has caught up to what veteran operators have long known. We engage in abrupt change, and engagement supports thinking during the crisis. Norepinephrine is rapidly released, supporting cognition. The slower release of cortisol will constrain abstract thinking to allow focus and rapid response. We see this is a crisis in the hospital – the individual who stands still for too long will unlikely participate in the emergency without some additional support.

We use stress-induced constraints on cognition and fear circuitry behaviors to overcome the inherent vice of stress and maladaptive fear-circuitry behaviors (12, 13). The vital HRO characteristic of modulating amygdala-driven behaviors is significant (12, 67-69).

Our neurological response to the threat from forcing functions or abrupt catastrophe creates a liminal space. We do not seem to belong in this space because our learned rules do not apply. It is intensely personal because we can never be sure others have the same experience. We must be acutely aware of our body’s responses: “If your body is moving faster than your brain can think, then slow down. If you feel your eyes glaze over, slow down,” William J. Corr, Captain of the Los Angeles Fire Department (personal communication). Corr was describing the shift from engagement to the disengaged thought that can occur in the liminal zone.

Engagement takes advantage of these neurological responses. Stress constrains the *executive functions*: the brain integrates, from opposite ends, perception, hastily created plans and motor activity. During a crisis, the hypothalamic-pituitary-adrenal (HPA) axis enables survival behaviors by releasing cortisol to “disarm” the executive functions. Novelty, uncertainty, and uncontrollability in executive functions cause stress responses. Fear circuitry behaviors at the subcortical level maintain a safe distance from the threat. Amygdala-driven behaviors as reflexes rapidly initiate protective behaviors.

“Our neurological response to threat from forcing functions or abrupt catastrophe creates a liminal space. This is the place we don’t seem to belong because our learned rules don’t apply. It is intensely personal because we can never be certain if others are having the same experience.”

The human brain will release corticotropin-releasing factor (CRF), which goes to the hypothalamic-pituitary-adrenal axis (HPA), and the HPA terminate ongoing activity, suppresses executive functions, and impairs abstract cognition. Concurrently, CRF enters the locus coeruleus-norepinephrine system (LC-NE) to reorient cognition for attention and arousal – adaptive cognition is started, the individual focuses on behaviors, and engagement follows

Stress as a Problem

Viewing stress as an imbalance between demands and abilities is too simple for discussions of live-or-die situations or operating in dangerous contexts. We draw our model from Raymond Novaco’s (70) work because of its fidelity to lived experience. (One of the authors, DvS, was a student of Novaco in 1978).

“Without differentiation of demands from expectations, stress debilitates staff, increases attrition, and impairs performance of individuals and the team. Expectations will drive out the more capable and empathic members.”

Demands and expectations come from the environment. Demands are external to the individual and must be engaged. Expectations are social and subjective; they develop from our minds or those around us. Expectations are also how we judge success. Unfortunately, we too often find that the drive to meet expectations will occur at the expense of meeting demands. This apparent conflict became a central part of introducing new residents in the PICU and is vital for effective performance (DvS). Without differentiation of demands from expectations, stress debilitates staff, increases attrition, and impairs the performance of individuals and team performance. Expectations will drive out the more capable and empathic members.

Demands initiate engagement. We must keep the focus of engagement directed toward those demands.

We meet demands and expectations with our attributes and resources. Attributes refer to the individual’s characteristics, knowledge, attitudes, decision-making abilities, and problem-solving capabilities. Resources are external to the person, which people can call upon while the event is ongoing. Because resources exist does not mean we can rely on them. “If you don’t have it with you, then it doesn’t exist,” is a familiar fire department saying. This problem, how to operate in an austere situation, led one of the authors to develop a visual respiratory examination to replace blood gas analysis (71) and study retrograde intubation by paramedics (72) after the inability of paramedics to intubate an adolescent with pulmonary edema from commotio cordis.

Attributes and resources combine to give the individual the capabilities necessary for effective engagement. The HRO’s goal is more than “life-long learning” the HRO continually increases the capabilities of the organization, teams, and individuals. The HRO views individuals as assets, the approach found in military services.

Family Presence during Resuscitation

Engagement creates the cognitive state necessary for engagement. This progression sounds tautological until you observe a novice move from observer to participant, then to engagement. Cognition differs in each of these three states. One of the authors (DvS) served on a fire rescue ambulance and engaged in thousands of resuscitations with family or friends present, if not actively helping. Rookies participated as valued members of the team. Therefore, it was surprising that beginners and families were routinely dismissed from healthcare. The author would then tell the parents that their child died, answer their questions about the resuscitation, and describe the life-saving efforts made by the team. When the family could later enter the room, they encountered a clean room.

Initially, the author would bring the family to the room while it had evidence of the effort made by the team. Because the custom was to present a clean room to the family, it took some time for staff to appreciate that when the family entered the room, they saw their child and evidence of the work involved in saving their child. Nurses thought a messy room reflected poorly on their efforts.

“Staff engaged with the family and could find they were able to comfort the family with small gestures or words, which had a greater effect than previous work to make the room clean and organized.”

The final measure of bringing the family in *during* the resuscitation caused the greatest friction. The author would leave the room to bring the family to their child, as no staff member would do this. Written out like this, one can imagine the response from staff. The reality was different. Staff engaged with the family and could find they could comfort the family with small gestures or words, which had a more significant effect than previous work in making the room clean and organized. This program became internalized into the PICU and has since been published in the medical literature (73).

This change in resuscitation demonstrates engagement as a

quantum entity, described above in *Action as Information*. We cannot know the direction of our actions until we act. The sequence of those actions can affect the trajectory of events. Generated events from the sequence of our actions and responses have a transient existence. The meaning of that information gives coherence among events (45).

“We cannot know the direction of our actions until we act. The sequence of those actions can affect the trajectory of events. Generated events from the sequence of our actions and responses have a transient existence. It is the meaning of that information that gives coherence among events.”

Responses are transient, allowing the staff member to rapidly intervene with the family or correct action if the family's response may be maladaptive, something we cannot do in a family meeting. Supportive interactions are significant; even a silent presence becomes support. Engagement dyads form and break, sometimes by voice, eyes, or a person's presence. Veterans and Neonatologists can give meaning to these interactions, which can reduce the stress experienced by staff.

Engaging the family in any form creates the cognitive state to continue engagement long after the emergency.

Situational Cognitive Distortions (13, 36, 74)

When not modulated, threats cause unrecognized situational cognitive distortions (13, 36), stress-induced disorders, fear circuitry disorders, and amygdala-driven behaviors (13, 36, 75, 76). Because we use our judgment to judge our judgment, these maladaptive threat effects only become visible in others or after failure. They can become normalized, making the ecology of fear inevitable and invisible (77).

Maladaptive stress and fear behaviors become normalized in high-risk environments when we do not recognize how the situation distorts our thinking. We call these *situational cognitive distortions* because, absent stress or fear, the individual operates at a high level of cognition (36, 57).

- The fight responses include anger and frustration
- The flight responses take the form of avoidance and distraction, often presenting as avoiding tasks, carrying out inconsequential tasks, responding to distractions, or addressing easily accomplished tasks to the detriment of essential efforts
- The fear-freeze response manifests as confusion or actual cognitive or physical freezing, the inability to recall knowledge, or impaired working memory
- Attentive freeze (threat-freeze) appears as an aroused pause immediately after an abrupt change that is misinterpreted as the fear-freeze response, but the attentive freeze is accompanied by focused attention to detail and mental preparation for action

- Tonic immobility appears as active refusal or avoidance to make a decision accompanied by intestinal discomfort (the latter is often not discussed)

Stress Capacity

It appears prudent to have stress management programs to reduce or help people respond to it. In dangerous contexts, the individual must be prepared to work in demanding situations; the focus becomes increasing stress capacity (78).

A US Army Green Beret working toward an MBA asked one of the authors (DvS) about risk management. The author pointed out that he does not *manage* risk. If he receives an assignment, he asks himself if he has the capabilities. If not, then what does he do to have the necessary capabilities? The same question is for his unit and onward through his command.

Engagement is about capabilities, not evaluating risk. The act of engagement capitalizes on stress-induced cognitive constraints to maintain focus. Fear-circuitry behaviors maintain a safe distance, which operates below the level of consciousness. In extreme situations, amygdala-driven behaviors are helpful to survive.

An HRO engages through individuals who detect discrepancies and disruptions by their salience. The individual interprets these outliers as early heralds of failure or as benign—events, and benign means they are noted and monitored, not ignored.

HRO can be described in terms of engagement, failure as information, and continuous adjustment of actions to accommodate the new information (observation by Errol van Stralen, Ancora Education). The HRO operates in a state of continuous or life-long increase of capabilities. What this means for the individual is continuously increasing stress capacity.

“The HRO operates in a state of continuous or life-long increase of capabilities. What this means for the individual is continuously increasing stress capacity.”

Conclusion

From our understanding, we identify what is salient, which is sufficiently important, and readily catches our attention. This object is the outlier as discrepancy or disruption. This perturbation is the early herald of failure caught during the covert, compensated state. At that moment, what was once irrelevant becomes relevant. Relevance is contextual and can also be role-specific, creating a requisite diversity of individual engagements. This relevance is how we fit the situation into our understanding.

As the environment responds to our actions, we respond to the environment responding to us. The cognitive state this creates influences the meaning we give to the information we generate and the structures we create. The act of engagement creates the cognitive state that supports engagement. The situation is now extending our understanding.

When we engage in the “fog of war,” it is the act of engagement that gives meaning to our experience.

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INFANT AND FAMILY-CENTERED DEVELOPMENTAL CARE (IFCDC)

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?



WANT TO KNOW MORE ABOUT THE STANDARDS AND RECOMMENDATIONS? VISIT: [HTTPS://NICUDESIGN.ND.EDU/NICU-CARE-STANDARDS/](https://nicudesign.nd.edu/nicu-care-standards/)

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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



Brilliant! Dr. Bell bridges the journey from grief to growth.
This is classic wisdom on healing from our heartbreaks
and ultimately enjoying a fulfilling life.

– CHRISTINE THEARD, M.D.

Post-Traumatic Thriving

The Art, Science, & Stories of Resilience



Randall Bell, Ph.D.

Briefly Legal: Was Kernicterus the Cause of the Adverse Outcome?

Maureen Sims, MD, Barry Schifrin, MD

“At 44 hours, the serum bilirubin was evaluated as part of pre-discharge orders and found to be 13.9 mg/dL. The baby was discharged at 50 hours with an order to return to the clinic for a follow-up in 24 h. The weight at discharge was decreased by 9.3% from birth weight. The mother said in her deposition that her other child had received phototherapy before discharge.”

A 3541-gram appropriate-for-gestational age 38 5/7 week-gestation male is delivered to a 22-year-old gravida 2 para 2 Hispanic mother via vaginal delivery with vacuum assist. The prenatal course was unremarkable. Apgar scores were 8¹ and 9⁵. The birthweight was 3541 grams, and the physical examination was unremarkable. The baby was sent to room-in with the mother, who breastfed. At 21 hours, serum bilirubin was evaluated per routine orders and was found to be 8.2 mg/dL. The mother and baby both had an A + blood type. The direct antiglobulin test (DAT) was negative. No documentation of the extent of jaundice was in the records. At 44 hours, the serum bilirubin was evaluated as part of pre-discharge orders and found to be 13.9 mg/dL. The baby was discharged at 50 hours with an order to return to the clinic for a follow-up in 24 h. The weight at discharge was decreased by 9.3% from birth weight. The mother said in her deposition that her other child had received phototherapy before discharge.

“The mother did not keep the scheduled visit but returned to the clinic when the baby was 96 hours old. The mother stated that the baby’s eyes looked yellow, and his skin was more yellow than at discharge. The physical examination revealed that the weight was the same at birth, and the physical examination was normal except for jaundice. Local laboratory blood revealed a total bilirubin of 20.1mg/dL with a direct of 0.61.”

The mother did not keep the scheduled visit but returned to the clinic when the baby was 96 hours old. The mother stated that the

baby’s eyes looked yellow, and his skin was more yellow than at discharge. The physical examination revealed that the weight was the same at birth, and the physical examination was normal except for jaundice. Local laboratory blood revealed a total bilirubin of 20.1mg/dL with a direct of 0.61. An order was placed in the chart for the nurse to “call pt, if less yellow, re-draw lab if more yellow refer to hospital.” In the deposition, the nurse in the pediatrician’s office who received the order could not precisely explain what the order meant and did not remember the order or the patient. In her deposition, the mother stated that she did not hear from the pediatrician or the nurse until the following day (120 hours, day 5) when the nurse left a message on the mother’s telephone to “put the baby in the sunlight.”

On day 17, the baby was admitted for poor feeding, lethargy, and poor tone. His bilirubin on admission was 12.2 mg/dL with a direct of 0.2 mg/dL. Laboratory evaluations were normal, including a complete blood count, blood and urine cultures, electrolytes, and a basic metabolic panel. After admission, an evaluation revealed hypertonicity, but the medical team neither suspected bilirubin encephalopathy nor obtained neuroimaging or auditory brainstem response. On follow-up examination at two years of age, the child had developed athetoid cerebral palsy, hearing impairment, and other developmental delays. Magnetic resonant imaging (MRI) was interpreted as normal by the treating neuroradiologist but as consistent with kernicterus by the plaintiff’s neuroradiologist.

The case was settled without going to a trial.

“More than 80% of newborn infants will have some degree of jaundice. Since high bilirubin concentrations can cause acute bilirubin encephalopathy and kernicterus, careful monitoring of all newborn infants and adherence to Guidelines for intervention is essential.”

Discussion

General

More than 80% of newborn infants will have some degree of jaundice. Since high bilirubin concentrations can cause acute bilirubin encephalopathy and kernicterus, careful monitoring of all newborn infants and adherence to Guidelines for intervention is essential. Kernicterus is a permanent disabling neurologic condition characterized by some or all of the following: choreoathetotic cerebral palsy, upward gaze paresis, enamel dysplasia, and sensorineural hearing loss. Policies must be in place and strictly enforced in hospitals and other birthing locations to ensure the proper care necessary to minimize the risk of bilirubin neurotoxicity.

The American Academy of Pediatrics

Age	Bilirubin mg/dL	Issue	Plaintiff's position	Defense's position
21 hours	8.2	Levels exceeding 5-6 mg/dL within 24 h are abnormal. Jaundice is clinically discernible in most babies at this level	A level of 8.2 mg/dL at 21 h places this baby at high risk for dangerous hyperbilirubinemia. Clinical risk factors include: exclusive breastfeeding, vacuum extraction as well as high bilirubin level <24 h	ABO hemolytic disease was ruled out. The baby was healthy. Avoid separation of baby from mother with phototherapy. Safe to follow.
44	13.9	No visual assessments of jaundice in the chart, No assessments of transcutaneous/ laboratory testing between 21 and 44 h after birth.	Ongoing clinical assessments of jaundice by the nurses should have been made. The rate of rise was rapid, 0.43/h	Not causally related
50		Discharged with a scheduled 24 h post-discharge follow-up Parent education	Negligently discharged infant while in the high-risk zone for hyperbilirubinemia Failed to provide sufficient education to parents to safeguard infants. Failed to institute phototherapy Alternatively, care providers could schedule a further bilirubin level the morning after discharge. Failed to appreciate other risk factors, including sibling with hx of jaundice, exclusive breastfeeding, and vacuum extraction. Failed to pursue the mother for a follow-up visit vigorously. The mother says she did not know the importance of keeping the 24-hour follow-up appointment.	The mother did not keep the 24 h follow-up visit. Mother was irresponsible. The implication is that it is the mother's fault the baby had an adverse outcome
		Pediatrician told the mother to place the baby in sunlight after discharge	While direct exposure to sunlight will decrease bilirubin levels, practical difficulties are involved in safely exposing infants. Not an appropriate intervention in U.S. Filtered sun is used in income-restricted countries.	Sunlight works.
96 (4 days)	20.1	Was a four-day level of 20.1mg/dL the peak?	The trend was likely to go higher. Exclusive breastfeeding, prior sibling with jaundice & phototherapy, and sequestered blood from the vacuum indicate a higher level after day 4. High risk for bilirubin neurotoxicity	A level of 20.1mg/dL is the peak.
		Pediatrician order to nurse: "call pt; if less yellow, re-draw lab. If more yellow , refer to hospital."	Vague and indecipherable. Below standard to give such an order	Reasonable order
Three weeks	12	Lethargy, poor feeding, decreased tone	The baby had acute bilirubin encephalopathy. The bilirubin level peaked some days after being drawn at four days. Not possible to tell how high, but it peaked higher than 20 mg/dL	The admitting physicians did not suspect or diagnose bilirubin encephalopathy. The highest level was 20.1mg/dL
Two years		Athetoid cerebral palsy, cognition, and developmental delays, hearing impairment	Chronic encephalopathy secondary to bilirubin toxicity	Other issues could have been responsible for these clinical findings

		MRI	Consistent with kernicterus. A normal MRI does not exclude kernicterus. The bilirubin probably peaked higher after being drawn on day 4. Only a postmortem examination can rule out kernicterus. More probably than not, the clinical and laboratory evaluations point to a kernicterus diagnosis. The diagnosis of kernicterus is always presumptive until postmortem.	Since MRI was normal, it cannot be kernicterus. Agree with treating neuroradiologist
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In September 2022, the Clinical Practice Committee of the AAP updated both its 2004 clinical practice Guideline and its 2009 commentary clarifying and modifying indications for the post-nursery management of bilirubin levels in healthy neonates. The Committee raised the phototherapy thresholds to a narrow range that they considered safe, revised the risk assessment approach based on the hour-specific bilirubin concentration, and defined the need for an “escalation of care” to address elevated bilirubin concentrations rapidly. The primary aim of post-discharge jaundice evaluation is to avoid severe hyperbilirubinemia and the increased risk it poses of toxicity to the central nervous system.

“In September 2022, the Clinical Practice Committee of the AAP updated both its 2004 clinical practice Guideline and its 2009 commentary clarifying and modifying indications for the post-nursery management of bilirubin levels in healthy neonates.”

The 2022 AAP clinical Guideline provides specific recommendations and evidence-based “key action statements” on:

1. prevention of hyperbilirubinemia
2. assessment and monitoring for hyperbilirubinemia.
3. treatment of hyperbilirubinemia
4. post-discharge follow-up
5. hospital policies and procedures.

Prevention begins with:

1. the identification and treatment of mothers at risk for developing antibodies to red blood cell antigens, which can lead to hemolytic disease
2. providing feeding support during birth hospitalization
3. screening 24 to 48 hours after birth or before discharge if that occurs earlier, with either transcutaneous bilirubin or total serum bilirubin level. The same approach is recommended for infants born at home.

This practice Guideline highlights risk factors such as lower gestational age, jaundice in the first 24 hours after birth, poor feeding, excessive weight loss, scalp hematoma or significant bruising (from obstetrical procedures such as operative vaginal delivery), trisomy 21, and macrosomic infant of a diabetic mother. It further points out the challenges of identifying infants with

glucose-6-phosphate dehydrogenase (G6PD) deficiency, among the most important causes of hyperbilirubinemia leading to kernicterus in the U.S. worldwide.

“This practice Guideline highlights risk factors such as lower gestational age, jaundice in the first 24 hours after birth, poor feeding, excessive weight loss, scalp hematoma or significant bruising (from obstetrical procedures such as operative vaginal delivery), trisomy 21, and macrosomic infant of a diabetic mother.”

The evaluation of follow-up bilirubin levels should be based on the difference between the pre-discharge bilirubin level and the hour-specific phototherapy threshold, which considers the baby’s age in hours and gestational age and the presence of any risk factors for neurotoxicity from hyperbilirubinemia. The closer the newborn’s bilirubin level is to the newborn’s risk-based phototherapy threshold, the closer follow-up the assessment needs to be.

“In the new Guideline, the phototherapy and exchange transfusion thresholds have increased slightly. These intervention thresholds consider gestational age and whether there are additional risk factors for neurotoxicity related to hyperbilirubinemia, including a low albumin level, isoimmune or other hemolytic diseases, sepsis, or clinical instability.”

In the new Guideline, the phototherapy and exchange transfusion thresholds have increased slightly. These intervention thresholds consider gestational age and whether there are additional risk factors for neurotoxicity related to hyperbilirubinemia, including a low albumin level, isoimmune or other hemolytic diseases, sepsis, or clinical instability. Additional new recommendations address follow-up care after discontinuing phototherapy to assess for rebound hyperbilirubinemia. The recommendations emphasize that timely identification of hyperbilirubinemia and the appropriate use of intensive phototherapy can almost always prevent the need for an exchange transfusion. Recommendations also discuss

the circumstances under which intensive phototherapy may be provided at home.

If more than one measure of bilirubin is available (TcB or TSB), the trajectory of the increase may identify infants at higher risk of subsequent hyperbilirubinemia. A rapid rise (≥ 0.3 mg/dL per hour in the first 24 hours or ≥ 0.2 mg/dL per hour after that) is exceptional and suggests hemolysis. In this situation, performing a direct antibody test (DAT) not previously done is especially important.

As mentioned, the Guidelines include the concept of “escalation of care.” This medical imperative deals with serum bilirubin levels exceeding 2 mg/dL below the gestational age and age-in-hours specific exchange transfusion threshold assessed on the appropriate exchange transfusion nomogram (with no or no, recognized hyperbilirubinemia neurotoxicity risk factors). “Escalation of care in this scenario entails admission to a pediatric hospital unit capable of providing intensive phototherapy, intravenous therapy, and exchange transfusion. An exchange transfusion is required if the infant shows signs of acute bilirubin encephalopathy (feeding difficulty, lethargy, hypertonia). The severity of the infant’s symptoms can be quantified using the bilirubin-induced neurogenic dysfunction score, which assesses clinical signs (mental status, muscle tone, crying, sucking, feeding issues, visible jaundice) associated with bilirubin toxicity (hypotonia followed by hypertonia, and/or opisthotonos).

Patient education and timely follow-up are critically important and deserve emphasis, even for low-risk infants. Before discharge, all families should receive written and verbal education about neonatal jaundice and information specific to their baby, including the infant’s pre-discharge bilirubin level and details about follow-up after discharge.

“Patient education and timely follow-up are critically important and deserve emphasis, even for low-risk infants. Before discharge, all families should receive written and verbal education about neonatal jaundice and information specific to their baby, including the infant’s pre-discharge bilirubin level and details about follow-up after discharge.”

Comments on the case described above

This baby was born before the 2022 Guidelines were published, but the plaintiff’s criticisms were based on the 2004 Guidelines. It was predictable that this baby would probably develop significant hyperbilirubinemia: 1) he had a level of 8.1mg/dL within 24 hours 2); he had a significantly high level of 13.9 mg/dL at 44 hours, six hours prior to discharge, and 3) he had a vacuum assisted delivery which probably resulted in some sequestered blood which would add bilirubin production to his physiologic jaundice; 4) his bilirubin of 20.1 mg/dL was measured at 96 h before the level was likely to peak; 5) his sibling required phototherapy for jaundice.

Peak levels of bilirubin and duration of hyperbilirubinemia vary depending on racial and ethnic factors, the region of the world,

and the type of feeding. White and African-American babies tend to peak 60-72 hrs with a 5-6 days duration of hyperbilirubinemia. Asian American babies tend to peak at 72-120 hours and have a duration of hyperbilirubinemia of 10-14 days. While Hispanic babies tend to peak bilirubin slightly earlier than Asian babies, there is a broader variation, perhaps related to the multicultural mixture among this group. Compared to breastfed babies, the bilirubin levels of formula-fed babies tend to peak earlier, with a lower peak and shorter duration.

“Skin pigmentation, for example, affects light reflectance, which can potentially impact the accuracy of the transcutaneous readings. While different methodologies have been developed to minimize this effect, the devices are imperfect. TcB generally overestimates TSB in newborns with darker skin pigmentation and underestimates TSB in newborns with lighter-pigmented skin.”

Studies using transcutaneous bilirubin (TcB) devices have developed nomograms to define the range of hour-specific normal values. Many available studies were performed in populations that included predominantly breastfed, white newborns. Possible explanations for the variability among different studies on peak bilirubin levels and time for resolution may have resulted partly from genetic variability in the hepatic conjugating ability of bilirubin, differences in breastfeeding practices, and prevalence of glucose-6 phosphate dehydrogenase (G6PD) deficiency or Gilbert syndrome in the study populations. In addition, there are differences in study design (enrollment criteria, type of TcB) and population. Skin pigmentation, for example, affects light reflectance, which can potentially impact the accuracy of the transcutaneous readings. While different methodologies have been developed to minimize this effect, the devices are imperfect. TcB generally overestimates TSB in newborns with darker skin pigmentation and underestimates TSB in newborns with lighter-pigmented skin.

“Vacuum-assisted operative deliveries have not been listed per se as a risk factor for hyperbilirubinemia, but vacuum deliveries are often associated with significant bruising (whether obvious or charted) and occasionally with subgaleal hemorrhages and cephalohematomas. Any sequestration of blood within a closed space is well known to increase bilirubin production.”

Vacuum-assisted operative deliveries have not been listed per se as a risk factor for hyperbilirubinemia, but vacuum deliveries are often associated with significant bruising (whether obvious or charted) and occasionally with subgaleal hemorrhages and cephalohematomas. Any sequestration of blood within a closed space is well known to increase bilirubin production.

“The acute lesions may be transient and, with clinical recovery, may disappear. Infants who exhibit chronic abnormality on T2-weighted images exhibit the classic clinical features of chronic post-kernicteric bilirubin encephalopathy consistently. However, the converse is not true (i.e., occasional children with the classic clinical syndrome have normal MRI findings.”

In contrast to common structural imaging modalities, ultrasonography, and computed tomography, MR imaging (MRI) has been of significant value in identifying both acute and chronic bilirubin encephalopathy. The principal findings involve bilateral and symmetric abnormalities of globus pallidus in approximately 90%, subthalamic nucleus in approximately 40%, and rarely the hippocampus. The lesions are seen best in the acute period, during the first several weeks of life on T1-weighted images, and later, chronic lesions on T2-weighted images. Abnormalities of the globus pallidus and subthalamic nucleus should be distinguished from the typical involvement in hypoxic-ischemic disease of the subcortical white matter, putamen, and thalamus. The acute lesions may be transient and, with clinical recovery, may disappear. Infants who exhibit chronic abnormality on T2-weighted images exhibit the classic clinical features of chronic post-kernicteric bilirubin encephalopathy consistently. However, the converse is not true (i.e., occasional children with the classic clinical syndrome have normal MRI findings. The MRI was normal in this case, but only postmortem evaluation can strictly confirm kernicterus.

Suggested Reading:

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NT



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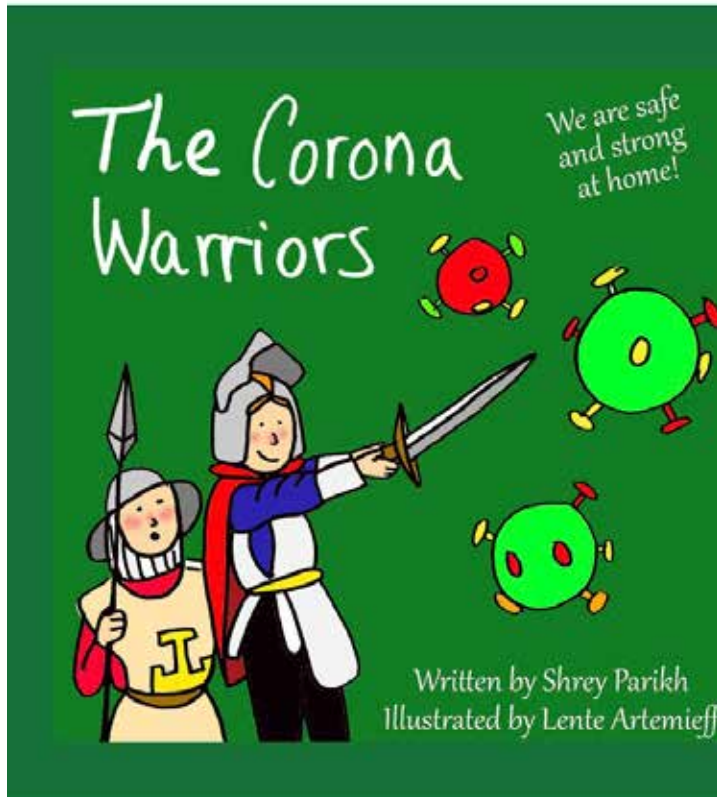


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SHARED DECISION-MAKING PROTECTS MOTHERS + INFANTS

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: A Preview of Evidence-Based Programs for the Developmental and Family-Centered Care Track at the 36th Gravens Meeting

Joy V. Browne, Ph.D., PCNS, IMH-E

“The field of Infant and Family-Centered Developmental Care (IFCDC) has expanded to develop and provide rich and thoughtful approaches to supporting babies and families. Along with the development of these programs has come the evidence of positive medical and developmental outcomes to support their application in intensive care units.”

The field of Infant and Family-Centered Developmental Care (IFCDC) has expanded to develop and provide rich and thoughtful approaches to supporting babies and families. Along with the development of these programs has come the evidence of positive medical and developmental outcomes to support their application in intensive care units. Seven evidence-based programs available to NICU professionals and family members will be presented in the Developmental and Family-Centered Care Track at the Gravens meeting this year. Representatives from these programs will provide an overview of the theoretical underpinnings, goals, content, and approaches used to deliver their approaches and, in particular, share the evidence on which each is based.

“A significant amount of Developmental and Family Centered Care Track time will be devoted to discussion with and questions from the Gravens attendees who will benefit from understanding which, if any, of these programs will be most beneficial to the babies’ families and professional staff in their intensive care unit.”

A significant amount of Developmental and Family Centered Care Track time will be devoted to discussion with and questions from the Gravens attendees who will benefit from understanding which, if any, of these programs will be most beneficial to the babies’ families and professional staff in their intensive care unit.

Below is a brief overview of each program and the kind of in-

formation that will be provided in the Developmental and Family-Centered Care Track at Gravens. General references to describe each program and available website information are included in this overview. Presenters are leaders in the field and will provide substantial baby and family outcome data as evidence in support of their respective programs. We invite you to attend the Developmental and Family-Centered Care Track to get more information on the programs and the evidence behind each approach. The session will help you understand each program’s underlying foundation, applicability, and robustness. Join us for an informative and lively session!

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The Newborn Individualized Developmental Care and Assessment Program (NIDCAP) (1) The NIDCAP priority is educational and consultative support to organizations towards effective infant care in an individualized neuro-developmentally supportive, family-centered framework. Systematic behavioral observation methodologies include the NIDCAP Observation, the Assessment of Preterm Infants’ Behavior (APIB), and the NIDCAP Nursery Program (NNP). These instruments document the complexity of preterm and at-risk newborn infants by focusing on the interplay of the infant’s autonomic, motoric, state organizational, and attentional functioning to develop strategies for individualized support as the infant interacts with their family, healthcare professionals, and environment. NIDCAP observations and neurobehavioral evaluations provide the basis for estimating the infant’s current behavioral functioning and goals, which in turn lead to the recommendations supporting the infant’s developmental trajectory. The NNP Program uses four key components: 1) Implementation of individualized developmentally supportive interactions with infants; 2) Enhancement of relationships between infant and family & promotion of family-centered care; 3) Provision of a nurturing physical & social environment; 4) Collaborative interactions and relationships among healthcare professionals. <https://nidcap.org>

Supporting and Enhancing NICU Sensory Experiences (SENSE) (2) is a program aimed at ensuring multi-modal positive sensory exposures across hospitalization for high-risk infants in

the NICU to optimize the NICU environment and improve outcomes for infants and families. Parent education in the SENSE program centers around helping families understand their important role in supporting their infant's development, the infant's sensory needs in the NICU, and what they can do to support the infant, given the infant's immaturity and medical interventions. Specific amounts of positive sensory exposures are identified in the SENSE program as targets for minimum amounts of positive sensory exposures each day. The program can be individualized for each infant based on the preferences of the family and/or the medical status/tolerance of the infant. The sensory interventions in the SENSE program are designed to be provided by parents, but the medical team and/or volunteers can also engage to ensure the sensory needs of each infant are met. The program is most often led by a neonatal therapist (PT, OT, SLP), which largely consists of education and support of the family, assessing the infant's tolerance, and adapting the program as needed. <https://chan.usc.edu/nicu/sense>

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Family Integrated Care (FiCare™) (3) In the FiCare model, parents/primary caregivers are welcomed as essential members of the infant's healthcare team, and the team works together to promote parent involvement to the fullest extent. Important to the implementation of FiCare is the partnership of former NICU parents (known as veteran, graduate, or alumni parents) in the core steering group to plan, implement and sustain the FiCare model in each NICU. The FiCare model is a comprehensive framework with four main pillars: Environment; NICU team education and support, Parent education/psychological support; and Active parent participation/partnership. This model's environment is designed or adapted to support 24-hour parental presence/participation. The model includes healthcare team training and ongoing education and coaching on Family-Centered Care (FCC) principles and FiCare skills to meet the special needs of NICU families. There is a program of parent-group education as well as individualized bedside teaching. Parents receive psychosocial support from professionals and trained parent-peer mentors. Finally, parents actively participate in daily rounds and shared decision-making and provide direct care for their infant in collaboration with nurses and other team members. <https://familyintegratedcare.com>

The Newborn Behavioral Observations (NBO) system™(4) is an infant-focused, family-centered approach designed to sensitize parents to their baby's competencies, vulnerabilities, and individuality. The goal of the NBO is to support parent-infant interaction from the very beginning, recognizing that development is shaped by and occurs only in the context of caregiving relation-

ships. The NBO aims to support the infant's development and the parent's confidence and well-being. It is appropriate for use from birth to three months of (corrected gestational) age. An NBO session consists of 18 neurobehavioral observations, including the infant's capacity to protect sleep, quality of motor tone and activity level; capacity for self-regulation, including crying and consolability; response to stress; and visual, auditory, and social-interactive capacities. NBO is not an assessment, but rather a relationship-building tool, designed to adapt for use by a wide variety of practitioners. It is appropriate to use in an array of settings, including inpatient units (NICU, CICU, well newborn), outpatient clinics, and homes. <https://www.childrenshospital.org/research/centers/brazelton-institute-research/nbo>

“Family Nurture Intervention was designed to overcome mother and infant autonomic stress and dysregulation following premature birth while in the NICU. The intervention involves an average of four two-hour facilitated calming sessions per week for an average 6-week period in the NICU.”

The Family Nurture Intervention (FNI) (5) Family Nurture Intervention was designed to overcome mother and infant autonomic stress and dysregulation following premature birth while in the NICU. The intervention involves an average of four two-hour facilitated calming sessions per week for an average 6-week period in the NICU. When the mother and infant are encouraged to connect emotionally at a deep level during the calming sessions, the observable behavioral state is called “emotional connection.” A novel autonomic theory of emotions explains the profound and long-term impact of FNI and requires a new interpretation of neonatal developmental biology. FNI promotes the emotional connection of the mother and baby by re-engaging innate or primary mother and Infant autonomic socioemotional reflexes (ASRs) that develop during gestation. This occurs by way of autonomic conditioning or learning. After birth, these learned reflexes ensure that the mother and baby's bodies are automatically attracted to one another without thought. FNI changes the ASR from avoidant to attraction when the mother expresses her feelings and deepest emotions directly to her baby. <https://nurturescienceprogram.org/family-nurture-intervention/>

Creating Opportunities for Parent Empowerment NICU Parent Program (COPE) (6)

The COPE program enables parents to cope effectively with a preterm birth through education and provider support. The program is provided to parents shortly after their premature infants' birth. It includes a four-part series of audio and written information that provides infant characteristics and parent role information 2-4 days after admission to the NICU, 4-8 days after admission, 1-7 days before discharge, and one week after discharge. Parent skill-building activities that help parents implement the COPE are included in the book the parent receives. COPE teaches parents how to interact with their preterm infant in ways that enhance growth and development. The program also helps parents understand the workings of the NICU and encourages their active engagement with the NICU staff. Providers with an understanding/training of the materials provide the parent book and journal along

with the audio version to the parents and remain in contact to answer questions in the early months after the parent training. <http://www.copeforhope.com/index.php>

“The Close Collaboration with Parents program is an evidence-based and systematic training program for neonatal healthcare teams to improve family-centered care practices. The program aims to improve the skills of the healthcare team members to collaborate with parents and support parenting during hospital care.”

Close Collaboration with Parents (7) The Close Collaboration with Parents program is an evidence-based and systematic training program for neonatal healthcare teams to improve family-centered care practices. The program aims to improve the skills of the healthcare team members to collaborate with parents and support parenting during hospital care. The program has a multi-scientific background integrating developmental psychology, neonatology, and nursing sciences. Learning is structured into four theoretical phases: 1) observing and communicating infants' behaviors and needs, II) supporting parents to share their observations and plan the care of the infant collaboratively with healthcare staff, III) understanding the individual story of the family into parenthood, and IV) involving parents in the decision-making from an early stage of care to the preparation of discharge. The training process for a unit takes about one and a half years. The training team provides support throughout the implementation, during which a unit carries out all four training phases for all their staff members with the help of e-learning and mentoring. Mentoring and reflective practice are the essential methods facilitating changes in the care practices aligned with family-centered care.

Please join us at the next Gravens meeting (March 8-11, 2023) to hear more details and evidence supporting these infant and family-centered care programs. Gravens will also provide you opportunities to meet and have conversations with these leaders in the field so that you have an in-depth understanding of their program's respective goals, approaches, and impact.

Acknowledgments:

We thank the following representatives of their respective programs for providing brief overviews included in this article.

Dorothy Vittner—NIDCAP

Bobbi Pineda—SENSE

Linda Franck—FiCare

Nancy Feinstein—COPE

Lise Johnson --NBO

Martha Welch and Robert Ludwig, FNI

Liisa Lehtonen and Sari Ahlqvist-Bjorkroth—Close Collaboration with Parents

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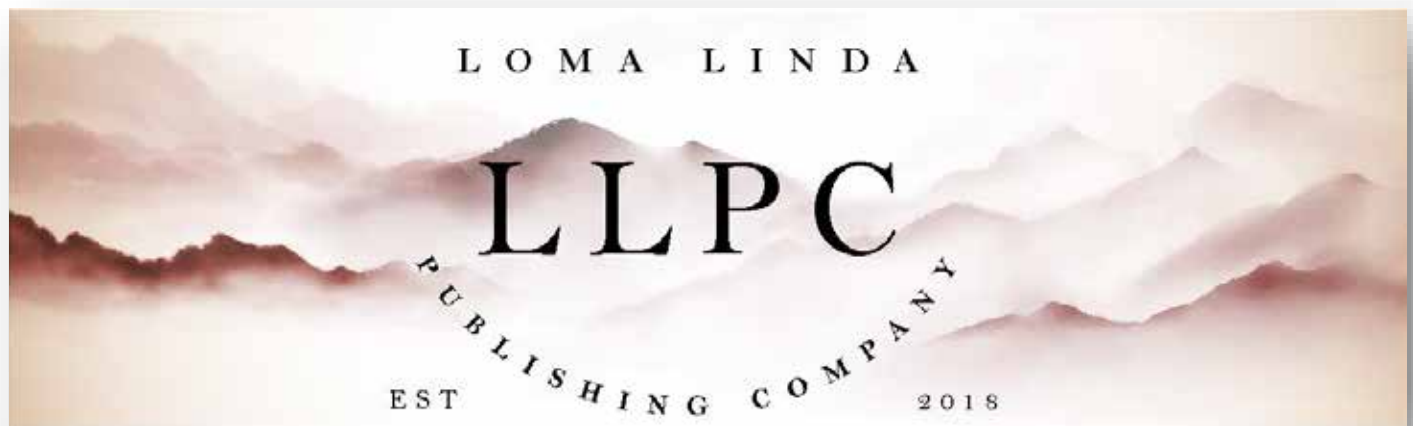
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TUESDAY, MARCH 7, 2023 <i>LET THE FESTIVITIES BEGIN!</i>	
TIME	SESSION / EVENT
4:30 PM - 7:00 PM	REGISTRATION DESK OPEN (LOBBY II)
7:00 PM - 9:00 PM	WELCOME RECEPTION (EXHIBIT HALL-ISLAND)

WEDNESDAY, MARCH 8, 2023 <i>SCIENCE & APPLICATION</i>	
TIME	SESSION / EVENT
6:30 AM - 7:15 AM	RUN/WALK/CRAWL ON THE BEACH (MEET POOL SIDE)
7:00 AM - 5:00 PM	REGISTRATION DESK OPEN (LOBBY II)
7:00 AM - 8:00 AM	CONTINENTAL BREAKFAST (EXHIBIT HALL-ISLAND - 1 HR)
8:00 AM - 5:00 PM	PLENARY SESSIONS (GRAND BALLROOM)
8:00 AM - 8:15 AM	WELCOME & INTRODUCTIONS: JOY BROWNE
8:15 AM - 9:00 AM	GLOBAL RESEARCH AND THE LIVED EXPERIENCE OF BECOMING AN ADULT AFTER PRETERM BIRTH: SAROJ SAIGAL, APRIL LARAMEY
9:00 AM - 9:45 AM	In Black Mothers' Own Words: IDENTIFYING AND ADDRESSING ANTI-BLACK RACISM IN THE NICU: RACHEL WITT, MIA MALCOLM
9:45 AM - 10:15 AM	BREAK IN EXHIBIT HALL (30 MIN)
10:15 AM - 11:00 AM	ALL CARE IS BRAIN CARE: SONIA BONIFACIO
11:00 AM - 11:45 AM	COUPLET CARE IN THE NICU: BJORN WESTRUP
11:45 AM - 12:15 PM	GRAVENS AWARD AND SHORT PRESENTATION BY RECIPIENT
12:15 PM - 1:30 PM	LUNCH ON OWN (1 HR 15 MIN)
1:30 PM - 2:15 PM	IMPROVING OUTCOMES WITH SMALL BABY UNITS: KRIS REBER
2:15 PM - 3:00 PM	THE CENTRAL ROLE OF THE FAMILY IN A SMALL BABY UNIT: RAYLENE PHILLIPS, CYNTHIA SHOGREEN
3:00 PM - 3:30 PM	BREAK IN EXHIBIT HALL (30 MIN)
3:30 PM - 4:15 PM	CLOSE COLLABORATION WITH PARENTS: A TOOL TO DEVELOP A CULTURE OF FAMILY-CENTERED CARE IN THE NICU: LIISA LEHTONEN
4:15 PM - 4:55 PM	ETHICS OF FAMILY-CENTERED CARE: ANNIE JANVIER (RECORDED PRESENTATION)
4:55 PM - 5:00 PM	FINAL THOUGHTS & TAKE-HOME MESSAGES: BOB WHITE
6:30 PM - 8:30 PM	EXHIBIT HALL RECEPTION & POSTER WALK (SUBSTANTIAL SNACKS PROVIDED) 7:00 - 7:45 PM - POSTER AUTHORS AVAILABLE 8:10 - 8:30 PM - DOOR PRIZE RAFFLE: VINCENT SMITH (EXHIBIT HALL)

THURSDAY, MARCH 9, 2023 <i>THEMED TRACKS</i>	
TIME	SESSION / EVENT
6:30 AM - 7:15 AM	RUN/WALK/CRAWL ON THE BEACH (MEET POOL SIDE)
7:30 AM - 1:30 PM	REGISTRATION DESK OPEN (LOBBY II)
7:00 AM - 8:00 AM	CONTINENTAL BREAKFAST: NETWORKING TABLES (EXHIBIT HALL-ISLAND - 1 HR)
8:00 AM - 1:00 PM	THEMED TRACKS
TRACK A DEVELOPMENTAL AND FAMILY INTEGRATED CARE BEACH/GULF	TRACK B NEWBORN ICU DESIGN PALM/BAY
8:00-8:15 - INTRODUCTION & ANNOUNCEMENTS: JOY BROWNE	8:00-8:15 - INTRODUCTION & ANNOUNCEMENTS: BOB WHITE
8:15-8:45 - NEWBORN INDIVIDUALIZED DEVELOPMENTAL CARE & ASSESSMENT PROGRAM (NIDCAP): DOROTHY VITTNER	8:15-8:45 - USE OF COLOR IN HOSPITAL DESIGN: REBECCA AMES, MARDELLE SHEPLEY
8:45-9:15 - NEWBORN BEHAVIORAL OBSERVATION: LISE JOHNSON	8:45-9:15 - ACCESS TO NATURE IN THE NICU: NAOMI SACHS (VIRTUAL PRESENTATION)
9:15 - 9:45 - FAMILY NURTURE INTERVENTION (FNI): MARTHA WELCH	9:15-9:45 - NEW UNIT PRESENTATION: UNIV OF TURKU: LIISA LEHTONEN
9:45 - 10:15 BREAK (30 MIN) (EXHIBITORS BREAK DOWN AFTER LAST BREAK)	9:45-10:15 - HCA FLORIDA UNIVERSITY HOSPITAL: DAPHNA BARBEAU
10:15-10:45 - COUNSELING OPTIONS & PARENT EDUCATION (COPE): NANCY FEINSTEIN	10:15 - 10:45 BREAK (30 MIN) (EXHIBITORS BREAK DOWN AFTER LAST BREAK)
10:45-11:15 - SUPPORTING & ENHANCING NICU SENSORY EXPERIENCES (SENSE): BOBBI PINEDA	10:45-11:15 - BELLIN MEMORIAL HOSPITAL GREEN BAY: DEBORAH FISHER, MATT HANOLD
11:15-11:45 - FAMILY INTEGRATED CARE (FI CARE) : LINDA FRANCK (VIRTUAL PRESENTATION)	11:15-11:45 - COUPLET CARE: COMPLETE CARE FOR MOTHER AND CHILD-HIGH CARE FOR MOTHER COMBINED WITH INTENSIVE CARE FOR NEONATES: JOAN DE VRIES, ANITA ZIJP
11:45-12:30 - AUDIENCE DISCUSSION & QUESTIONS INCLUDING CLOSE COLLABORATION: JOY BROWNE, MODERATOR	11:45-12:15 - PROPOSED ADDITIONS TO THE RECOMMENDED STANDARDS FOR NEWBORN ICU DESIGN: BOB WHITE AND COMMITTEE
12:30-1:00 - SUMMARY & NEXT STEPS: JOY BROWNE	12:15-12:45 - CROWDSOURCING NEWBORN ICU DESIGN CHALLENGES: BOB WHITE AND COMMITTEE
	12:45-1:00 - SUMMARY & NEXT STEPS: BOB WHITE
1:00 - 6:00 PM	REST, PLAY, NETWORK
6:00 - 9:00 PM	SUNSET DINNER & DANCING ON THE BEACH FEE IS \$50.00. PLEASE REGISTER BY MARCH 1, 2023

FRIDAY, MARCH 10, 2023		
WORKSHOPS & ABSTRACTS		
TIME	SESSION / EVENT	
6:30 AM - 7:15 AM	RUN/WALK/CRAWL ON THE BEACH (MEET POOL SIDE)	
7:00 AM - 4:30 PM	REGISTRATION DESK OPEN (LOBBY II)	
7:00 AM - 8:00 AM	CONTINENTAL BREAKFAST (1 LOBBY II - 1 HR)	
8:00 AM - 9:00 AM	PLENARY SESSION (GRAND BALLROOM) DIFFICULT CONVERSATIONS: THE INNER WORK: NATALIE JOHNSON	
9:00 AM - 9:30 AM	BREAK (30 MIN)	
9:30 AM - 12:15 PM	WORKSHOPS	
9:30 AM - 10:45 AM	H WORKSHOPS (75 MIN)	ROOM
	H-1: CLOSE COLLABORATION: LIISA LEHTONEN, SARI AHIQVIST-BJÖRKROTH MODERATOR: JUDY SMITH	BEACH
	H-2: CHALLENGING CONVERSATIONS: COMMUNICATING WITH CLARITY, CONVICTION, AND KINDNESS: NATALIE JOHNSON MODERATOR: MARDELL McCUSKEY SHEPLEY	GULF
	H-3: IMPROVING FAMILY ENGAGEMENT IN THE NICU SETTING: KIMBERLY NOVOD, GABY CORDOVA RAMOS, MOLLY FRAUST-WYLIE MODERATOR: MALATHI BALASUNDARAM	PALM
	H-4: SUPPORTING SLEEP STATES FOR PRETERM BABIES: JUZER TYEBKHAN, ROMAN CHABBA MODERATOR: KATHLEEN KOLBERG	BAY
	H-5: NEUROPROTECTIVE SMALL BABY CARE: RAYLENE PHILLIPS, JAYNE SOLOMON, LESLIE ALTIMIER, LACIE DIXON MODERATOR: BOB WHITE	ISLAND II
10:45 AM - 11:15 AM	BREAK (30 MIN)	
11:15 AM - 12:30 PM	I WORKSHOPS (75 MIN)	ROOM
	I-1: COUPLET CARE: STINA KLEMMING, BJORN WESTRUP MODERATOR: BOB WHITE	BEACH
	I-2: BRAIN CARE: SONIA BONAFACIO MODERATOR: PAIGE CHURCH	GULF
	I-3: IT STARTS WITH YOU: A HANDS-ON, PRAGMATIC WORKSHOP TO ADDRESS RACIAL INEQUITIES IN THE NICU: YARDEN FRAIMAN, CHRISTIE LAWRENCE, MOLLY FRAUST-WYLIE MODERATOR: VINCENT C. SMITH	PALM
	I-4: STANDARDS INTEGRATION: CAROL JAEGER, JOY BROWNE MODERATOR: JOY BROWNE	BAY
	I-5: FAMILY CENTERED CARE TASK FORCE: A QUALITY IMPROVEMENT LEARNING COMMUNITY: MALATHI BALASUNDARAM, COLBY DAY, CAROLINE TONEY-NOLAND MODERATOR: MITCHELL GOLDSTEIN	ISLAND II

12:30 PM - 1:45 PM	LUNCH ON OWN (1 HR 15 MIN)	
1:45 PM - 4:45 PM	ABSTRACTS	
1:45 PM - 3:00 PM	ABSTRACT SESSIONS (75 MINUTES)	ROOM
	<p>A: DEVELOPMENTAL CARE - MODERATOR: JOY BROWNE</p> <ol style="list-style-type: none"> 1) SALIVARY OXYTOCIN AND CORTISOL RELEASE ARE ASSOCIATED WITH PREMATURE INFANT NEUROBEHAVIORAL PATTERNS: DOROTHY VITTNER 2) MOTHER-INFANT INTERACTION PATTERNS IN THE NICU-VARIATIONS ACROSS TIME AND BY SOCIAL CONTEXT: CHRISTINE NEUGEBAUER 3) PARENT PRESENCE AND ENGAGEMENT IN THE NICU-TRENDS AND RELATIONSHIPS TO INFANT STRESS: SUSAN HORNER 	BEACH
	<p>B: FAMILY SUPPORT - MODERATOR: RAYLENE PHILLIPS</p> <ol style="list-style-type: none"> 1. RECOGNIZING PARENTS AS ESSENTIAL CARE IN THE NICU: ASHLEE VANCE (VIRTUAL) 2. IMPROVING COMMUNICATION IN THE NICU-IMPLEMENTATION OF THE FAMILY SNAPSHOT TOOL: PRESENTER: MAYA DAHAN 3. A MULTI-TIERED SYSTEMIC APPROACH TO HELPING FAMILIES THRIVE IN THE NICU AND BEYOND: KAROLINA GROTKOWSKI 	GULF
	<p>C: FEEDING - MODERATOR: KATHLEEN KOLBERT</p> <ol style="list-style-type: none"> 1. FEEDING SUPPORT NEEDS OF INFANTS IN A LEVEL III NICU: PAMELA DODRILL 2. EFFICACY OF GIVING OROPHARYNGEAL MOTHER'S MILK IN EXTREME PRETERM INFANTS IN EARLY TRANSITION TO BREASTFEEDING AND DURATION OF HOSPITAL STAY-A CASE CONTROL STUDY: ERIN ROSS (VIRTUAL) 3. NICU DISCHARGE GUIDELINE IMPLEMENTATION BY COMMUNITY-BASED TEAM: A REAL-WORLD SCENARIO: CUYLER ROMEO 	PALM
3:00 PM - 3:30 PM	BREAK (30 MIN)	
3:30 PM - 4:45 PM	ABSTRACT SESSIONS (75 MINUTES)	ROOM
	<p>A: DEVELOPMENTAL CARE - MODERATOR: CHRISTIE LAWRENCE</p> <ol style="list-style-type: none"> 1. TIME IS MORE PRECIOUS THAN GOLD: A GOLDEN HOUR IMPROVEMENT PROJECT: BLARE FORBES 2. THE I-RAINBOW: A FLEXIBLE, EVIDENCE-BASED CARE PATH FOR PROVIDING DEVELOPMENTAL CARE IN THE NEONATAL INTENSIVE CARE SETTING: EILISH BYRNE (VIRTUAL), MELISSA SCALA (VIRTUAL) 3. COOL ATTACHED: ELLEN HELDOORN-FEIJTH 	BEACH
	<p>B: FAMILY SUPPORT - MODERATOR: RAYLENE PHILLIPS</p> <ol style="list-style-type: none"> 1. THE NICU BLUES: "AM I LOSING MY MIND?": BETH BUCKINGHAM 2. THE POWER OF REFLECTION: BECOMING A TRAUMA-INFORMED PROFESSIONAL: MARY COUGHLIN 3. PANDEMIC PANDEMONIUM-THE IMPLICATIONS OF VISITATION RESTRICTIONS THROUGH THE LIVED EXPERIENCES OF NICU PARENTS, AND WHY WE MUST REDEFINE THEIR ROLE AS ESSENTIAL CARE PARTNERS: JAYLEE HILLIARD, NICOLE NYBERG 	GULF

	<p>C: DESIGN - MODERATOR: BOB WHITE</p> <ol style="list-style-type: none"> EVOLUTION OF THE AUDITORY ENVIRONMENT BY POST-MENSTRUAL AGE IN INFANTS BORN VERY PRETERM: YASEMIN ERSEN (VIRTUAL) A NOVEL TEXTING-BASED VIRTUAL ASSISTANT FOR NICU FAMILIES IS VALUABLE AND FEASIBLE: ASHLEY OSBORNE THE ISOLETTE DOES NOT PROTECT FROM THE NOISE WITHIN: MITCHELL GOLDSTEIN 	PALM
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SATURDAY, MARCH 11, 2023	
SPIRITUALITY & FAMILIES	
TIME	SESSION / EVENT
6:30 AM - 7:15 AM	BEACH RUN/WALK/CRAWL (MEET AT POOL SIDE)
7:00 AM - 11:50 AM	REGISTRATION DESK OPEN (LOBBY II)
7:00 AM - 8:00 AM	CONTINENTAL BREAKFAST (1 HR) LOBBY II
8:00 AM - 12:00 PM	PLENARY SESSIONS (GRAND BALLROOM)
8:00 AM - 8:15 AM	INTRODUCTION TO THE MORNING: VINCENT C. SMITH, MOLLY FRAUST-WYLIE
8:15 AM - 8:45 AM	PARENT PERSPECTIVES: KIMBERLY NOVOD
8:45 AM - 9:15 AM	SOCIAL DETERMINANTS OF HEALTH IN THE NICU: GABY CORDOVA-RAMOS
9:15 – 10:00 AM	BREAK (45 MIN)
10:00 - 10:30 AM	ANTIRACISM IN NEONATOLOGY & CLINICAL CARE: YARDEN FRAIMAN
10:30 - 11:00 AM	HEALTH EQUITY IN THE NICU: TROY SAVAGE
11:00 - 11:30 AM	GLOBAL HEALTH EQUITY: SUSAN NIERMEYER
11:30 - 12:00 PM	WRAP-UP: BOB WHITE, JOY BROWNE
<p>FAREWELL UNTIL NEXT YEAR!</p> <p>GRAVENS 37TH ANNUAL CONFERENCE MARCH 6-9, 2024</p> <p>(WELCOME RECEPTION 7:00-9:00 PM MARCH 5, 2024)</p> <p>SAFE TRAVELS!</p>	

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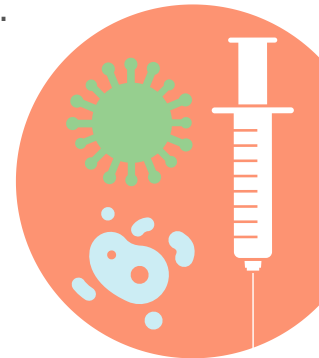
SOAP

WASH YOUR HANDS

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

GET VACCINATED

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



COVER COUGHS AND SNEEZES.

Sneeze and cough into your elbow.



USE A HAND SANITIZER THAT IS 60%+ ALCOHOL.



STAY AWAY FROM SICK PEOPLE

Stay at home to protect vulnerable babies and children. Avoid crowds when out.



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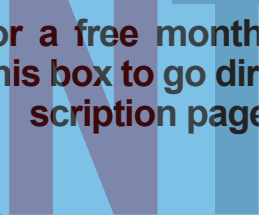
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COVID-19

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.

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 room.
- Don't cuddle with pets.

KITCHEN

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



#STOPTHESPREAD

Stop the Spread at HOME
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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.

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COVID-19

DETENER LA PROPAGACION 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.



AISLAMIENTO

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

COCINA

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



#STOPTHESPREAD

Detén la propagacion en CASA
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BAÑO

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



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

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Maneras de manejar COVID-19 en casa

Hogar

- Manténgase 6 pies de distancia de los demás en todo momento.
- 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.
- Hacer gárgaras todas las mañanas y noches con productos de enjuague bucal antiséptico que contienen alcohol.
- Lavé la manos 10-11 veces al día, y antes de cada comida por lo menos 20 segundos.
- Mantenga Buena ventilación en toda la casa. Abra las ventanas y puertas cuando sea posible.
- No compartá toallas, cobijas, y almohadas con personas que estén infectados.
- Llame al 211 para obtener servicios de entrega gratuitos.
- Use ropa protectora, chaqueta, guantes, máscara que se pueda quitar después de estar cerca de infectados.

Enfermo

- Aíslase permaneciendo en una habitación separada con baño separado. No vayas a espacios compartidos
- Si no se puede aislar crea un separador de ambiente con una sábana.
- Ventile la habitación con aire fresco por lo menos 3 veces al día.
- Mantenga agua y productos de saneamiento en la habitación.
- Mantenga una bolsa de basura en la habitación.
- Proteja a las mascotas, no las abra.
- Notifique a todos los contactos de los últimos 10 días.
- No espere! Si se siente peor llame a su médico.

Ways to Manage Covid 19 @ Home

Household

- Stay 6 feet apart from others at all times.
- 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)
- Gargle with antiseptic mouthwash in the morning and evening.
- Wash hands 10-12x a day, before each meal for at least 20 seconds.
- Keep good ventilation throughout home. (open windows/doors) where possible
- Do not share towels, blankets, pillows with sick.
- Call 211 for assistance/free delivery of services.
- Wear protective clothing (jacket, gloves, mask) that can be removed after being around infected.

Sick

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

WEAR A MASK

PROTECT PARENTS + BABIES

COVID-19

When we all wear masks...

We protect parents and babies.



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COVID-19

Quando todos usamos mascarillas ...

Protegemos a los padres y los bebés.



Fragile Infant Forums for Implementation of IFCDC Standards: Systems Thinking and Implementation

Carol Jaeger, DNP, RN, NNP-BC, Carole Kenner, PhD, RN, FAAN, FNAP, ANEF



“A recent meeting of the Gravens Consensus Panel for Infant and Family-Centered Developmental Care (IFCDC) allowed for an in-depth application of principles of change, quality improvement, and working models in which these approaches can be used.”

Recent emphasis on systems thinking in a Fragile infant Forum for implementation of Standards

A recent meeting of the Gravens Consensus Panel for Infant and Family-Centered Developmental Care (IFCDC) allowed for an in-depth application of principles of change, quality improvement, and working models in which these approaches can be used. The following summary highlights the content and discussion of the panel's work and is intended to lay a foundation for future application and implementation of the IFCDC evidence-based standards.

What is systems thinking, and what does it have to do with Infant and Family-Centered Developmental Care (IFCDC) im-

plementation? (1)

All of us work in systems when we provide IFCDC. The “system” may refer to the unit or the entire hospital. To understand the connection and relationships among the parts of a system, an organization/unit consideration of the entire ecosystem must be considered. Below is an example of the parts of the “system” that must be considered as IFCDC moves to implementation.

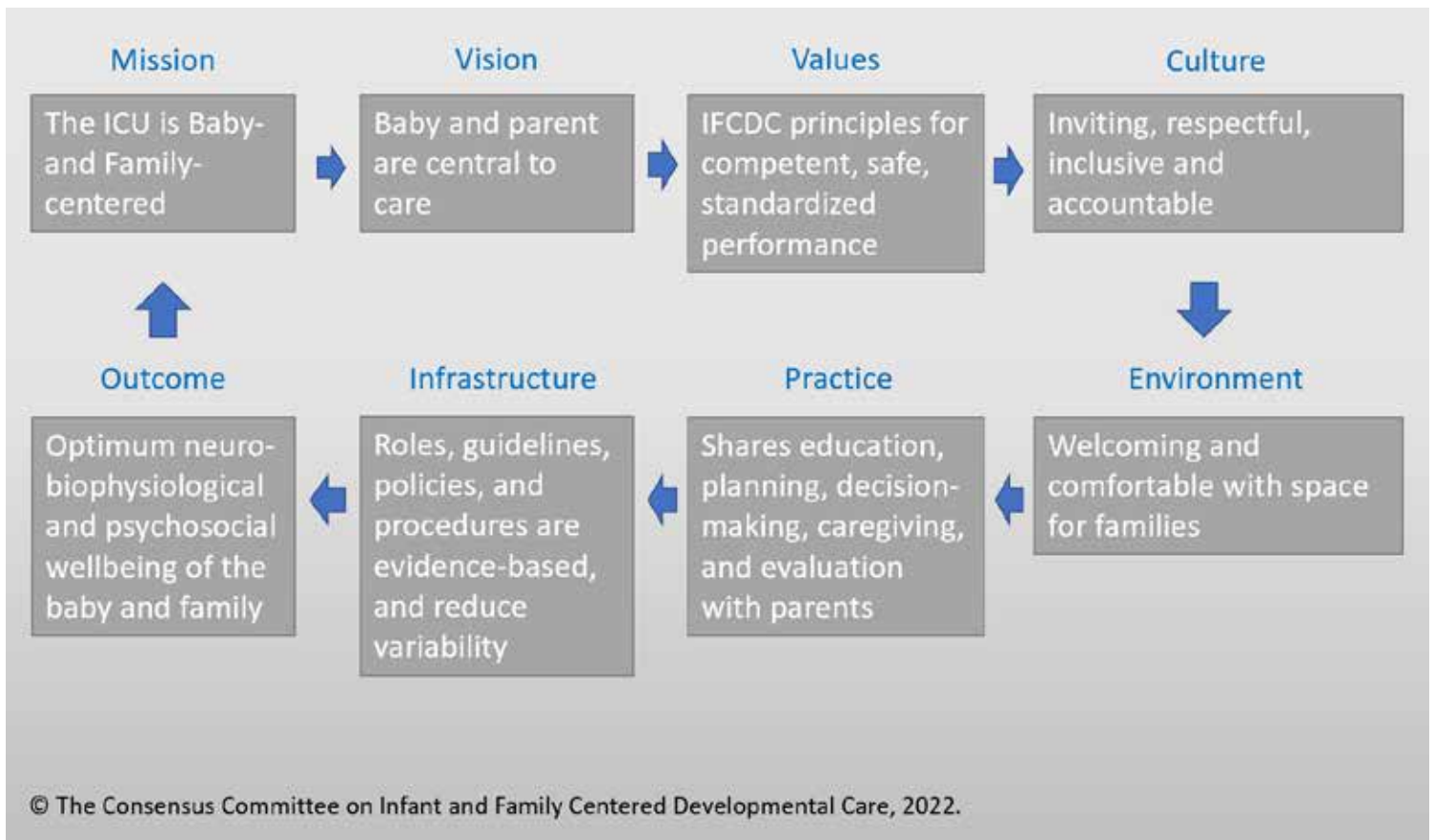
“To implement and adopt IFCDC, the unit culture must shift its thinking and how they deliver care—in most units, it is a major change. Change is constant, emotion-laden, and inevitable. Managing change helps decrease the chaos that can ensue if positive, consistent, and process-oriented leadership is absent.”

Implementing change in intensive care

To implement and adopt IFCDC, the unit culture must shift its thinking and how they deliver care—in most units, it is a major change. Change is constant, emotion-laden, and inevitable. Managing change helps decrease the chaos that can ensue if positive, consistent, and process-oriented leadership is absent. Application of a Theory of Change—whether it is Kubler-Ross (2); Lewin (3), or Rogers (4), the key is to recognize that people within an organization will react differently to change. Rogers (4) refers to the four categories of people according to their characteristics: Innovators and early adopters (readily recognize the need for change), Early Majority (need to think through the change), Late Majority (rule-followers, question the need to change), and Laggards or Resisters (feel threatened, need active persuasion to change). Informal system leaders may represent the characteristics of any of the categories of people. As a leader, you must engage all these types of people in the change, or your implementation will be doomed.

Various models and approaches to planning and facilitating change

Leaders may find it helpful to initially develop a roadmap of the process – to get a “big-picture” (5,6) perspective of the needs, direction, timeframe, and significant impact the change can make on the system. The Logic Model (7) is a tool to guide your thinking through the steps of change. Step 1 – what is your goal? What are you trying to accomplish? Step 2 – what are the inputs? What are you investing? Step 3 – what are the outputs? To whom do we reach? What do we do? What will we create? Step 4 – what are the outcomes? - short-term changes to learning and knowledge acquisition, midterm changes to behavior, practice, and decision-



making, and long-term results affecting social, economic, civic, and/or environmental change. Finally, what is your goal's significant impact or major accomplishment?

Systems thinking goes together with continuous quality improvement – “how are we doing?”, “can we do it better?”. The tools that can be used depending on the organization’s needs include P-D-S-A (Plan Do Study Act) (8) and key Drivers (9). Plan for measurable minor changes, then do something, study the implications, and act (PDSA). Ask in the process what are your influencers-the key drivers to make this change. The diagram below highlights some suggested key drivers.

“Changes must be prioritized, so take your big ideas and get feedback from all your stakeholders. Build continuous feedback to identify how the change is progressing again, considering the characteristics of your population innovators to laggards (3).”

Changes must be prioritized, so take your big ideas and get feedback from all your stakeholders. Build continuous feedback to identify how the change is progressing again, considering the characteristics of your population innovators to laggards (3).

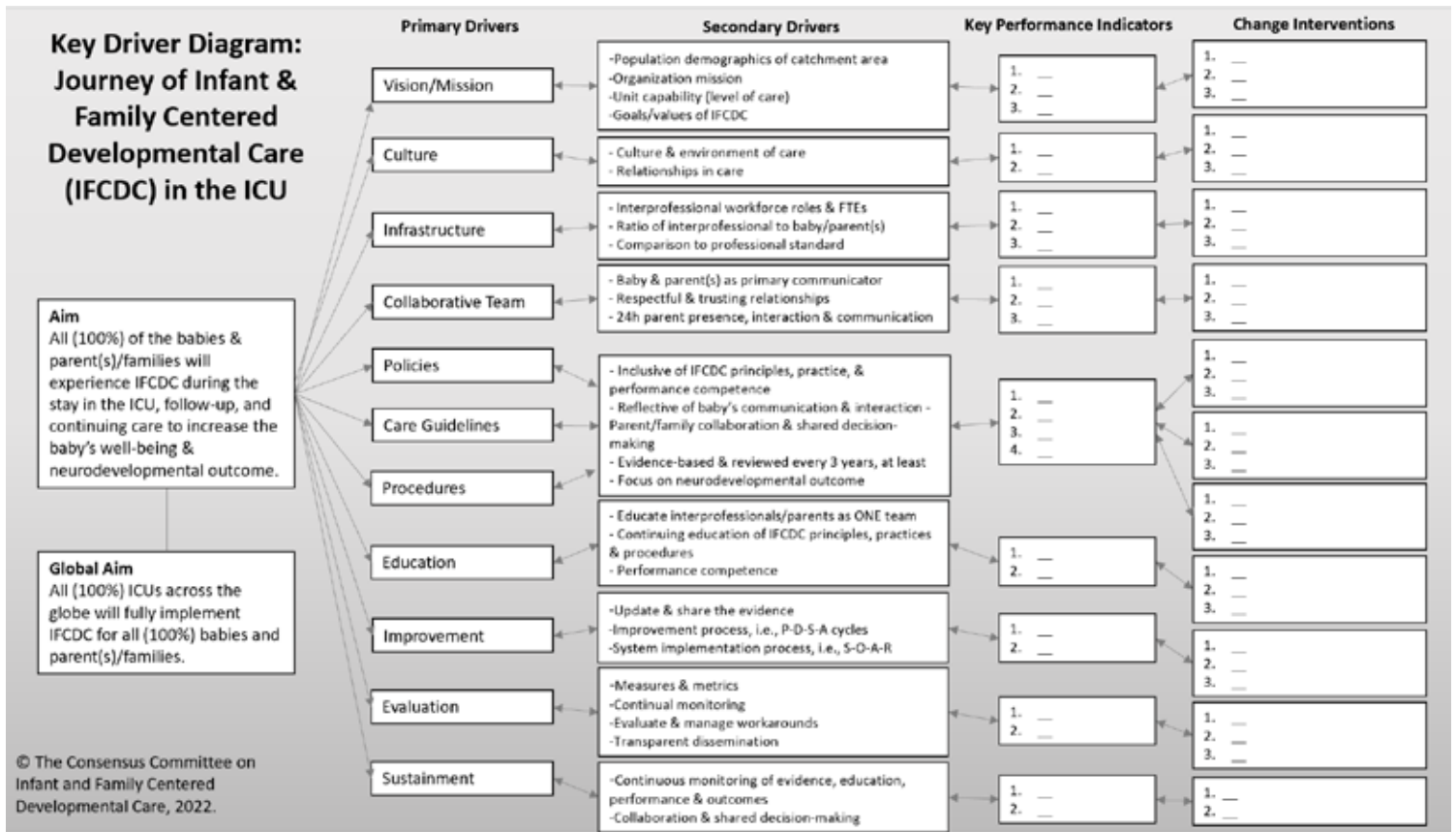
Identify measurable targets of the system and continuously moni-

tor those targets. Measures may include quantifiable and quantitative metrics of the system (unit) and population demographics, infrastructure, staff and family performance competence, staff and parent satisfaction, perception of the system culture, and outcome before and after the change. Evidence-based tools/instruments used for measurement are available in the literature.

There are seven basic quality improvement tools:

1. Cause-and-effect diagram;
2. Check sheet;
3. Control chart;
4. Histogram;
5. Pareto chart;
6. Scatter diagram;
7. Stratification. (10)

The Fishbone Diagram examines the cause and effect of the reasons change occurs. (11) Remember that systems thinking in complex adaptive systems should be applied to all evidence-based practices that exemplify IFCDC. IFCDC Competence implementation uses a gap analysis to identify the challenges in implementing an IFCDC standard or competency and determine how easily the change will be implemented, its impact, its effort, and how it is prioritized. (12)



Go by a playbook for the implementation. The playbook puts it all together. It examines the collaborative team, the evidence to support the change, the gap/problem, potential cause and effect as illustrated by a Fishbone Diagram, the stages of change-key driver diagram; assessment/measurement tools; metrics obtained before and after the change with continuous monitoring with visual measures over time to note the change or effect. Communication with the team throughout the process and identification of the lessons learned are essential to successful change. Then share the process and results through a publication like this one or conference presentations.

Why systems change is essential to implement and sustain IFCDC standards

There is an urgent need for change in systems better to support the neurodevelopment of babies in intensive care units. The evidence shows that gaps exist in the implementation of IFCDC. There is a lack of collaboration among healthcare providers and caregivers in the performance of consistent neurodevelopmental management of the baby. (13, 14, 15) There is a failure to include the parents/family as team members consistently. (16, 17, 18, 19, 20) There is variation in the application of interventions to satisfy mutual goals for the health and well-being of the baby, family, and staff. (21, 22) Care is consistently managed “to” the baby, not “with” the baby. (23) There is an inability to recognize the baby's communication in response to intervention. (24, 25, 26, 27). There is inadequate education and mentoring to guide interaction “with” the baby. (28-35) There is insufficient infant mental health support that is critical to the baby's behavioral communication and nurturing relationship with the parents (25-27) (There is a lack of cultural humility in the interaction between the healthcare team and the family. (36, 37, 38) The evidence-based standards and competencies of systems thinking identify what the principles and practices of IFCDC should look like when caring for babies and families in

intensive care. Change can begin with education about the principles and standards and be implemented by including them in the system's mission, vision, values, culture, environment, practice, and infrastructure to achieve nurturing baby- and family-centered care and optimum neurodevelopmental outcome for the baby. (1, 39)

“Persistence is the key to managing change. The leader must employ positive persistence – when barriers are identified, determine how to address them and move on. Successful change is never easy, but the impact can significantly impact the babies and families we care for in our units.”

Persistence is essential for change to become “how we do things around here.”

Persistence is the key to managing change. The leader must employ positive persistence – when barriers are identified, determine how to address them and move on. Successful change is never easy, but the impact can significantly impact the babies and families we care for in our units. Monitor the metrics and sustain the culture, environment, practice, and performance competence you have worked hard to change for the better.

For a more in-depth description of the theories, models of change,

and guidance on how to implement change, please refer to the White Paper (40, 41)

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Back to Basics

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) are most often referenced. However, the determinants and dynamics thereof are not necessarily understood or considered in and of themselves.”

The efficacy of mechanical ventilation is determined by the laws of physics related to gas flow. Resistance (R) and compliance (C) are most often referenced. However, the determinants and dynamics thereof are not necessarily understood or considered in and of themselves.

Overview

Whether spontaneous or mechanical, breathing is subject to physics and gas flow laws. The nature of each is very different and directly affects how these laws influence ventilation.

Negative pressure produced by the diaphragm excursion produces the pressure differential required for gas to flow into the lungs during normal spontaneous breathing. Aside from producing gas flow, this negative pressure also has other effects, particularly in premature infants.

When inhaling, negative pressure increases airway diameter, which directly and exponentially affects airway R; the larger diameter increases gas flow dramatically since R decreases by the fourth power as the diameter increases. The result is that the time required to fill the lungs decreases.

Conversely, positive pressure within the lungs provides the differential necessary for gas to leave. This pressure is also exerted

on the airways, decreasing airway diameter and increasing airway resistance. In the adult, this is not a significant concern as airways are mature and well supported, but in the premature infant, this is not the case, and the airways are prone to collapse during expiration if the pressures are insufficient to maintain patency. This may happen whether breathing is spontaneous or the baby is mechanically ventilated.

Mechanical ventilation requires positive pressure to blow gas into the lungs during the inspiratory phase, increasing airway diameter just as in spontaneous breathing, possibly more so. The expiratory phase of mechanical ventilation (in conventional modes) is essentially the same as in spontaneous breathing, and the effect on airways is the same.

Because airway diameter is greater during inspiration than expiration, it takes less time for a given volume of gas to enter the lungs than to leave. Normally, people do not breathe with a one-to-one inspiratory to the expiratory ratio (I:E ratio) but rather at a 1:3 and 1:5 I:E ratio (1), allowing sufficient time for the lungs to empty.

“A newborn’s respiratory rate is faster than that of an adult, typically 40 – 60 breaths per minute, though a recent study found that about 5% of healthy newborns breathe at a rate of 65 (2). This provides less time for gas to enter and exit the lung; the infant’s normal I:E ratio of 1:1.5 – 1:2 (3) mitigates this to an extent.”

A newborn’s respiratory rate is faster than that of an adult, typically 40 – 60 breaths per minute, though a recent study found that about 5% of healthy newborns breathe at a rate of 65 (2). This provides less time for gas to enter and exit the lung; the infant’s normal I:E ratio of 1:1.5 – 1:2 (3) mitigates this to an extent. Aside from a higher respiratory rate, an infant’s airways are much smaller than an adult’s, with attending higher R. In the case of a micro-premature infant, R poses a much larger obstacle to gas flow.

Compounding these factors is a physiological difference in new-

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borns and particularly premature infants:

“While typical term newborn tidal volumes are the same per kilogram as adults, the newborn’s anatomical dead space is higher (approximately 3mls/kg c.f. 2.2 mL/kg in the adult) (4) this is not the case with the premature infant, whose Vt is smaller (in one study 50th percentile mean Vt was 4.2-5.8 mL/kg although there was wide variation, particularly during the first hour of life) (5).”

Dead Space

While typical term newborn tidal volumes are the same per kilogram as adults, the newborn’s anatomical dead space is higher (approximately 3mls/kg c.f. 2.2 mL/kg in the adult) (4) this is not the case with the premature infant, whose Vt is smaller (in one study 50th percentile mean Vt was 4.2-5.8 mL/kg although there was wide variation, particularly during the first hour of life) (5).

Physiological dead space is also increased partly due to shunting. (4)

“Chest wall compliance increases in the newborn because the rib cage is more cartilaginous than the adult, decreasing chest recoil during expiration. This increases the time required for exhalation since recoil is one factor that facilitates exhalation.”

Chest Wall and Respiratory Mechanics

Chest wall compliance increases in the newborn because the rib cage is more cartilaginous than the adult, decreasing chest recoil during expiration. This increases the time required for exhalation since recoil is one factor that facilitates exhalation.

Aside from being less mature, the newborn’s ribs are more horizontal. This places the respiratory muscles at a mechanical disadvantage compared to the adult. A smaller number of type 1 muscle fibers makes the diaphragm more prone to fatigue. (4)

Respiratory Control

Even at term, the respiratory centre is not entirely mature, and

there is a wide respiratory rate and pattern variation. There is a decreased response to hypercarbia, a decrease in the respiratory rate with hypoxia, and a maximal increase in response to hypercarbia in the face of hyperoxia. These responses are opposite to those of an adult (4,6).

Work of Breathing

The aforementioned factors all increase the work of breathing. There is a point at which ventilatory efficiency is ideal. An old reference (1957) ranges between 30-50 breaths/minute (4). In the premature infant, this is more pronounced as much efficiency is lost to a chest wall prone to retraction.

Oxygen Transport

The oxyhemoglobin disassociation curve is shifted to the left in the newborn due to fetal hemoglobin’s increased affinity for oxygen. This makes it more efficient at picking up oxygen in the lungs but decreases its ability to offload oxygen at the tissue level. Cardiac output in the newborn can only be increased by increasing heart rate, further limiting the ability to respond to inadequate oxygenation; shunt in the presence of a patent ductus arteriosus blunts this response.

Oxygen consumption is higher in the newborn and more so in the premature infant due to increased work of breathing and decreased ventilatory efficiency (4).

Implications for Mechanical Ventilation and Respiratory Support

“While NIV has decreased the incidence of chronic lung disease overall, the limitations must not be ignored, and clinicians must recognise and respond appropriately when those limitations are reached.”

Non-Invasive Ventilation (NIV)

Aside from higher R, immature airways are prone to collapse, and adequate CPAP/PEEP/MAP is required to help decrease airway R and maintain patency. These decrease work of breathing, but the limited range of efficiency remains unchanged, and even moderate pressures often lead to gastric and abdominal distention (“CPAP belly”), further reducing efficiency and increasing the work of breathing.

While NIV has decreased the incidence of chronic lung disease overall, the limitations must not be ignored, and clinicians must recognise and respond appropriately when those limitations are reached. This is most often demonstrated by increasing FiO₂ requirements and increased apneic and bradycardic episodes.

Conventional Ventilation (CV)

Mechanically ventilation does not change the laws of diminishing returns. There is an optimal respiratory rate above which efficiency decreases and ventilation deteriorates, just as in sponta-

neous breathing. As the rate increases, the respiratory cycle time decreases, and there comes the point at which further increases are either ineffective or lead to further deterioration. This is often due to gas trapping.

Due to limitations in its ability to respond to changes in hemodynamics, the cardiovascular system's ability to maintain adequate perfusion and, thus, tissue oxygenation may be exceeded at higher MAP.

In the extremely immature lungs of the micro-premie, pressures required to achieve optimal inflation may exceed the tolerances of conducting airways, particularly the alveolar ducts, leading to the development of micro-tears. This is the path to fulminant air leak, namely pulmonary interstitial emphysema.

“Because the respiratory cycle is very brief, HFO requires negative pressure during the expiratory phase to speed up emptying. This may lead to airway instability or outright collapse if sufficient MAP is not provided.”

High-Frequency Oscillation (HFO)

Increasingly HFO is being recognised as being a gentler, more lung-protective mode of ventilation than CV (although not without controversy).

Here the smaller volumes used decrease volutrauma and sheer stresses and require less time to deliver and evacuate, but this is offset by the high rates used. Because the respiratory cycle is very brief, HFO requires negative pressure during the expiratory phase to speed up emptying. This may lead to airway instability or outright collapse if sufficient MAP is not provided.

Newer, 3rd generation ventilators provide for volume targeted ventilation during HFO. Since V_t is no longer a function of frequency, it may be decreased without resulting in higher V_t. This is not the case in places where these machines have yet to be approved (the U.S.); higher frequencies may be required to limit volumes delivered to tiny babies. While HFO/VG does not eliminate the problem of gas trapping, it does decrease the risk. Just as with CV, the law of diminishing return exists with HFO, just at higher rates.

High-Frequency Jet Ventilation (HFJV)

HFJV is unique in its ability to ventilate in the face of high airway R and poor pulmonary compliance. Because the jet “breath” shoots down the centre of the airway at high speed and initially reasonably high pressure, it can better ventilate effectively in a broad range of scenarios.

With the very short inspiratory time (typically 0.02 seconds but as high as 0.034 seconds) and the I:E ratio as high as 1:12, there is much more time available for the lung to empty. Rates used in clinical practice range between 240 – 420/minute, coupled with

the effect of double helical bidirectional flow (which allows a small amount of gas to leave the lung during inspiration). HFJV as a mode is the least likely to result in gas trapping. That is not to say it does not occur, particularly with tiny babies.

HFJV has also been shown to provide adequate oxygenation at lower MAP than other modes, a bonus when dealing with the limited capacity of the premature infant's cardiovascular system (7).

“HFJV has also been shown to provide adequate oxygenation at lower MAP than other modes, a bonus when dealing with the limited capacity of the premature infant's cardiovascular system (7).”

Summary

As the patients we treat in the NICU become ever smaller, the stark differences in their physiology, particularly R, are multiplied. High time constants resulting from high R make ventilating conventionally ever more complex.

High-frequency ventilation can best mitigate the difficulties of ventilating the micro-premie, particularly with volume targeting. HFJV may be the best choice for mode should this feature not be available and should be considered where gas trapping is a concern or is clinically evident.

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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.

NT

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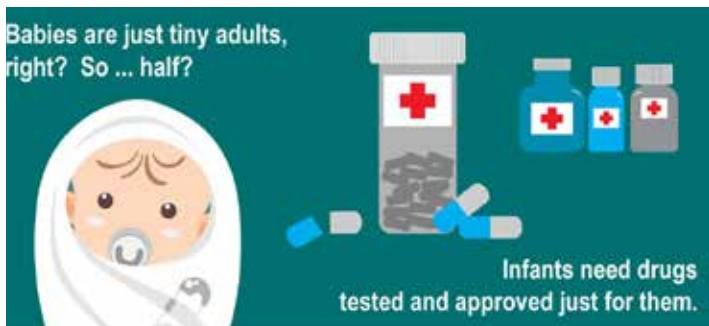


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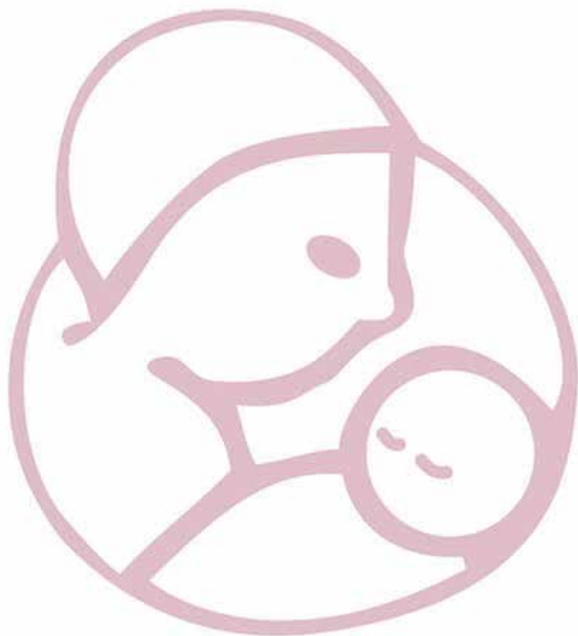
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Consultation

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

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Highlights from the 39th Annual Conference Advances in Therapeutics and Technology: Critical Care of Neonates, Children, and Adults Ontario, CA

Donald Null, MD

“The conference opened with a tribute to Tom Harris, MD, who started this conference. He initiated using a jet ventilator to treat preterm newborns in the early 1980s in Salt Lake City at Primary Children’s Hospital.”

The conference opened with a tribute to Tom Harris, MD, who started this conference. He initiated using a jet ventilator to treat preterm newborns in the early 1980s in Salt Lake City at Primary Children’s Hospital. These patients were dying of severe pulmonary interstitial emphysema or severe RDS. Tom was a superb clinician, researcher, physiologist, teacher, and friend.

Dr. Goldstein, MD, gave a superb presentation on Covid and RSV. He presented an update on future immunizations for RSV and the need for the American Academy of Pediatrics to change its recommendation for which patients should receive Synagis.

Dr. Morris-Whyte on managing a newborn with Multisystem Inflammatory Syndrome presented an excellent abstract. The case report is published in this edition of Neonatology Today

Dr. J Klein, MD, provided an excellent lecture on using the High-Frequency Jet Ventilator as an initial mode of support for ELBW 22-25 week gestation newborns. This management has improved survival in this group of ELBW neonates.

“Dr. J Klein, MD, provided an excellent lecture on using the High-Frequency Jet Ventilator as an initial mode of support for ELBW 22-25 week gestation newborns. This management has improved survival in this group of ELBW neonates.”

Dr. D Null, MD, discussed using High-Frequency Ventilation to transport VLBW and ELBW babies. Management strategies were given for the use of the TXP. The use of the TXP appears to improve pulmonary outcomes in ELBW babies by minimizing baro-

trauma and improving lung function. Settings for the device were discussed with specific pulmonary pathophysiology.

K Welton RRT and B Mercado RRT presented an abstract on unplanned extubations. They listed the top 3 causes and how to avoid unplanned extubations. The causes are associated with the Night shift, with cares taped at the corner of the mouth. Avoid poor taping, unrestrained, cares, skin-to-skin, and infrequent taping/afixing skills.

Dr. Minton, MD, provided an excellent abstract on aerosolized surfactants. This procedure avoids intubation and using a laryngoscope to place a catheter in the trachea. The results were very encouraging.

Dr. Lakshmanan, MD, lectured on the follow-through of ELBW patients. This includes families, social, technical medicine, and developmental outcomes. Parent focus is a priority.

Dr. Profit, MD, discussed optimizing Quality and Equity in Newborns in CA. CPQCC Ca Perinatal Quality Care Collaboratives. His data included 500,000 births, 17,00 NICU admissions, 140 NICUs contributed, 7,000 Acute Neonatal Transport, and 9,000 High-Risk Infants. These results were centered on Quality Improvement education and QI Research looking at outcomes and potential treatment modifications.

“Dr. Profit, MD, discussed optimizing Quality and Equity in Newborns in CA. CPQCC Ca Perinatal Quality Care Collaboratives. His data included 500,000 births, 17,00 NICU admissions, 140 NICUs contributed, 7,000 Acute Neonatal Transport, and 9,000 High-Risk Infants. These results were centered on Quality Improvement education and QI Research looking at outcomes and potential treatment modifications.”

Dr. Pramanik, MD, presented an excellent presentation on NEC regarding Incidence, etiologies, pathophysiology, presentation, diagnosis, treatment, and prevention.

Dr. Ramanathan, MD, provided a vital talk regarding the gut mi-

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crobiome and lung disease. The role of human milk in programming health in very preterm infants. The protective effect of exclusive human milk on the lung, heart, and brain.

Dr. Null, MD, discussed antibiotic stewardship. The benefits are clear for decreasing the use of antibiotics. However, a negative blood culture does not mean the neonate is not infected. Five cases were presented, demonstrating inadequate assessment of the patient for infection. Take home message 1. Negative blood culture does not mean antibiotics should be stopped. 2. Using fewer antibiotics means infection needs to be at the top of the list of why the baby is not doing well. 3. Early treatment prevents death or disability. 4. Listen to the Nurse or parent. 5. Examine the patient

Dr. Fineman, MD, gave a very informative talk on Pulmonary Hypertension in general. He discussed BPD and PPHN patients' management, drugs, follow-up, cardiac catheterization timing, and follow-up frequency. He also discussed pediatric and cardiac patients with PPHN and their management.

Disclosures: The author has no conflicts noted.

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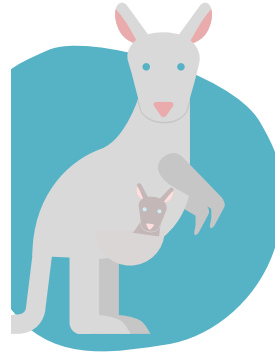
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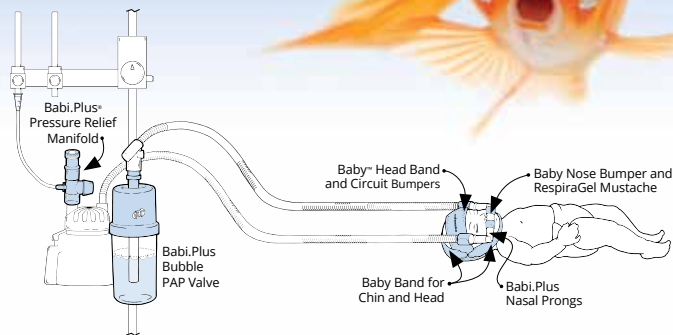


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Thirteen-year-old Emily Rose Shane was tragically murdered on April 3, 2010 on Pacific Coast Highway in Malibu, CA. Our foundation exists to honor her memory.

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August 9, 1996 - April 3, 2010



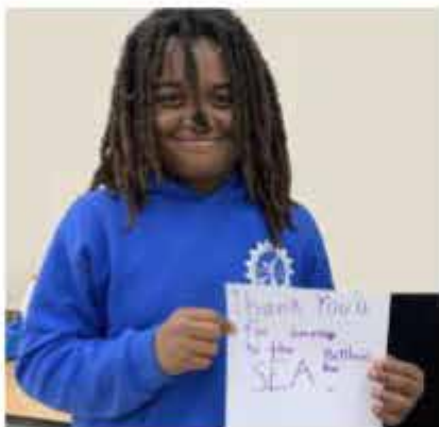
Each year, the Emily Shane Foundation SEA(Successful Educational Achievement) Program provides academic and mentoring support to over 100 disadvantaged middle school students who risk failure and have no other recourse. We have served over 700 children across Los Angeles since our inception in the spring 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.**

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1 week _____	\$30
1 month_____	\$120
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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

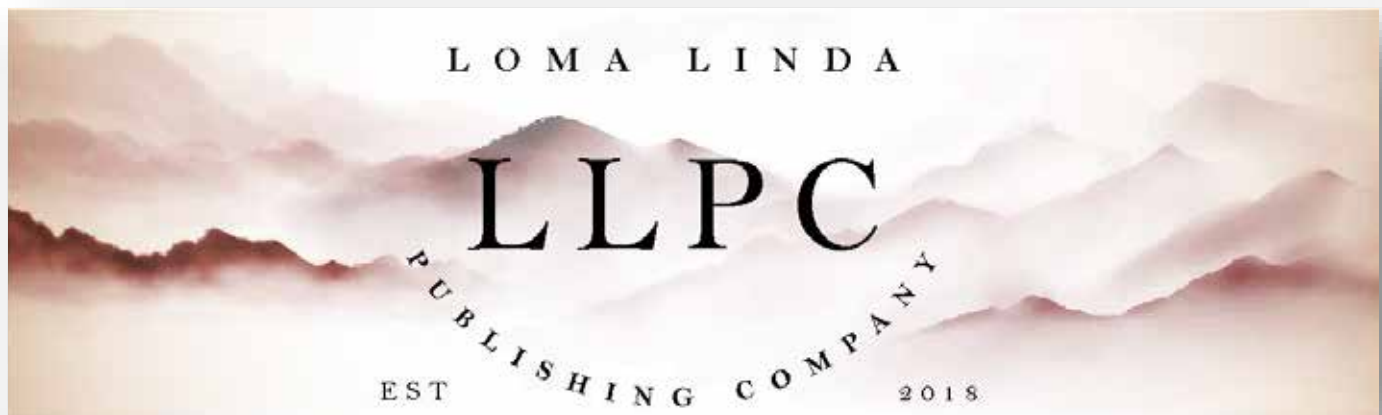
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The Importance of Seeing and Supporting the Maternal and Infant Health Needs of the United States Indigenous Populations

Alison Jacobson



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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.

“Attention continues to be rightfully and critically paid to maternal and infant health (MIH) disparities among White, Black, and Hispanic populations, but a recent study reminds us of another sector of the large and diverse MIH universe in the United States and the genuine health care issues they also face.”

Attention continues to be rightfully and critically paid to maternal and infant health (MIH) disparities among White, Black, and Hispanic populations, but a recent study reminds us of another sector of the large and diverse MIH universe in the United States and the genuine health care issues they also face.



Did you know that premature and low birth weight babies have a 4x greater risk for SIDS?

At First Candle we're educating parents, grandparents and caregivers about safer sleep to make sure all babies reach their first birthday. Learn more at firstcandle.org

In December 2022, the Health and Human Services Advisory Committee of Infant and Maternal Mortality (ACIMM) released its study, “Making Amends: Recommended Strategies to Improve the Health and Safety of American Indians and Alaska Native Mothers and Infants,” following its literature review of birth outcomes and historical, social, economic, political and environmental factors on the health of American Indian (AI) and Alaska Native (AN) populations and a series of meetings with agencies, non-governmental organization, and academic institutions relevant to AI/AN maternal and child health issues. (1)

“This calls for working with AI/AN communities as those empowered to seek solutions; improving data use by accurate identification and inclusion in data policy development; and expanding and leveraging Health Resources Services Administration (HRSA) and the Maternal and Child Health Bureau (MCHB) focus and investment.”

The study developed three directions, with strategic action steps:

Make The Health And Safety Of AI/AN Mothers And Infants A Priority For Action.

This calls for working with AI/AN communities as those empowered to seek solutions; improving data use by accurate identification and inclusion in data policy development; and expanding and leveraging Health Resources Services Administration (HRSA) and the Maternal and Child Health Bureau (MCHB) focus and investment.

Improve The Living Conditions Of AI/AN Mothers And Infants And Assure Universal Access To High-Quality Healthcare.

This includes improving the Indian Health Service, enlisting more AI/AN practitioners, and improving social determinants of health.

Address Urgent And Immediate Challenges That Disproportionately Affect AI/AN Women Before, During, And After Pregnancy.

This includes greater identification and prevention of Missing and Murdered Indigenous Women and Girls (MMIWG), improved care of incarcerated pregnant and postpartum women, and increased surveillance and screening for intimate partner violence (IPV).

Improvements in these critical areas would have a positive impact on infant mortality rates, including those due to Sudden Unexplained Infant Death (SUID), which includes Sudden Infant Death Syndrome (SIDS) and Accidental Strangulation and Suffocation in Bed (ASSB). SIDS is considered to be a complex condition that may have more than one causation, but improved maternal health can lead to improved infant health during gestation, birth, and postpartum phases.

According to the Centers for Disease Control and Prevention (CDC), the Non-Hispanic American Indian/Alaska Native population has the highest SUID rate in the U.S., at 216 deaths per 100,000 live births.

“According to the Centers for Disease Control and Prevention (CDC), the Non-Hispanic American Indian/Alaska Native population has the highest SUID rate in the U.S., at 216 deaths per 100,000 live births.”

The U. S. also has the highest maternal mortality rate among developed countries, at 17.4 deaths per 100,000 live births, compared to 8.4 for France, 8.6 for Canada, and 6.5 for the U.K. (2), and the Non-Hispanic American Indian/Alaska Native population has the second-highest pregnancy-related mortality ratio in the U.S., at 26.5 per 100,000 live births. (3) Not surprisingly, the reasons include factors found in the ACIMM study, ranging from access and quality regarding health care to socioeconomic issues resulting from racism and living standards.

Another important aspect the study group identified is the importance of physically working within the community. Therefore, federal advisory committee meetings focusing on issues relating to these populations should be held in those communities “to assure greater engagement, understanding, representation, and accountability.”

This is a meaningful recommendation. [First Candle](#) itself has deepened its understanding of the need for community outreach. Through our anecdotal and qualitative research, we saw the link between communities feeling recognized and gaining trust in professionals, practitioners’ better understanding of community realities, and the higher possibility of improved MIH outcomes.

This led to the launch in 2022 of our Let’s Talk Community Chat program, which enables healthcare providers and families to gather in local settings to discuss and learn, in a supportive setting, information and issues around sleep-related infant death and maternal health and to form beneficial relationships. Understanding the need for recognition and trust also continues to shape the

implicit bias elements in our Straight Talk for Infant Safe Sleep training program for healthcare professionals.

The ACIMM study indicates that practicing inclusivity in health care counseling wherever and whenever possible matters. The factors contributing to maternal and infant mortality are universal, and that which affects any of these ethnicities and communities affects all of us.

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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3. <https://www.cdc.gov/reproductivehealth/maternal-mortality/pregnancy-mortality-surveillance-system.htm#race-ethnicity>

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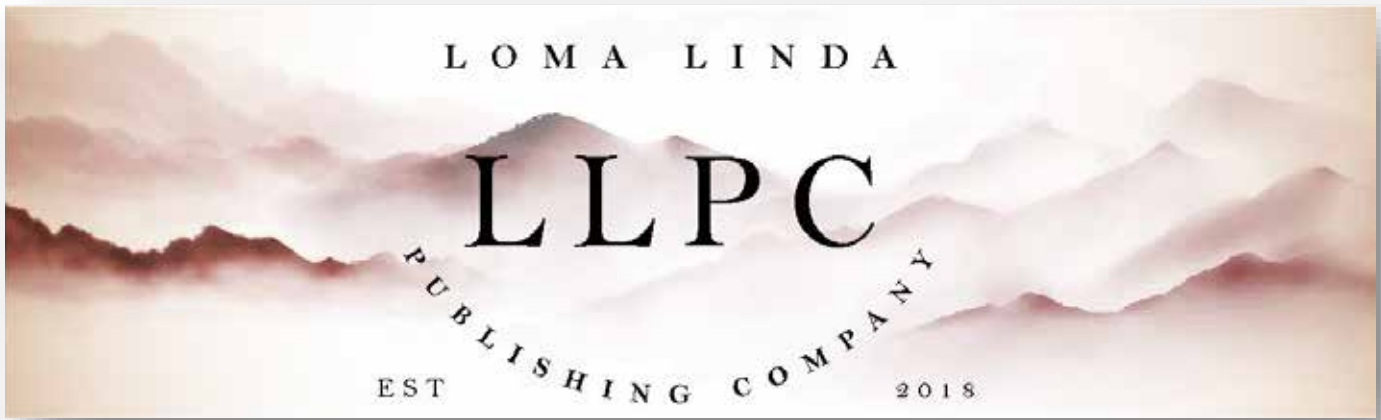
As we indicated last month, we look forward to a number of new features as well.

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.

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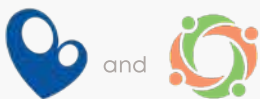
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TOP 10

RECOMMENDATIONS FOR THE PSYCHOSOCIAL SUPPORT OF NICU PARENTS



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

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

1 PROMOTE PARTICIPATION

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



2 LEAD IN DEVELOPMENTAL CARE

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



3 FACILITATE PEER SUPPORT

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



4 ADDRESS MENTAL HEALTH

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



5 SCREEN EARLY AND OFTEN

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



6 OFFER PALLIATIVE & BEREAVEMENT CARE

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

7 PLAN FOR THE TRANSITION HOME

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



8 FOLLOW UP

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

9 SUPPORT NICU CARE GIVERS

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



10 HELP US HEAL

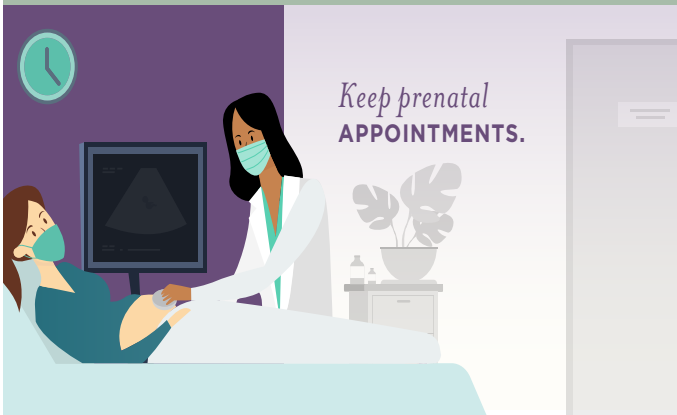
Welcome the pastoral care team into your NICU to serve families & staff.

SUPPORT4NICUPARENTS.ORG

The PREGNANT MOM'S Guide To Staying SAFE DURING COVID-19



Maintain at least
A 30-DAY SUPPLY
OF YOUR MEDICATIONS.



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

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



nicuparentnetwork.org
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Position available for Neonatal Nurse Practitioner (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.

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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.



www.nationalperinatal.org/rsv

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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.





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.

Improvement of Maternal Morbidity and Mortality: Maternal Level of Care, Maternal Transport, and Regionalization

Mary Fang, BS M.D. Candidate

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*.



“She was not going to go home that evening; she was going to the hospital via airlift from an island to the mainland major hospital.”

In my mind’s eye, I painted a picture of her experience flying here. She lay down to get her routine ultrasound done and watch the grayscale frames of the twins head-knocking inside her uterus, eager to share some polaroids of her growing babes with her husband that evening, suddenly gazing back to the screen, which showed red and blue lines over her cervix she did not remember seeing or being told about previously. She was not going to go home that evening; she was going to the hospital via

airlift from an island to the mainland major hospital. Mrs. Smith was tearful and expressed difficulty understanding why doctors recommended she stay in-patient in a hospital far from home for the remainder of her pregnancy, which she had just learned would end four weeks earlier than initially planned. She felt no change compared to before that ultrasound visit, where type I vasa previa and absent end diastolic flow of growth-restricted twin A were newly diagnosed. With the constellation of mo-di twins, vasa previa, and AEDF (absent end-diastolic flow), the possibility of her needing to be transported urgently or emergently was significant. However, with her now at a high-level care center, the transport would be up the elevator, not in an ambulance or aircraft, when life or death could be a matter of milliliters of fetal blood within minutes.

“However, with her now at a high-level care center, the transport would be up the elevator, not in an ambulance or aircraft, when life or death could be a matter of milliliters of fetal blood within minutes.”

Perinatal care, comprised of the maternal-fetal/neonatal triad, has improved throughout the decades. However, the improvement is predominantly based on improved neonatal outcomes. (1) Implementing risk-appropriate neonatal care in the 1970s has significantly reduced neonatal and infant morbidity and mortality, especially among very low birthweight infants that receive appropriate care in at least a level III NICU. (1) However, the other side of the perinatal triad, the maternal side, continues to face rises in maternal mortality and morbidity in the U.S., especially among women of color. (2) The longstanding neonatal model of levels of care has more recently inspired similar maternal levels of care models, whereby each level has a minimum ability related to staffing and resources. (2) Appropriate level of maternal care spans the antenatal,

perinatal, and postpartum periods. Efforts for assigning levels of maternal care at the national level are at their early stages, with mandatory versus voluntary efforts by the state. Efforts were piloted in 14 hospitals in 3 states in 2017. In Texas, the first iteration of maternity designation was codified in 2018, and all facilities in Texas were designated a level by September 2021 by the Department of State Health Services. Level 1 centers provide basic care to low to moderate-risk pregnant patients and detect, stabilize, and initiate management until the patient is transferred. Level 2 facilities provide specialty care, and level 3 facilities provide subspecialty care and are equipped to manage complex maternal and obstetric complications. Level 4 facilities are regional perinatal health care centers that are equipped to manage the most complex conditions and critically ill pregnant patients. There are challenges with adoption and acceptance in other states due to concern primarily for lower level hospitals and the process of applying, preparing prior to site review, the site review, and post-site report.

“There are challenges with adoption and acceptance in other states due to concern primarily for lower level hospitals and the process of applying, preparing prior to site review, the site review, and post-site report.”

Despite the aforementioned concerns, regionalization through identifying high-level facilities and maternal transport is necessary to improve outcomes based on assigned risk. Maternal transport is one of the keystones for improving mortality or major morbidity through transferring care from a low-acuity to a high-acuity facility. (3) These improved outcomes relate to preventing near-miss events, adverse outcomes that may have occurred in the absence of transport. However, maternal transport accessibility is not equal or equitable due to differences in time and

distance from the nearest high-acuity center, inefficient identification of the nearest center, and/or lack of clear hospital protocols to appropriately transfer patients who require it. Improving equitable access to transfer to appropriate levels of care, especially highlighted in rural facilities (4), demands hospital-level quality improvement initiatives, including identifying patients who need transport and clear plans on the method of transport and distance. Reasons for maternal transfer fall into maternal and/or fetal/neonatal indications. While the most common reason is the lack of availability of appropriate-level neonatal care, maternal medical or surgical conditions or emergency care at a facility without obstetric services also require transfer. (3) Improved maternal regionalization is another effort to facilitate the transfer of care via defining relationships between different level facilities and labeling the capabilities of a facility. Some instances may necessitate the identification of multiple higher-level facilities, depending on the facility's capacity to accept new transfers. Mode-of-transport (i.e., ambulance versus airlift) is also an important consideration, reliant on distance, urgency, and availability of the transport means.

“Fragmentation of perinatal care also contributes to increased morbidity and mortality. This discordance is multi-fold, with some facilities with appropriate high-level care for the maternal side but not the neonatal side, or vice versa, and hospitals without MFMs or neonatologists within a 10-mile radius. (4)”

Fragmentation of perinatal care also contributes to increased morbidity and mortality. This discordance is multi-fold, with some facilities with appropriate high-level care for the maternal side but not the neonatal side, or vice versa, and hospitals without MFMs or neonatologists within a 10-mile radius. (4) This incongruity between appropriate maternal and neonatal care availability significantly affects outcomes for high-risk pregnancies. Studies have demonstrated improved outcomes for maternal transfer for neonatal indications prenatally versus postnatally. (3,4) Improved regionalization can help increase the number of high-risk births occurring at the appropriate-level facility, avoiding separation of the mother and newborn after birth. (3,4) This is achieved by better defining the scope of maternal and neonatal care concurrently to plan for delivery at a center that provides appropriate care for both the mother and the newborn.

“ This is achieved by better defining the scope of maternal and neonatal care concurrently to plan for delivery at a center that provides appropriate care for both the mother and the newborn.”

Risk stratification and planning for delivery for high-risk pregnancies in advance require longitudinal care by a multidisciplinary team, including a maternal-fetal medicine specialist. Adequate

prenatal care aids in the delivery plan by identifying and monitoring high-risk conditions. Unfortunately, there also exist disparities in the adequacy of prenatal care and, subsequently, differences in access to management by MFM. Co-morbidities that are unidentified or not adequately managed during pregnancy, including interval ultrasounds and antenatal testing, increase morbidity and mortality. In such cases, without access to routine prenatal care, presentations to care are often only to the emergency room, which might not be able to take care of the obstetric emergency, especially if it was undiagnosed beforehand due to lack of longitudinal obstetric care. An undiagnosed obstetric condition presenting for the first time in an emergent setting without appropriate resources and personnel can further delay transfer due to the stabilization requirement before transfer. (3) Perinatal health includes consideration of the maternal and fetal/neonatal perspectives. Conditions associated with maternal morbidity and mortality can directly impact fetal/neonatal outcomes and thus warrant high-level care antenatally with an MFM to make decisions about antenatal surveillance and include other specialists during the pregnancy.

Accurate risk stratification depends on identifying and controlling co-morbidities identified antenatally and informs management during the antenatal, perinatal, and postnatal/postpartum period, including assigning the appropriate level of care. As high-risk maternal patients are often associated with high-risk fetal/neonatal counterparts, planning care at a facility with level-appropriate care for both the mother and newborn improves outcomes. Maternal transport and regionalization, in addition to risk stratification, improve maternal morbidity and mortality with care at a facility equipped with resources and personnel to adequately and promptly respond appropriately. Lack of access to prenatal or MFM care and, thus, inappropriate diagnosis and management of maternal and/or fetal conditions underlie disparities in outcomes despite these improvements. Fortunately, identifying the barriers and inequities in accessing appropriate levels of care is ongoing, leading to the development of quality, evidence-based tools to lessen these gaps.

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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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Postpartum Revolution

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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



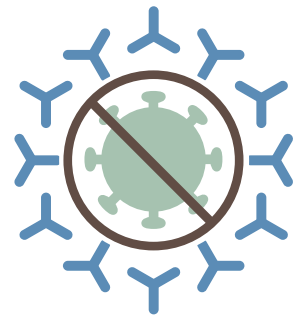
which is especially dangerous for babies younger than 3 months



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.

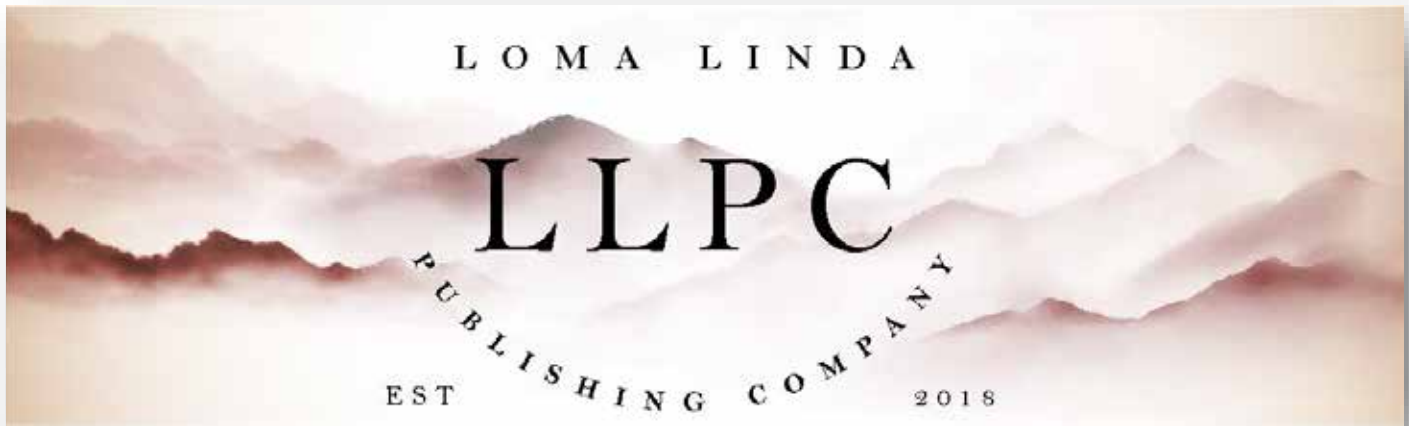


Babies older than 6 months can get a flu shot and COVID-19 vaccinations. There is no vaccine for RSV, but monthly antibody shots during RSV season can help protect them.



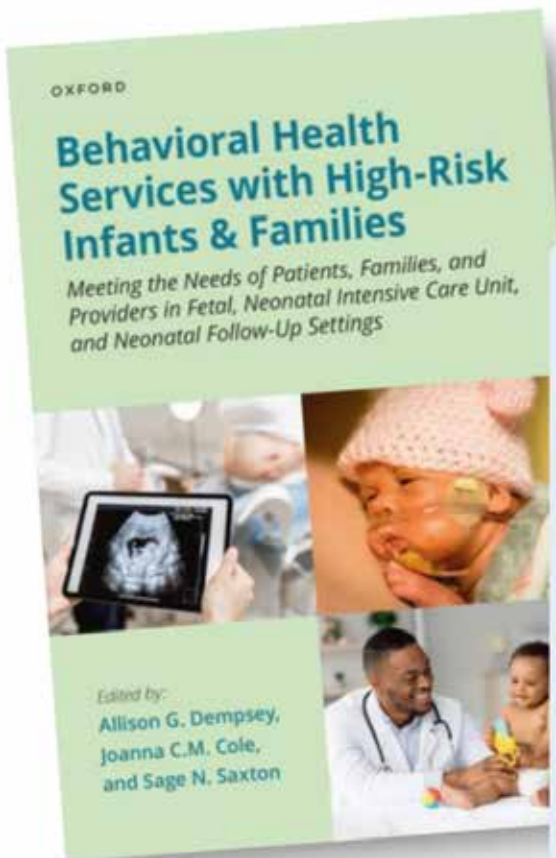
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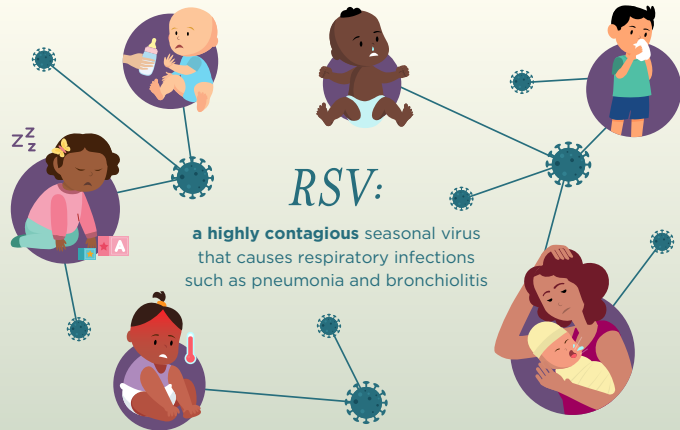
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Respiratory Syncytial Virus

DID YOU KNOW?



The Gap Baby: An RSV Story



Infants under age 1



RSV is the leading cause of hospitalization



16x more likely to get RSV than the flu



Postpartum Revolution

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Kids under age 5 experience



500,000 emergency room visits for RSV each year



57,000 hospitalizations for RSV each year

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

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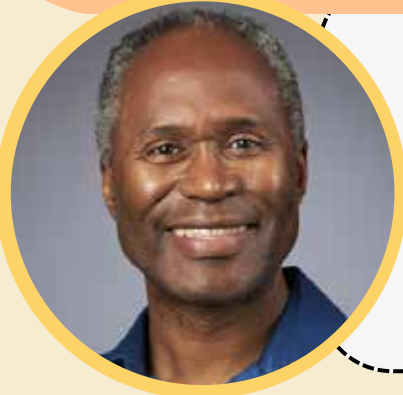
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FCC Taskforce Webinar

March 16, 11-12:30 PT

Importance of NICU discharge guidelines and standards



VINCENT C. SMITH, MD MPH

Pronouns: He/Him

Professor of Pediatrics

Boston University Chobanian & Avedisian School of Medicine

Division Chief of Newborn Medicine

Department of Pediatrics

Boston Medical Center

Boston University School of Medicine

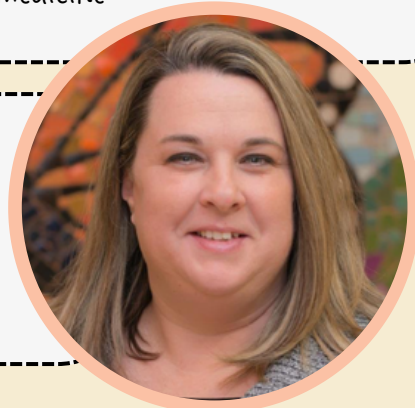
KRISTY LOVE

Pronouns: she/her

Executive Director

National Perinatal Association

Parent Advocate



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



MALATHI BALASUNDARAM, MD, FAAP

Pronouns: she/her

Clinical Associate Professor, Division of Neonatology

Dept of Pediatrics, Stanford School of Medicine

Attending Neonatologist,

El Camino Health, Mt View, CA

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Family Centered Care Taskforce: Local NICU Parental Support: An Overview

Dharshi Sivakumar MD, Michelle Wrench RN, CCRN

The natural process of parent-infant attachment can be interrupted due to newborn intensive care unit (NICU) admission at birth. The attachment process comes from a developmental perspective on human life (1). Bonding with the parents or primary caregiver is fundamental to growth and development in children (2). Attachment and bonding have been used interchangeably, even though they should be defined separately in research.

“Bonding with the parents or primary caregiver is fundamental to growth and development in children (2). Attachment and bonding have been used interchangeably, even though they should be defined separately in research.”

Attachment between the parent and the high-risk infant in the NICU can be facilitated through protective factors such as nurturing touch, closeness, caregiving, sensitivity to the infant's cues, and responsiveness to the infant's needs (3,4). However, the early separation between parent and infant and a traumatic technological NICU environment interrupt the complex attachment process (5). Interventions to support or modify these factors during the NICU stay should help establish parent-infant attachment (6).

“ High-risk infants hospitalized in the NICU often receive life-saving interventions during a critical development period when their brain is susceptible to positive and negative environmental factors. This time is particularly challenging for families.”

High-risk infants hospitalized in the NICU often receive life-saving interventions during a critical development period when their brain is susceptible to positive and negative environmental factors. This time is particularly challenging for families. Parents of hospitalized newborns are likely to experience clinically significant symptoms of stress, anxiety, and depression. These symptoms can impact the nature and quality of the early parent-infant relationship and lead to long-term consequences for the family dynamic (7-10). Perinatal parent mental health represents a key factor that impacts neuro-developmental outcomes of high-risk infants. It is necessary to optimize the well-being of NICU infants and their families by increasing awareness and screening for parents' mental health in the NICU and building systems for support and early intervention (11).

Over the past couple of decades, the NICU philosophy and how we care for these infants have changed. With the introduction of

family-centered/integrated care, families are spending more time in the NICU and witnessing the ups and downs of their loved one's journey—the guilt, anxiety, and sadness of losing a normal pregnancy fuel the trauma and stress in mothers. Over time, this leads to postpartum depression, anxiety during NICU stay, and post-traumatic stress disorder a few months after discharge (12).

How can healthcare providers support these NICU families? Reviewing the literature, we could recognize a few common positive, supportive methods for the families (13,14).

“How can healthcare providers support these NICU families? Reviewing the literature, we could recognize a few common positive, supportive methods for the families (13,14).”

Meeting other parents in the unit during regular social and informative parent group sessions to give emotional support and gain confidence in participating in the care of their high-risk infant

- Providing access to well-established online groups to discuss common NICU issues with other past and present parents
- One-on-one support through a trained peer buddy program. Psychosocial and mental health screening and early psychological support for the vulnerable parents
- Bedside staff assigning simple activities to perform during parents' daily visits. Simple tasks like holding the infant, skin-to-skin care, reading, pumping at the bedside, selecting the clothes and dressing their infants, infant massage program, and following a well-designed developmental program with different staging
- Creating such opportunities for parent empowerment improves confidence in providing infant care and parental knowledge about an infant's development. These interventions are therapeutic to the parents and improve the infant's clinical and developmental outcomes(15-19).

The challenges in setting up parent support programs are different in each NICU

1. In tertiary care NICUs in children's hospitals or academic centers, the hospital administration and patient experience will love to support these measures as part of financial incentives to their institution. Funds will be provided to support different programs, and all the trainees in the NICU will readily participate in these projects. However, implementing such a program has its challenges, such as difficulty changing the culture, staff participation due to time constraints, cooperation with subspecialty providers and supporting the families living far from the hospital and visiting less often.
2. In a smaller level, 2 and 3 NICUs in community hospitals,

getting support from hospital administration and patient experience are crucial to developing parent support programs. The administration is unaware of these measures in these hospitals as they focus more on adult patients. The hospital administration support is necessary to receive funds that will help to support staff time and commitment. The staff are willing to support the families and have time. Most of the parents live close by and visit more often.

“No matter what the hospitalization entails for babies and families of the neonatal ICU, support from staff and other parents with similar experiences can ease the burden of trauma and optimize coping during the NICU journey.”

No matter what the hospitalization entails for babies and families of the neonatal ICU, support from staff and other parents with similar experiences can ease the burden of trauma and optimize coping during the NICU journey. Building a sense of community and a safe place to talk about shared experiences begins early at El Camino Health NICU. This is a 20-bed level 3 NICU in a community hospital staffed by academic neonatologists in the heart of Silicon Valley. We established a few parental support programs under the comprehensive family-centered care program.

1. **Parent Exchange Program:** We have been doing this support program for over a decade and did not stop during the pandemic. Our Parent Exchange Program meets monthly via zoom on a regularly scheduled day. Our team comprises two neonatal nurses (Michelle Wrench and Tammy Lee), FCC chair Dr. Malathi Balasundaram and a Family Partnership Council member. During this time, parents of current NICU babies can rely on having a safe environment to share their experiences, discuss concerns, and meet and connect with other NICU families. This is an excellent time for parents to inquire about and discuss discharge planning and what to expect while parenting a NICU baby long-term. We always have a former NICU parent in attendance to share their experiences of NICU parenting both during hospitalization and after discharge. The staff of Parent Exchange focuses on the importance of self-care, how to connect with their baby, and informing parents of their crucial role as part of their child's care team. Resources are offered to parents to connect with additional support through online platforms, including our own unique El Camino Hospital Slack Community.
2. **El Camino Health NICU Slack community:** Parents can connect exclusively with former El Camino Health NICU families to share stories, build a broader yet local NICU parent support system, get parenting tips and baby equipment recommendations as well as have an exciting place to share their

infant's progress as they grow! We have ~170 local veteran NICU families in this community. The FCC chair invites the current NICU families to join the Slack group if they are interested. They can read the stories of prior NICU families and their thriving babies or post questions to the group. It is created and run by former parents; no staff members except the FCC core team are part of this community.

3. **Parent activities and involvement:**
 - a. Early skin-to-skin (kangaroo) care
 - b. Early hand expression and oral care with mother's own milk by parents and staff
 - c. Reach out and read program
 - d. Infant massage program starting at 32 weeks

Interview Questions for Parent Buddy Applicants

1. Tell me a bit about your connection to El Camino Hospital. When was your baby born and at what gestation? What challenges did your baby face or overcome during their NICU stay? Did they face any challenges after graduating from the NICU? How old is your baby today? Tell us about them!
2. What do you imagine the role of a parent buddy to be?
3. Why are you interested in becoming a parent buddy?
4. What are 2 or 3 of your strengths you would bring as a parent buddy?
5. Tell me about a challenging or problem situation you had in coping with your baby's early birth and how you handled it.
6. Please give an example of how you prefer to communicate with health care professionals.
7. What is an example of how you manage or reduce your stress?
8. What time-commitment would you be able to make to being a parent buddy?

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

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Vision/Problem Statement:

Parents of infants in the Neonatal Intensive Care Unit (NICU) will have access to a formal program of peer to peer support provided by trained, experienced parents, in addition to professional support. This support will help them cope with stress and anxiety, develop resilience, and gain practical parenting skills.

Background and Importance:

Parents are often overwhelmed and distressed when an infant is born prematurely or with a medical condition, especially if they are first time parents. NICU parents are well-documented to have higher rates of depression, posttraumatic stress disorder and anxiety than parents of healthy, term infants. They often experience sadness, a sense of loss and feelings of failure and powerlessness. When parents are distressed or depressed, their interactions with their infants may be impaired, they are less sensitive and attuned to their infant's needs, and this in turn leads to impaired social, emotional, cognitive and physical development in their infants. The evidence shows that supporting NICU parents leads to improved developmental outcomes for their infants.

Parent to parent support programs have been developed in many intensive care nurseries to provide the unique support that comes from peers. In 2012, the American Academy of Pediatrics recommended that health care professionals should facilitate and encourage peer support. Peer support and role modeling helps parents throughout every stage of their infants' hospitalizations, from giving them hope, to helping them begin to develop parental identity, to providing anticipatory guidance about taking their infants home. Research validates the value of parent to parent support in a NICU setting. NICU parents who receive peer support show:

- Increased confidence and well-being in their parenting
- Improved problem-solving capacity and adaptive coping
- Increased perception of social support, self-esteem, and acceptance of their situation
- Increased interactions and more nurturing behavior with their infants
- More frequent visits to the hospital
- Reduced stress, anxiety and depression

There is a business case for peer to peer as part of comprehensive family support. It results in shorter length of stay due to parents' increased competence at caregiving and ultimately results in lower hospital costs, especially under DRG or bundled payment scenarios. It is likely to lead to lower hospital readmission rates for NICU babies, because parents are more competent and confident at caregiving by the time of hospital discharge. "Pay for performance," reimbursement rates are tied to patient satisfaction scores, which are impacted by competitive programs like these. In addition, young women are key drivers of traffic to healthcare systems so ensuring that mothers have a positive experience is crucial in ensuring their loyalty to the organization.

Goal/Target:

A functional parent to parent support program will be in place by Summer of 2019 serving at least 10% of parents. Recruiting, screening and training processes as well as evaluative components will be developed and documented.

Baseline/Current State/Condition:

Current parental psychosocial support in the El Camino NICU is provided by a social worker, as well as the bedside nurses and neonatologists. Parent hours are held monthly to provide opportunity for parents to connect. In addition, individual staff sometimes connect new parents with experienced parents with the goal of providing peer support. No formal processes, staff or training is in place and not all parents are given the opportunity. In addition, parents are sometimes referred to online peer communities that are specifically designed to support this population.

The ten member Family Advisory Board (FAB) in the NICU at El Camino has been active for 2 years. Among their other contributions has been an interest in creating a parent to parent support program. This interest is strongly shared by the unit and physician leadership. The Patient Experience Department of the hospital also desires the development of a program and will provide the assistance of a consultant with experience in starting and managing peer to peer programs.

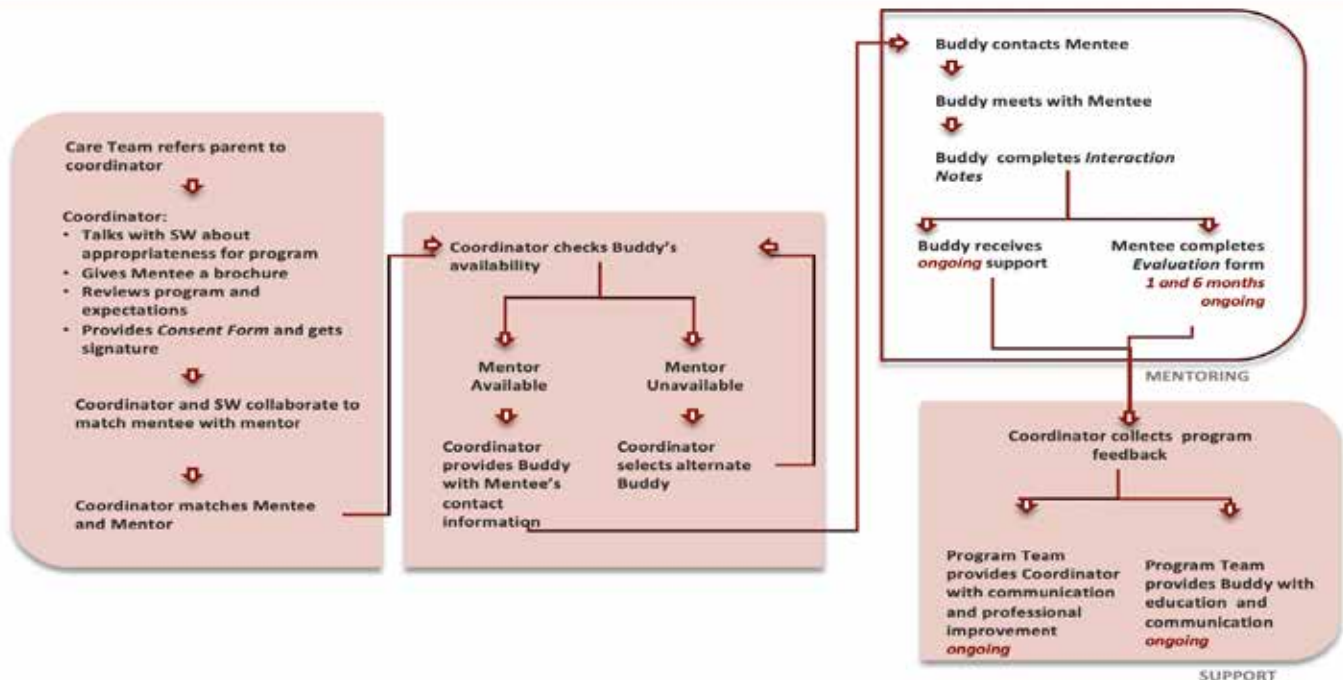
Risks/Mitigation:

Project Timeline/High-level Implementation Plan:

Goal/Target	Countermeasures/Tactics	Status
Validate need and support for program.	<ul style="list-style-type: none"> • Review the literature for evidence of benefit to the target population. • Engage the FAB in identifying the need and requirements of a program. • Evaluate other modalities for parent to parent support. • Identify and engage program champions. 	Complete
Institute planning process and make key decisions to drive program development.	<ul style="list-style-type: none"> • Identify essential team members and set meeting schedule. • Develop mechanisms for communicating with related departments, such as volunteers or risk management. • Develop vision and guiding principles in alignment with organization's mission. • Determine specific model of peer support desired. • Explore national programs and any affiliations. • Agree on timeline for implementation. 	In Progress
Secure support for the program and attain required resources.	<ul style="list-style-type: none"> • Integrate parent to parent with other patient and family centered initiatives, such as FAB and the parent hour. • Develop role descriptions, including all program personnel. • Document processes, ie matching protocol, based on best practices. • Identify methods of program evaluation and required data collection. • Create required forms. Review with Risk. 	In Progress
Implement program and collect data.	<ul style="list-style-type: none"> • Identify all program stakeholders. Meet with individuals: educate, make needed modifications and gain commitment from multi-disciplinary leadership and staff. • Develop the business case and line item budget and gain approval. • Create program materials and interdepartmental marketing campaign. 	In Progress
As program stabilizes and fundamental work is completed, begin further expansion of the program elements and size.	<ul style="list-style-type: none"> • Determine number of veteran parents/mentors desired. • Recruit and identify first cohort offering to diversity. • Develop and provide training. • Provide ongoing support and education for mentors. 	In Progress

Follow up:

NICU Parent Buddy Program Process Flow



- e. Appropriate developmental care programs developed by rehabilitation therapists to start from the first week of life in the NICU, and staff are trained to perform and

The Parent Buddy Program will match and partner you with a parent of a NICU baby who faces similar challenges. As a participant in the program, you agree to release the following information to your buddy.

Name _____
 Address _____
 Gender _____ Baby's gestation and challenges _____

How would you like to be contacted by your buddy?
 Home phone _____ cell phone _____
 email address _____

Your signature below confirms your understanding that your buddy will need to discuss any serious safety and welfare concerns about you with your health care team.

Signature _____ Date _____

Mentee:
 Contact Date: _____ Contacted By: phone _____ email _____ in-person _____ Length of Contact: _____
 Information _____
 Support/encouragement _____
 Check in on peer _____
 Navigation _____
 Other _____

Agreements, Follow up and Next Steps _____

Requested follow-up [Please send email to team member and note here] _____

Additional Concerns and/or Comments _____

Buddy _____ Date _____

We need your help to make sure the NICU Parent Buddy Program meets your needs. Please respond to the following statements and provide comments to help us improve your experience.
 For each statement, circle the number that best represents your experience. Thank you!

	Strongly Disagree	Disagree	Neither Agree or Disagree	Agree	Strongly Agree
1. My Buddy provided me with emotional support and helped me feel connected. Comments _____					
2. My Buddy was a good match for me. Comments _____					
3. Having a buddy helped decrease my stress and/or anxiety. Comments _____					
4. My Buddy has helped me feel more empowered and active in my baby's care. Comments _____					
5. I am satisfied with the NICU Parent Buddy program in general. Comments _____					
6. I would recommend the NICU Parents Buddy program to another parent. Comments _____					

Additional comments and suggestions _____

Optional Name _____ Date _____

assist families

- f. Bedside binders for parents to track their infant's progress and significant milestones and disseminate important resource information.
 - g. Post-discharge follow-up phone call program
4. Parent buddy program: Parents are connected to compatible veteran parents to support the families during NICU stay and after discharge. In El Camino Health, we collected separate NICU-specific Press Ganey scores and solicited families to complete the survey after discharge. Nurses making follow-up phone calls reminded the families about the survey. We used the survey results and targeted better scores as an

incentive to win the administrator's support. The hospital patient experience and leadership team assisted the program by recruiting a parent buddy expert as a consultant and a trauma therapist from Maternal Outreach Mood Services (MOMS) to start this program. A parent buddy team with veteran parents, nursing staff, rehabilitation therapists, NICU nursing manager, physicians, and a maternal social worker was formed in September 2018. The team met monthly to discuss and develop goals, training, matching process, and program evaluation. Relevant documents such as mentee consent, mentor medical release form, mentor/mentee evaluation forms, and mentor education materials for online and in-person training were created over the next six months. We recruited a NICU nurse educator as a program coordinator. Due to time restraints, we did 2 hours of online training and 2 hours of in-person training for mentors. Six veteran parents on our family advisory board volunteered to become initial mentors and trained in March 2019. Following that, a second set of parents were trained three months later. The first mentor-mentee pair was matched in April 2019. Mentor training continued virtually during the pandemic, and we currently have 18 NICU veteran parents in the program. In supporting mentors, the FAB suggested starting a unit-specific Slack community. This now supports the parent buddy program and all other families in the NICU. We recruit new mentors during our annual NICU reunion program a couple of years after NICU discharge. Parents who benefited from the parent buddy program are willing to return the favor to other families, and we have several veteran parent volunteers to train annually. Plans are in progress to return to in-person training in 2023. As of today, we have 47 NICU parents supported by this program.

Evaluation comments from the mentees,

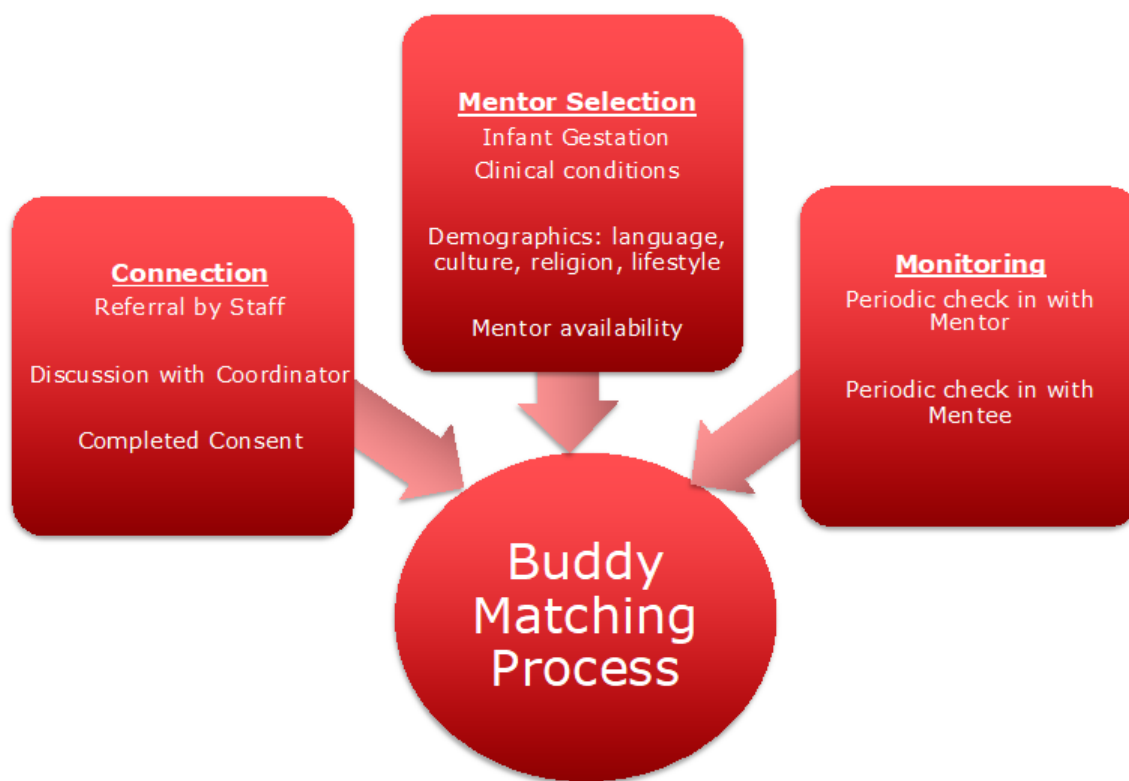
"I think this **needs to be structured as a friendship** as opposed to a Mentor/Mentee format. This is not an equal experience; therefore, you can never truly be "the Mentor" you are a friend who had your experience and may be able to relate and be empathetic at a few or many levels."

"Parenting in the NICU can be such a challenging and stressful experience for parents. Connecting through the El Camino Parent Buddy Program **gives experienced NICU parents a way to help others feel supported and understood during an emotional time** with the goal of helping them feel supported and empowered in the ways they need the most".

"At a time when everything feels crazy and out of our control, it's nice to know that something as simple as a **basic human connection can have a positive effect.**"

"Strongly recommend to NICU parents to provide moral support to mentees."

"Individual and group parental support, education, and resources will help the families confidently participate in the daily infant's care. These activities are therapeutic to the parents and improve the infant's clinical and neuro-developmental outcomes."



It is estimated that each year 10% of newborn infants require NICU admission due to being born sick and/or premature. Neonatal hospitalization can have a profound and pervasive negative impact on parents due to being separated from their infants and the unfamiliar and technological nature of the unit. As discussed above, every NICU can implement effective interventions when the infant is admitted to the NICU. In premature birth, interventions can be initiated at the time of the initial meeting during prenatal consultation. As maternal and neonatal health professionals, we are responsible for developing appropriate programs to support families in every NICU. Individual and group parental support, education, and resources will help the families confidently participate in the daily infant's care. These activities are therapeutic to the parents and improve the infant's clinical and neuro-developmental outcomes.

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NT



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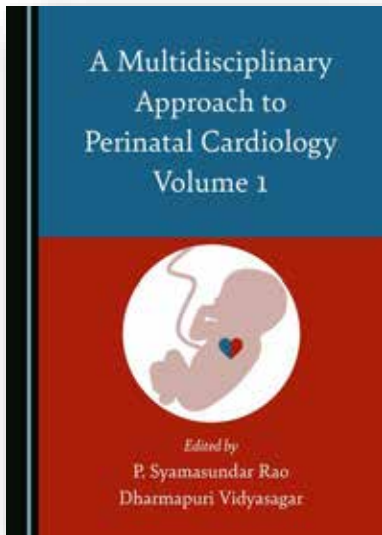
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A Multidisciplinary Approach to Perinatal Cardiology Volume 1

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

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Online L&D Staff Education Program

Caring for Pregnant Patients & Their Families: Providing Psychosocial Support During Pregnancy, Labor and Delivery

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Continuing education credits provided by



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 PPRM 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 PPRM 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 PPRM 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

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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 Provisership 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)™*. 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.

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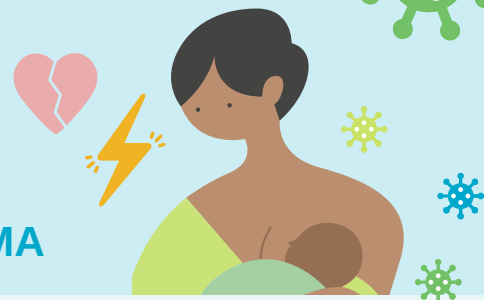
SHARED DECISION-MAKING PROTECTS MOTHERS + INFANTS

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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newly
validated

Caring for Babies and their Families: Providing Psychosocial Support to NICU Parents

7- Module Online Course in NICU Staff Education



National Perinatal Association PERINATAL SUBSTANCE USE

nationalperinatal.org/position
www.nationalperinatal.org/Substance_Use



Educate. Advocate. Integrate.



Readers can also follow

NEONATOLOGY TODAY

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@NEOTODAY

The National Urea Cycle Disorders Foundation



The NUCDF is a non-profit organization dedicated to the identification, treatment and cure of urea cycle disorders. NUCDF is a nationally-recognized resource of information and education for families and healthcare professionals.

www.nucdf.org | Phone: (626) 578-0833

Will Hepatitis C Testing for High-Risk Infants be Expanded?

Michelle Winokur, DrPH

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 directors. 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.



“The youngest and most vulnerable victims of America’s expanding hepatitis C epidemic are newborn babies. Nevertheless, many of those exposed to the virus are not getting tested.”

The youngest and most vulnerable victims of America’s expanding hepatitis C epidemic are newborn babies. Nevertheless, many of those exposed to the virus are not getting tested.

That could soon change, though, if new [federal recommendations](#) are approved. (1)

New Testing Recommendations

The Centers for Disease Control and Prevention has recommended:

- All babies born to pregnant women with confirmed or probable hepatitis C should receive testing.
- Infants whose test detects the virus should be referred to healthcare providers with expertise in pediatric hepatitis C management.

“Hepatitis C virus infections quadrupled over the past decade nationally. Moreover, the latest data show that among infants born to HCV-infected mothers, 7% develop this infection through contact with the mother’s blood during pregnancy or childbirth.”

Hepatitis C virus infections quadrupled over the past decade nationally. Moreover, the latest data show that among infants born to HCV-infected mothers, 7% develop this infection through contact with the mother’s blood during pregnancy or childbirth.

Despite its prevalence, hepatitis C is notoriously underdiagnosed because it can attack the liver for years without the patient showing any symptoms. An estimated 40% of people currently infected do not realize they have it.

Standardized testing for all infants exposed perinatally would help improve diagnosis, linkage to care, and treatment. A highly effective anti-viral therapy is approved for children as young as three.

“Standardized testing for all infants exposed perinatally would help improve diagnosis, linkage to care, and treatment. A highly effective anti-viral therapy is approved for children as young as three.”

The new recommendations would also help close the disparity that sees some high-risk children evaluated and treated while others do not.

A Health Care Paradox

Hepatitis C has been called a paradox of U.S. health care. The

medical community has never been better equipped to diagnose, treat and prevent this disease, yet infections continue to surge.

Sharing unsterilized needles is a significant cause of hepatitis C infection; the ongoing opioid epidemic fuels its spread. Hepatitis C causes liver inflammation, leading to long-term health problems, including cancer and cirrhosis of the liver. It also kills more Americans than all other infectious diseases, COVID-19 exempted.

“The CDC’s infant recommendations come after the agency’s 2020 release of universal screening guidelines for all adults, including pregnant women. Both initiatives are part of a comprehensive national effort to eradicate hepatitis C.”

The CDC’s infant recommendations come after the agency’s 2020 release of universal screening guidelines for all adults, including pregnant women. Both initiatives are part of a comprehensive national effort to eradicate hepatitis C.

Reaching that goal is an uphill battle. The latest recommendations are vital for that fight and deserve broad support.

References:

1. <https://public-inspection.federalregister.gov/2022-25421.pdf>

Michelle Winokur, DrPH, is the Executive Director of the Institute for Patient Access. This article was also published at healthpolicytoday.org.

NT

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National Perinatal Association PERINATAL MENTAL HEALTH

nationalperinatal.org/position
www.nationalperinatal.org/mental_health



Educate. Advocate. Integrate.

SHARED DECISION-MAKING

PROTECTS PARENTS + BABIES

COVID-19 

INFORMED PROVIDERS

Seek participation
Help explore options
Assess preferences
Reach a decision
Evaluate the decision

CARE DELIVERY REQUIRES
PARTNERSHIP



nationalperinatal.org/NPAandNANN

99nicu

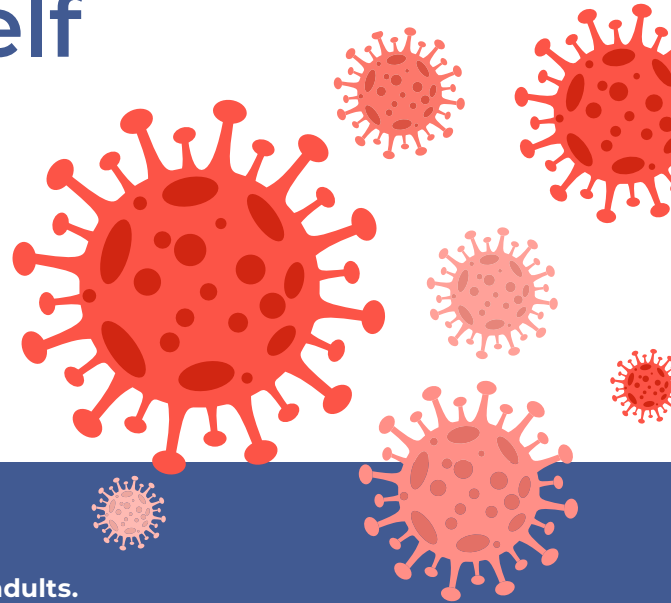
Sign up for free membership at 99nicu, the Internet community for professionals in neonatal medicine. Discussion Forums, Image Library, Virtual NICU, and more...”

www.99nicu.org

Immunizing Yourself Against COVID-19

COVID-19 vaccines have been shown to:

- ✓ Lessen the severity of symptoms¹
- ✓ Reduce disease transmission³
- ✓ Reduce risk of mortality²
- ✓ Make communities healthier and safer⁴



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.



PROTEIN SUBUNIT VACCINES

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



VECTOR VACCINES

Used for decades against chickenpox, malaria and tuberculosis.

HOW THEY WORK:

Instruct cells to make COVID-like proteins that trigger the immune system to fight the virus.

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

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 participants⁶



Proven safe and effective

for adults as well as children⁷



Vetted and approved by the US FDA and EMA and endorsed by the WHO⁸⁻¹⁰

Get Your Job

Vaccines are available at your:



Doctor's office



Neighborhood pharmacy



Community health center

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>
6. <https://doh.wa.gov/emergencies/covid-19/vaccine-information/safety-and-effectiveness>

7. <https://doh.wa.gov/emergencies/covid-19/vaccine-information/safety-and-effectiveness>
8. <https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines>
9. <https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-2019-treatments-vaccines/vaccines-covid-19/covid-19-vaccines-authorized>
10. http://www.bccdc.ca/Health-Info-Site/Documents/COVID-19_vaccine/WHO-EUA-qualified-covid-vaccines.pdf



Save the Date!

May 25, 2023

26th Annual Conference
Quality of Life for Families XXVI

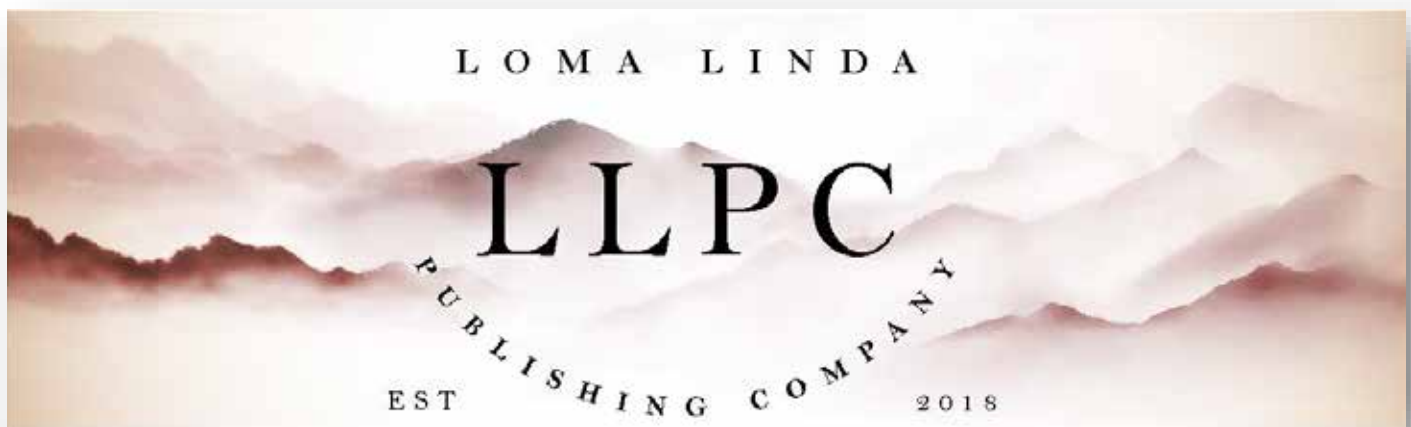


Keynote Speaker: **Dr. Diana Ramos**
California Surgeon General

Where: [Hilton Los Angeles North/Glendale](#)
[100 West Glenoaks Blvd,](#)
[Glendale, CA 91202](#)



You can attend In-Person or Hybrid



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Subscribe Electronically
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www.CongenitalCardiologyToday.com

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



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: Happy New Year from the 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 how you can support our mission of helping children worldwide. Do you have internships or additional engagement opportunities?"

It may be six more weeks of winter, but the International Children's Advisory Network, Inc. (iCAN), is springing into action with many exciting opportunities to participate in! If you are new to iCAN, please visit our website at www.iCAN.health to learn more about how to get involved and how you can support our mission of helping children worldwide. 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 to our vast network. Please contact iCAN at abbyclark@icanresearch.org for more information. Join the iCAN Parent Council!

"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!"




Help Support a Child \$1,000

Help Our Youth Share Their Story

The International Children's Advisory Network, Inc., (iCAN) is a worldwide network of children's advisory groups, known as Kids Impacting Disease Through Science (KiDS) and Young Persons Advisory Groups (YPAGS). These dedicated youth member groups work in unison around the world to provide a voice for children and families in medicine, research, and innovation. Every year iCAN hosts a summit that brings these groups together in shared experience and camaraderie. iCAN is a tax exempt organization as described in Section 501 (c)3 of the Internal Revenue Code.

We want as many children to come to the summit as possible. However, attending the Summit is not always possible for our families who often experience financial hardships. So iCAN pays for lodging, most food, and a transportation stipend in addition to summit activities. As more youth join iCAN, we need your help more than ever! Your tax-deductible donation of \$1,000 will help bring a child to the Summit, to make it possible for that child to share their voice, and to interact with medical professionals and other kids like them. We will acknowledge you as an individual donor or you may dedicate the donation in honor of a loved one, as you wish.



www.icanresearch.org #iCANMakeADifference 

iCAN's Parent Council is recruiting members. 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>

Join iCAN's Young Adult Professionals Program!

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

Apply Here: <https://www.icanresearch.org/councils-committees>. iCAN's 2023 Annual Research and Advocacy Conference will be on July 10 - 14 in San Diego, California! We will partner with our sister organization, the International Society for Pediatric Innovation (ISPI).

Registration Opens on March 1!

This annual event allows our members to learn from one another's unique experiences as kids who live with chronic and/or rare conditions and network with leading healthcare profession-



als. 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” (see above flier) or sponsoring iCAN!

Learn More:

<https://www.icanresearch.org/summit>

“iCAN’s 2023 Annual Research and Advocacy Conference will be on July 10 - 14 in San Diego, California! We will partner with our sister organization, the International Society for Pediatric Innovation (iSPI).”

Do not miss iCAN’s next session of Ask the Experts! Mark your calendar for February 18, 2023, at 10:00 a.m. EST. The topic is AR/VR in Healthcare. All are welcome to attend, and kids of all ages are invited to join. We welcome all doctors, researchers, and community leaders to join us. Sign up for this session; you will not 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:

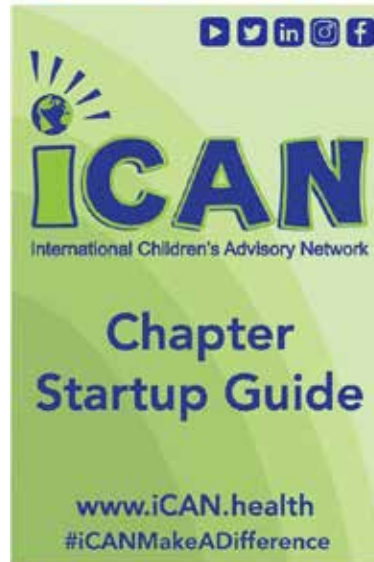
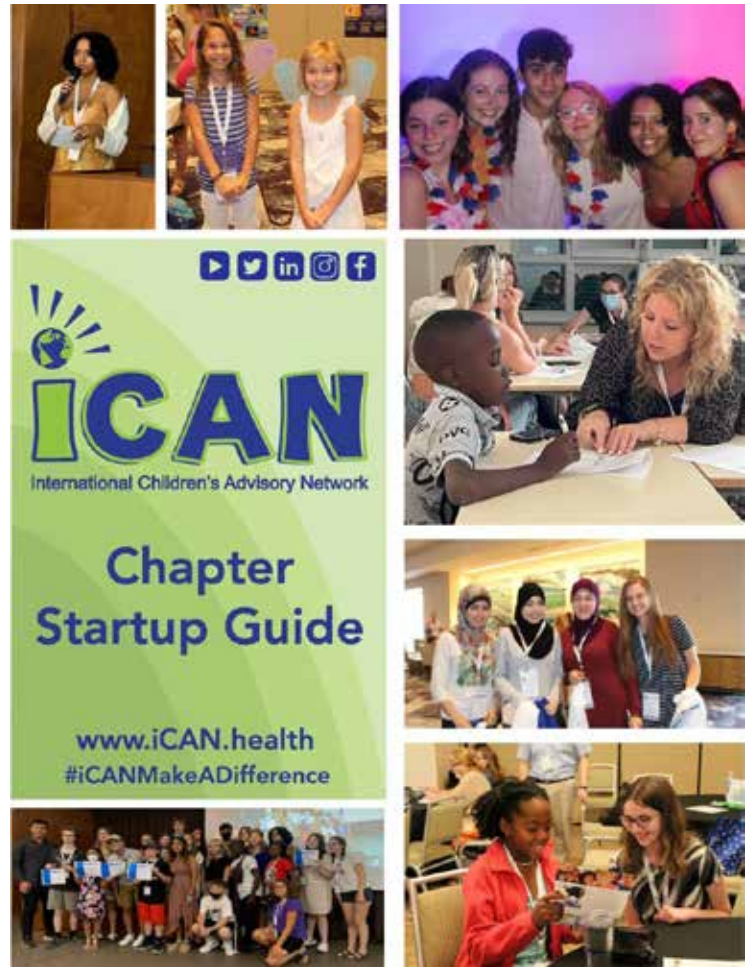
www.icanresearch.org/events.

If you would like to create a project or initiate a new chapter, please contact 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.

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2023 iCAN SUMMIT

to be held July 10-14th in Southern California



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



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.



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**E EK 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.



National Association of Neonatal Nurses

nann.org



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



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



PROTECT YOUR FAMILY FROM RESPIRATORY VIRUSES

flu coronavirus

pertussis RSV



WASH YOUR HANDS often with soap and warm water.

SOAP

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.

www.nationalperinatal.org

National Perinatal Association

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



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

Survey Says: RSV

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

- Hospitalization
- Lifelong health complications
- Death

for infants and young children



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

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



But Parents are Unprepared.

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



RSV EDUCATION & AWARENESS CAN HELP

After parents learned more about RSV, they were:

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



NCJIH National Coalition for Infant Health

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

PREEMIE BOOK ON SALE

ONCE UPON A PREEMIE

BY JENNÉ JOHNS
AUTHOR | SPEAKER | ADVOCATE



OU
AP

“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

Premie Family



wgts 91.9
Washington, D.C.

HEALTH & WELLNESS GUIDE
heart&soul

TARAJI P. HENSON
A GLIMPSE INTO TARAJI P. HENSON'S HEART & SOUL

HOLIDAY PARTIES MADE SIMPLE

THE ONCE UPON A PREEMIE STORY



PEBBLES of Hope
Using the world's smallest babies to lighten lives

MAJIC
102.3 92.7
The Real Sound of the DMV

WDAS
105.3 FM

CBS RADIO

AVAILABLE FOR \$12.99 ON AMAZON OR ONCEUPONAPREEMIE.COM

Still a Premie?

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

But that's not every preemie's story.

Born between 34 and 36 weeks' gestation?

STILL A PREMIE

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



Jaundice



Feeding issues



Respiratory problems

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



Born preterm at a "normal" weight?

STILL A PREMIE

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

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

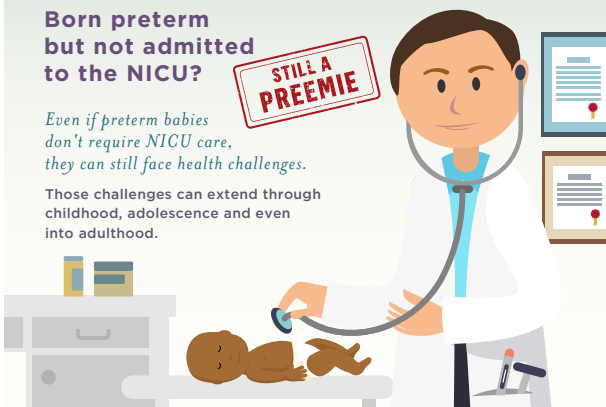


Born preterm but not admitted to the NICU?

STILL A PREMIE

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

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



Some Premies



Will spend weeks in the hospital



Will have lifelong health problems



Are disadvantaged from birth

All Premies



Face health risks



Deserve appropriate health coverage



Need access to proper health care

NCJFH 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



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.



Eunice Kennedy Shriver National Institute
of Child Health and Human Development



Medical News, Products & Information

Compiled and Reviewed by Saba Saleem, BS, OMS 4

1st RSV vaccine could be approved this summer

NEWS PROVIDED BY

[ABC News](#)

By Haley Yamada

February 21, 2023

After decades of research, a first-of-its kind vaccine designed to [protect newborns](#) against [RSV, or respiratory syncytial virus](#), could be approved by August.

Pfizer, the maker of the vaccine, [announced Tuesday](#) that the U.S. Food and Drug Administration has accepted its application for review and will make a decision on whether or not to approve the vaccine by August 2023.

"If approved, RSVpreF would help protect infants at their first breath from the devastating effects of this infectious disease, which though well-known, has been particularly evident throughout this RSV season," Annaliesa Anderson, Ph.D., Pfizer's senior vice president and chief scientific officer of vaccine research and development, [said in a statement](#). "We look forward to progressing the review of Pfizer's RSV maternal vaccine candidate with the FDA and other regulatory authorities, given its significant potential to positively contribute to global health in the prevention of RSV in infants."

Pfizer's protein-based RSV vaccine works by vaccinating a pregnant person, who then passes on some protective antibodies to the infant.

The company has also said the vaccine has shown promising data in adults 65 and older.

RSV usually causes mild, cold-like symptoms, but can become serious, especially for infants and older adults. Premature infants and young children with weakened immune systems, congenital heart or chronic lung disease, and adults with chronic health conditions like heart or lung disease are among the most vulnerable to complications from RSV, according to the [Centers for Disease Control and Prevention](#).

Infants who are 12 weeks of age or younger at the start of RSV season are also at greater risk for serious illness.

The virus is the most common cause of bronchiolitis and pneumo-



nia in kids under the age of 1 in the U.S., [according to the CDC](#).

According to data collected from preliminary studies, Pfizer's vaccine was 82% effective at protecting newborns, within the first three months of life, from severe RSV illness. Within six months of an infants' life, the vaccine effectiveness dropped to 69%, according to Pfizer.

The company announced in November that given promising preliminary data on their maternal RSV vaccine for newborns, the FDA granted a green light to stop enrolling new patients in the vaccine's studies.

"Among very young children, particularly those [younger] than 6 months of age, we have a high probability now of protecting against serious illness and hospitalization," Pfizer's Dr. William Gruber, who has been personally working on the RSV vaccine for over 40 years, told ABC News in November. "To be able to be in a position where we have the potential to provide 80% or more protection against serious disease is a dream fulfilled."

Currently, there is no approved RSV vaccine.

Pfizer's vaccine would be the first RSV vaccine given to pregnant people to protect infants. The company said that there were "no safety concerns" for vaccinated pregnant participants and their newborns during the trial.

If the FDA approves the vaccine in August, it will then go to the CDC for final approval.

The FDA is also currently reviewing nirsevimab, a drug that is not a vaccine but a monoclonal antibody designed to protect infants from RSV complications. The medication, developed by Sanofi and AstraZeneca, is administered to infants as a one-time injection after birth.

Nirsevimab is already approved in Europe and the United Kingdom, according to Sanofi, and was [accepted for FDA review in January](#).

The U.S. Food and Drug Administration (FDA) Center for Drug Evaluation and Research (CDER) has accepted the Biologics License Application (BLA) for nirsevimab for the prevention of respiratory syncytial virus (RSV) lower respiratory tract disease in newborns and infants entering or during their first RSV season and for children up to 24 months of age who remain vulnerable to severe RSV disease through their second RSV season.

The National Urea Cycle Disorders Foundation



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Nirsevimab is being developed jointly by Sanofi and AstraZeneca and, if approved, would be the first protective option for the broad infant population, including those born healthy, at term or preterm, or with specific health conditions. The FDA has indicated they will work to expedite their review. The Prescription Drug User Fee Act date, the FDA target action date for their decision, is in the third quarter of 2023.

The news comes as pediatric hospitals across the country have experienced a [rise in the number of patients admitted with RSV](#). Infections due to RSV spiked by 69% last fall and appeared earlier than usual, [according to the CDC](#).

Late last year, pediatric bed occupancy in the U.S., hit its highest in two years, with 75% of the estimated 40,000 beds filled, according to an [ABC News analysis](#).

Infants and toddlers can usually recover at home with RSV unless they start to have difficulty breathing, increased irritability, are not eating or drinking, or appear more tired than usual, in which case parents should contact their pediatrician and/or take their child to the emergency room.

At-home care for kids with RSV can include Tylenol and Motrin for fevers, as well as making sure the child is hydrated and eating.

Doctors tell ABC News that parents can help protect their kids from RSV by continuing to follow as much as possible the three Ws of the coronavirus pandemic: Wear a mask, wash your hands and watch your distance.

Infants who are either born prematurely (less than 35 weeks) or born with chronic lung disease may benefit from a medication to prevent complications of RSV since they are at increased risk of severe disease. Parents should discuss this with their pediatrician.

SOURCE ABC NEWS

NT

COVID Poses Severe Risks during Pregnancy, Especially in Unvaccinated People

Pregnant people infected with SARS-CoV-2 are more likely to be admitted to an intensive care unit or die than those who are uninfected, but vaccination significant-

ly reduces the risk

NEWS PROVIDED BY

[Scientific American](#)

By Tanya Lewis

February 22, 2023

Millions of people have been pregnant and given birth during the pandemic. When the COVID-causing virus SARS-CoV-2 first emerged, it wasn't clear what additional risks—if any—it posed to pregnant people and their babies.

But accumulating evidence now shows that having COVID during pregnancy increases the likelihood of severe outcomes and death in the parent, as well as the possibility of fetal complications. A large meta-analysis published in *BMJ* in January found that [pregnant women infected with the virus](#) have a significantly higher risk of complications, including pneumonia, intensive care unit admission, mechanical ventilation and death, compared with uninfected pregnant women. And babies born to infected women were more likely to be admitted to a neonatal intensive care unit (NICU), to be born preterm or to have a low birth weight.

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“There are two reasons you can be really sick in pregnancy” with a COVID infection, says Emily Smith, an assistant professor of global health at the George Washington University Milken Institute School of Public Health and lead author of the meta-analysis. “One [is] from COVID itself—pneumonia and other things that any person [could] have from COVID. And...it may cause or exacerbate existing maternal morbidities—things that any pregnant person could have.”

Fortunately, vaccination mitigates many of these risks. A study published in the February 11 issue of the *Lancet* found that vaccinated pregnant women were at lower risk of severe COVID, ICU admission and death than unvaccinated pregnant women. And if they received a booster shot, the risk was even lower.

“Because pregnant women are generally young and fit and healthy, they don’t consider themselves to be at a high risk,” says the *Lancet* study’s senior author Aris Papageorghiou, a professor of fetal medicine and director of research at the Oxford Maternal & Perinatal Health Institute. “But the truth of the matter is that when you are pregnant, you are at higher risk from COVID infection.”

It is well established that flu and other infections are more dangerous during pregnancy. There are possible reasons for this. One hypothesis is that pregnant people experience immunological changes that prevent their body from rejecting the fetus—much like it might reject a transplanted organ, Papageorghiou says. Another reason, he adds, could be that the growing uterus puts pressure on the lungs, making it harder to breathe. Additionally, some pregnant people may be undertreated for an infection because doctors are nervous about drugs’ effects on the fetus, Smith says.

Early in the pandemic, Smith and her colleagues sought to quantify the risks COVID posed to pregnant people and their babies. The researchers started collecting data in April 2020, and their analysis ultimately drew on 12 studies that involved a total of

more than 13,000 pregnant women. These studies were conducted between February 2020 and July 2021 and spanned 12 countries: Ghana, China, Italy, Kenya, Nigeria, South Africa, Spain, Sweden, the Democratic Republic of the Congo, Turkey, Uganda and the U.S. In most of the studies, COVID was diagnosed with a PCR test. Importantly, it was likely that virtually none of the women in the study were vaccinated, as most of the data were collected before vaccines were widely available or in places with low uptake, Smith notes.

The results showed that, on average, pregnant women with COVID had a greater than sevenfold risk of death, compared with pregnant women who did not have it. Only three of the 12 studies recorded deaths, however. And while the study found that the absolute risk of pregnant women dying from COVID was relatively high—seven deaths per 100,000 pregnant people diagnosed with the disease—it’s important to note that some of the countries where the studies were conducted have much poorer maternal health care than the U.S. (meaning that this death rate is not representative of all women, especially in wealthy countries such as the U.S.). Nevertheless, the risk was still found to be significantly increased.

Pregnant women with COVID were also 23 times more likely to develop pneumonia, 15 times more likely to need to be put on a ventilator, more than five times more likely to have blood clots and nearly four times more likely to be admitted to an ICU while pregnant.

Furthermore, babies whose mothers had COVID were nearly twice as likely to be admitted to a NICU, 1.7 times as likely to be born preterm and slightly more likely to have a low birth weight. The researchers did not find an association between COVID infection in the mother and stillbirth.

“The big takeaway for me is that these are serious consequences for mom and for baby, and these are big risks,” Smith says. “On the other hand, don’t panic. But it is a reason to take some precautions to protect yourself.”

The findings add to those of a previous study that was published in 2021 in *JAMA Pediatrics* by Papageorghiou and his colleagues. It, too, found that pregnant women and their babies were at an increased risk of severe complications and death from COVID.

Yet there is now increasing evidence that vaccination protects pregnant people from the worst COVID outcomes.

In their *Lancet* study earlier this year, Papageorghiou and his team analyzed about 4,600 pregnant women during the period when the first Omicron variant of SARS-CoV-2 was circulating (late November 2021 through June 2022). The researchers found that COVID vaccination with the primary series alone was 48 percent effective at protecting against severe disease in all pregnant women, and vaccination followed by at least one booster was 76 percent effective. For pregnant women who actually got COVID, vaccination with the primary series was 74 percent effective against severe disease, and with the booster, it was 91 percent effective.

“Almost all the adverse effects were in women who had not been vaccinated. Vaccines still provided a very powerful reduction in maternal morbidity,” Papageorghiou says. “Women with boosters had more protection than women who hadn’t had a booster. And women who had a vaccine within the last 10 months were much less likely to have [severe] symptoms.”

Asma Khalil, a professor of obstetrics and maternal-fetal medicine at St. George’s Hospital at the University of London, and her colleagues have also found that in pregnant people, the vaccine was nearly 90 percent effective at preventing SARS-CoV-2 infection a week after the second dose—though protection likely declines over time. Those vaccinated also had a 15 percent lower risk of stillbirth. (Vaccination was not associated with significantly lower risk of miscarriage or fetal abnormalities, however.) “We have reassuring data from a large number of pregnant individuals that the vaccine is effective and safe,” Khalil says, and that “the vaccine is protective of

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the mother and the baby.”

Other studies have found that the antiviral medication [Paxlovid can be safely given to pregnant people](#) at high risk of developing severe COVID (for reasons unrelated to the pregnancy).

When the COVID vaccines first became available, a number of [those who were pregnant felt hesitant about](#) getting the shots because the vaccines’ clinical trials did not explicitly recruit pregnant people. Yet some of the people in the trials did become pregnant, and there was no evidence of adverse effects from vaccination, Papageorghiou says. “When we look at those [data], there were no excess miscarriages, there were no differences in fertility rates,” he says, adding that the U.S. vaccine surveillance system—which tracks adverse events from vaccination—has reported no congenital problems or problems with fetal growth.

Given the measurably greater risks pregnant people face from COVID infection and the safety and efficacy of vaccination, the main challenge may be persuading more pregnant people to get vaccinated. Health care providers such as midwives and ob-gyns have a role in educating their patients. “All we can do is just inform women with the best information,” Papageorghiou says. “Give them the facts.”

SOURCE SCIENTIFIC AMERICAN

NT

In Babies, a Fifth Vital Sign?

NEWS PROVIDED BY

[University of Texas at Austin, Dell Medical](#)

School

February 6, 2023

Researchers studying preterm infants are discovering something huge: Not only can movement predict short-term emergencies, but it also has meaningful implications for long-term health.

At birth, assessing vital signs helps determine complications among the body’s most basic functions.

Humans are in motion long before we’re born: In utero, fetal movements promote the healthy development of vital organs, the nervous system and more.

And when babies are born, studying their movement patterns presents a critical opportunity. Certain patterns can predict when preterm infants — those born before 37 weeks of gestation — will experience one of several common, yet dangerous, events like pauses in breathing (apnea) or a slowed heart rate (bradycardia). Beyond a stay in the neonatal intensive care unit, these events can indicate babies’ long-term neurological health well into adulthood, so the ability to predict — and, ultimately, prevent — them could fundamentally change neonatal care delivery.

These findings and more are all part of a large-scale data collection and analysis effort led by [David Paydarfar](#), M.D., chair of Dell Med’s [Department of Neurology](#), and Ally Richardson, a graduate student at the [Oden Institute for Computational Engineering and Sciences](#). Funded by a grant from the National Science Foundation, their team and collaborators at Dell Children’s Medical Center of Central Texas are monitoring the vital statistics of babies in the NICU, aiming to understand — and, eventually, reduce — the complexity of care for these vulnerable patients.

“We’re trying to make the case that movement is a vital sign, just like blood pressure, pulse, respiration or temperature,” Paydarfar says. “We know that preterm infants are at risk of many neurological complications later in life, like cerebral palsy, autism spectrum disorder or learning disabilities, and tracking on some of these early events can help us better understand the relationship to those later outcomes more clearly.”

From Measurement to Intervention

The team is using data already collected in the NICU to study more than 100 babies’ statistics. Rather than rely on video monitors or accelerometers, which are sensitive to failure or get in the way of basic care, the team developed an algorithm to accurately track movement patterns via blood-oxygen saturation levels, which are already collected as part of routine care.

The results can be, at times, counterintuitive.

“If I get up and I start running, I breathe more,” Paydarfar says. “Well, in preterm infants who have very immature movement patterns, they are more likely to do the opposite. They stop breathing — their heart rate goes down. So we see a direct, paradoxical effect in these bursts of movement, and we can actually use movement to predict when the next apnea is going to be.”

The team uses machine-learning algorithms to predict the adverse events, which could one day lead to tools like a smart mattress that gently vibrates an infant when it detects that an apnea may occur, or monitors that signal to hospital staff when a baby is about to experience bradycardia.

Producing effective clinical tools from the raw biological data, though, means taking a brand-new computational approach.

“In these high-stakes decision-making situations, clinicians need to be able to verify why the machine-learning model is classifying an apnea or other event, and most black-box algorithms don’t do that,” Richardson says. “Something I’m really passionate about is creating an algorithm and a tool that openly gives doctors all the information needed to verify so that they can trust the data and make good decisions in those moments.”

The ‘Holy Grail’ of Predictions

For [John Loyd](#), M.D., associate professor in Dell Med’s [Department of Pediatrics](#) and chief of the Division of Neonatology at Dell Children’s Medical Center, the opportunities for the modeling effort to impact care are stark, and go beyond





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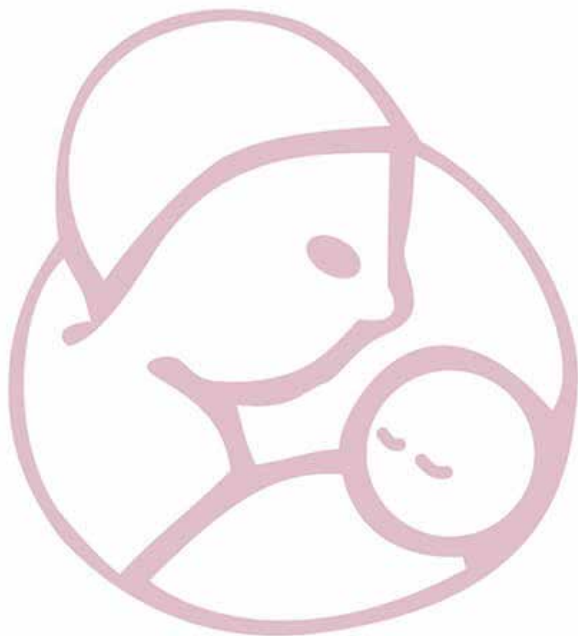
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responding to life-threatening events.

“The holy grail of this would be a clear indicator that something bad is about to happen with a baby, which we could then respond to before it happens,” Loyd says. “But the second thing is also to be able to more clearly identify those who are safe for discharge. With movement, we may be able to more clearly identify infants that are developmentally ready for discharge.”

“A project like this shows us how a medical school can benefit our local community, as our system of care continues to get more sophisticated thanks to these kinds of research partnerships.”

The NSF-funded research grant entitled “Movement as a Vital Sign in Preterm Infants” has been conducted in collaboration with Dagmar Sternad, Ian Zuzarte and Leonora Blodgett at Northeastern University, and Premananda Indic at The University of Texas at Tyler.

SOURCE UT AUSTIN

NT

Science Update: Infants’ cries may predict later developmental problems, NIH-funded study suggests

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[NIH Newsroom](#)

February 10, 2023

Characteristics of the cries of preterm infants may help predict their risk for long-term developmental and behavioral problems, suggests a study funded by the National Institutes of Health. The findings may lead to tools to identify babies at highest risk for such issues, aiding early treatment or prevention efforts.

The study of 363 preterm infants was funded by NIH’s *Eunice Kennedy Shriver* National Institute of Child Health and Human Development and led by Barry M. Lester, Ph.D., of the Women & Infants Hospital of Rhode Island in Providence. The results are published in *JAMA Network Open*.

Background

Scientific advances have greatly increased the survival of infants born before 30 weeks of pregnancy. However, these very preterm babies remain at high risk for delays in developing motor, cognitive, and language skills, as well as behavioral problems. The ability to detect those at highest risk for developmental and behavioral disorders would help guide work to identify appropriate early interventions.

Abnormal newborn cries have been linked to severe medical conditions affecting the brain, raising the possibility that cry characteristics could serve as a measure of brain and nervous system health. However, most studies have examined a limited number of cry characteristics and have not assessed long-term health outcomes.

In the current study, researchers recorded the cries of preterm infants—born at an average of 27 weeks of pregnancy—during the week of their discharge from neonatal intensive care units at nine academic medical centers in the United States. They used artificial intelligence to analyze numerous acoustic features of the infants’ cries, from loudness and pitch to how sound is altered by constriction of the vocal tract. Around age two years, the study participants underwent testing to assess their developmental progress, and parents completed

questionnaires assessing their children’s behavior and risk for autism spectrum disorder.

Results

The researchers’ computational analysis linked the acoustic characteristics of newborn cries to language and cognitive deficits, behavior problems, and a positive autism screen at age two years. A positive screen may indicate a higher risk for later developmental problems.

Significance

The work raises the possibility that infant cry analysis could be developed into a bedside screening tool to identify children at high risk for certain developmental and behavioral disorders. If validated in a larger study with a more diverse infant population, the findings may help identify strategies to mitigate the negative impacts of such disorders.

Reference

Manigault AW *et al.* [Acoustic cry characteristics in preterm infants and developmental and behavioral outcomes at 2 years of age](#). *JAMA Network Open* DOI: 10.1001/jamanetworkopen.2022.54151 (2023)

SOURCE NIH

NT

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

Released: Thursday 12/13/2018 12:32

PM, updated Saturday 3/16/2019 08:38, Sunday 11/17/2019 and Friday 11/20/2020

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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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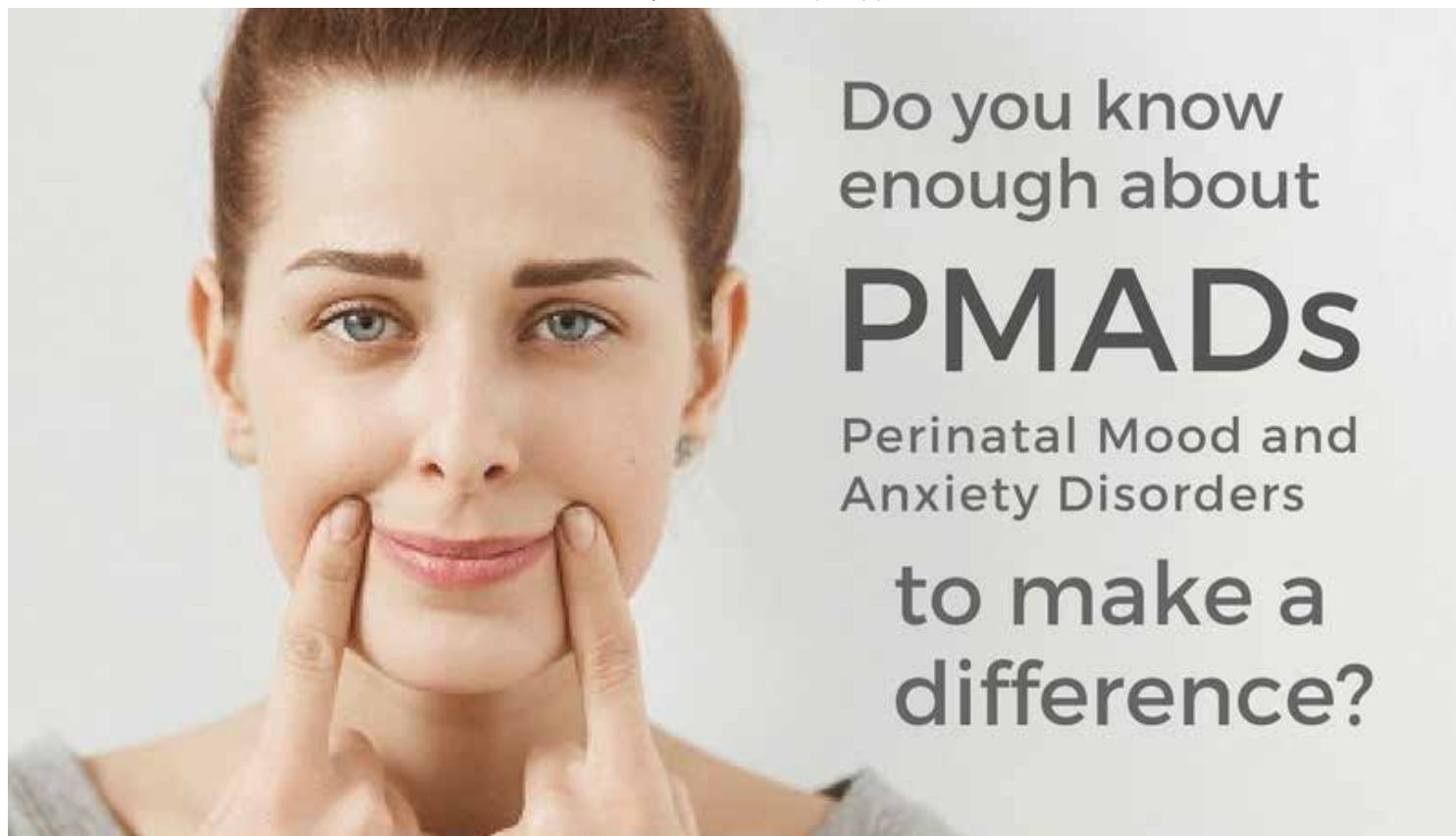
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Maternal Infection May Play Role in Child's Leukemia

— Genitourinary tract infections in particular associated with greater risk

NEWS PROVIDED BY

[MedPage Today](#)

By Elizabeth Short

February 20, 2023

Maternal genitourinary tract infections during pregnancy were linked to the development of leukemia in offspring, a Danish nationwide study found.

Children born to a mother who experienced any kind of infection during pregnancy had increased risk of childhood leukemia (HR 1.35, 95% CI 1.04-1.77), reported Jian-Rong He, DPhil, of Guangzhou Medical University in China, and coauthors.

No association was observed for respiratory tract, digestive, or other infections. However, maternal genital infections (HR 2.42, 95% CI 1.50-3.92) and urinary tract infections (HR 1.65, 95% CI 1.15-2.36) were each associated with leukemia among offspring, according to the study published in *JAMA Network Open*.

When comparing children exposed to maternal infections during pregnancy and unexposed children, the absolute risk differences for childhood leukemia per

100,000-person years were 1.8 cases for any infection, 3.4 cases with urinary tract infections, and 7.1 cases per 100,000-person years for genital tract infections.

"We found that urinary and genital tract infection during pregnancy was associated with a higher risk of childhood leukemia, but the associated absolute risk remained small given the rarity of childhood leukemia. Future epidemiologic studies in different regions and mechanistic research are needed to confirm our findings and investigate the underlying mechanisms," the authors wrote.

Leukemia is the most common childhood cancer and its etiology is poorly understood. Better knowledge of the possible causes of childhood leukemia could provide possible plans for prevention of the disease in the future.

"These findings suggest that immune-related factors during pregnancy may be involved in the development of childhood leukemia," He and colleagues wrote.

"Childhood leukemia may originate in utero, given that leukemia-related chromosome lesions have been observed at birth. Previous studies reported that cytokine levels at birth were different for healthy children compared with individuals who developed leukemia in childhood," they said.

For now, pregnant women around the world are already routinely treated with antibiotics for urinary tract infection and bacterial vaginosis in antenatal care.

The study pooled several Danish national registries and captured over 2.2 million children born from 1978 to 2022 (nearly half girls) for 27 million person-years of follow-up.

Children were followed for 12 years on average, during which 4,362 children were diagnosed with cancer before the age of 15. Of these, 1,307 had leukemia: 1,050 with acute myeloid leukemia (AML), 192 with acute lymphoid leukemia (ALL), and 92 with another type of leukemia.

Genitourinary tract infection was specifically associated with increased risks of both AML and ALL.

There was also a threefold increased risk for leukemia among children who had mothers with sexually transmitted infec-

tions during the course of their pregnancy (HR 3.13, 95% CI 1.73-5.67).

There were no observed associations between maternal infection during pregnancy and other kinds of childhood cancers, such as lymphoma or brain tumors.

A sibling analysis was also conducted to compare confounding factors with the main analysis. Overall, there was no significant evidence to indicate that shared traits among families impacted childhood leukemia rates.

Overall, 81,727 mothers (3.7%) had some type of infection during the course of their pregnancy: 1.7% experienced urinary tract infections, 0.7% experienced genital tract infections, 0.5% had a digestive system infection, and 0.3% had respiratory tract infections.

There were some differences between mothers who experienced infection and those who did not. Those who had any infection were more likely to be experiencing their first pregnancy, to give birth to preterm and smaller infants, to experience diabetes or to smoke during pregnancy, to have a higher BMI during pregnancy, and they were somewhat younger and had fewer years of education than their counterparts.

Limitations to the study include maternal infection data being based on hospital diagnoses, meaning cases outside hospital networks were not included. Treatment for more serious conditions related to pregnancy that ultimately led to the capture of an infection could have played a role in the associations observed as well.

Disclosures

The study was supported by grants from the China Scholarship Council-University of Oxford, the National Natural Science Foundation of China, the Danish Council for Independent Research, the Nordic Cancer Union, Novo Nordisk Fonden, and the Swedish Council for Working Life and Social Research.

He reported receiving a PhD scholarship from the China Scholarship Council.

Primary Source

JAMA Network Open

Source Reference: He JR, et al "Evaluation of maternal infection during pregnancy

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and childhood leukemia among offspring in Denmark” JAMA Netw Open 2023; DOI: 10.1001/jamanetworkopen.2023.0133.

SOURCE MEDPAGE TODAY

NT

A new era in the fight against measles and rubella

NEWS PROVIDED BY

[World Health Organization Newsroom](#)

February 22, 2023

The Measles Initiative was formed in 2001 to establish a global partnership to coordinate efforts to prevent child deaths and morbidity caused by the highly contagious measles virus. In 2012, the founding partners -- American Red Cross, U.S. Centers for Disease Control and Prevention, the United Nations Foundation, UNICEF and the World Health Organization (WHO) -- agreed to include rubella elimination under a new name, the Measles and Rubella Initiative (M&RI).

Huge strides have been made since then. The Initiative has helped deliver measles vaccines to children worldwide, contributing to saving over 56 million lives globally since its formation and invested more than US\$1.2 billion in measles and rubella control activities, in partnership with Gavi, the Vaccine Alliance, and the Bill & Melinda Gates Foundation (BMGF).

The impact of these investments is significant. From 2000 to 2021, the annual number of estimated measles deaths decreased 83 per cent, from 761 000 to 128 000. While much progress has been made,

the goal is to collaborate with countries and partners to achieve the Immunization Agenda 2030 (IA2030) target to save another 50 million lives through access to essential vaccines by the end of 2030, with measles immunization contributing a large percentage.

Towards that end, all founding partners adopted the [Measles and Rubella Strategic Framework 2030](#), which is fully aligned with IA2030, an ambitious global strategy to maximize the lifesaving impact of vaccines.

M&RI then began a consultative process to fully integrate the strategy, coordination and action with IA2030 strategy and partnership processes. As a result of that process, the newly revitalized M&RI partnership will now be called the IA2030 [Measles & Rubella Partnership](#) (M&RP). The transition began on 1 January 2023 and has now been formalized.

Building on years of previous work together, the membership of the IA2030 M&RP will include the original five founders and has expanded to include Gavi and BMGF as core partners.

The transition comes at a time when the world has seen the worst continued backsliding in global immunization coverage in 30 years, largely on account of the COVID-19 pandemic and related disruptions. It is opportune as we need to work more closely than ever before to address the nearly 40 per cent increase in the number of unvaccinated children globally.

IA2030 is in its early years, and we are among the first initiatives to transition to IA2030 management. We hope our success will serve as a precedent for other disease-specific initiatives in the coming years. This transition is a step forward to overcome current challenges and ensure all children, everywhere, are protected against measles, rubella, and other vaccine-preventable diseases.

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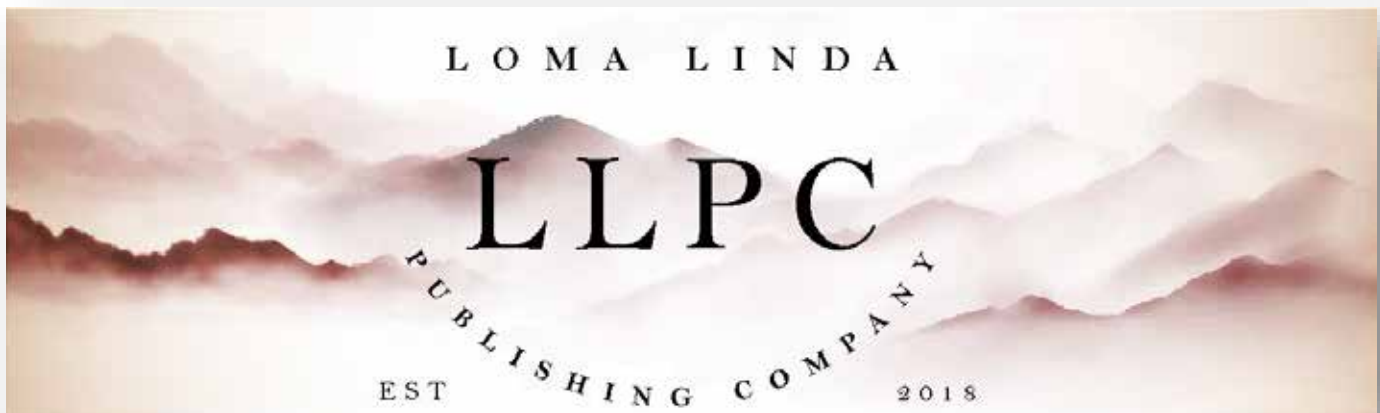
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Moms' and babies' medical data predicts prematurity complications, Stanford Medicine-led study shows

Stanford Medicine scientists and their colleagues have shown they can tap mothers' and babies' medical records to better predict newborn health risks.

NEWS PROVIDED BY

[Stanford Medicine News Center](#)

By Erin Digitale

February 15, 2023

By sifting through electronic health records of moms and babies using a machine-learning algorithm, scientists can predict how at-risk newborns will fare in their first two months of life. The new method allows physicians to classify, at or before birth, which infants are likely to develop complications of prematurity.

A study describing the method, developed at the Stanford School of Medicine, was published online Feb. 15 in *Science Translational Medicine*.

"This is a new way of thinking about pre-term birth, placing the focus on individual health factors of the newborns rather than looking only at how early they are born," said senior study author Nima Aghaeepour, PhD, an associate professor of anesthesiology, perioperative and pain medicine and of pediatrics. The study's lead authors

are postdoctoral scholar Davide De Francesco, PhD, and Jonathan Reiss, MD, an instructor in pediatrics.

Traditionally defined as birth occurring at least three weeks early, premature birth is linked to complications in babies' lungs, brains, vision, hearing and digestive system. Although earlier births generally carry higher risks, the timing of birth predicts only approximately how a specific infant will fare. Some infants who are born quite early develop no complications, while others born at the same stage of pregnancy become very ill or die.

"Preterm birth is the single largest cause of death in children under age 5 worldwide, and we haven't had good solutions," Aghaeepour said. "By focusing our research on predicting the health of these babies, we can optimize their care."

Many complications of prematurity take days or weeks after birth to emerge, causing substantial damage to newborns' health in the meantime. Knowing which infants are at risk could enable preventive measures.

"We look mainly at the baby to make treatment decisions in neonatology, but we are finding that we can get valuable information from the maternal health record, really homing in on how individual babies' trajectories have been shaped by exposure to their specific maternal environment," said study coauthor David Stevenson, MD, a neonatologist at Lucile Packard Children's Hospital Stanford, professor of pediatrics and director of the March of Dimes Prematurity Research Center at the Stanford School of Medicine.

"This is a move toward precision medicine for babies," he added.

Reading medical records like books

The researchers linked electronic medical records for mothers at Stanford Health Care and for their babies at Stanford Medicine Children's Health, covering 32,354 live births that occurred between 2014 and 2020. The mothers' medical records included information from the pregnancy and, for those who had been patients at Stanford Medicine prior to pregnancy, health data from before they became pregnant. The infants' records started with information

recorded at birth, including weight; blood tests; and Apgar score, which is assessed in the delivery room one and five minutes after birth. The Apgar score incorporates factors such as the infant's pulse, breathing and muscle tone.

Using a machine learning algorithm called a long short-term memory neural network, the researchers built a mathematical model from the medical records and tested whether it could predict 24 possible health outcomes for infants up to two months after birth.

"There is a computational challenge in using electronic health records because they are longitudinal and contain a large amount of data from each patient," Aghaeepour said. "A long short-term memory neural network operates similarly to a person reading a book. When we're reading, we don't remember every word, but we remember the key concepts, read the next part, add more key concepts and carry that forward. The algorithm doesn't memorize the entire electronic health record of every patient, but it can remember key concepts and carry those forward to the point where we make a prediction."

At the time of birth, the machine learning model provided strong predictions for which infants would develop various conditions including bronchopulmonary dysplasia, a type of chronic lung disease; retinopathy of prematurity, a problem with the retina that can cause vision loss or blindness; anemia of prematurity; and necrotizing enterocolitis, a severe gastrointestinal complication often not diagnosed until weeks after birth, by which time interventions are complex and associated with poor outcomes.

The model also gave strong predictions a week before birth for multiple outcomes including mortality and retinopathy of prematurity, which can cause vision loss or blindness, as well as moderately strong predictions for 11 other conditions.

"I was surprised by how much predictive power we have before the baby is even born, and right at birth," Aghaeepour said. "I did not expect to see that. I had thought accuracy would come several days after birth, once we had collected data from the baby."

Some complications were not reliably pre-



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dicted by the model, such as which infants would develop candidiasis, or yeast infections; polycythemia, a high concentration of red cells in the blood; or meconium aspiration syndrome, in which the infant inhales meconium, a sticky substance expelled from the fetal bowel, during birth.

The researchers validated that the strength of the predictions did not change over the years (comparing births from 2014 to 2018 with those from 2019 to 2020); they also validated some of the findings using an independent group of 12,258 mother-baby pairs from UC San Francisco.

The model's predictions at birth provided more accurate information than currently used risk assessment tools such as Apgar scores and the National Institute of Child Health and Human Development risk score. These scores consider only the condition of the baby at birth and do not incorporate any information from the mother's medical history, the researchers noted. However, additional studies in more diverse populations are needed before this machine-learning tool is ready to replace existing risk calculators at the bedside, the researchers said.

Mother's health matters

The model revealed unexpected connections between certain health or social conditions in mothers and the health of their infants, according to the researchers.

For instance, mothers with anemia — a common pregnancy complication — were more likely to have newborns with anemia. These infants were also more likely to develop the bowel complication necrotizing enterocolitis, the study found.

"We need to explore what linkages explain these relationships at a biological level, as these might offer clues to how certain conditions occur," Stevenson said. "That will allow us to intervene better to help those kids."

The new algorithm was also able to link specific types of socioeconomic disadvantage in mothers with certain prematurity complications in their babies.

"If a mother was homeless, we found that the health impact on the baby would be different from the impact of incarceration, whereas under traditional paradigms both of these socioeconomic factors might be thought to have similar effects on prematurity risk," Aghaepour said.

Predictions from the model could help neonatologists better identify which patients will benefit from existing protocols to prevent birth complications, Stevenson said. For example, newborns who experience lack of oxygen during birth can now receive cooling protocols in early life, which lower their body temperature for a few days to

prevent brain injury. Predictive scores may help identify additional infants who could be helped by cooling, he said.

The work needs to be replicated in larger, more diverse patient populations and folded together with other Stanford Medicine research that characterizes pregnancies according to thousands of biomarkers that change during gestation, the scientists said.

Scientists from UC San Francisco contributed to the study.

Funding for the research was provided by the National Institutes of Health (grants 1R01HL139844, 3P30AG066515, R35GM138353, 1R61NS114926, 1R01AG058417, R01HD105256, P01HD106414, T32GM007618 and T32GM067547), the Burroughs Wellcome Fund, the American Heart Association, the March of Dimes, the Robertson Foundation, the Alfred E. Mann Foundation, and the National Science Foundation.

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Whooping cough vaccination during pregnancy benefits US infants

NEWS PROVIDED BY

[CDC Newsroom Release](#)

February 6, 2023

A [CDC study published today](#) provides further evidence that Tdap vaccination during pregnancy helps protect newborns from whooping cough during their first two months of life, when they are most vulnerable to the disease.

[Whooping cough](#), or pertussis, is highly contagious and [can be especially serious for infants](#) who aren't old enough to be vaccinated. CDC scientists tracked

reports of infant whooping cough cases between January 1, 2000, and December 31, 2019. They found an association between reduced rates of whooping cough in newborns younger than two months old and [Tdap vaccination during pregnancy](#). These findings further support CDC's recommendation for Tdap vaccination during weeks 27–36 of each pregnancy.

"Getting Tdap during pregnancy offers infants the best protection before they are old enough to receive their whooping cough vaccines," said Dr. José R. Romero, Director of CDC's National Center for Immunization and Respiratory Diseases. "This protection is critical because those first few months are when infants are most likely to have serious complications, be hospitalized or die if they get whooping cough."

The new study is the first time researchers have looked at U.S. population level trends in infant whooping cough cases since this maternal vaccination strategy began in 2011. Newborn whooping cough rates decreased significantly since the introduction of maternal Tdap vaccination. When given during the third trimester of pregnancy, Tdap vaccination prevents more than three in four cases of whooping cough in infants younger than two months old.

"Everyone who is pregnant should feel confident in knowing that the Tdap vaccine is safe and effective," said Dr. Linda Eckert, American College of Obstetricians and Gynecologists' liaison to CDC's Advisory Committee on Immunization Practices. "Knowing that Tdap vaccination during pregnancy protects nine in 10 babies from being hospitalized with whooping cough, I strongly recommend this vaccine to all my pregnant patients for their peace of mind and for their family's health and well-being."


Women should get vaccinated during the third trimester of each pregnancy to boost their antibodies and pass those antibodies on to their infants. All people in close contact with infants should be up to date with their whooping cough vaccines.

CDC and partners are working to increase Tdap vaccination during pregnancy, which dropped during the COVID-19 pandemic. Visit the [CDC whooping cough website](#) for more information.

Contact: [Media Relations](#)
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Genetics Corner: HACD1-Associated Congenital Myopathy in an Infant of Chaldean Ethnicity.

Robin D. Clark, MD

Case Summary:

A genetics consultation was requested for a 41 week 5 day gestation female with congenital hypotonia and poor feeding. She had been admitted to the NICU on the second day of life from a community hospital. She was born after a routine pregnancy by induced vaginal delivery, with vacuum assist, for post-dates and through clear amniotic fluid to a healthy 35-year old G3P3 mother. A nuchal cord was present. All growth parameters were appropriate for her gestational age: birth weight 3320 g, birth length 53.3 cm and head circumference 33.5 cm. CPAP was administered for six minutes for weak cry, low tone and grunting. She did well in room air. Apgar scores were 6 and 8 at 1 and 5 minutes respectively. She had significant head lag, generalized hypotonia and excessive oral secretions. She had little interest in feeding and took only 4 ml. An upper GI study was normal. She achieved full enteral feedings by gavage on day 2 of life. There were no signs of sepsis.

“She had significant head lag, generalized hypotonia and excessive oral secretions. She had little interest in feeding and took only 4 ml. An upper GI study was normal.”

A limited needle EMG showed no electrophysiologic evidence of anterior horn cell disease, neuropathy, myopathy, neuromuscular junction transmission defect or demyelination. A brain MRI showed a small collection of extra-axial fluid along the left cerebral hemisphere, measuring up to 7 mm, most consistent with a subdural hygroma with a nonspecific prominence of the left occipital horn.

Speech and occupational therapists noted significant pharyngeal dysphagia. She had frank aspiration of all consistencies (thin, nectar, honey) on a swallow study on day 6 of life and no improvement on video swallow study at 3 weeks of age. She was

not considered safe to feed orally due to high risk of aspiration. A gastrostomy tube was placed on day 23 of life.

The parents denied consanguinity. They are both of Chaldean descent. Chaldeans are a Catholic religious minority, ethnically Assyrian rather than Arab, who trace their roots to Babylon in Northern Iraq. The father is 39 years old. The parents have two other healthy children: a 3-year old girl and an 18-month old male. The family history was negative for congenital anomalies, early or unexplained deaths or chronic diseases.

“[The parents] are both of Chaldean descent. Chaldeans are a Catholic religious minority, ethnically Assyrian rather than Arab, who trace their roots to Babylon in Northern Iraq.”

On physical exam she was awake and alert but flaccid in a “frog leg” position with an NG tube in place. She was nondysmorphic and moved all extremities spontaneously. A head ultrasound was normal.

The initial genetics evaluation focused on Prader-Willi syndrome which was essentially ruled out with normal chromosome microarray and a DMA methylation test for chromosome 15. She was discharged home at 4 weeks of age. She returned as an outpatient for an evaluation in genetics clinic. A clinical exome performed on an outpatient basis revealed homozygous likely pathogenic variants in HACD1: 373_375+2del, diagnostic for a congenital myopathy.

“A clinical exome performed on an outpatient basis revealed homozygous likely pathogenic variants in HACD1: 373_375+2del, diagnostic for a congenital myopathy.”

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Assessment:

This child has HADC1-associated congenital myopathy (OMIM 619967), an autosomal recessive nonprogressive disorder. It causes hypotonia at birth, early feeding problems and delayed motor skills. Walking, sometimes with a waddling gait, is usually achieved by 2 ½ years. A Gower's sign can persist into adulthood but there is usually gradual improvement in muscle weakness with age. Muscle biopsy can show fiber size disproportion. There is no respiratory involvement and cognitive development is normal.

“[HADC1-associated congenital myopathy] causes hypotonia at birth, early feeding problems and delayed motor skills. Walking, sometimes with a waddling gait, is usually achieved by 2 1/2 years.”

There are a few reports of this variant in other affected individuals from Iraq, making it likely that this is a founder mutation (1). Abbasi-Moheb, et al. reported 3 patients with the same or similar pathogenic variant, all of whom had generalized muscle weakness and motor delay. The main clinical features were generalized muscle weakness, poor head control, feeding problems with poor suck, failure to thrive and Gower sign for one at 4 years, no longer present at age 7.

This small intronic deletion alters the highly conserved splice donor site for exon 2 of the HADC1 transcript. It is predicted to abolish canonical splice donor activity causing skipping of exon 2 and a shift in the reading frame. A stop codon is introduced at the very beginning of exon 3.

“HADC1 encodes an endoplasmic reticulum associated protein, 3-hydroxyacyl-CoA dehydratase, that catalyzes the third step in elongation of long chain fatty acids to VLCFA.”

HADC1 encodes an endoplasmic reticulum associated protein, 3-hydroxyacyl-CoA dehydratase, that catalyzes the third step in elongation of long chain fatty acids to very-long-chain fatty acids (VLCFA). Very long chain fatty acids are incorporated into membrane lipids such as phospholipids and sphingolipids. Depending on their chain length and degree of (un)saturation, their functions differ. VLCFA have a role in promoting strong membrane curvature and vesicle fusion. Myoblast fusion, a necessary step for optimal myofiber growth, is the result of a complex relationship between lipids and proteins, which has not been fully elucidated. However, HADC1 has been shown to be a key regulator of a lipid-dependent muscle fiber growth mechanism (2).

Low levels of VLCFA are expected in this condition. Laboratory studies, including VLCFA, free and total carnitine and acylcarnitine profile, are pending. An echocardiogram and ECG are recommended because cardiac sequelae have been reported rarely (3). Management may include supplementation with Coenzyme Q10 and low-dose carnitine. Adding peanut oil and peanut butter to the diet is recommended as a dietary source of cerotic acid, a 26 carbon long chain saturated fatty acid (26:0), also found in beeswax, from which it derives its name. Parental testing for the variant in HADC1 is in progress.

“Management may include supplementation with Coenzyme Q10 and low-dose carnitine. Adding peanut oil and peanut butter to the diet is recommended as a dietary source of cerotic acid.”

One intriguing consideration for future therapy is an antisense oligonucleotide (ASO) designed to silence this intronic splicing variant and enable normal splicing of exon 2. ASO technology is the basis for nusinersen (Spinraza), the FDA approved therapy for spinal muscular atrophy (4) that acts by correcting an SMN2 exon 7 splicing error.

“One intriguing consideration for future therapy is an antisense oligonucleotide (ASO) designed to silence this intronic splicing variant and enable normal splicing of exon 2.”

Practical applications:

1. Pay attention to the family history. Members of small reproductive isolates have an increased risk for homozygous autosomal recessive disorders. Recognize the importance of this aspect of the family history, even in the absence of consanguinity.
2. Measure VLCFA as part of the evaluation of the hypotonic infant. Both high and low levels are significant.
3. Recognize that unexplained poor feeding and hypotonia are indications for exome testing.

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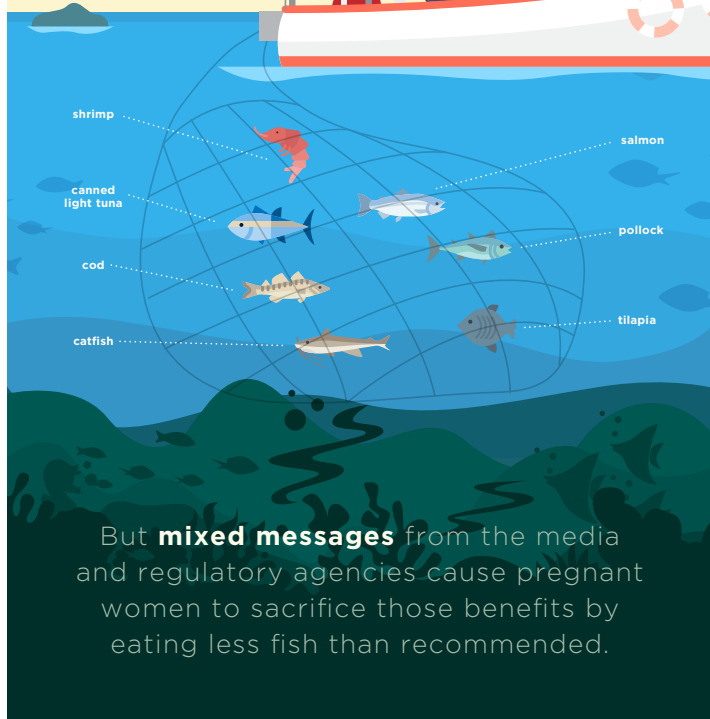
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New Year, New Codes

Kara Wong Ramsey, MD, Scott D. Duncan, MD, MHA

“The American Medical Association (AMA) updated guidelines for CPT® Evaluation and Management (E/M) codes effective January 1, 2023, for both inpatient (99252-99255) and outpatient consultation (99242-99245) to decrease documentation burden irrelevant to patient care and reduce provider burn out. All observation hospital codes have been removed.”

Current Procedural Terminology (CPT®) codes are updated annually; providers must be knowledgeable about changes that affect their billing practices. The American Medical Association (AMA) updated guidelines for CPT® Evaluation and Management (E/M) codes effective January 1, 2023, for both inpatient (99252-99255) and outpatient consultation (99242-99245) to decrease documentation burden irrelevant to patient care and reduce provider burn out. All observation hospital codes have been removed. Hospital visit codes for both inpatient and outpatient “observation status” will be merged and billed with inpatient codes (99221-99223; 99231-99233; 99234-99236).

“ Inpatient consultation codes (99252-99255) may be chosen based on medical decision-making (MDM) or time. A consultant may report only one consultation code during an admission.”

Table 1
Inpatient CPT® Consultation Codes

CPT® code	MDM	Time
Initial consultation		
99252	Straightforward	Meet or exceed 35 min
99253	Low	Meet or exceed 45 min
99254	Moderate	Meet or exceed 60 min
99255	High	Meet or exceed 80 min
Subsequent consultation		
99231	Straightforward or Low	Meet or exceed 25 min
99232	Moderate	Meet or exceed 35 min
99233	High	Meet or exceed 50 min

In addition, of particular interest to neonatologists, the level of service time has been adjusted for consultation codes, and level 1 outpatient and inpatient codes have been eliminated. Inpatient consultation codes (99252-99255) may be chosen based on medical decision-making (MDM) or time. A consultant may report only one consultation code during an admission. Subsequent consultations during the same hospital stay are reported using the subsequent hospital inpatient codes (99231-99233). Table 1 lists the CPT® code, level of MDM, and time component. Typically, prenatal consultations with hospitalized patients are time-based. It is no longer required to state that >50% of the time is spent on counseling and/or care coordination for consultation codes.

“ Table 1 lists the CPT® code, level of MDM, and time component. Typically, prenatal consultations with hospitalized patients are time-based. It is no longer required to state that >50% of the time is spent on counseling and/or care coordination for consultation codes.”

Question:

You are asked to see a new inpatient consult, referred by the maternal-fetal medicine doctor at 39 weeks gestation for maternal in-utero opioid exposure. The patient is a 30-year-old G1P0 whose pregnancy is notable for chronic use of oxycodone three times daily over the past year due to back pain after a motor vehicle accident. She is admitted for induction of labor at 39 weeks. The patient is concerned about a potentially prolonged hospital stay for neonatal opioid withdrawal syndrome, as mentioned by her maternal-fetal medicine doctor during a previous office visit. You spend 15 minutes reviewing her medical chart and prenatal records before seeing the patient. You spend 20 minutes in direct face-to-face contact with the patient explaining the need to observe her infant for at least 72 hours in the hospital per American Academy of Pediatrics recommendations to evaluate for neonatal

opioid withdrawal syndrome. You discuss the possible need for NICU admission if the baby requires pharmacological treatment for severe symptoms and answer all her questions. You spend an additional 15 minutes explaining your recommendations to the obstetrical team, answering their questions about the safety of providing breastmilk to the infant if the mother remains on oxycodone, and documenting your recommendations in your consultation note.

Which CPT code should you use?

- A. 99252 Straightforward complexity inpatient consult 35 minutes
- B. 99253 Low complexity inpatient consult 45 minutes
- C. 99254 Moderate complexity inpatient consult 60 minutes
- D. 99255 High complexity inpatient consult 80 minutes



Answer: B 99253 Inpatient consultation, low complexity, 45 minutes

“Although you cannot include time spent by other clinical staff (such as RN or MA), you can report time that you personally spent preparing for the visit through chart review, face-to-face time with the patient, placing additional orders, interpreting lab or imaging results, care coordination, communicating with other health care team members and documenting in the medical record.”

When the CPT® code is chosen based on time, reporting the total of face-to-face and non-face-to-face time spent on the patient encounter on the same day is appropriate. Although you cannot include time spent by other clinical staff (such as RN or MA), you can report time that you personally spent preparing for the visit through chart review, face-to-face time with the patient, placing additional orders, interpreting lab or imaging results, care coordination, communicating with other health care team members and documenting in the medical record. However, note that the time spent on these non-face-to-face activities must be performed on the same day of the encounter to include the total sum of time. You cannot count time spent on the day prior to your patient encounter.

“For medical problems that may seem straightforward to an experienced neonatologist, the parents may spend a long time asking to clarify or follow-up questions or requesting other family members’ presence during the consultation.”

This vignette presented an inpatient consultation with the proper CPT® code based on time spent (the sum of face-to-face and non to face to face time, including preparation work). For medical problems that may seem straightforward to an experienced neonatologist, the parents may spend a long time asking to clarify or follow-up questions or requesting other family members’ presence during the consultation. The prospect of potentially having a baby in the NICU is daunting, and we owe it to our families to spend the time necessary to answer their questions to the fullest extent possible. Conversely, some families may not spend much time asking questions. Perhaps the family is already familiar with the medical condition from previous experience or cannot receive much detailed medical information, in which case a follow-up consultation visit may be warranted.

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Biographical Sketch

Dr. Duncan received his undergraduate degree from Transylvania University in Lexington, KY, and completed his medical training at the University of Louisville. He completed a Master’s Degree in Healthcare Administration at the Gillings School of Global Public Health at the University of North Carolina at Chapel Hill in 2011. He is currently the Chief of the Division of Neonatal Medicine at the University of Louisville. Dr. Duncan is a Fellow of the American Academy of Pediatrics and is the Chair of the Coding Committee of the Section on Neonatal-Perinatal Medicine, where he has been a member since 2010

Dr. Kara Wong Ramsey received her undergraduate degree from Stanford University in California and completed her medical training at Harvard Medical School in Boston, MA, and post-graduate medical training with Hawaii Residency Programs in Honolulu, HI. She is a neonatologist at Kapiolani Medical Center for Women and Children in Honolulu, HI. Dr. Wong Ramsey is a Fellow of the American Academy of Pediatrics and has been a member of the Coding Committee of the Section on Neonatal-Perinatal Medicine since 2020.

Disclosure: The author has no disclosures.

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Annie Janvier, MD, PhD

Translated by Phyllis Aronoff and Howard Scott



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PREVENTIVE MONOCLONAL ANTIBODIES

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Introduce antibodies that are ready to ward off disease in the body.

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.

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.

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

RSV
COVID-19

Both can provide tailored protection from a variety of diseases.

Yes

Yes

Both vaccines and preventive monoclonal antibodies undergo extensive testing for safety and efficacy.

Vaccines and Preventive Monoclonal Antibodies

WHAT'S THE DIFFERENCE?

The Importance of Immunization

Vaccines and preventive monoclonal antibodies are two different types of immunization. While they function differently, they both serve the same purpose: protecting people from serious illnesses and diseases.

Different Technology, Same Protective Value



<https://www.who.int/news-room/feature-stories/detail/how-do-vaccines-work#:~:text=Vaccines%20contain%20weakened%20or%20inactive,rather%20than%20the%20antigen%20itself.>

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The Indirect Impact of RSV

Susan Hepworth, Suzanne Staebler, DNP, APRN, NNP-BC, FAANP, FAAN, Mitchell Goldstein, MD, MBA, CML

OVERVIEW

RSV impacts not only infants and young children, but also entire families.

The National Coalition for Infant Health and the Alliance for Patient Access sought to examine the multifaceted burden that RSV places on families and to identify potential policy solutions.

Two surveys were conducted, one of parents who had at least one child contract RSV and one of health care providers who treat infants and children with RSV.

Both surveys were conducted with YouGov, a global public opinion and data company. Parents and providers were recruited from a pool of pre-selected respondents to ensure they met the survey's requirements. Participants received an honorarium.



RSV PARENT SURVEY

340 parents who had at least 1 child sick with RSV



67% of parents said their child was hospitalized for RSV

RSV HEALTH CARE PROVIDER SURVEY

175 health care providers across various pediatric and neonatal subspecialties



67% worked in an outpatient facility
33% worked in a hospital

RESULTS



FINANCIAL BURDEN

More than 2/3 of parents said the costs of RSV posed a financial burden or financial crisis.

7% of parents said they were fired as a result of caring for their child with RSV.

32% of parents reported losing potential income while their child had RSV.



EMOTIONAL BURDEN

68% of parents said watching their child suffer affected their mental health.

69% of parents felt guilty that they could not do more to prevent their child's RSV.

When parents found out there was no treatment for RSV, only supportive care:

- **48%** felt angry
- **46%** felt helpless



SOCIAL BURDEN

43% of parents had never heard of RSV before finding out their child was sick.

54% of parents had to rely on family and friends for sibling care, transportation and other responsibilities.

42% of parents said they struggled to care for their other children when one faced RSV.

RESULTS



PARENT EDUCATION & AWARENESS

86% of providers said they include RSV education as part of routine care.

99% of providers agreed that parents need more information about RSV.



TREATMENT CHALLENGES

Nearly 1/3 of providers have been reluctant to test for RSV because no treatment exists.

48% of providers said it was difficult to decide whether to send an infant or child with RSV to the emergency room.

92% agreed that if an immunization were available, it should be added to the Vaccines for Children program's list of pediatric vaccines.



MISCONCEPTIONS

A majority of providers (60%) explained that around 50% or more of the babies they see hospitalized for RSV were born healthy, despite many people thinking severe RSV only impacts premature infants or those with preexisting conditions.

CONCLUSION

Both surveys highlighted that the burden of RSV extends well beyond its physical symptoms.

The virus may lead to:

- **Long-lasting health challenges** for babies and young children
- **Financial, social and emotional burdens** for families
- **Frustration for providers**, who lack a cure or viable preventive interventions

This burden is not experienced by the few. Most infants and children contract RSV by the time they are two, and challenges that accompany RSV may impact anyone who has been affected.

Moving forward, the many burdens of RSV demonstrate the need for:

- **More RSV education**
- **Research and innovation** for preventive interventions
- **Access to prevention and treatment** for all babies and children

The challenges caused by RSV can reach far and wide, and its indirect impacts often leave families struggling.



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National Coalition for Infant Health Values (SANE)

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

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

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

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



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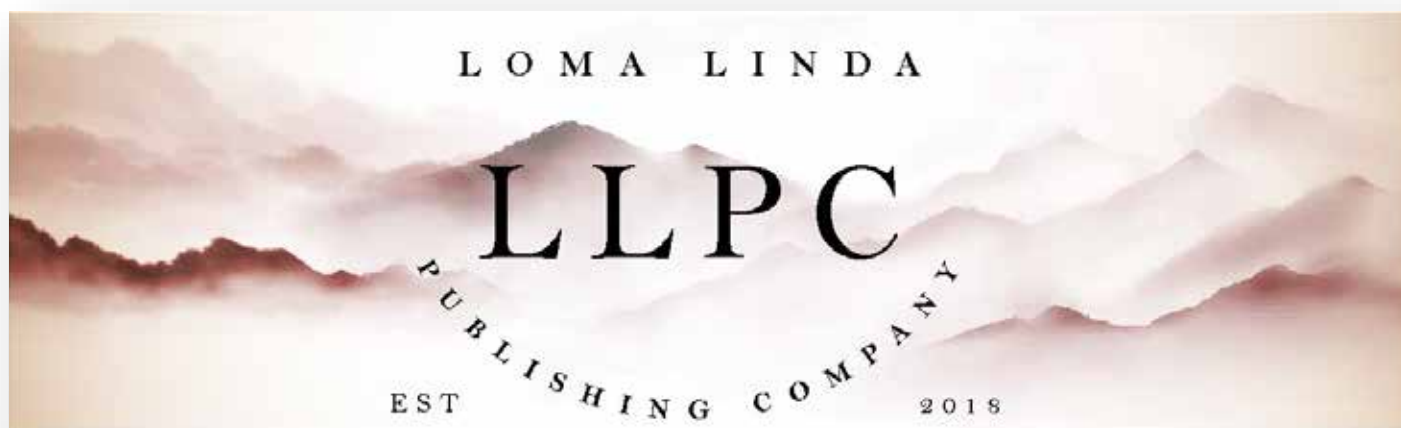
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The Signs & Symptoms of RSV

RESPIRATORY SYNCYTIAL VIRUS

Know the Signs & Symptoms of RSV



Cough



Runny Nose



Struggling to Breathe
(breastbone sinks inward when breathing)



Difficulty Eating



Lethargy



Wheezing

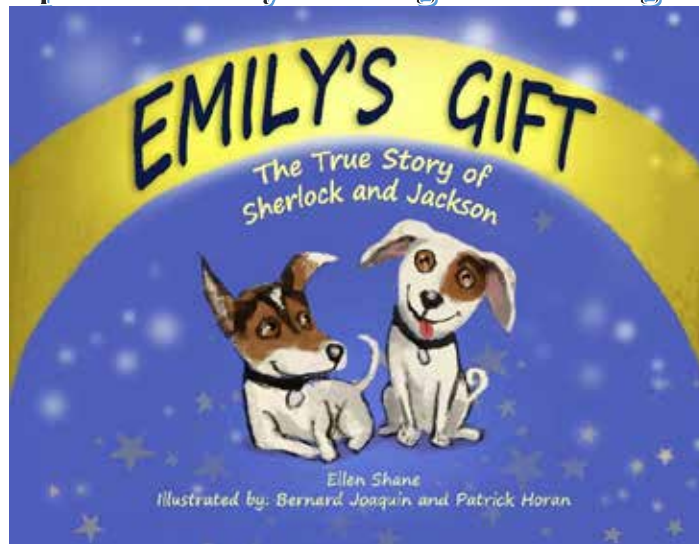
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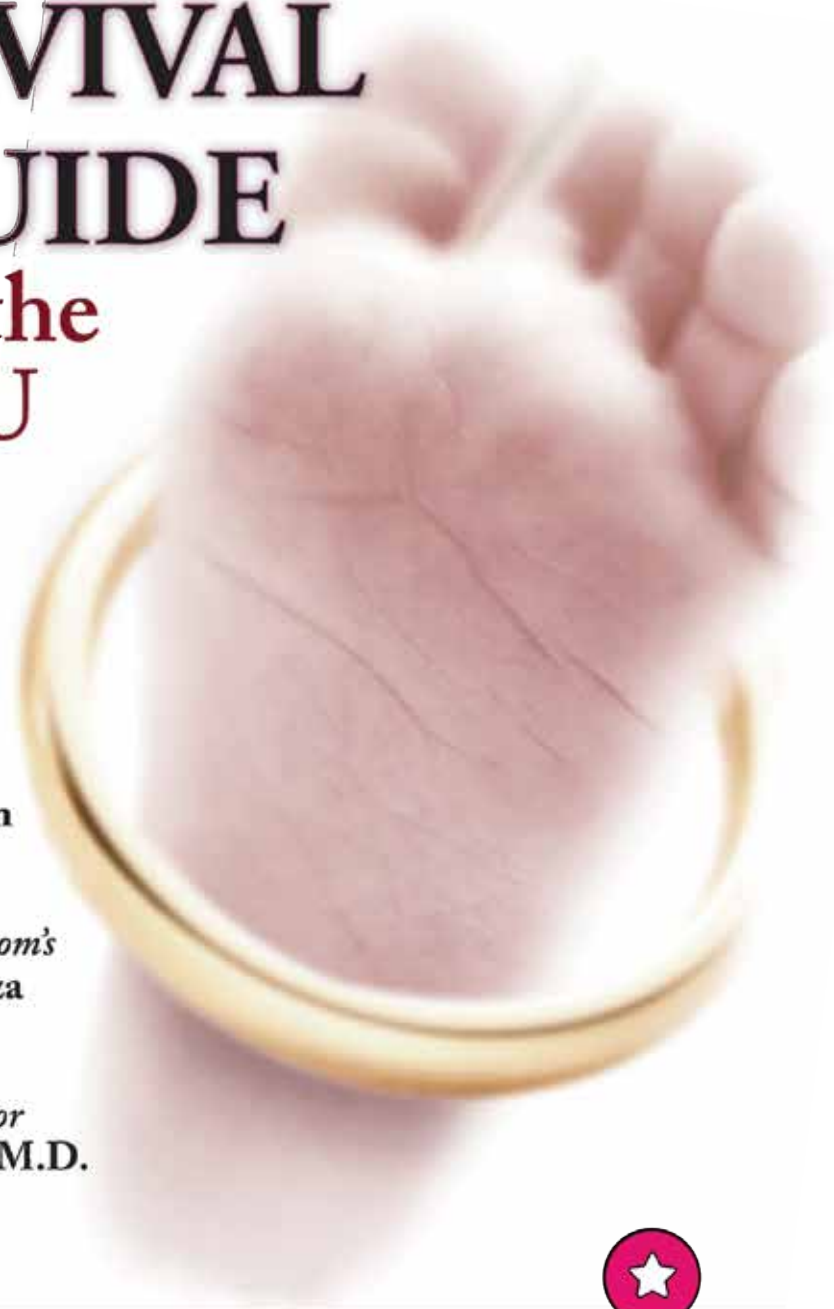
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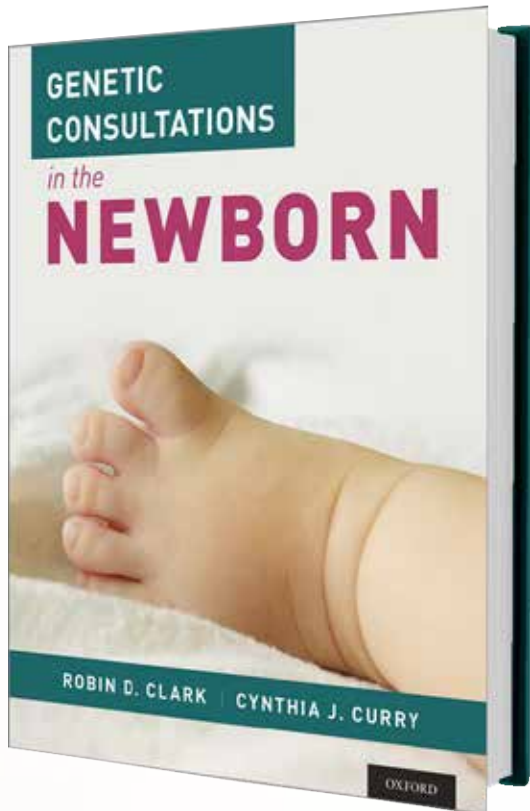


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Clinical Pearl:

Understanding the Impact of Neonatal Acute Kidney Injury

Kellie Barsotti, MD; Melanie Wielicka, MD PhD

“In recent years, we have significantly advanced our understanding of acute kidney injury (AKI) within the neonatal population. At birth, only about 4% of cardiac output reaches the kidneys; this is reflected in infants’ low glomerular filtration rate, especially those born prematurely.”

In recent years, we have significantly advanced our understanding of acute kidney injury (AKI) within the neonatal population. At birth, only about 4% of cardiac output reaches the kidneys; this is reflected in infants’ low glomerular filtration rate, especially those born prematurely. Any additional stressors such as hypoxia, hemodynamic instability, or infection, all of which we frequently encounter in preemies, have the potential to impact renal perfusion further and induce AKI (1). The incidence of AKI in infants born before 29 weeks gestation has been reported to be as high as 43% (2). Thus, significant efforts have been made to define neonatal AKI better and identify the risk factors and the related short and long-term outcomes.

Over the past ten years, the neonatal modified Kidney Disease: Improving Global Outcomes (KDIGO) criteria have become the gold standard definition for neonatal AKI. It determines the severity of AKI based on the magnitude of the rise in serum creatinine from prior values and the decrease in urine output and may be used in patients <120 days of age (1,3). This definition, as many other ones used in pediatrics, was adapted mainly from an adult patient-driven one. For instance, it fails to account for the physiologic changes in neonatal creatinine, which initially reflects maternal creatinine. If maternal serum creatinine is low, it would be expected that in an extremely premature infant, their creatinine would increase over the first several days of life, which would not necessarily be representative of AKI.

Additionally, serum creatinine (SCr) is a marker of renal function, not injury. The initial insult must cause a significant decline in renal function in order to result in an increase in SCr, which can sometimes take several days (1). This issue leads to a delay in SCr increase in relation to the timing of the injury. Furthermore, the KDIGO criteria fail to account for the neonate’s chronological and post-menstrual age (1). Despite its flaws, this definition has provided a certain degree of standardization and has allowed us to describe neonatal AKI’s epidemiology and outcomes better.

The Assessment of Worldwide Acute Kidney Epidemiology in Neonates (AWAKEN) study (2) included 24 centers and collected data from almost one thousand neonates admitted to neonatal intensive care units. It has demonstrated that the risk of AKI increases significantly with decreasing gestational age and that neonates with AKI have higher odds of death and prolonged hospitalization. It has also expanded upon the neonatal-modified KDIGO definition to address neonatal physiology and redefine absolute serum creatinine thresholds based on gestational age. Using mortality as a meaningful clinical outcome, they tested the hypothesis that ideal cutoffs for serum creatinine levels within the first week of life will differ by gestational age. Their data shows that absolute and percent serum creatinine cutoffs are higher in those neonates born at less than 29 weeks gestation, suggesting that the neonatal modified KDIGO definition does not adequately account for physiologic differences seen within the first week of life and also between neonates of different gestational ages. This project marks an important milestone in AKI research in that previously, we relied on retrospective, single-center studies and lacked meaningful data on AKI incidence and risk factors in patients categorized by gestational age and time point in their hospital course.

“This project marks an important milestone in AKI research in that previously, we relied on retrospective, single-center studies and lacked meaningful data on AKI incidence and risk factors in patients categorized by gestational age and time point in their hospital course.”

Last year, Aziz et al.’s smaller, single-center study provided supportive evidence for AKI being inversely proportional to both gestational age and birth weight and for an association between AKI and increased mortality in extremely low-birth-weight neonates. Interestingly, they suggested that while mortality is strongly associated with neonatal AKI, it does not directly result from it, and its amelioration does not reduce the risk of death in this population (4). In response to these findings, Askenazi et al. discussed in a commentary piece why this is less likely to be true (5). The authors note that there is a possibility of bias within the statistical approach of the initial study with the use of Shapley Additive Explanations Analysis (a structural model that shows the relative association of each measured variable with a given outcome) to determine the association between each variable and their relationship to mortality. Another reason this paper cites is the limitations of using the neonatal-modified KDIGO criteria in this pa-

tient population, especially in the first several days of life, some of which we have already discussed. Because of the potential for this miscalculation bias, many studies do not include serum creatinine from the first 48 hours of life, unlike Aziz et al. Since serum creatinine often does not increase for up to 48 hours following a renal insult, it becomes challenging to assess AKI's relationship with mortality in this population when elevation in serum creatinine has been proven to lag behind the injury. As there seems to be a widespread consensus that serum creatinine is a suboptimal marker for monitoring neonatal renal function, identifying novel biomarkers that would allow for earlier identification and better classification of AKI continues to generate interest. Some of the ones that have been suggested thus far include urine neutrophil gelatinase-associated lipocalin, cystatin-c, and kidney injury molecule-1, although further work is needed before we will be able to use them in our clinical practice (1).

“Despite all the recent advances in neonatal AKI research, many questions remain unanswered. For instance, there seems to be insufficient data on its impact on long-term renal function. Mammen et al. studied a cohort of children hospitalized in the pediatric intensive care unit with AKI, demonstrating that 10% of these patients developed chronic kidney disease (CKD) (6).”

Despite all the recent advances in neonatal AKI research, many questions remain unanswered. For instance, there seems to be insufficient data on its impact on long-term renal function. Mammen et al. studied a cohort of children hospitalized in the pediatric intensive care unit with AKI, demonstrating that 10% of these patients developed chronic kidney disease (CKD) (6). Although some small, single-center studies suggest an increased risk of CKD following neonatal AKI, the shortage of meaningful data challenges neonatal providers when deciding which infants will require subspecialty follow-up and to what extent. Nevertheless, there is strong evidence that points towards a link between AKI and mortality, as well as its association with other unfavorable clinical outcomes. Ancillary studies based on the AWAKEN cohort have shown associations between AKI and hypertension, AKI and intra-ventricular hemorrhage, and AKI and chronic lung disease (2). These findings have important implications for clinicians and researchers, as they stress the need for more data on short- and long-term prevention and management strategies.

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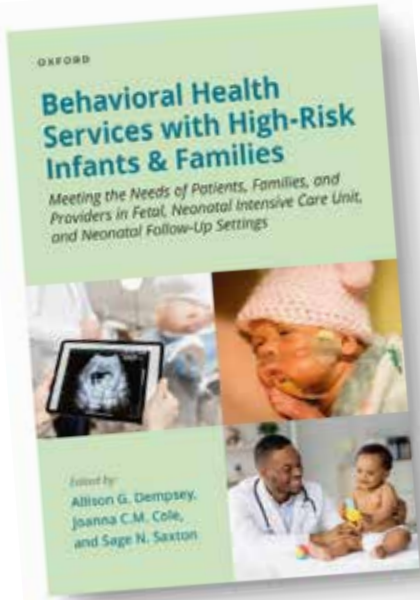
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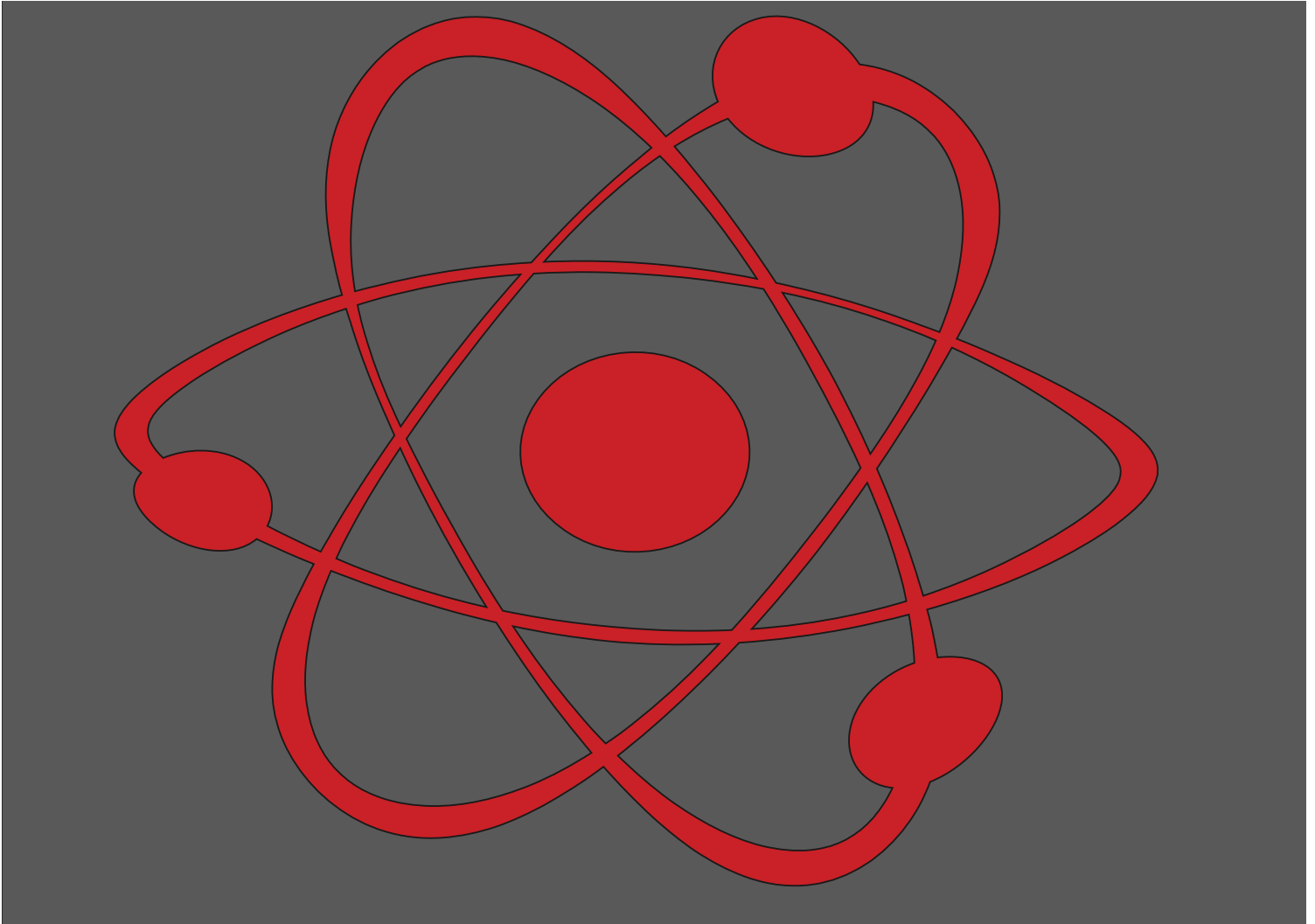
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Will your **PRETERM INFANT** need **EARLY INTERVENTION** services?

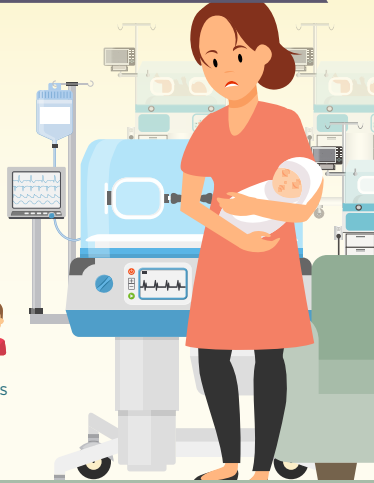
Preterm infants are:

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



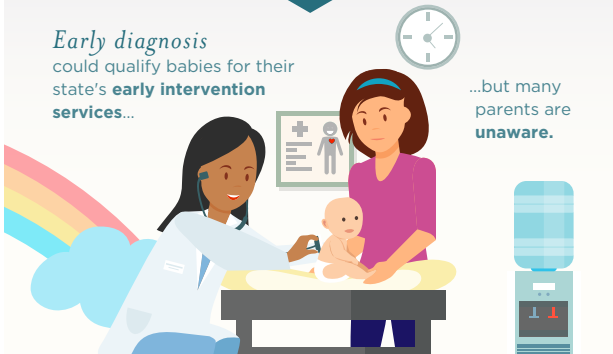
Address physical challenges



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Protecting Access for Premature Infants through Age Two
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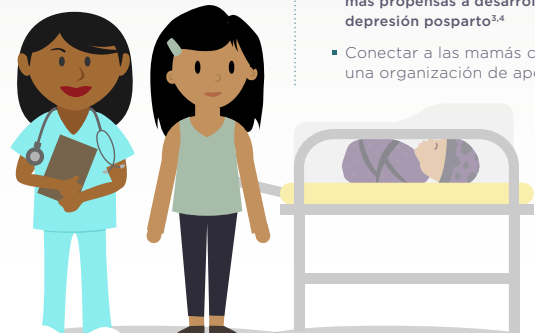
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- Conectar a las mamás con una organización de apoyo



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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.*

NEONATOLOGY TODAY

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**Chief, Division of Neonatology
University of Washington School of Medicine
Seattle Children's Hospital**

The incoming Chief will have the opportunity to continue the legacy of the program and the responsibility of establishing and implementing a strategic plan that will guide the division into its future. The successful applicant will be responsible for oversight of clinical care and education in all sites, faculty development and retention, and advancing the national stature of the program with visionary leadership and innovation.

Appointment as full time Associate Professor (without tenure due to funding) or Professor (without tenure due to funding) of Pediatrics at the University of Washington, School of Medicine, will be commensurate with experience, training, and achievement. This is a 12-month service period position from July 1 to June 30. All University of Washington faculty engage in teaching, research, and service.

Opportunity Highlights:

- Overseeing direct and consultative care as well as provider education and support in the five state WWAMI region, the division totaling 43 faculty neonatologists manages 2 level IV NICUs (84 beds) and 3 level III NICUs (81 beds). In addition to staffing the level IV and III NICUs, division APPs and neonatal hospitalists also staff 5 level II NICUs (28 beds) with oversight by division neonatologists, for a total of 199 NICU beds.
- ACGME Neonatology fellowship program led by Megan Gray, MD, Program Director and Kirti Upadhyay, MD, Associate Program Director.
- The division's research interests span the field of Neonatology to advance clinical care. With SCH ranked #5 nationally among pediatric research institutions, division faculty benefit from an established research infrastructure and an institutional commitment to offer every child the opportunity to participate in research.
- Recognized among the nation's best children's hospitals and the top ranked pediatric facility in the Northwest, Seattle Children's Hospital is a 334-bed facility that offers over 60 pediatric subspecialties and is the pediatric and adolescent academic medical center for Washington, Alaska, Montana, and Idaho.

Qualifications

Applicants are required to have an MD, or DO, or MD/DO combined (or foreign equivalent). Must be board certified in Neonatology. The successful candidate should have training completed in an accredited Neonatology fellowship.

Application Instructions

Applicants will submit a formal CV, cover letter and diversity statement. The diversity statement should address current and/or future commitments to and experiences with equity, diversity, and inclusion.

For more details about this opportunity, please contact Marcel Barbey at marcel@careerphysician.com, or at 817-707-9034. All interactions will remain confidential, and no inquiries will be made without the consent of the applicant.

UWSOM is an AA/EOE/ADA Employer

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.

Collier County is located on the Southwest Coast of Florida with easy access to Southwest Florida International Airport. Outdoor activities include golf, boating, fishing and beautiful beaches.

Competitive compensation and benefits package.

Qualified candidates please contact:

Joyce Berger, Physician Recruiter

joyce.berger@nicklaushealth.org or 786-624-3510

nicklauschildrens.org/NCPS

DFW

Clinical Trial Center (Full-Time, Day Shift) - Research Coordinator

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.

Additional Information

- Organization: Loma Linda University Health Care
- Employee Status: Regular
- Schedule: Full-time
- Shift: Day Job
- Days of Week: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday



LOMA LINDA
UNIVERSITY



Loma Linda University Children's Hospital is hiring Neonatal Nurse Practitioners

Children's Hospital, centrally located in Southern California, has earned Magnet Recognition as part of the American Nurses Credentialing Center's (ANCC) Program.

We are looking for experienced or new graduate Neonatal Nurse Practitioners (NNPs) who are excited to join a cohesive team that practices in a collaborative, fast-paced, high-acuity setting.

- Full-time and part-time positions available
- Level IV, 84-bed Neonatal Intensive Care Unit (NICU)
- Regional referral center encompassing Tiny Baby unit, ECMO, Cardiac ICU, Neuro NICU and Surgical services
- Maternity services and delivery center
- 24/7 coverage by NNP team and Fellows
- Competitive employee benefit packages



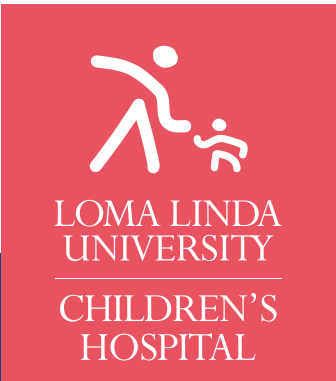
For more information, please contact:

Karin Colunga, MSN, RN, PNP-BC
Director of Advanced Practice Nursing
kecolunga@llu.edu | 909-558-4486

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News and Information for BC/BE Neonatologists and Perinatologists



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NEONATOLOGY TODAY

Peer Reviewed Research, News and Information in Neonatal and Perinatal Medicine

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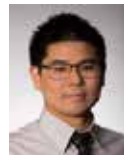
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PROTECT YOUR FAMILY FROM RESPIRATORY VIRUSES

flu

coronavirus

pertussis

RSV



SOAP

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.

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Neonatology Today's policies ensure the protection and responsible use of animals and humans in all research articles under consideration. Authors are encouraged to follow the guidelines developed by the National Centre for the Replacement, Refinement & Reduction of Animals in Research (NC3R), International Committee of Medical Journal Editors, and the Guide for the Care and Use of Laboratory Animals and U.S. Public Health Service's Policy on Humane Care and Use of Laboratory Animals (PHS Policy). Authors are expected to demonstrate to their institutional review board or suitable proxy that ethical standards are met. If there is doubt whether research conducted was in accordance with ethical standards, then there must be verification that the institutional review body approved the uncertain aspects. Research not following these policies on participating animal and human subjects may be rejected. Researchers have a moral obligation towards the humane treatment of animals and ethical considerations for humans participating in research and are expected to consider their welfare when designing studies.

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NT

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 both of this month's artwork. The first is a rendition of Cyclamen flower which resembles Rabbit Ears. The bird of the month is the drawing of the Swan.



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.

11. NT recommends reading Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals from ICMJE prior to submission if there is any question regarding the appropriateness of a manuscript. NT follows Principles of Transparency and Best Practice in Scholarly Publishing (a joint statement by COPE, DOAJ, WAME, and OASPA). 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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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:



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.

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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



@drpaulawhiteman



@drpaulawhiteman