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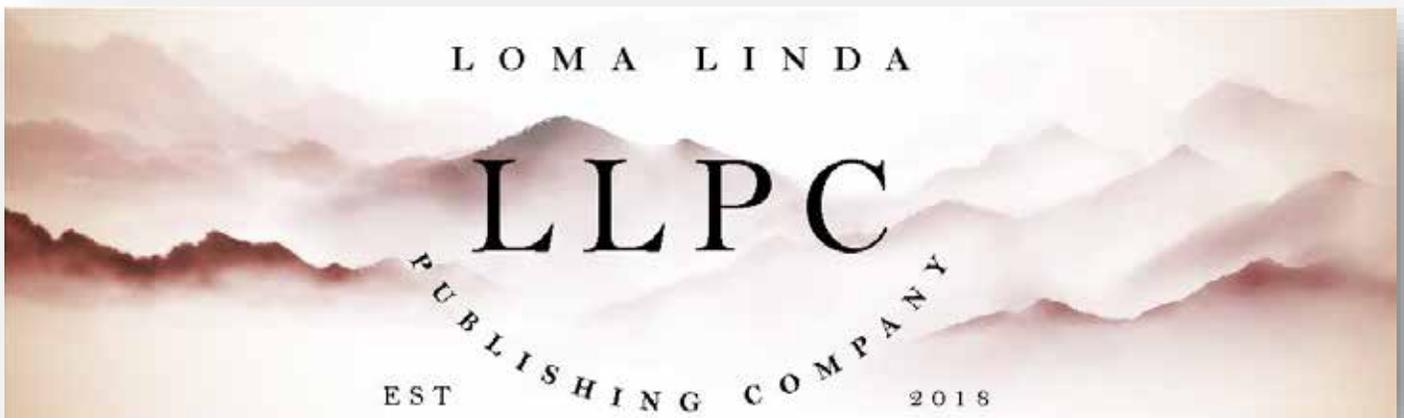
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A Prospective Quality Improvement Project Using the Neonatal Early-Onset Sepsis Calculator Among Late Preterm and Term Newborns at a Large Single-Center Neonatal Intensive Care Unit

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Keywords: Quality improvement project, neonatal early-onset sepsis calculator, blood culture, complete blood count, Early-onset sepsis.

Introduction:

Problem Description:

Early-onset sepsis (EOS) is defined as a positive blood culture for a pathogenic organism within 72 hours of birth. (1) The non-discriminant symptomatology associated with EOS contributes to the difficulty in establishing a definitive diagnosis before blood culture results are known. (2) Therefore, to err on the side of caution, many providers initiate empiric antibiotic therapy regardless of newborn risk status and clinical presentation. (2)

“Early-onset sepsis (EOS) is defined as a positive blood culture for a pathogenic organism within 72 hours of birth. The non-discriminant symptomatology associated with EOS contributes to the difficulty in establishing a definitive diagnosis before blood culture results are known. Therefore, to err on the side of caution, many providers initiate empiric antibiotic therapy regardless of newborn risk status and clinical presentation.”

In 2010, the Centers for Disease Control and Prevention (CDC), the American Academy of Pediatrics (AAP), the National Institute for Health and Care Excellence (NICE), and the American Society of Microbiology (ASM) published reports and guidelines for best practices related to the management of EOS of the newborn.

Nevertheless, many providers continue to use outdated practices rooted in unit traditions or experiences to guide care decisions, which has resulted in variations in provider antimicrobial prescribing practices across and within neonatal intensive care units (NICUs) and escalated the use of unwarranted antibiotic therapy. (3–9) For example, Schulman and colleagues conducted a retrospective cohort study of 52,061 newborns diagnosed with unproven but suspected sepsis admitted to 127 NICUs across California. Findings of this multi-site study indicated variations in practice, including the initiation of EOS evaluations (complete blood count [CBC], C-reactive protein [CRP], and blood culture) and the administration of empiric antibiotics, with a 40-fold variation in antibiotic prescribing practices among units with similar numbers of proven infection. (10)

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Evidence suggests that the recognition of inconsistent antimicrobial prescribing practices has led antibiotic stewardship programs to develop a more evidence-based approach to caring for this vulnerable population. However, accepting and adopting these programs remain challenging, as providers must re-evaluate the systematic practice of initiating EOS evaluations and empiric antibiotic therapy during the immediate newborn period. (11)

Available Knowledge:

Incidence of EOS and Antibiotic Stewardship

Following the introduction of intrapartum antibiotic prophylaxis for group B-Streptococcus (GBS) two decades ago, the incidence of EOS in the United States (US) decreased from 0.77 to 1 per

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1,000 live births to 0.4–0.5 per 1,000 live births. (8, 12) While the incidence of EOS remains low, the initiation of antibiotic therapy remains high. (13)

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It has been widely reported that the unwarranted administration of antibiotics is associated with an increased risk of necrotizing enterocolitis (NEC), invasive candida infections, multi-resistant drug organisms, late-onset sepsis, and death. (14–18) Term newborns who have been exposed to antibiotics have a higher incidence of atopy, childhood obesity, and asthma. (19, 20) Moreover, indiscriminate EOS evaluations and antibiotic use can potentially affect the parent-newborn bond and breastfeeding success as well as increasing lengths of stay and healthcare expenditures. (21)

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Despite recommendations published by leading pediatric organizations and increasing evidence to support a more thorough, multifactorial approach to the management of EOS, many providers fail to employ antibiotic stewardship protocols and practices, which contributes to unnecessary EOS evaluations and unwarranted antibiotic therapy among late preterm (LPT) and term newborn infants. For example, in the US, it is estimated that approximately 400,000 term infants admitted to the NICU without a confirmed diagnosis of EOS will receive antibiotics at birth. (22–

24)

The philosophy of providers who “understand but don’t believe” the importance of antibiotic stewardship has contributed to newborns being treated ten times more for culture-negative sepsis than for blood cultures that are positive for pathogenic organisms. (11) The practice of treating clinical sepsis or suspected sepsis with negative culture results remains contentious and lacks consensus among providers. (13) Moreover, evidence suggests that providers continue to subscribe to high antibiotic utilization when the overall incidence of EOS remains low in high-income countries. (13)

Neonatal Early-Onset Sepsis (NEOS) Calculator:

Kaiser Permanente developed the NEOS calculator to estimate EOS risk per 1,000 live births in newborns greater than or equal to 34 weeks gestation utilizing applicable maternal delivery variables. (22) The calculator was tested and modified over 14 years using a large multi-center birth cohort that included over 600,000 newborns. (22, 25) This free web-based online tool is designed to provide guidance and management pathways for EOS evaluations and empiric antibiotic therapy based on maternal risk factors and clinical examinations (<https://neonatalesepsiscalculator.kaiserpermanente.org>).

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The calculator utilizes a multivariate assessment risk of EOS in newborns greater than or equal to 34 weeks gestation. (30) The summation of risk factor variables includes:

- An incidence of EOS per 1000 live births (0.5 per 1000 live births is the CDC incidence or unit-specific EOS incidence)
- Gestational age of the newborn
- Highest maternal intrapartum temperature

- Length of time of rupture of membranes
- Maternal GBS status
- And initiation of intrapartum antibiotic prophylaxis before delivery (22)

Additionally, the calculator allows the provider to enter a physical examination assessment. Based on the assessment findings, the clinical state of the newborn is characterized into one of the following hierarchical, mutually exclusive categories according to predetermined criteria: (1) well-appearing, (2) equivocal, or (3) clinical illness. (22)

The developers of the NEOS calculator recommend utilizing the tool from birth up to 24 hours of age, which is a conservative approach but would likely detect clinical changes in the newborn. (22) There are four progressive tiers of recommendations based on risk scores and clinical symptomology to help guide providers: (1) observe without evaluation, (2) observe and evaluate (obtain blood culture), (3) evaluate and strongly consider antibiotics, and (4) evaluate and treat with empiric antibiotics. Multiple studies have reported fewer EOS evaluations and a 44% to 78% reduction in empiric antimicrobial therapies with the implementation of the NEOS calculator over extended periods. (26–29)

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In the seminal study conducted by Escobar et al. using the NEOS calculator, a newborn who presents with clinical illness per physical examination and sepsis risk factors present, a score of ≥ 1.54 per 1000/births, or having a combination of an equivocal presentation with risk factors and a score of $\geq .065$ per 1000/births would constitute a high-risk newborn requiring further evaluation.

(22) This supports the assumption that as the probability of sepsis risk increases, so does the NEOS risk score per 1000/births.

Rationale:

Over the past 12 years, the CDC, AAP, and NICE published guidelines and reports regarding the appraisal and management of EOS in newborns. (3–9, 30) These directives have inspired progressive clinicians to adopt evidence-based practices in managing EOS to limit newborn exposure to unwarranted antibiotic administration and mitigate adverse outcomes. As previously stated, providers, including those working in the NICU of interest for this Quality Improvement Project (QIP), continue to practice based on knowledge acquisition from initial programs of study or local unit traditions where historical viewpoints outweigh the current trends toward evidence-based antibiotic stewardship in the NICU. The mean incidence of EOS within the NICU of interest for this QIP was 1.44 cases per 1,000 live births over nine years, 2010-2018. Moreover, 65% of newborns over or equal to 34 weeks gestation received empiric antibiotic therapy. These figures supported the need for providers to critically examine current unit practices and consider adopting an evidence-based approach to decreasing antibiotic exposure among newborns classified as low-risk for developing EOS.

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Specific Aims:

This QIP aimed to reduce EOS evaluations and empiric antibiotic use by 20% in newborns greater than or equal to 34 weeks admitted to the NICU by implementing an evidence-based protocol using the NEOS calculator. A 20% reduction was deemed an achievable goal within the time frame of the QIP.

The secondary aims of this project included examining provider adherence rates following the implementation of the NEOS calculator and estimating the potential reduction of EOS evaluations and empiric antibiotic use retrospectively (July–December 2016) before the implementation of the NEOS calculator in 2018. Additional outcome measures included evaluating NEOS calculator recommendations with actual cases of EOS and the stratification of antibiotic use based on the clinical presentation compared to the recommendations from the NEOS calculator.

Methods:

Context:

The setting for the project was a 50-bed, level III regional transport designated NICU, admitting approximately 600 to 700 newborns annually. Referral newborns comprise 20% of the annual admissions from the surrounding communities. A private group of six neonatologists and neonatal nurse practitioners support this unit, along with several pediatric subspecialists.

Inclusion criteria for the QIP were newborns greater than or equal to 34 weeks gestation with a complete maternal history. Exclusion criteria included newborns under 34 weeks gestation and those with missing maternal data (i.e., maternal temperature, variables factored into the NEOS calculator).

Needs Assessment and Stakeholder Buy-In:

Before implementing this project, stakeholder buy-in was garnered by identifying the historical antibiotic prescribing practices and the number of EOS evaluations among newborns greater than or equal to 34 weeks' gestation admitted to the NICU between July through December 2016. The pre-implementation evaluation was discussed and analyzed with one of the country's leading clinical researchers in neonatology to establish credibility for the project among the NICU providers. Data related to 203 newborns who met inclusion criteria were processed using the NEOS calculator. NEOS scores were retrospectively applied to compare empiric antibiotic use and EOS evaluations to the NEOS calculator recommendations using the CDC incidence of EOS of 0.5 per 1000 live births. Findings were presented to the providers and key stakeholders. The initial presentation included the outcomes of the baseline analysis, which supported the need to implement new unit EOS protocols/guidelines with the application of the NEOS calculator. Moreover, this data served as the comparison or baseline group for post-implementation data analysis.

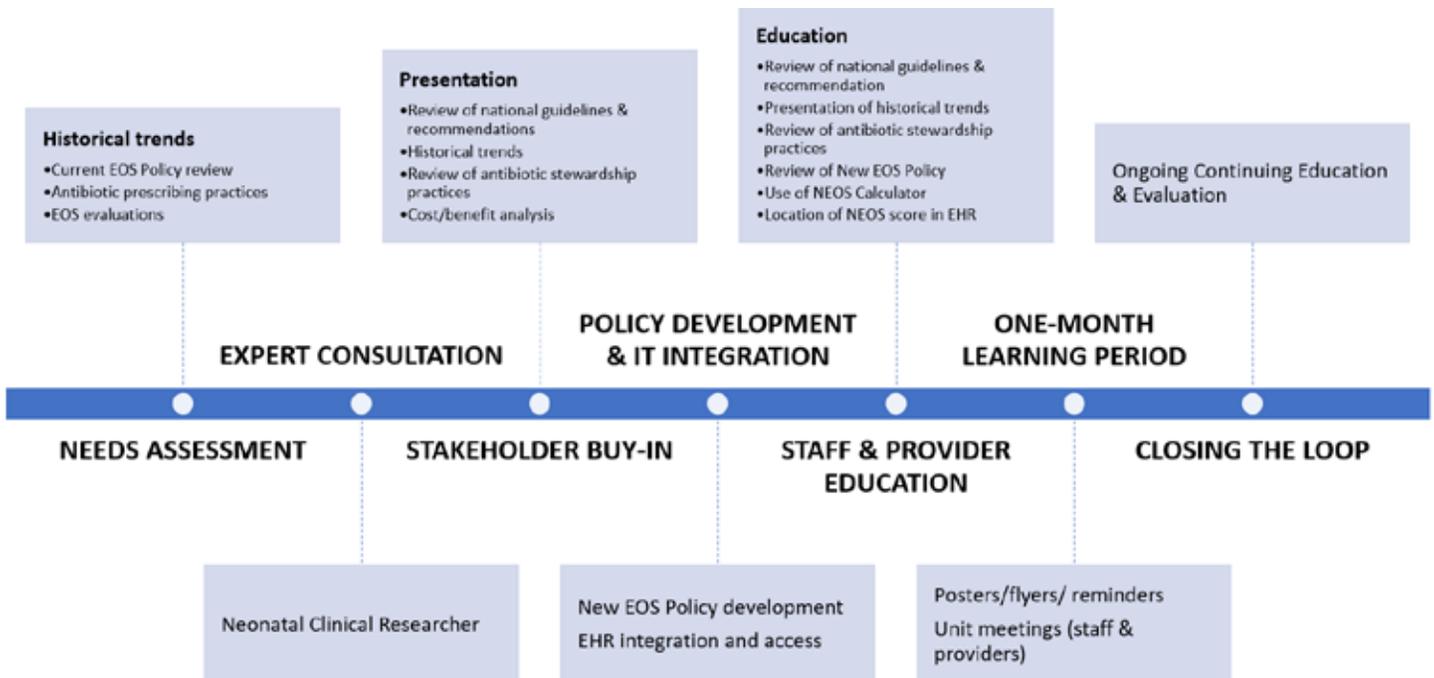
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A new unit EOS policy was developed and integrated into the existing electronic medical record (EMR) system. Staff and provider education related to the current national guidelines and recommendations, a review of antibiotic stewardship practices and best recommendations, the use of the NEOS calculator, and the goals of the QIP were presented. Posters, flyers, and reminders were displayed on the unit, and the investigator frequently attended staff and provider unit meetings to provide continuing education and answer any questions. The post-implementation phase began after a one-month learning period (see Figure 1).

Intervention:

Implementation of the NEOS calculator with the revised EOS protocol occurred over nine months, from June 2018 to February 2019. Before the QIP was implemented, educational sessions were conducted for providers and NICU staff nurses, including PowerPoint presentations and interactive, hands-on scenarios from the NEOS calculator website. This antibiotic stewardship QIP's purpose was to transform the providers' behavior and

Figure 1. Timeline of Stakeholder Buy-in



the unit's culture toward a more evidence-based perspective of EOS within the NICU. Pre- versus post-implementation unit EOS guidelines were as follows:

Pre-implementation

- Blood culture at birth.
- CBC, CRP at birth.
- Empiric antibiotics based on risk factors.
- CBC, CRP at 24 hours of age.

Post-Implementation

- Evaluation per the NEOS calc.
- CBC between 6 to 12 hours of age.
- Empiric antibiotics per the NEOS calc.
- Repeat CBC as needed.

Additionally, two algorithms were created for newborns < and ≥34 weeks gestation, including new parameters for observation of late preterm and term newborns exposed to chorioamnionitis. Algorithms and NEOS calculator instructions were inserted into the unit's practice guideline binder. Also, a NEOS calculator shortcut was created on the desktops of each computer system in the NICU for easy reference.

Study of Intervention:

As previously noted, before project implementation, the mean incidence of EOS within the QIP facility was 1.44 cases per 1000 live births. Therefore, NEOS scores were collected prospectively utilizing two EOS incidences: 0.5 per 1000 live births (per CDC recommendations) and one per 1000 live births (consistent with unit cases). The intent was to compare the recommendations from the calculator on EOS evaluations (i.e., recommendations to obtain a blood culture) and initiation of empiric antibiotics. After the fifth month of data collection, a change was made to restrict incidence calculation parameters to one per 1000 live births, more representative of the local EOS incidence. Baseline data collected and analyzed during the needs assessment of this project served as the comparison group to examine the effectiveness of the intervention following implementation.

Providers' practices were examined for adherence to the NEOS calculator recommendations. Documentation included the NEOS calculator birth score and clinical exam score were included within the EMR under an appropriate diagnosis.

Measures and Analysis:

A convenience sample obtained from a single tertiary NICU was used for this project. All vital healthcare information was deidentified, converted into 69 variables, and stored in a password-protected database. The primary outcome of the QIP was to examine the effectiveness of implementing an evidence-based EOS protocol using the NEOS calculator in reducing EOS evaluations and empiric antibiotics use.

A secondary outcome measure was provider adherence rates. The NEOS calculator recommendations with actual cases of EOS and the stratification of antibiotic use based upon the clinical presentation to the recommendations from the NEOS calculator served as additional outcome measures.

SPSS 27 was used for data analysis. Descriptive statistics were employed to assess frequencies and percentages across group demographic characteristics and other variables of interest, including provider adherence. Independent sample *t*-tests were used to evaluate the mean differences between EOS evaluations and empiric antibiotics between pre- and post-implementation periods. The significance level was set at 0.5.

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Ethical Considerations:

A local public university granted Institutional Review Board (IRB) approval before the QIP started. The participating hospital accepted this IRB approval. Data de-identification, collection, and documentation utilized a corresponding ID number for each newborn to protect confidentiality. The findings of this project have been limited to the reporting of aggregate data.

Results:

Pre-Implementation Demographic Characteristics:

The retrospective analysis included 203 newborns scored through the NEOS calculator. Demographics for this group were mostly Caucasian 56.2% (n =114) and male 62.1% (n = 126), with an average gestational age of 37.4 weeks and birthweight of 2932 grams. Cesarean section (CS) deliveries accounted for 53% (n = 108) of deliveries. Positive maternal GBS status was 17.7% (n = 36), while 37.4% (n = 76) were unknown at delivery time. Additionally, 7.9% (n = 16) were born to mothers with a temperature ≥ 38° Celsius. Table 1 summarizes the demographic characteristics associated with the pre-implementation group.

Table 1. Pre vs. Post-Implementation Demographic Characteristics

	Pre-Implementation N=203	Post-implementation N=357	P value
Mean gestational age (weeks)	37.4	37.1	.10
Mean birthweight (grams)	2932g	2934g	.98
Term	119 (58.6)	195 (54.6)	.36
Late preterm	84 (41.4)	162 (45.4)	.36
Male	126 (62.1)	196 (54.9)	.09
Female	104 (37.9)	161(45.1)	.05
Caucasian	114 (56.2)	198 (55.5)	.87
African-American	79 (38.9)	133 (37.3)	.72
Hispanic	4 (2%)	16 (4.5)	.13
C-section	108 (53.2)	195 (54.6)	.75
SVD	95 (46.8)	162 (45.4)	.75
Maternal fever (>38.0 C)	16 (7.9)	32 (9)	.66
Maternal GBS positivity	36 (17.7)	64 (17.9)	.95
Maternal GBS unknown	76 (37.4)	129 (36.1)	.76

EOS Evaluations and Empiric Antibiotic Administration:

Among participants in the pre-implementation group, empiric antibiotics were administered to 65% (n = 132), and EOS evaluations were obtained on 99% (n = 201) of newborns. Clinical examination findings revealed that 51.7% (n = 105) were well-appearing, and 48.3% (n = 98) were characterized as clinical illnesses. Clinical illness was defined as receiving any respiratory support, from a nasal cannula to full ventilator support. Due to the retrospective nature of the evaluation, no newborns were classified as equivocal. See Tables 2 and 3.

Of the 203 newborns scored using the NEOS calculator, recommendations revealed that three newborns should have received an EOS evaluation, and only one recommendation was made to initiate an EOS evaluation and empiric antibiotics. Contrary to these recommendations, 61.9% (n = 65) of newborns were treated with empiric antibiotics. Seven newborns categorized as well-appearing had a positive blood culture; one culture was positive for GBS, and the remaining six were colonized with other bacteria. Of the seven positive cultures, only the newborn with GBS bacteremia and another with positive blood and cerebral spinal fluid (CSF) cultures for *Bacillus cereus* were treated with a full course of antibiotics. The newborn with meningitis was treated with ampicillin and gentamicin for 19 days. Five positive blood cultures were considered contaminants, and these newborns received less than five days of antibiotic therapy. In comparison, one newborn received seven days of treatment for possible sepsis. It is important to note that the NEOS calculator would have recommended "observation without evaluation" for all seven newborns with positive blood cultures who had a well-appearing clinical examination using the CDC EOS incidence of 0.5 per 1000.

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Of those 98 newborns categorized as clinical illness, 68.4% (n = 67) received empiric antibiotic administration, and all were evaluated for EOS, including the collection of blood cultures. Conversely, the NEOS calculator recommended that 100% of newborns be evaluated, suggested the initiation of empiric antibiotics on 37.7% (n = 25), and recommended that providers strongly consider empiric antibiotic administration on newborns' remaining 62.3% (n = 42). Finally, only one blood culture was positive for *E. coli*, and this newborn received 17 days of antibiotic therapy. The calculator's recommendations were to evaluate and strongly consider antibiotics for this newborn with *E. coli* sepsis.

Risk Stratification of Antibiotic Use and Physical Examination:

Quantitative risk stratification was analyzed for antibiotic use in

relation to the physical examination findings. Of the 105 well-appearing newborns, all received an EOS evaluation, and empiric antibiotics were initiated on 56.2% (n = 59) despite being in the two lowest birth risk scores when scored using the NEOS calculator. Moreover, the NEOS calculator recommended obtaining blood cultures on only five of the 99 newborns within these lower-tiered categories, while withholding empiric antibiotics was recommended for all. The newborns categorized as well-appearing with birth scores > 1.54 (high-risk) received an EOS evaluation and were treated empirically, mirroring the NEOS calculator recommendations. Of the 98 newborns whose physical examination was categorized as clinical illness, all were evaluated, and 68.3% (n = 67) were treated empirically.

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The NEOS calculator could reduce empiric antibiotic administration by 71.2% among the well-appearing and clinical illness groups. Furthermore, the strongly considered recommendation reduces empiric therapy if the provider evaluates high-risk maternal factors while excluding respiratory distress disorders like transient tachypnea of the newborn and respiratory distress syndrome in the LPT and term population. Only one newborn was diagnosed with NEC, and there were no readmissions or deaths related to EOS.

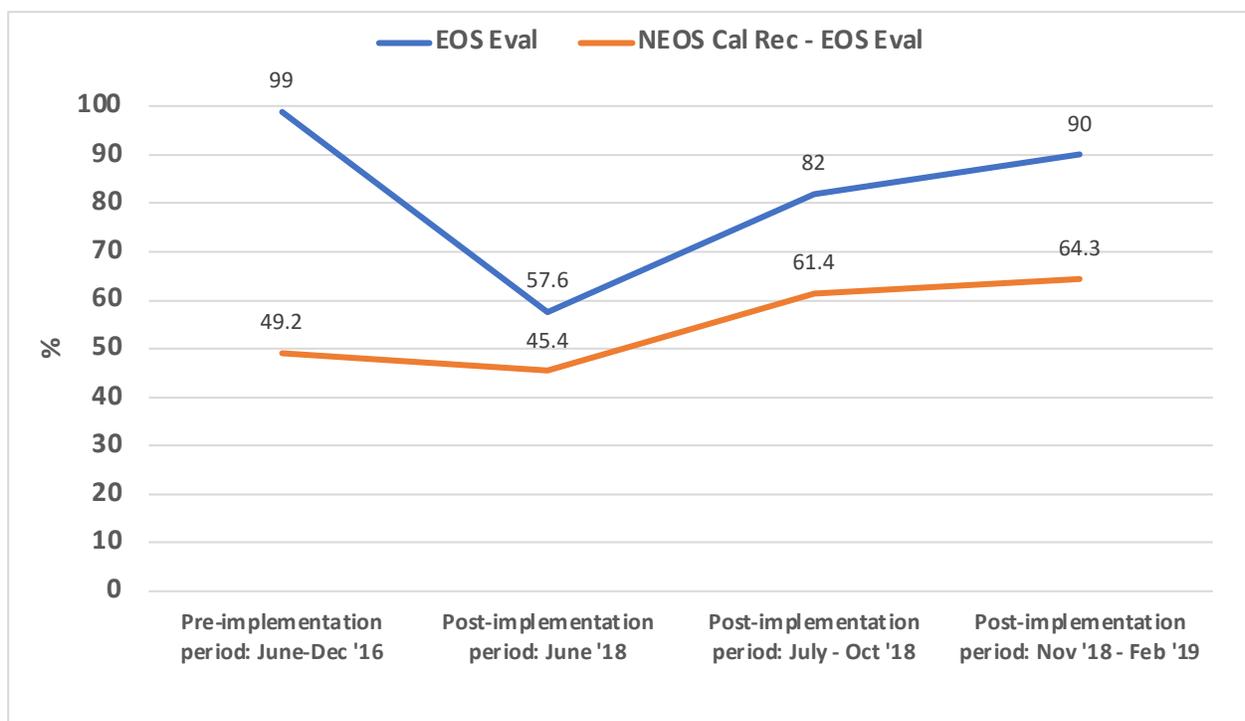
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Post-Implementation:

Timeframe and Demographic Characteristics:

The post-implementation period consisted of nine months of data collection within the unit and scored 357 newborns prospectively

Table 2. EOS evaluations actual vs NEOS calculator recommendations.



using the NEOS calculator. Of the 357 newborns, 15.6% (n = 56) were referral newborns from outlying facilities. Participants were mostly Caucasian 55.5% (n = 198), male 54.9% (n = 196), with a mean birthweight of 2934 grams and gestational age of 37.1 days. Cesarean section accounted for 54.6% (n = 195) of deliveries. Maternal GBS positivity was 17.9% (n = 64), while unknown status included 36% (n = 129). Maternal fever above 38 degrees Celsius applied to 9% (n = 32) of the participants. See Table 1.

NEOS Calculator

For the first five months following the implementation of the calculator, the incidence of EOS risk was set at 0.5/1000 births to determine scores, recommendations, and direct treatment measures. For the remaining four months of the project, the incidence was increased to one per 1000 live births to resemble the facility's local EOS incidence more closely.

Empiric Antibiotic Administration:

During the nine-month collection period, 81.8% (n = 292) of newborns were evaluated for EOS, a decrease of 17.4% from the pre-implementation period, $\chi^2 (1, n=560) = 36.28, p < .001$. Empiric antibiotics were prescribed for 51.5% (n = 184) of newborns, a decrease of 20.3% prior to implementing the NEOS calculator $\chi^2 (1, n = 560) = 9.16, p < .003$. Of the 357 newborns, the clinical exam within the NEOS calculator resulted in a distribution as follows: 39.2% (n = 140) were categorized as well-appearing, 9% (n = 32) as equivocal, and 51.8% (n = 185) as clinical illness.

Incidence of Risk 0.5 per 1000 live births

As previously stated, during the first five months of the post-implementation period NEOS calculator was set using an incidence of risk of 0.5 per 1000 live births. Of the 357 newborns observed during the entire project, 217 were scored during the first five months; 40.1% (n = 87) were categorized as well-appearing, 9.7% (n = 21) as equivocal, and the remaining 50.2% (n = 109) as clinical illness.

Well-appearing physical examination

Of the 87 well-appearing newborns, 18.4% (n = 16) were treated with empiric antibiotics. Conversely, the NEOS calculator recommended obtaining an EOS evaluation for six newborns,

while empiric antibiotic administration was recommended for only one newborn. Subsequently, three well-appearing newborns developed suspected EOS for GBS (treated x 10 days) and *Enterococcus faecalis* (treated x 10 days), although a repeat blood culture and lumbar puncture (LP) obtained before the initiation of antibiotics were negative, and *E. coli*. In the case of *E. coli*, the initial blood culture drawn at birth was negative. However, a repeat blood culture was drawn just before 72 hours of age due to NEC symptomology and was consequently positive, as noted above.

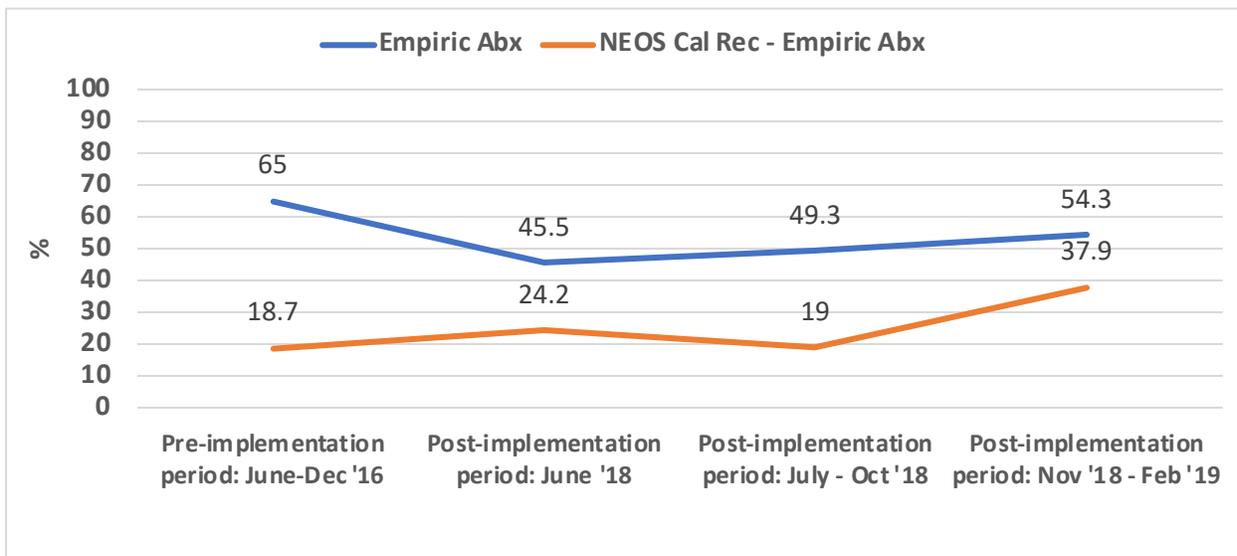
“During the nine-month collection period, 81.8% (n = 292) of newborns were evaluated for EOS, a decrease of 17.4% from the pre-implementation period, $\chi^2 (1, n=560) = 36.28, p < .001$. Empiric antibiotics were prescribed for 51.8% (n = 184) of newborns, a decrease of 20.3% prior to implementing the NEOS calculator $\chi^2 (1, n = 560) = 9.16, p < .003$.”

Additionally, two positive blood cultures were considered contaminants. The NEOS calculator did not recommend a blood culture for these cases of EOS using the 0.5 per 1000 incidence. However, if the 1.0 per 1000 incidence were utilized, the calculator would have recommended a screening blood culture for two (67%) positive cultures.

Equivocal physical examination

The equivocal presentation consisted of 21 newborns, of which 14.3% (n = 3) received empiric antibiotics. The NEOS calculator suggested that three newborns receive EOS evaluations and one to be treated empirically. One blood culture was a positive culture for GBS, and this newborn received a 13-day regimen of antibiotic therapy. This was another example of an ambiguous case of EOS,

Table 3. Empiric antibiotics actual vs. NEOS calculator recommendations



as both a repeat blood culture and LP were negative and obtained less than 18 hours from the initial culture. The NEOS calculator recommended “observe without evaluation” for the 0.5 and 1.0 per 1000 EOS incidences with an equivocal presentation in this newborn.

“Of the 87 well-appearing newborns, 18.4% (n = 16) were treated with empiric antibiotics. Conversely, the NEOS calculator recommended obtaining an EOS evaluation for six newborns, while empiric antibiotic administration was recommended for only one newborn. Subsequently, three well-appearing newborns developed suspected EOS for GBS (treated x 10 days) and Enterococcus faecalis (treated x 10 days), although a repeat blood culture and lumbar puncture (LP) obtained before the initiation of antibiotics were negative, and E. coli.”

Clinical illness physical examination

There were 109 newborns classified as clinical illness. Approximately 80% (n = 88) of these were treated empirically. However, this group had only three positive cultures: one GBS and the others categorized as not GBS or *E. coli*. Treatment consisted of 10 days for the GBS EOS case, while the other two newborns received seven and eight days of antibiotics for possible sepsis. The NEOS calculator recommended an evaluation and empiric antibiotics for two (67%) positive blood cultures using the 0.5 per 1000 EOS incidence. The calculator recommendations for these three EOS cases were the same despite a change in the EOS incidence to 1.0 per 1000 live births.

“Overall, for the first five months after the implementation of the NEOS calculator, 50% (n = 107) of newborns were treated empirically. In sharp contrast, NEOS calculator recommendations suggested initiating empiric antibiotics on only 19.4% (n = 42). Additionally, 78.3% (n = 170) of newborns received an EOS evaluation versus 54.4% (n = 118) based on calculated scores.”

Overall, for the first five months after the implementation of the NEOS calculator, 49.3% (n = 107) of 217 newborns were treated empirically. In sharp contrast, NEOS calculator recommendations suggested initiating empiric antibiotics on only 19.4% (n = 42). Additionally, 78.3% (n = 170) of newborns received an EOS evaluation versus 54.4% (n = 118) based on calculated scores (Table 2, Table 3).

Stratification of Antibiotic Use and Physical Examination:

There were 150 newborns who were identified under the lowest risk stratifications for the calculator (birth score of < 0.64 with well or equivocal exam and birth score of 0.65–1.54 with well exam). EOS evaluations were done on 53.5% (n = 80), while only 6% (n = 9) were recommended. Furthermore, 16.2% (n = 24) of newborns were treated with antibiotics within the lowest risk stratifications. The most challenging decision from the NEOS calculator is to evaluate and strongly consider antibiotics. In this group, 72.5% of newborns received antibiotics. There was the potential to reduce EOS evaluations by 30.5% and empiric antibiotics by 61.4% per the recommendations from the calculator.

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Incidence of Risk 1 per 1000 live births

The remaining four months of the project included 140 newborns scored through the NEOS calculator with one per 1000 live births to resemble the local incidence of EOS more closely within the tertiary facility. Of these 140 newborns, 37.8% (n = 53) were categorized as well-appearing, with 15.1% (n = 8) receiving empiric antibiotics. The NEOS calculator suggested evaluating eight newborns and starting antibiotics for only one well-appearing newborn. There was one positive culture during the latter four months, which was considered a contaminant. This newborn received 48 hours of antibiotic therapy while the calculator recommended to “observe without evaluation.”

There were 11 newborns with an equivocal physical examination, and 45.5% (n = 5) were treated empirically. In contrast, recommendations were to evaluate six of these newborns while initiating empiric antibiotics on only one.

Fifty-four percent (n = 76) of newborns were characterized as clinical illness; 82.9% (n = 63) received antimicrobials. In this same group, the NEOS calculator recommendations were to obtain EOS evaluations on all 76 patients, strongly consider antibiotic administration for 32.9% (n = 25), and initiate empiric antibiotic therapy on the remaining 67.1% (n = 51) of newborns.

“Fifty-four percent (n = 76) of newborns were characterized as clinical illness; 82.9% (n = 63) received antimicrobials. In this same group, the NEOS calculator recommendations were to obtain EOS evaluations on all 76 patients, strongly consider antibiotic administration for 32.9% (n = 25), and initiate empiric antibiotic therapy on the remaining 67.1% (n = 51) of newborns.”

During the latter four months, the NEOS calculator recommended that 64.3% (n = 90) of newborns receive an EOS evaluation, while providers evaluated 90% (n = 126). Furthermore, the recommendations from the calculator suggested treating 37.9% (n = 53) with antibiotics, but 54.3% (n = 76) were treated empirically (Table 2, Table 3).

Provider Adherence

During the post-implementation phase, provider adherence, or lack thereof, was operationalized as two separate outcome measures: recommended EOS evaluation and unwarranted antibiotic utilization. The first measure of adherence was analyzed based on the number of calculator recommendations made to obtain an EOS evaluation compared to the number of EOS evaluations ordered by providers. Of the 357 newborns scored using the NEOS calculator during this period, providers obtained EOS evaluations on 82.9% (n = 295), despite recommendations made to evaluate only 208 newborns, indicating an overall adherence rate to this measure of only 58.2%. The second measure, unwarranted antibiotic administration, was defined as the number of newborns treated with antibiotics despite calculator recommendations to “observe” or “strongly consider” empiric antibiotics without the presence of additional risk factors such as a chest x-ray consistent with meconium aspiration syndrome. Of the 185 newborns treated with empiric antibiotics, provider adherence to the NEOS calculator recommendations was 51.6% (n = 95).

Discussion:

Summary and interpretation:

An overall decrease in empiric antibiotics by 20.3% was noted following the NEOS calculator’s implementation. Additionally, EOS evaluations declined by 17.4% during the post-implementation period, approaching the goal of 20% established for the QIP. Although these findings indicate improvement, they are less substantial than similar studies, which reported favorable results in reducing laboratory testing and a 38 to over 50% potential

reduction in antibiotic use with the introduction of the NEOS calculator over time. (26, 28, 31) These results may be attributed to the limited timeframe and the stepwise approach taken by the investigators to target a gradual reduction to assess the impact and feasibility of this intervention before projecting more substantial reductions.

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One phenomenon that was discussed among the investigators before the implementation of the NEOS calculator was that providers would possibly follow the recommendations from the calculator regardless of assessing EOS risk factors for each newborn. For example, a 36-week infant delivered by repeat C-section requiring CPAP with minimal risk of infection would still be classified as “clinical illness,” suggesting “strongly consider” or “begin” empiric antibiotics. In contrast, this newborn would have been evaluated while withholding empiric antibiotics before implementing the NEOS calculator. Subsequently, 82.2% of newborns treated during the post-implementation period and 68.3% during the pre-implementation period were categorized under clinical illness. This could be interpreted as the providers following the NEOS calculator suggestions indiscriminately rather than considering EOS risk factors in practice during the pre-implementation period.

The biggest quandary for providers during the QIP was trusting the recommendations of the NEOS calculator in two specific scenarios: observe without evaluation and evaluate and strongly consider antibiotics. More newborns received an EOS evaluation in the first scenario by a large margin, while most antibiotics administered under the second scenario could have been withheld initially. It is essential to highlight that many of the newborns categorized as clinical illnesses with minimal maternal risk factors for an infection

subsequently received empirical therapy. It is postulated that provider skepticism about the accuracy of the NEOS calculator contributed to unnecessary antibiotic administration. There was no evidence of increased severity of EOS with improved antibiotic stewardship utilizing the NEOS calculator. This further supports the findings of Cantey and Baird, who reported that providers' decisions to treat empirically might be related to concerns about false-negative blood culture results. (11)

“An overall decrease in empiric antibiotics by 20.3% was noted following the NEOS calculator’s implementation. Additionally, EOS evaluations declined by 17.4% during the post-implementation period, approaching the goal of 20% established for the QIP. Although these findings indicate improvement, they are less substantial than similar studies, which reported favorable results in reducing laboratory testing and a 38 to over 50% potential reduction in antibiotic use with the introduction of the NEOS calculator over time.”

Limitations:

The major limitation of this QIP was the timeframe between the pre-implementation and post-implementation periods. Other limitations include a smaller sample size when compared to multi-site studies, as data were obtained from a convenience sample and limited to a single tertiary NICU. Another consideration related to sample size was the lack of inclusion of newborns with incomplete maternal records (n = 81), particularly for those admitted from outlying centers.

In addition, during the post-implementation period, there was a lack of ability to differentiate decision-making between the neonatologist and the NNP. Therefore, the physician of record on each admission note was utilized to assess adherence to the calculator. This lends to possible discrepancies in the decision-making process with the calculator among providers.

The sustainability of the NEOS calculator within the NICU was not evaluated beyond the QIP due to the facility’s change of ownership, the introduction of new EMR systems, and provider relocation. In 2020, there was a perception of periodic provider abandonment from the newly established EOS guidelines and indifference to the NEOS calculator despite the noted improvements in antibiotic stewardship without adverse outcomes.

Conclusions:

There is a utility for NEOS calculator use if providers are willing to accept an evidence-based guideline that utilizes maternal risk factors and close observation during the initial 12 to 24 hours

of life to guide treatment plans; however, resistance to change is expected in the NICU environment. Therefore, providers must address outdated unit practices and embedded beliefs to effectively implement and adopt best practices to improve patient outcomes and mitigate the adverse effects of unnecessary laboratory testing and unwarranted antibiotic administration in this vulnerable population.

“The biggest quandary for providers during the QIP was trusting the recommendations of the NEOS calculator in two specific scenarios: observe without evaluation and evaluate and strongly consider antibiotics. More newborns received an EOS evaluation in the first scenario by a large margin, while most antibiotics administered under the second scenario could have been withheld initially. It is essential to highlight that many of the newborns categorized as clinical illnesses with minimal maternal risk factors for an infection subsequently received empirical therapy. It is postulated that provider skepticism about the accuracy of the NEOS calculator contributed to unnecessary antibiotic administration. There was no evidence of increased severity of EOS with improved antibiotic stewardship utilizing the NEOS calculator.”

Since the most recent publications of guidelines for EOS of the newborn by the AAP in 2018, considerations to utilize an evidence-based protocol with close clinical assessment remains a sensible approach, especially considering that less than 1% of newborns admitted to the NICU are diagnosed with EOS. Another critical factor is to examine management practices and EOS incidence within individual units to facilitate a customizable option for practice. These decisions can be enhanced by providers carefully assessing maternal delivery attributes with newborns who fall under the clinical illness category.

Nursing and medical staff buy-in, or lack thereof, contribute significantly to the successful implementation, evaluation, and sustainability of QIPs within the NICU. Finally, the importance of provider accountability in establishing practices that improve the quality of care for patients, consumers, and healthcare organizations acceptable to the level of expenditures accompanying each NICU

admission cannot be underestimated.

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Towards —

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(she/her)**
Envision Healthcare



**Vargabi Ghei, MD, MSHS
(she/her)**
Envision Healthcare,
HCA Northwest Hospital



**Pamela Torreblanca, RN,
Clinical Nurse Coordinator
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HCA Northwest Hospital

FAMILY INTEGRATED CARE: FROM PILOT TO PRACTICE IN A BUSY LEVEL 3 NICU



**Emily Whitesel, MD
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Attending Neonatologist,
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Medical Center (BIDMC)



**Molly Fraust-Wylie
(she/her)**
NICU Family Program
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Cardiac Corner Teaser

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A 34 and 6/7 premature baby boy presented with a murmur and a failed congenital heart screening with a saturation of 87; they were intubated with 100% oxygen for respiratory distress. A chest x-ray was obtained. Please describe five abnormal findings (see answers at the end of Cardiac Corner).



Image 1: Chest x-ray of this 2-day-old who, on critical CHD screening, “failed” with a pulse oximetry reading of 88 in the right hand and 87 in the left foot.

National Perinatal Association: Further Enhance our Impact in Delivering Education, Supporting Providers and Families, and Advocating for Improved Perinatal Outcomes Nationwide

Chavis A. Patterson, PhD

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.



“As the newly appointed president of the board of directors for the National Perinatal Association (NPA), I am honored and excited to continue the remarkable work of our organization over the next two years.”

As the newly appointed president of the board of directors for the National Perinatal Association (NPA), I am honored and excited to continue the remarkable work of our organization over the next two years. Building upon the solid foundation laid by our predecessors, we aim to enhance

further our impact in delivering education, supporting providers and families, and advocating for improved perinatal outcomes nationwide.

“Building upon the solid foundation laid by our predecessors, we aim to enhance further our impact in delivering education, supporting providers and families, and advocating for improved perinatal outcomes nationwide.”

I hope to capitalize on the strength of our diverse membership to broaden the scope of our work and reach more providers and families nationwide. By fostering a supportive and inclusive environment, we can harness our members' unique perspectives, skills, and resources to develop innovative solutions and initiatives that address the multifaceted challenges families face during the perinatal period. Through collaborative efforts, we will ensure that our policies are inclusive, responsive, and effectively address the diverse needs of families from all backgrounds and circumstances.

“I hope to capitalize on the strength of our diverse membership to broaden the scope of our work and reach more providers and families nationwide.”

As we embark on this journey, I am committed to providing guidance and leadership to our organization as we navigate the complexities of perinatal

care. By fostering open communication, collaboration, and shared decision-making, we will continue to advance our mission of promoting the health and well-being of families during this critical phase. Thank you for the opportunity to serve as your president, and I look forward to working alongside each of you to pursue our collective goals.

“As we embark on this journey, I am committed to providing guidance and leadership to our organization as we navigate the complexities of perinatal care. By fostering open communication, collaboration, and shared decision-making, we will continue to advance our mission of promoting the health and well-being of families during this critical phase. Thank you for the opportunity to serve as your president, and I look forward to working alongside each of you to pursue our collective goals.”

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2024

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The Indirect Impact of RSV

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:

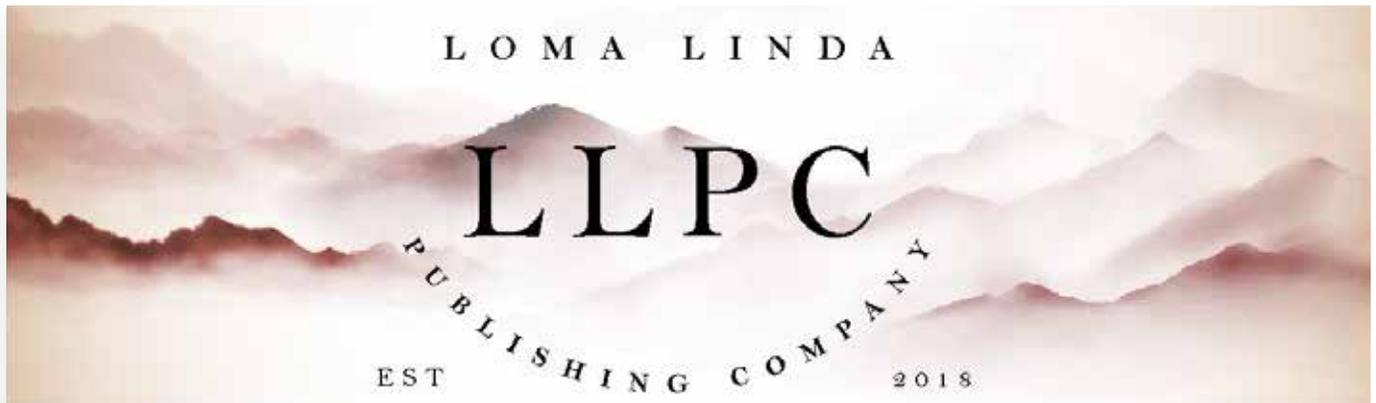
- **Long-lasting health challenges** for babies and young children
- **Financial, social and emotional burdens** for families
- **Frustration for providers**, who lack a cure or viable preventive interventions

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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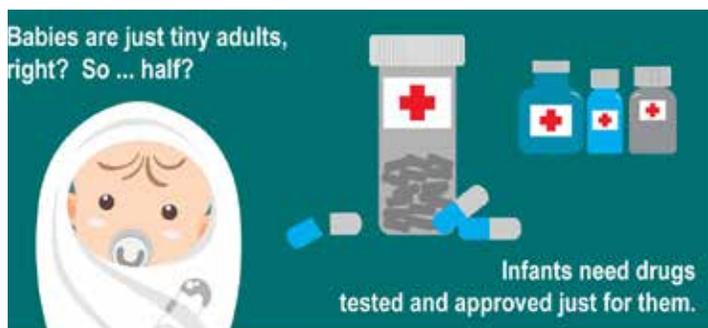
Which Infants are More Vulnerable to Respiratory Syncytial Virus?

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%

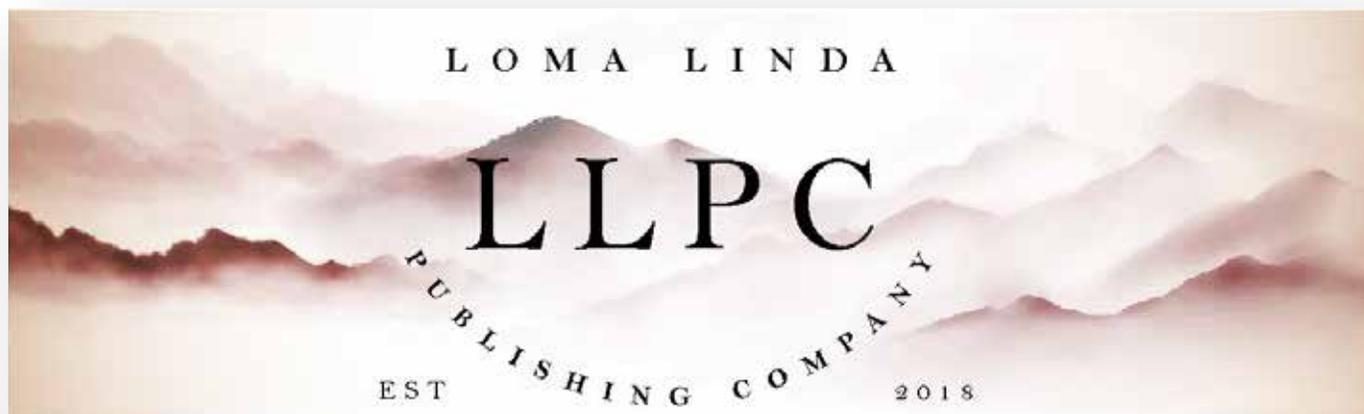


Center for Clinical Trials and Research  National Center for Juvenile Health



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.

AfPA
Alliance for Patient Access



Ethics and Wellness: Empathy, not Blame

Mitchell Goldstein, MD, MBA, CML; Lily Martorell-Bendezu, MD; Elba Fayard, MD; and T. Allen Merritt, MD, MHA

“...blame is harmful. It erodes trust, undermines morale, and impedes learning. It creates a culture of fear, defensiveness, and isolation. Blaming others prevents us from addressing the root causes of adverse outcomes or situations and sets back improvements in the quality and safety of neonatal care.”

Blame is a toxic emotion that can poison trainees and coworkers in the field of neonatology. It is one of the antitheses of wellness. Blame can arise from various sources, such as parents, colleagues, administrators, learners, or even oneself. It can be directed at individuals, teams, systems, and institutions. Blame may be based on factual evidence, subjective perceptions, or unfounded assumptions. However, regardless of its origin, target, or validity, blame is harmful. It erodes trust, undermines morale, and impedes learning. It creates a culture of fear, defensiveness, and isolation. Blaming others prevents us from addressing the root causes of adverse outcomes or situations and sets back improvements in the quality and safety of neonatal care.

As neonatologists, we work in a complex, high-risk environment where we face daily challenging care decisions, ethical dilemmas, moral distress, and uncertainty. We care for the most vulnerable patients and their families, who often experience intense emotions, such as grief, anger, guilt, or hopelessness. We also face increasing pressures from external forces, such

“Empathy is the ability to understand and share the feelings of another without judgment or bias. Empathy allows us to see the situation from different perspectives, appreciate the challenges and constraints that others face, and recognize our common goals and values. Empathy fosters a culture of compassion, collaboration, and communication. It enables us to support each other, to learn from each other, and to improve together.”

as regulatory agencies, insurance companies, or legal systems, that may impose unrealistic expectations, conflicting demands, or punitive measures on rational clinicians. In such a context, it is understandable that blame may arise as a way of coping, venting, or seeking justice. Nevertheless, indulging in blame or ignoring its consequences is neither acceptable nor productive.

What we need, instead of blame, is empathy. Empathy is the ability to understand and share the feelings of another without judgment or bias. Empathy allows us to see the situation from different perspectives, appreciate the challenges and constraints that others face, and recognize our common goals and values. Empathy fosters a culture of compassion, collaboration, and communication. It enables us to support each other, to learn from each other, and to improve together.

“Research has shown that blame culture activates the amygdala, leading to feelings of fear, anxiety, and disengagement. In other words, blaming another reduces their capacity to have a 'learning or teachable moment.'”

Consider for a moment that blame interacts with the amygdala in the brain's region involved in emotional processing and plays a crucial role in our response to threats and dangers. Research has shown that blame culture activates the amygdala, leading to feelings of fear, anxiety, and disengagement (1). In other words, blaming another reduces their capacity to have a “learning or teachable moment.”

“...brain structures highly involved in the emotional component of empathy include the inferior frontal gyrus, inferior parietal lobule, anterior cingulate, and anterior insula. These structures create the network responsible for emotion recognition, emotional contagion, motor empathy, and shared pain, or increasing the possibility of learning. In their review article, these authors emphasize that empathy and compassion set the stage for new learning and personal growth.”

In contrast, brain structures highly involved in the emotional component of empathy include the inferior frontal gyrus, inferior parietal lobule, anterior cingulate, and anterior insula. These structures create the network responsible for emotion recognition, emotional contagion, motor empathy, and shared pain, or increasing the possibility of learning (2). In their review article, these authors emphasize that empathy and compassion set the stage for new learning and personal growth. These approaches to corrective action offer a neurophysiological explanation regarding the preferred response to errors made by trainees, colleagues, or others in practice.

Empathy does not mean that we condone errors, overlook failures, or absolve accountability. It means that we approach them with curiosity, humility, and respect. It suggests we seek to understand the factors that contributed to them rather than assign blame. It means we use them as opportunities for feedback, reflection, and growth rather than as sources of shame, guilt, or resentment. Empathy means we offer and accept apologies, forgiveness, and reconciliation rather than inflict or endure punishment, isolation, or ostracism.

“Empathy does not mean that we condone errors, overlook failures, or absolve accountability. It means that we approach them with curiosity, humility, and respect. It suggests we seek to understand the factors that contributed to them rather than assign blame. It means we use them as opportunities for feedback, reflection, and growth rather than as sources of shame, guilt, or resentment.”

Empathy is not a trait we are born with or acquire once and for all. It is a skill that we can learn, practice, and cultivate. It requires intention, attention, and action. It demands that we listen actively, speak respectfully, and act kindly. It requires that we challenge our assumptions, acknowledge our biases, and correct our mistakes. We must model, teach, and reward empathic behaviors and discourage, correct, and sanction blaming behaviors. It requires that we create and sustain a culture of empathy at all levels, from bedside to boardroom, from classroom to courtroom, and from laboratory to legislature.

Empathy is neither a luxury nor a weakness nor a distraction. It is a necessity, a strength, and a priority to enhance learning from each other. It is the antidote to blame and the foundation of improving continuing excellence in neonatology. It is what our patients, their families, and ourselves deserve and demand from us. Approaching wellness, empathy, and not blame elevates the conversation and produces the most applicable path toward improved life satisfaction for all involved.

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2024

Keeping Your Baby Safe

from respiratory infections

**RSV
COVID-19
colds
flu**

How to protect your little one from germs and viruses

This year's cold and flu season may be a dangerous one - 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 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. Protect your baby from flu, pertussis, RSV, and COVID-19 by getting your immunizations.

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.

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Letters to the Editor

Letter to the Editor: Plasma L-alanine and L-asparagine Levels and Growth in Preterm Infants

Letter to the Editor: Plasma L-alanine and L-asparagine Levels and Growth in Preterm Infants

Dear Editor:

Measuring plasma metabolites is not readily available as a bedside tool to assess growth in preterm infants. Nilsson et al. (1) have shown a positive correlation between serum L-asparagine levels and growth parameters among preterm infants. Earlier, Aliu et al. (2) showed an association between a reduction in L-asparagine levels in very preterm infants and extrauterine growth restriction (EUGR). In a recent study, You et al. (3) elucidated the importance of plasma L-alanine and L-asparagine levels in the growth of preterm infants with and without bronchopulmonary dysplasia (BPD). In their research, You et al. (3) identified ten distinct plasma metabolites at 36 weeks postmenstrual age. They noted a decrease in plasma L-alanine and L-asparagine levels in infants diagnosed with BPD.

Interestingly, the percentages of infants with small for gestational age (SGA) and EUGR at discharge were higher in the no-BPD group (13% vs. 6.7% SGA, 80% vs. 76.7% EUGR). Despite having more SGA and EUGR presentations, the infants with no BPD but with higher plasma L-alanine and L-asparagine levels had good catch-up growth by two years of age (Figure 1), implying the importance of plasma L-alanine and L-asparagine levels in growth. This unique finding needs further exploration.

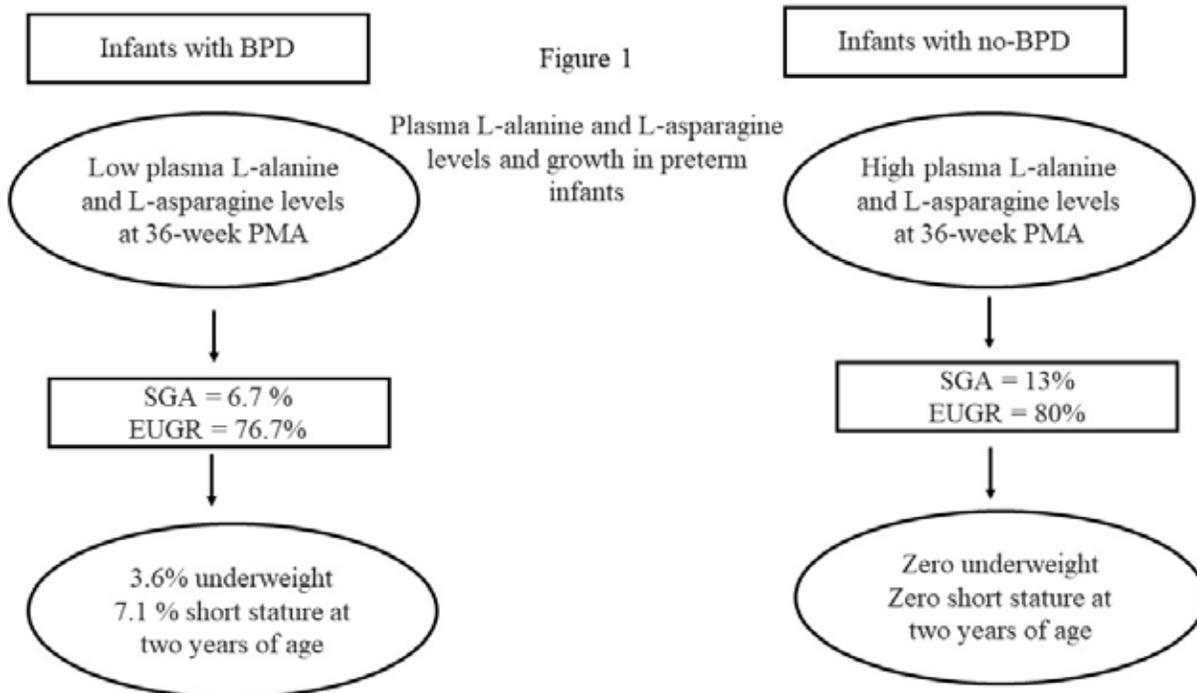
“Despite having more SGA and EUGR presentations, the infants with no BPD but with higher plasma L-alanine and L-asparagine levels had good catch-up growth by two years of age (Figure 1), implying the importance of plasma L-alanine and L-asparagine levels in growth. This unique finding needs further exploration.”

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1. Nilsson AK, Tebani A, Malmodin D, et al. Longitudinal Serum Metabolomics in Extremely Premature Infants: Relationships With Gestational Age, Nutrition, and Morbidities. *Front Neurosci*. 2022;16:830884. Published 2022 February 17. doi:10.3389/fnins.2022.830884
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Shabih Manzar, MD, MPH

Louisiana State University Health Sciences Center at Shreveport



BPD - Bronchopulmonary dysplasia; SGA - Small for gestational age
EUGR - Extrauterine growth restriction; PMA - Postmenstrual age

You Y, et al. *Early Hum Dev*. January 28, 2024.

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Dear Dr. Manzar:

Thank you for this exciting observation. The use of plasma metabolites to indicate potential growth potential has not been adequately explored. BPD, we know can influence growth and is not uniform in its presentation. While it would make sense that those babies with BPD might have decreased growth potential, the idea that those without BPD might be protected either with enhanced plasma metabolite supplementation or if their nutrition had been optimal in providing the necessary precursors for catch-up growth may be novel. (1-3)

“While it would make sense that those babies with BPD might have decreased growth potential, the idea that those without BPD might be protected either with enhanced plasma metabolite supplementation or if their nutrition had been optimal in providing the necessary precursors for catch-up growth may be novel. (1-3)”

Indeed, any stressor might be sufficient to reduce growth velocity, and thus, growth potential might also reduce the concentration of various plasma metabolites (while reducing others). This phenomenon may not be unique to the presence of BPD and may also be present with any number of other stressors. Or, BPD may alone be sufficient to reduce the concentration of these metabolites.

“Indeed, any stressor might be sufficient to reduce growth velocity, and thus, growth potential might also reduce the concentration of various plasma metabolites (while reducing others).”

The findings presented in the study by You et al. shed light on the potential role of plasma L-alanine and L-asparagine levels in as-

sessing the growth trajectory of preterm infants, particularly those at risk of bronchopulmonary dysplasia (BPD). The observed correlation between reduced levels of these metabolites and the diagnosis of BPD underscores the intricate interplay between metabolic factors and respiratory health in this vulnerable population. (3)

Of particular interest is the divergent growth outcomes observed in infants without BPD but with varying plasma L-alanine and L-asparagine levels. Despite a higher prevalence of small for gestational age (SGA) and extrauterine growth restriction (EUGR) at discharge in this group, those with elevated levels of these metabolites exhibited notable catch-up growth by two years of age. (2) This suggests a potential compensatory mechanism or metabolic resilience that merits further investigation.

“Despite a higher prevalence of small for gestational age (SGA) and extrauterine growth restriction (EUGR) at discharge in this group, those with elevated levels of these metabolites exhibited notable catch-up growth by two years of age. (2) This suggests a potential compensatory mechanism or metabolic resilience that merits further investigation.”

The implications of these findings extend beyond clinical practice to our understanding of the metabolic underpinnings of growth in preterm infants. By elucidating the relationship between plasma metabolites and growth outcomes, this research opens avenues for targeted interventions to optimize nutritional support and foster optimal growth trajectories in this vulnerable population.

Exploration into the mechanisms underlying the observed associations and the long-term implications of altered plasma metabolite levels is warranted. Such investigations promise to refine existing growth assessment and intervention strategies in preterm infants, ultimately improving their long-term health outcomes.

Further research into this area is essential and may inform better care of our most at-risk NICU graduates.

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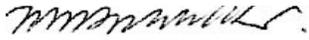
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Sincerely,



Mitchell Goldstein, MD, MBA, CML

Editor in Chief

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Erratum (Neonatology Today January, 2024)

Neonatology Today is aware that an early release of January 2024 incorrectly listed Dr. Nicole Kraus as an "MD" instead of a "DO." We apologize for the oversight. The correct title is now listed in the electronic repository.

Corrections can be sent directly to LomaLindaPublishingCompany@gmail.com. The most recent edition of Neonatology Today including any previously identified erratum may be downloaded from www.neonatologytoday.net.

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Neonatology Today welcomes your editorial commentary on previously published manuscripts, news items, and other academic material relevant to the fields of Neonatology and Perinatology.

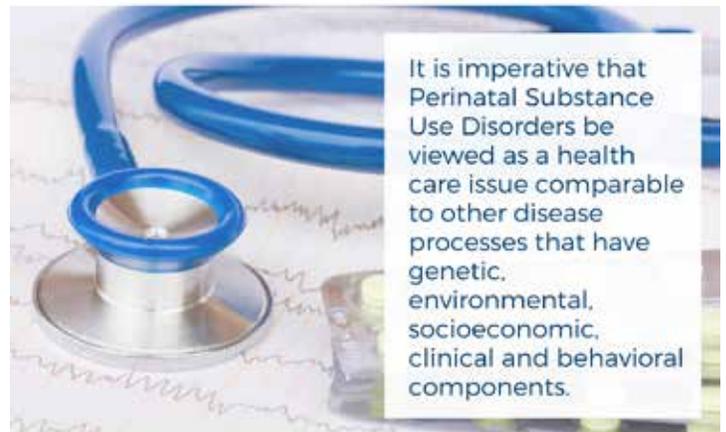
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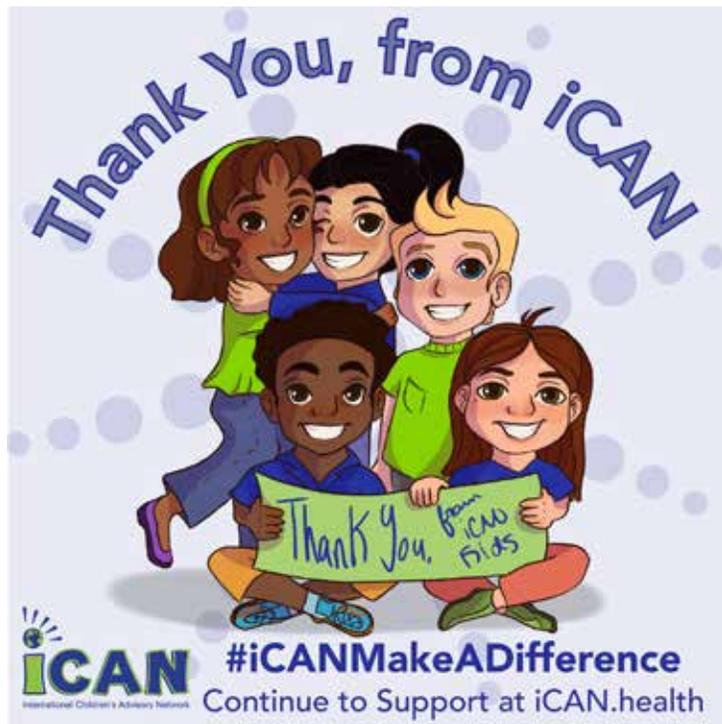
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Navigating Toward Neonatology: Infantile Spasms

Benjamin Hopkins, OSMIV, Donald M. Null, MD

“Welcome back to my fourth installment. My name is Benjamin Hopkins, and I am currently a fourth-year medical student at Western University of Health Sciences in Pomona, California. When ‘I grow up,’ I want to be a Neonatologist. Look at last month’s journal for my previous article and follow along with this column as I navigate my way to becoming a Neonatologist.”

Welcome back to my fourth installment. My name is Benjamin Hopkins, and I am currently a fourth-year medical student at Western University of Health Sciences in Pomona, California. When ‘I grow up,’ I want to be a Neonatologist. Look at previous months’ journals for my earlier articles and follow along with this column as I navigate my way to becoming a neonatologist.

Currently, I am submitting my rank order list for pediatric residency programs. Knowing that I am heading toward a fellowship, my rank list prioritizes programs with high match rates in neonatology, that offer me broad exposure to neonatal patients, have close connections to multiple hospitals with different levels of neonatal ICUs, and, of course, where I feel most comfortable.

“One of my patients this month was a 15-year-old female who had intellectual disabilities due to infantile spasms as a newborn... The patient’s infantile spasms were unresponsive to a variety of medical treatments and ended up subsiding on their own. Of patients with infantile spasms, approximately 85% have significant developmental disabilities, often with other underlying diseases. Among the 85% of those with developmental disabilities, 50% are considered to have severely delayed development.”

I am still rotating within pediatric neurology. It continues to be a fantastic experience, with various “bread-and-butter” and complex

patients and many unique patients in the inpatient and outpatient settings. The attending neurologist I work with is an excellent instructor who offers individualized patient care, exceptional treatment options, and education to each patient and their family. My time was spent diving deeper into the etiologies of neurologic disorders and the optimal treatments to help patients have the best quality of life.

One of my patients this month was a 15-year-old female who had intellectual disabilities due to infantile spasms as a newborn. She is receiving many therapies, including speech therapy, occupational therapy, and physical therapy and has previously had swallowing and behavioral therapy. She is currently taking risperidone for autism-like behavior, self-inflicted injuries, and behavioral outbursts. She is not presently taking any anti-seizure medication, as she has been seizure-free since the infantile spasms. The patient’s infantile spasms were unresponsive to a variety of medical treatments and ended up subsiding on their own. Of patients with infantile spasms, approximately 85% have significant developmental disabilities, often with other underlying diseases (1). Among the 85% of those with developmental disabilities, 50% are considered to have severely delayed development (1).

“Infantile spasms have been studied for over a century and belong to a group of early-onset epilepsies of infancy and childhood that include epileptic spasms and hypsarrhythmia. Infantile spasms are diagnosed on characteristic seizure patterns. Classification of infantile spasms has progressed to distinguish types of spasms (flexor, extensor, mixed), often confused with normal infant motor behaviors ”

Infantile spasms have been studied for over a century and belong to a group of early-onset epilepsies of infancy and childhood that include epileptic spasms and hypsarrhythmia (1–4). Infantile spasms are diagnosed on characteristic seizure patterns (1, 3, 4). Classification of infantile spasms has progressed to distinguish types of spasms (flexor, extensor, mixed), often confused with normal infant motor behaviors (3, 4). In infantile spasms, the neck, body, arms, and legs are often symmetrically contracted in the axial plane for 0.2–2 seconds (1). The spasms typically arise in 20–40 spasms with intervals lasting 5–30 seconds (1). With the spasms being shorter at the onset, electroencephalography (EEG) is essential in diagnosis (1–4). Performing an EEG early in the course is recommended to help support the diagnosis (1, 4). The typical pattern seen on EEG is hypsarrhythmia, which appears in about 70% of infantile spasm diagnoses (1, 4). Hypsarrhythmia is a chaotic, severe paroxysmal EEG pattern with abnormal background activity (1–4). If hypsarrhythmia is not seen, it may appear within the first week of symptoms; otherwise, a

variant of hypsarrhythmia may be seen (1, 4). The most common variant pattern seen on EEG is a generalized slow-wave transient followed by an attenuation of the background activity in all regions (4).

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The incidence of infantile spasms is 0.02–0.04%, with an average age of onset of six months (1, 4). There is no clear etiology of infantile spasms; the current understanding is that it has many causes consistent with structural, genetic, and metabolic abnormalities (1, 2, 5). With improved genetic testing and our increased ability to diagnose specific brain disorders, the etiology of infantile spasms can be found in roughly 60% of cases (1, 5). When an etiology is found, it can be pre-, peri-, or postnatal: prenatal causes make up roughly 55%, perinatal roughly 25%, and postnatal roughly 8%. Other causes, such as brain tumors, comprise 12% (1). Around 25% of patients with infantile spasms will have spontaneous resolution of them within one year of onset (4).

“The incidence of infantile spasms is 0.02–0.04%, with an average age of onset of six months. There is no clear etiology of infantile spasms; the current understanding is that it has many causes consistent with structural, genetic, and metabolic abnormalities. With improved genetic testing and our increased ability to diagnose specific brain disorders, the etiology of infantile spasms can be found in roughly 60% of cases... Around 25% of patients with infantile spasms will have spontaneous resolution of them within one year of onset.”

Treatment for infantile spasms starts with adrenocorticotropic hormone (ACTH) (1–3, 5). Other standard therapies include oral corticosteroids and vigabatrin (1–3). Non-standard therapies include the ketogenic diet, topiramate, zonisamide, clobazam, clonazepam, valproate, phenobarbital, oxcarbazepine, levetiracetam, and surgery (2, 3, 5). Prompt treatment is critical in improving long-term outcomes; however, treatment is often delayed and resistant to numerous medications (2, 5). For infantile spasms that are completely resistant to medication or have a single unilateral epileptogenic cortex, surgery is considered, though this is most often not a viable option (3, 5). Treatment efficacy is assessed with EEG at two weeks, and if spasms or hypsarrhythmia has not resolved, medication change is indicated (1). When not initially controlled, medications have been found to have response rates of 22% at two weeks, with the patient often having poor cognitive outcomes, frequently due to the delay in seizure control (2, 5). Collaborating with the patient’s primary care provider is essential to monitor treatment potential side effects (2).

The prognosis primarily depends on the etiology of the infantile spasms, and there is a better prognosis when no underlying etiology is found (1, 3). Poor prognosis is found when there is delayed development before the onset of infantile spasms or late initiation of treatment (1). Although the prognosis for most patients remains poor, new animal models and further studies that help identify favorable prognosis have been and are continuing to be developed (3, 4). Some conditions can be challenging to distinguish from infantile spasms: benign infantile myoclonus, infantile colic, Sandifer’s syndrome, Ohtahara’s syndrome, early myoclonic encephalopathy, and myoclonus associated with metabolic diseases (1). Any seizure in children under 18 months should be considered for infantile spasms, as earlier diagnosis and treatment are critical in providing the best care (1).

This month, I enjoyed talking with Dr. Donald Null, a neonatologist with over 50 years of experience who is currently an Emeritus Professor of Pediatrics in the Division of Neonatology at the University of Utah. We spoke about how to excel as a neonatologist, critical care physicians’ mental wellness and burnout, and what to get involved in to offer the best treatment in all situations.*

1. What qualities are most essential to excel at as a neonatologist?

The most essential quality is listening to those around you—not just your colleagues but the nurses, respiratory therapists, nutritionists, consultants, and parents because if anyone knows their baby better, it’s the parents. When the parent says, I’m concerned that something’s going on, they have a much better idea than you as the doctor who spends five minutes doing an exam in the morning. The same thing applies to nurses; that’s what I learned as an intern. My mentor in neonatology taught me that if Ms. Bess, one of our senior nurses, says the baby is sick, you better get off your butt and look at the baby because that baby is sick. If you looked at that baby 30 minutes ago, it doesn’t matter; it’s your job to sort out why. So, being an excellent physician requires listening to those around you and trying to understand and help what’s going on with your patient.

“The most essential quality is listening to those around you—not just your colleagues but the nurses, respiratory therapists, nutritionists, consultants, and parents...”

2. What do you now know that you wish you knew before going into neonatology?

We've learned that there will be changes in the care you provide because of technological advancements and medical treatment options. You have to remember that when I started, there was no pulse oximeter, high-frequency ventilation, or surfactant; it was just the beginning of blood pressure's ability to be managed noninvasively. That was developed in the Air Force when I was training there in 1972 and 1973. We know we will have better ways to manage things in the future.

“We've learned that there will be changes in the care you provide because of technological advancements and medical treatment options.”

It taught me that an excellent physical exam and a visual and hands-on patient management ability became essential. After all, I was on the transportation team in a helicopter where you couldn't hear anything because of the helicopter's noise. We didn't have a pulse ox; we didn't have anything but our eyes and our hands to assess our patients and try to be able to manage them.

As things have advanced, there have become significantly more ways to manage patients. Now, you can manage patients differently in transport because you have indwelling arterial catheters with a monitor that continuously monitors blood pressure. You have high-frequency ventilation, or conventional, where you can better understand the pressures being delivered to the patient from that standpoint. You can carry a device with you that can measure the blood gas. In the 1970s, you needed almost a cc of blood to get blood gas; now, we can do it with a few drops. These things have become extraordinarily beneficial, but what has been lost between you and me is the physical exam and assessment of the patient because everybody's relying on the blood gas they get back, the pulse ox, the ventilator findings, a chest X-ray, et cetera. They don't assess the patient with a physical exam, and when you're doing transport, you better have that because you won't have access to an x-ray.

If you don't know how to assess the patient for risk factors such as pneumothorax, for instance, then you won't do an excellent job with your patient. Being more skilled at doing a physical exam and what it means becomes very important. So you better be able to assess the patient for whether you're confident they have a pneumothorax and you're going to stick a needle in their chest to get rid of the air. You can know several things that assist you in making that decision.

3. What would you encourage a future neonatologist to prioritize and be involved in?

That's a good question because some of it depends on your primary interests. I will tell you that respiratory was what you wanted to be involved in when I started. After all, you have to remember that in 1970, if you were a two-kilo baby, and you were a male and you were 34 weeks, and you had significant respiratory distress, the likelihood of you dying was about 80%. Today, a two-kilo baby has a 98% or 99% chance of surviving. And if he doesn't, it's because of infection or another reason. As time has changed, we've gone to other areas. A neonatologist has to do all those areas; you have nutrition, which has changed considerably. You have respiratory, which has also changed significantly to where we now do a lot

of less invasive inhalation. In short, we have done lots of things, and we've brought the survival rate up. When I was a resident, they would tell me that if the baby weighed less than a thousand grams, the baby wasn't going to survive. In some facilities, they had a scale in the delivery room, put the baby on it, and if the baby weighed 900 grams, they'd hand it to the mother, say, here, your baby won't live; comfort your baby. I mean, now people would gasp at that from that standpoint. And we should, because 900 grams are way into the 70, 80, 90 percent [survival] range at this point, depending on how they start.

There are many areas that you can focus on. One of my best friends was a neonatologist; his deal was the follow-up. He did incredible work with follow-up and after-discharge management. You can become interested in nutrition, follow-up, respiratory and cardiac issues, etc. And now, with the ability to do ultrasound findings, you can do ultrasounds of the chest, looking for pneumothoraces, ultrasound of the heart to look at the function and what kind of medications you're going to use for the patient and how it's going to fix or not fix the patient from this additional view.

I suggest to trainees or individuals like yourself who want to do neonatology there are multiple areas you can focus on. Those are areas you can get into when you rotate through other specialties, see what stands out to you and what area you have passion for. As a resident, you're rotating through neurology, nephrology, cardiology, and many more. You can expand your knowledge base, and in this day and age, you can go to a meeting or get on a video and look at how you look at the heart, not like you're looking at the heart as a cardiologist, but just as an extra tool. You can use it to see if something needs to be done, like a pneumopericardium or a hemopericardium. These are the things you can start to learn early on that will assist you in deciding what areas you want to focus on.

“I suggest to trainees or individuals like yourself who want to do neonatology there are multiple areas you can focus on. Those are areas you can get into when you rotate through other specialties, see what stands out to you and what area you have passion for.”

You must decide a couple of things when you go into neonatology. One is where do I want to be? Do I want to be at a level four center, or do I want to be at a level two center? You must remember that if you're at a level two center and a patient gets sick, you've got to go to the level four center for it. So, will you be comfortable sending your patients to a level four? My boss said to me, do you want to refer your patients, or do you want to be the person they refer patients to? I very quickly knew what I wanted. That helps you with how you will practice and what you need to know when you practice from that standpoint.

It is essential to consider all aspects, though; being in a level two NICU, sometimes you have to have a lot more skills than you do in a level four because in a level four, you've got cardiology, nephrology, GI, you've got all those things at the hospital with you. Whereas in a level two NICU, you don't; however, you can contact somebody, and they will drive over there the next day and look at a patient for you, but you need the skill to say, I can't wait till tomorrow. I've looked at this patient, and this patient's sick enough

that I need to get this patient somewhere else. That means that if you say, well, I want to go to a level two NICU because I want to have a little more time with my family from that standpoint, but I'm going to learn how to use an echo machine so that I know when I need to send a patient to a level four NICU.

“You must decide a couple of things when you go into neonatology. One is where do I want to be? Do I want to be at a level four center, or do I want to be at a level two center? You must remember that if you're at a level two center and a patient gets sick, you've got to go to the level four center for it...My boss said to me, do you want to refer your patients, or do you want to be the person they refer patients to? I very quickly knew what I wanted. That helps you with how you will practice and what you need to know when you practice from that standpoint.”

4. How do you think the critical care scenario of the NICU affects the chance of burnout? And how should we counter it?

It depends on your basic personality with how much you can work and how many hours you can work. I grew up with way different schedules than are currently present, and I loved what I did. To me, going into the NICU and helping a patient, talking to parents, and when the baby isn't going to survive, sitting with the parents when we withdrew support from the baby was what I liked to do.

I have never had burnout, sometimes working 80 or 90 hours a week just because that's who I am, what I enjoy doing, and helping parents with what they do. You have to decide how much of your time and energy you will invest in your job as a physician. How much of your time is invested outside of the hospital and outside of what you do for work? You have to look at that balance. In an ICU setting, you will have to spend more time inside than outside from that standpoint. Some concerns are how you tolerate caring for patients who may not survive. That's not because you did something wrong, but occasionally, you'll do something wrong, and the patient will die. You still have to say, I did the best I could, and this is what I've done, and this is how I've helped people, and this is how I've helped families.

However, you have to be cut out for that because that's where many people have burnout. The burnout is because you might lose patients and don't think you can return to work this week. For myself, having grown up in the military, it was a little different because you had the kind of stuff where I had to deal with families whose husbands died overseas. I was caring for the kids, so it was a different environment.

Being okay with having patients who might die is only part of it. I was talking with some friends of mine who are physicians, and he said we talk about this work-life balance, but I am still waiting to hear anybody talking about adding work on the work side. They're always adding balance on the other side. That is something that people must start focusing on, making the work side a good place for you.

“If you're going to be a neonatologist and want to be in a level three or four facility, you'll have plenty of coverage, but you'll have the sickest of the sick. You're going to lose patients, and you're going to have to work through it. When somebody is ill, you will have to cover for them. Sometimes, that's the way life is, and if you don't want to do that, you ought to be, but if you still want to be a neonatologist, you should be in a level two facility where you'll have less of that.”

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5. What are you currently working on?

I have retired from being in the newborn ICU; however, I do research in the lamb lab. What we're trying to do now is to look at certain medications that can be given to reduce the risk of developing chronic lung disease and not hurt the patient with side effects.

So, I developed the ability to take the preterm lamb and put them on a high-frequency nasal support. With that, they don't develop chronic lung disease, and they don't develop injury to the brain, lungs, kidneys, or other organs. One thing that the model enables us to do is if you have a new medication that you are concerned about that could harm the patient; while it might fix the lungs, it might hurt the kidneys, liver, or brain.

We now have a model that we can use on the animal model that gives us chronic lung disease. We can provide it to that animal and see if it reduces the chronic lung disease they typically develop from a conventional ventilator.

You can give it to an animal that isn't going to get chronic lung disease or lung injury and is still preterm. You can give that medicine to them and see if it causes any injury to the other organs, which would have no injury in normal development without the medication.

With the knowledge we gain through this model, you can then take that medication and be much more confident that it's a reasonable medication to try in humans and will not very likely—you can never say never—but rarely would cause an injury to the human. So that's the kind of stuff I'm working on right now.

*Answers paraphrased from video/voice call.

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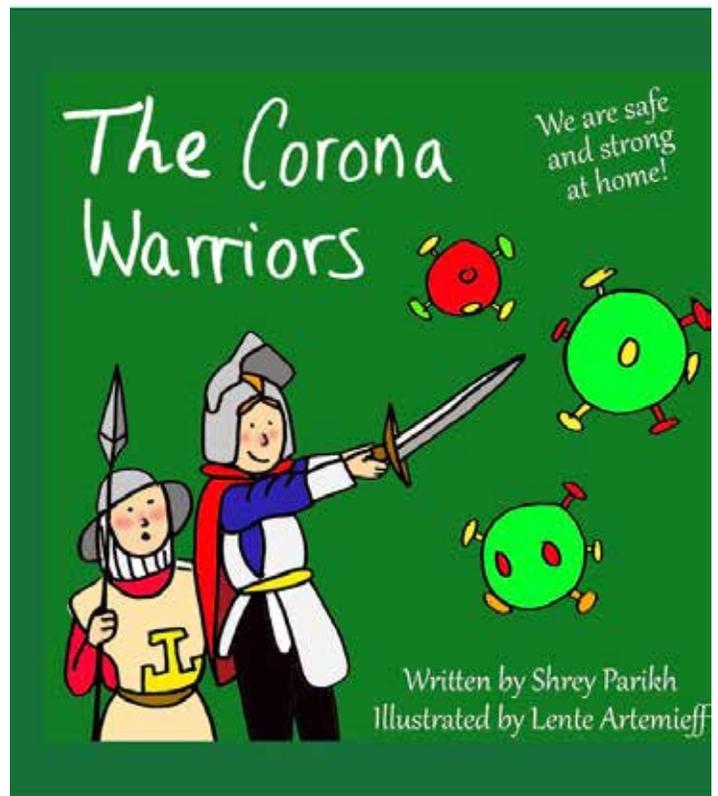
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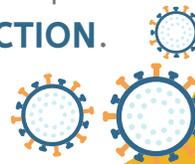
Should Infants Be Separated from Mothers with COVID-19?

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.



SEPARATING the DYAD

doubles providers' workload, burdening systems.



BASED ON THE ARTICLE:

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

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Fellows Column: Surfactant: To Use or not to Use

Marian Banh, OMS3; Rohan Chawla, OMS3; Nobel Enayati, OMS3; Sara Kohandani, OMS3

Case Report

An infant was born via normal spontaneous vaginal delivery at 28^{2/7} weeks gestation to a 26-year-old G₂P₁ woman with no chronic medical conditions. The mother was Group B Streptococcus (GBS) negative, rubella immune, HBsAg negative, and had consistent prenatal care. A short cervix and premature labor had complicated the pregnancy. Antenatal steroid therapy was completed, and the membranes were ruptured just before delivery. Delayed umbilical cord clamping was performed for 30–60 seconds. The newborn weighed 1290 grams and required continuous positive airway pressure (CPAP) and hand ventilation at delivery. Apgar scores were 9 and 9 at 1 and 5 minutes, respectively. The infant was admitted to the neonatal intensive care unit (NICU) for respiratory failure, prematurity, and observation for presumed sepsis. Upon admission, the infant was placed on High Flow Nasal Cannula (HFNC) with Noninvasive Mechanical Ventilation (NIMV) at a peak inspiratory pressure (PIP) of 18, positive end-expiratory pressure (PEEP) of +5, and a fraction of inspired O₂ (FiO₂) of 0.30. Antimicrobial therapy for presumed sepsis was started. CBG levels were measured at a pH of 7.326, pCO₂ of 54.8, pO₂ of 39.2, HCO₃ of 28.6, and a base excess of 2.6. A chest X-ray at two days of age showed diffuse reticular opacities bilaterally. At this time, the neonatologist on duty chose to withhold surfactant administration.

“An infant was born via normal spontaneous vaginal delivery at 28^{2/7} weeks gestation to a 26-year-old G₂P₁ woman with no chronic medical conditions...The newborn weighed 1290 grams and required continuous positive airway pressure (CPAP) and hand ventilation at delivery.”

On day 2, FiO₂ levels on NIMV were lowered to 0.28 and then to 0.21 on day three without signs of respiratory distress. A repeat chest X-ray on day 5 demonstrated persistent, granular ground glass attenuation bilaterally, raising concerns for possible respiratory distress syndrome (RDS). Surfactant administration was again withheld at this time. Nares and blood cultures investigating neonatal sepsis were negative; however, the WBC was markedly elevated at 69.2 beginning on day two and remained elevated throughout the week. Furthermore, several episodes of apnea and bradycardia were noted in the first week but had all self-resolved. The infant remained stable for two weeks and was switched from NIMV to bubble CPAP at a PEEP of +5 and an FiO₂ of 0.21 without complications. A 9-day course of both ampicillin and gentamicin was completed, with WBCs returning to normal

levels after two weeks. Throughout recovery, the infant received a continuous IV infusion of caffeine citrate and tolerated feeds well. With each subsequent weaning trial, the infant appeared stable without any signs of cyanosis or increased work of breathing (i.e., retractions, grunting, nasal flaring).

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Introduction:

Our research suggests that surfactant administration may not always be imperative, challenging the conventional assumption and thus highlighting the need for individualized neonatal care strategies based on clinical assessment and comprehensive evaluation of respiratory status. A cross-sectional retrospective study concluded that 37.5% of surfactant prescriptions were irrational (1). Surfactant administration, though crucial in certain situations, should be prescribed more judiciously and not universally. We aim to challenge the conventional approach to surfactant administration in the NICU.

“Our research suggests that surfactant administration may not always be imperative, challenging the conventional assumption and thus highlighting the need for individualized neonatal care strategies based on clinical assessment and comprehensive evaluation of respiratory status...Surfactant administration, though crucial in certain situations, should be prescribed more judiciously and not universally.”

Surfactant Physiology:

Pulmonary surfactant is a complex mixture of 70–80% phospho-

lipids, which are primarily composed of dipalmitoylphosphatidylcholine (DPPC), 10% proteins, including SP-A, -B, -C, and -D, and 10% neutral lipids, mainly cholesterol (2). Surfactant production initiates at approximately 26 weeks of gestation and reaches mature levels around 35 weeks. This essential substance is synthesized in the endoplasmic reticulum (ER) of type II pneumocytes and is subsequently released from the lamellar bodies of these cells (3). Surfactant is a crucial substance in the lungs, especially for neonates, as it plays a key role in respiratory physiology. Its primary functions include:

1. **Reducing surface tension** at the air-liquid interface within the alveoli (tiny air sacs in the lungs) (4).
2. **Facilitating breathing**, as the presence of surfactant allows the lungs to expand more easily during inspiration, take in enough oxygen, and expel enough carbon dioxide. These are essential processes for maintaining proper oxygen levels in the blood (4).
3. **Preventing atelectasis**, which is the collapse of lung tissue, and surfactant helps prevent this by keeping the alveoli open (4).
4. **Immunological properties** strengthen the defense mechanisms of the respiratory system, protect the lungs from infections, and contribute to the overall health of the respiratory tract (4).

“Surfactant production initiates at approximately 26 weeks of gestation and reaches mature levels around 35 weeks...Its primary functions include: 1. Reducing surface tension...2. Facilitating breathing...3. Preventing atelectasis... [and] 4. Immunological properties”

Surfactant undergoes a process of synthesis, assembly, transport, secretion into the alveolus, subsequent degradation, and recycling. In newborns, particularly preterm infants, surfactant metabolism is slower than in adults (2). Issues in pulmonary surfactant metabolism can lead to respiratory distress, causing significant morbidity and mortality. This is often a result of accelerated breakdown due to factors like oxidation, proteolytic degradation, inhibition, or inherited defects in surfactant metabolism (2). Understanding the physiology of surfactant use in neonates is crucial for managing the respiratory health of preterm infants and those at risk of respiratory distress. Current management strategies for these defects include the administration of prenatal corticosteroids, surfactant replacement, whole lung lavage, and, in some instances, lung transplantation. Gene therapy has emerged as a potential avenue for addressing inherited defects in surfactant metabolism, offering promising prospects for treatment (2).

Current Criteria for Surfactant Administration:

Current guidelines for surfactant administration suggest that infants born at less than 24 weeks gestational age should undergo

immediate intubation upon birth, with prophylactic surfactant administration recommended within the first 15 to 30 minutes of life (5). For infants born at or beyond 24 weeks gestational age who are immediately intubated after birth, it is suggested to administer surfactant as an early treatment within the first two hours of life (5). Exceptions to these guidelines are made if the infant is breathing room air with minimal ventilatory support upon admission to the NICU (5). An immediate transition to nasal ventilation or continuous positive airway pressure is recommended (5).

“Surfactant undergoes a process of synthesis, assembly, transport, secretion into the alveolus, subsequent degradation, and recycling. In newborns, particularly preterm infants, surfactant metabolism is slower than in adults. Issues in pulmonary surfactant metabolism can lead to respiratory distress, causing significant morbidity and mortality. This is often a result of accelerated breakdown due to factors like oxidation, proteolytic degradation, inhibition, or inherited defects in surfactant metabolism. Understanding the physiology of surfactant use in neonates is crucial for managing the respiratory health of preterm infants and those at risk of respiratory distress.”

These guidelines are particularly relevant when faced with specific clinical indicators, including:

- a) Maintaining an FiO_2 above 0.5 to achieve an oxygen saturation (SpO_2) exceeding 88% or a partial pressure of arterial oxygen (PaO_2) surpassing 45 mmHg
- b) Maintaining a partial pressure of arterial carbon dioxide ($PaCO_2$) within the range of 55 mmHg to 60 mmHg with a pH level below 7.25
- c) Experiencing apnea requiring bag and mask ventilation
- d) Displaying evidence of significant work of breathing, such as retractions, grunting, and chest wall distortion in infants with increased oxygen needs (5)

Alternatives Methods to Surfactant Delivery:

In current medical practice, the most widely accepted method for administering surfactant is through endotracheal instillation (3). This method involves delivering the surfactant in a liquid form through an endotracheal tube, using a single bolus dose as quickly as a neonate can tolerate (3). While some studies suggest

administering the entire surfactant dose at once, others propose dividing the bolus into smaller aliquots (3). This decision is often left to the discretion of the healthcare providers (3).

Another approach to surfactant delivery, the INSURE (INTubation-SURfactant administration-Extubation) technique, involves an in-out intubation procedure to administer surfactant (3). This process involves intubation, surfactant administration, and extubation (3).

Current research is focused on newer methods to reduce the invasiveness of traditional approaches, with one such technique being minimally invasive surfactant therapy (MIST) (3). MIST involves connecting a neonate to non-invasive respiratory support, allowing surfactant administration to occur through spontaneous breathing (3). An alternative approach is the less invasive surfactant administrative (LISA) technique, which utilizes a flexible, thin catheter placed in the trachea during spontaneous breathing for surfactant delivery (3). Typically, this method requires support with CPAP, eliminating the need for intubation and thereby reducing the risk of potential lung injury associated with intubation (3).

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Adverse Effects of Surfactant Delivery:

Since surfactants are derived from animal sources, there is a risk of immune activation (3). The administration of surfactant in neonates has also been associated with hypotension, bradycardia, alterations in cerebral flow, and hypoxemia (3). Other observed effects of surfactant delivery include intraventricular hemorrhage, patent ductus arteriosus, retinopathy, necrotizing enterocolitis, and complications arising from the endotracheal tube blockage (3). Furthermore, the concurrent use of oxygen presents the potential for lung tissue damage due to oxygen pressure, and excessive oxygenation followed by cessation may result in conditions like bronchopulmonary dysplasia and retrolental fibroplasia in infants (3). There have also been reports of oxygen desaturation occurring upon the drug's administration (3).

The conventional methods of surfactant delivery, which involve endotracheal administration, carry inherent risks associated with

tubal administration of any drug (3). Maintaining hygiene is crucial, especially in neonates with underdeveloped immune systems, as the absence of preventive measures has been associated with infections and sepsis (3). Intubation, a prerequisite for surfactant delivery unless the neonate has already been intubated, poses risks such as injury, air leaks, airway obstruction, and mechanical damage, often requiring frequent suctioning (3).

A retrospective cohort study examining infants born between 24 and 31 weeks found that 30% experienced CPAP failure within the initial 72 hours of life following MIST administration (6). Additionally, the research revealed that MIST failure was independently linked to a heightened risk of severe intraventricular hemorrhage (6). Another study examined surfactant administration in 39 infants and found that 19 infants presented with some complication afterward, 11 minor and 8 major (7). Of the major complications, severe airway obstruction and persistent pulmonary hypertension were most common and associated with extremely low birth weight (7).

“A retrospective cohort study examining infants born between 24 and 31 weeks found that 30% experienced CPAP failure within the initial 72 hours of life following MIST administration. Additionally, the research revealed that MIST failure was independently linked to a heightened risk of severe intraventricular hemorrhage.”

Discussion:

The presented case prompts reconsideration of the conventional surfactant administration protocol. This patient's favorable progression without surfactant delivery suggests that rapid surfactant administration in preterm infants may not always be crucial. Unnecessarily using surfactant is invasive and can pose a risk of harm to the newborn (3).

Historically, the death of John F. Kennedy's son catalyzed the research surrounding RDS and the use of surfactants (8). More recently, the focus in this field has shifted towards refining surfactant administration and reducing its invasiveness, leading to the development of the LISA and INSURE techniques (3). While these methods have addressed the risks associated with intubation and preservation of spontaneous breathing, the paradigm shift towards less invasiveness in surfactant administration highlights the ongoing evolution in neonatal care, emphasizing a commitment to enhancing the delicate balance between therapeutic efficacy and minimizing potential complications.

Surfactant administration does not come without risk, and the potential adverse effects of surfactant delivery should be considered when treating patients. Potential complications such as hypotension, bradycardia, and immune activation should be weighed against the benefits of treatment, and the necessity of treatment must be carefully examined. Surfactant facilitates

breathing, reduces surface tension, prevents atelectasis, and improves immune protection. The presented case challenges the immediate necessity of surfactant in particular situations. Although our neonate, in this case, was born preterm with diffuse reticular opacities in the lungs, surfactant was not administered, and the patient's respiratory function improved.

“Although our neonate, in this case, was born preterm with diffuse reticular opacities in the lungs, surfactant was not administered, and the patient’s respiratory function improved.”

Our findings are corroborated by the retrospective cohort study that determined that not all infants receiving MIST had positive outcomes, emphasizing the need for more cautious treatment guidelines (3). Additionally, another study concluded that CPAP with or without surfactant administration had equal efficacy and illustrates the unnecessary invasiveness, risks, and costs associated with surfactant use, especially in low socioeconomic countries (9). Moreover, other research has suggested stricter guidelines for surfactant administration to reduce nonessential surfactant treatment. Multiple sources have recommended including FiO_2 as a criterion for prescribing surfactant, suggesting that it should only be prescribed if the FiO_2 requirement exceeds 0.30, 0.40, or 0.50 (10, 11, 12). Further research needs to be done to determine concrete treatment guidelines that consider FiO_2 requirements as well as EGA and steroid therapy. NICUs should aim to provide personalized neonatal care strategies based on detailed clinical assessment and respiratory status.

“Further research needs to be done to determine concrete treatment guidelines that consider FiO_2 requirements as well as EGA and steroid therapy. NICUs should aim to provide personalized neonatal care strategies based on detailed clinical assessment and respiratory status.”

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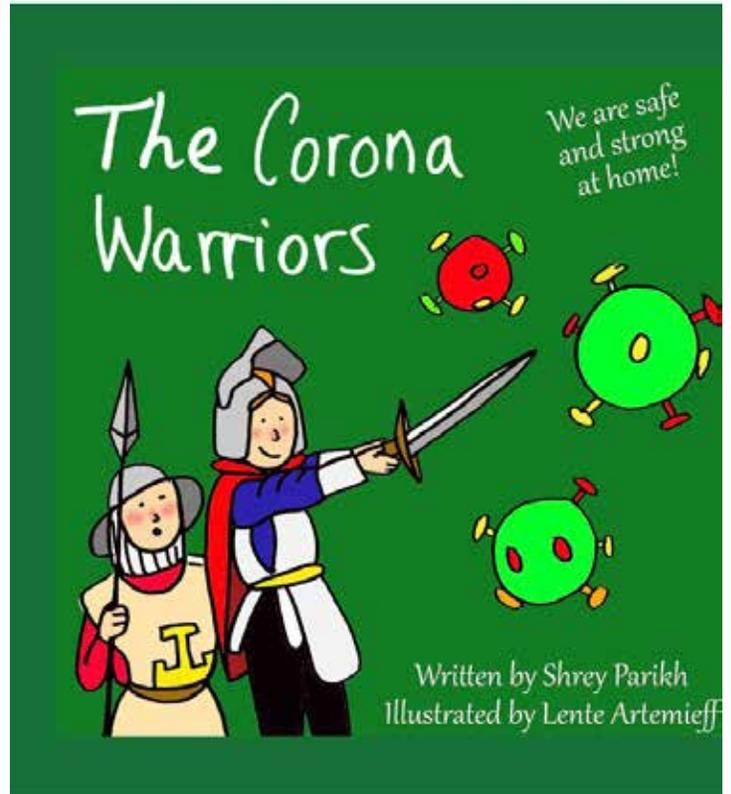
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- Topics may include Perinatology, Neonatology, and Younger Pediatric patients.
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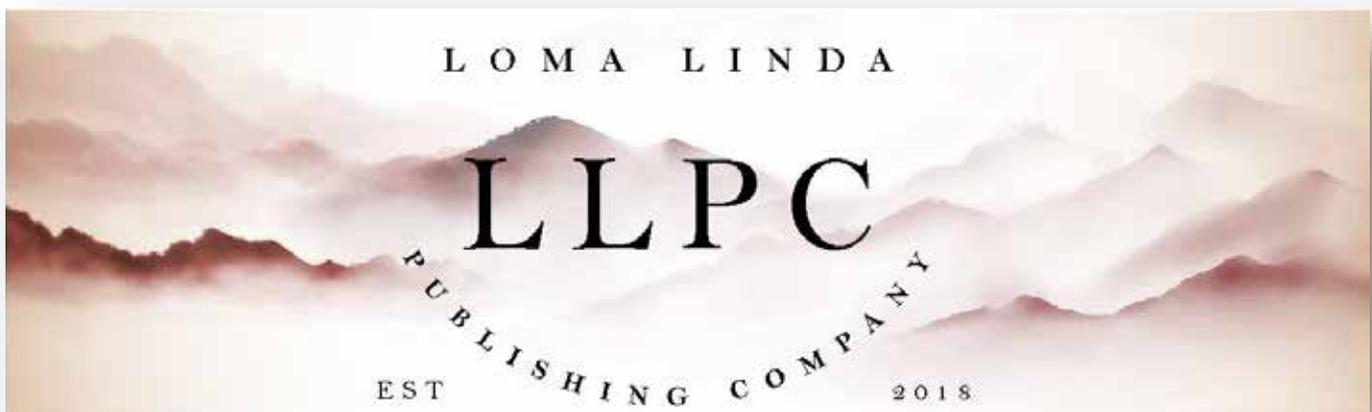
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Maternal Vulnerability and the Risk of Developing Neonatal COVID-19: The Unspoken Risk

María Elena Venegas Martínez, Nesly Lorena Velandia Fore-ro, Tania Acosta Vergara, Rafael Tuesca Molina, Hernando Baquero Latorre, Carla Venegas

"There is little knowledge about the influence of maternal socioeconomic vulnerability in developing COVID-19 infection in newborns. Described neonatal risk factors are mainly biological and do not include social factors."

Abstract:

Importance: There is little knowledge about the influence of maternal socioeconomic vulnerability in developing COVID-19 infection in newborns. Described neonatal risk factors are mainly biological and do not include social factors.

Objective: To evaluate the association between maternal socioeconomic vulnerability and the development of COVID-19 in newborns admitted to NICU.

Design: Original research, retrospective cohort study, in newborn-mother bond with one-year follow-up, admitted to NICU during the COVID-19 pandemic between March 2020 and December 2021. The primary endpoint was to evaluate maternal socioeconomic status through the Colombian national survey SISBEN-IV and the development of neonatal COVID-19. Data collectors were blinded about the patients' COVID status.

Participants: 500 mother-child bond records were analyzed and followed for a year. The eligible population required documented SISBEN-IV classification and a newborn nasopharyngeal swab PCR for Sars-Cov-2. The exposed cohort were newborns from mothers with SISBEN-IV A classification (extreme poverty).

Results: 158 (31.8%) mothers were classified in SISBEN-IV group A (extreme poverty). Maternal COVID-19 was higher in the exposed group (8.8% vs 3.8% $p=0.02$). Exposed newborns had higher COVID-19 incidence compared to unexposed (10.1% vs. 4.7%, $p=0.02$). Newborns from vulnerable mothers were 2.2 more likely to develop the disease (adjusted OR: 2.24 95%CI 1.06 - 4.69 $p\text{-val}=0.03$).

Conclusion: Understanding the interaction between biological and social factors is essential to impacting infant morbidity and mortality outcomes. We suggest maternal socioeconomic vulnerability be considered a differentiating risk factor for prenatal care and weight control for neonatal disease.

Background:

The socioeconomic condition of a pregnant woman with a high social vulnerability index (SVI), independent of the used assessment scale, increases her mobility risk. The National Institute of Health (NIH) of the United States has considered health inequalities a risk factor for developing Coronavirus Disease 2019 (COVID-19), affecting mother and child (1-11). Consequently, newborns under one month of age are eight times more likely to be admitted to the Intensive Care Unit (NICU) due to COVID-19 (OR:5,1 IC:1,7-14,9) (1,12-14). Due to the low prevalence of COVID-19 in newborns (<10%) (15), there is little knowledge about the influence of maternal socioeconomic vulnerability in the development of newborn COVID-19 (12,16). Likewise, described neonatal risk factors are mainly biological and do not include social factors (2, 17-19).

"The United States Center for Disease Control and Prevention (CDC) SET-NET 2020-2022 reports a prevalence of neonatal COVID-19 of 5.6%, an infection rate of 13.6% in the perinatal registry; and highlights that children under two months of age account for 25% of all hospitalization in children under four years of age (20)."

The United States Center for Disease Control and Prevention (CDC) SET-NET 2020-2022 reports a prevalence of neonatal COVID-19 of 5.6%, an infection rate of 13.6% in the perinatal registry; and highlights that children under two months of age account for 25% of all hospitalization in children under four years of age (20). Since infant morbidity is an indicator of well-being and development of a country, a study of maternal vulnerability evaluating the socioeconomic risk factors for developing neonatal COVID-19 could provide data to address primary care, and under a salutogenic model guide, public health solutions oriented to reduce social inequality gaps (21-26).

Newborn vulnerability is understood as any biological, psychological, or socioeconomic threat from the maternal environment, the caregiver, or the health system, which can lead to developing newborn COVID-19 (27). Chile studied the pregnant women SVI using a governmental social protection file that records social stratification (4). They found vulnerable mothers with higher susceptibility to health damage when compared to non-vulnerable mothers (4). The CDC has declared "evident health inequalities" as a risk factor for developing infectious diseases. It uses the SVI to help local officials identify communities in need before, during, and after a disaster (2). The Pan-American Health Organization (PAHO) is requesting additional information to monitor health services and

identify the non-prioritized population (27). Colombian data studying the relationship between the vulnerability of the Venezuelan migrant maternal population and their state of health (28) recognized maternal vulnerability as a risk factor for neonatal disease to achieve an effective, safe maternity program.

As per the Colombian Infectious Disease Association, COVID-19 is classified as a Public Health hazard. Due to the nature of the COVID-19 pandemic as a health emergency, there is a knowledge gap about COVID-19 in the neonatal stage and its predisposing factors (1, 18). The present original study seeks to evaluate the association between maternal socioeconomic vulnerability and the development of COVID-19 in newborns admitted to a Newborn Intensive Care Unit (NICU) in Barranquilla, Colombia, during the COVID-19 pandemic.

Materials and Methods:

Study design and participants:

Original research, retrospective cohort study, in newborn-mother bond with one-year follow-up, admitted to a high complexity Newborn Intensive Care Unit in Barranquilla – Colombia (MACSA-NICU), between March 2020 and December 2021. We built a cohort and examined the maternal socioeconomic status through the Colombian national survey SISBEN-IV and evaluated the presence of neonatal COVID-19 by PCR-RT. We reviewed the charts for all 1,100 newborns admitted during the study period.

The primary endpoint was to determine the association between maternal socioeconomic vulnerability and the diagnosis of newborn COVID-19. Secondary endpoints are included to characterize the features of maternal socioeconomic vulnerability and describe the neonatal biological risk factors for developing COVID-19.

Eligible populations included mothers of newborns admitted to the MACSA-NICU during the study period, with documented SISBEN-IV classification and a report of the newborn nasopharyngeal swab (real-time PCR for Sars-Cov-2). The exposed cohort was newborns from mothers with SISBEN-IV A classification, and the unexposed cohort was newborns from mothers with a classification other than A (it meant B, C, or D). Exclusion criteria included records from mothers without the SISBEN classification

survey, newborns without a nasopharyngeal swab PCR-RT for Sars-Cov-2 result, or with dysmorphisms. Five hundred records of newborn-mother bonds met the study criteria and were defined as subjects of study (See Figure 1).

The SISBEN-IV indicates social vulnerability in Colombia and was used to allocate resources to vulnerable populations. It was approved through document CONPES 3877 of 2016 and allows the calculation of the Multidimensional Poverty Index (MPI). This classification is comparable to international indicators such as the American SVI used by the CDC to investigate multilevel environmental and social influences and detect risk behaviors and health outcomes. The SISBEN-IV is carried out in the municipalities through a face-to-face survey by trained personnel, considering five items: housing and public services, education level, health status, and fertility, occupation, and household income. It determines the index of unsatisfied needs such as drinking water, sewage, garbage collection, electricity service, telephone line, literacy level, schooling level, health, and occupation. The classification goes from lowest to highest, where the lowest number has less capacity to generate income (See Figure 2).

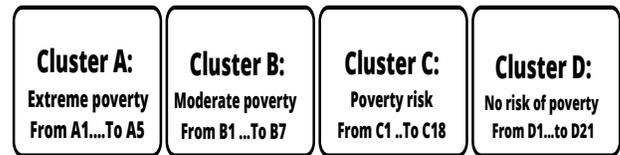


Figure 2: SISBEN-IV Colombian classification according to poverty

Group A: Population in extreme poverty (SISBEN-IV A: Vulnerable and exposed population).

Group B: Population of poor households with greater income capacity than group A.

Group C: Population at risk of falling into poverty.

Group D: Population not poor or vulnerable.

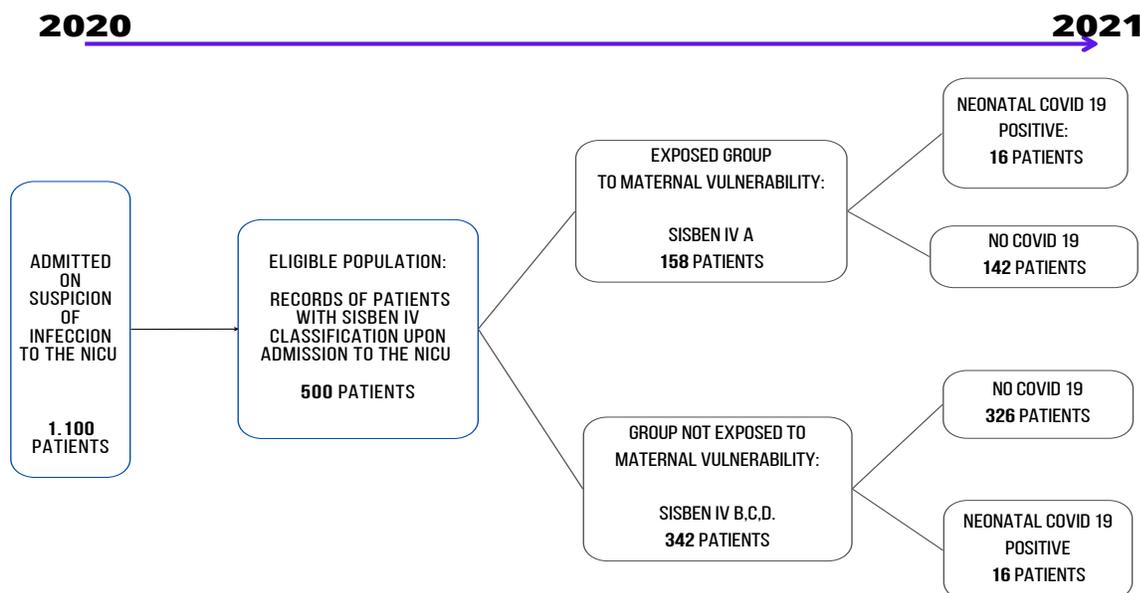


Figure 1: General scheme of the study according to vulnerability exposure March 2020 - December 2021

Maternal and neonatal variables and outcomes:

Maternal vulnerability (Exposure) was analyzed as a dichotomous variable (yes/no), determined according to maternal classification in the SISBEN-IV as group A (extreme poverty). The vulnerability status was considered "Yes" if the mother belonged to SISBEN-IV category A or "No" if she belonged to any category other than A.

The positive neonatal COVID-19 status (outcome) was determined as a dichotomous variable (yes/no) after confirmation of infection by positive PCR-RT for Sars-Cov-2 nasopharyngeal swab. All samples were carried out by authorized laboratories by the Colombian National Institute of Health. The Gold standard test was Real-time polymerase chain reaction (PCR-RT) for Sars-Cov-2. Laboratory results were generated through SemCovid and reported by SisMuestras Information System per resolution 1619 of 2015. Results were reported as "positive" or "negative."

Cohort follow-up:

A PCR-RT for Sars-Cov-2 nasopharyngeal swab was obtained in all newborns admitted to the NICU during the study period. Due to a delay in getting laboratory results, the mother and relatives left accurate contact information. After the newborn-mother bond was discharged from the hospital, mothers were contacted to consent to the study and carry out their follow-up. Telephone surveys were carried out at one and six months from hospital discharge.

Covariates:

The following maternal covariates were considered: age, ethnicity, nationality, marital status, level of education, underlying diseases, vaccination status for COVID-19, and history of maternal COVID-19 to perform a comprehensive analysis. Environmental covariates included zip code, overcrowding, and type of health insurance. Newborn covariates were appropriate prenatal care (> six visits), type of delivery, gestational age, neonatal age, gender, weight, perinatal complications, nutritional status, type of diet, neonatal underlying diseases, and positive family contact for COVID-19.

"Data was collected using an Excel questionnaire directly fed from the MACSA software, which maintains a daily database of admitted patients. One thousand one hundred medical records were reviewed, and 500 which met inclusion criteria were analyzed."

The Infectious Diseases Colombian Association criteria were followed to determine the risk factors for the severity of the disease. Mother's vaccination status was considered complete or incomplete according to the type of vaccine received; however, most mothers were not vaccinated at the delivery time.

Data collection:

Data was collected using an Excel questionnaire directly fed from

the MACSA software, which maintains a daily database of admitted patients. One thousand one hundred medical records were reviewed, and 500 which met inclusion criteria were analyzed. Five follow-up data collectors identified patients by telephone after hospital discharge and filled out the questionnaire. One hundred patients were assigned to each data collector blinded to the patients' COVID status.

The study followed national and international ethical considerations for human research. Research Ethical Committee (IRB) from Universidad del Norte approved and endorsed it as "less than minimal risk" (Registry No. 2067, May 26, 2022).

Bias control:

Potential sources of bias were controlled as follows:

For data collection, the typing team was masked. Health personnel collected the information in a database without access to the research methodology to control observer bias. Telephone contact was maintained with the mother and relatives or via their health insurance, updating their information every three months to avoid losing follow-up. The total dropout was 1,6%. Only patients registered in the SISBEN-IV government system were included to control selection bias. Each variable was analyzed independently for confusion bias, and the significant ones were included in a binomial logistic regression model. For misclassification bias, the database was double-checked by two different people before its final analysis.

Statistical analysis:

Qualitative variables (frequency and percentage) and quantitative variables (mean and standard deviation) were used to characterize the population. A univariate and bivariate descriptive analysis was carried out based on the effect variable (Positive Neonatal COVID-19). Contingency tables, Chi-square, p-value (significance <0.05), and simple logistic regression were used to establish the association between maternal socioeconomic vulnerability and diagnosis of neonatal COVID-19. Independent variables were analyzed, and then multi-variable analysis provided raw and adjusted ORs with their respective 95% CI. Significant variables were included in a binomial logistic regression model to establish the probabilities of newborns from socioeconomically vulnerable mothers presenting Neonatal COVID-19. A database was created in Excel (version 97-2004) and analyzed in the SPSS program version 2.9 0.0.0 (241).

Results:

Five hundred mother-child bond records were analyzed. Table 1 shows maternal (A), environmental (B), and neonatal (C) demographic characteristics.

"420 (84%) mothers were not vaccinated against COVID-19. At the delivery time, 27 moms (5.4%) had COVID-19."

Maternal demographic characteristics:

Mother's average age was 24 years (SD 6.6 years); 281 (56,2%) were Colombians and 219 (43,8%) were Venezuelans. 465 (93%) mothers were "mestiza," 12 (2,4%) "white," 8 (1,6%) "Afro," and 15 (3%) "other races" like native and gypsy. Most mothers were in free union with their partner (n=327 - 65,4%), 107 (21,4%) were single mothers, and 65 (13%) were married. Most mothers

achieved an incomplete high school degree (324 - 64,8%) or an incomplete elementary degree (22 - 4,4%); 23 (4,7%) had no education; 31 (6,2%) completed high school and 54 (10,8%) a bachelor's degree. One hundred fifteen mothers (23%) have at least one comorbidity: Preeclampsia (45 - 9%), Asthma (13 - 2,6%), Diabetes (8 - 1,6%), and Obesity (1 - 0,2%). Thirty-five mothers (7%) had no prenatal control, and 279 (55,8%) a poor-quality control with less than six visits at the time of delivery. 420 (84%) mothers were not vaccinated against COVID-19. At the delivery time, 27 moms (5.4%) had COVID-19.

Environmental characteristics:

271 (54.2%) of the population resides in the urban area of Barranquilla, 179 (35.8%) in the suburbs, and 50 (10%) in the rural areas. 130 (26%) mothers reported living in overcrowding conditions (four or more people sleeping per room at home). 309 (61.8%) mothers had health insurance at hospital admission. 158 (31.8%) mothers were classified as SISBEN-IV group A, considered in extreme poverty and a marker of socioeconomic vulnerability for this cohort. 195 (39%) mothers were classified B, 127 (25.2%) C, and 20 (4%) D or population at not risk of poverty.

Newborn demographic characteristics:

Newborn average age seven days (SD 10.7 days); 278 (55.6%) were male and 222 (44,4%) females; gestational age 37.5 weeks (SD 2.7 weeks); weight 2,889 gms (SD 665 gms); 160 (32%) were preterm. 302 (60.4%) babies were born via cesarean section and 198 (39.6%) had vaginal delivery. 440 (88%) had adequate weight for their gestational age, 14 (2,8%) were small, and 46 (9,2%) were big. 219 (43.8%) newborns were exclusively breastfed. 106 (21.2%) present perinatal complications like neonatal asphyxia, premature membrane rupture, amniotic infection, or requiring reanimation. 32 (6.4%) newborns tested positive for COVID-19: 13 (2.6%) were diagnosed with mild disease, 11(2.2%) with severe, and 8(1.6%) with critical disease. There were no mortalities among the newborns COVID-19 positive.

“In a bivariate analysis, after adjusting for confounding variables, newborns from vulnerable mothers (Exposure/SISBEN-IV A) were 2.2 times more likely to develop COVID-19 when compared to not vulnerable mothers (adjusted OR: 2.24 95%CI 1.06 - 4.69 p-val=0.03). Model 2: β :2,68; DE=0,183; p val<0,001.”

Follow-up Data and Cross-Analysis:

479 (95.8%) newborns were discharged home, 17 (3.4%) were transferred to a higher level of care, and 4 (0.8%) died. No mortalities in COVID-19 patients. There were no deaths at six months and 8 (1.6%) dropouts (See Table 1).

Table 2 shows maternal sociodemographic characteristics and clinical factors according to maternal vulnerability status (exposure/SISBEN-IV A). Homogeneous distribution for the populations

was observed, with p-values > 0.05 for all variables. The presence of positive maternal COVID-19 at the time of delivery was higher for the exposed group (8.8% vs 3.8% p=0.02). Likewise, neonatal demographic characteristics had no statistical difference based on the maternal vulnerability status. Neonatal COVID-19 in the exposed group was higher when compared with the unexposed population (10.1% vs. 4.7%, p=0.02), and the infection was more critical (3.1% vs 0.9%, p=0.04).

In a bivariate analysis, after adjusting for confounding variables, newborns from vulnerable mothers (Exposure/SISBEN-IV A) were 2.2 times more likely to develop COVID-19 when compared to not vulnerable mothers (adjusted OR: 2.24 95%CI 1.06 - 4.69 p-val=0.03). **Model 2:** β :2,68; DE=0,183; p val<0,001 (See Table 3).

“In our study, according to the SISBEN-IV Colombian socioeconomic status, maternal vulnerability was a significant risk factor for developing neonatal COVID-19.”

Discussion:

After overcoming the first stage of the COVID-19 pandemic, the risk behavior for vulnerable populations is more frequently associated with adverse health outcomes. The scarce social and psychological resources that overwhelmed the healthcare systems during the spread of the Sars-CoV-2 virus have been an example of this (20). There is a systematic neglect of the need for equality by gender, social class, or race, which makes people lose trust in institutions, education, and health systems (29). In our study, according to the SISBEN-IV Colombian socioeconomic status, maternal vulnerability was a significant risk factor for developing neonatal COVID-19.

The SISBEN-IV classification serves as an indicator of social vulnerability in Colombia and helps in the allocation of economic resources and benefit plans. This classification is comparable to international indicators like the USA SVI. Our study found that vulnerable mothers who correspond to extreme poverty presented higher incidences of COVID-19 infection at the time of delivery and a statistically significant relationship with the development of newborn COVID-19. Newborns from vulnerable mothers were up to 2.2 times more likely to develop the disease.

Other studies have used SVIs in search of answers to health problems. In 2019, Yee et al. used the SVI as a predictor for adolescent pregnancy (30); the same year in Brazil, Oliveira et al. carried out a case-control study proposing a model to predict preterm birth considering socioeconomic vulnerability, family vulnerability, and non-acceptance of pregnancy (31). As in Oliveira's study, we observed a high proportion of mothers without health insurance and unable to receive appropriate prenatal care.

In our study, the risk of presenting neonatal COVID-19 in the exposed population attributable to maternal socioeconomic vulnerability was 55 per 1,000 newborns. Supporting these vulnerable mothers and identifying their risk in a differentiated prenatal control could reduce the development of neonatal COVID-19 by up to 50% and, indeed, other adverse obstetric events. This intervention would impact the figures for maternal and child morbidity and

mortality and likely NICU expenses.

“According to the World Health Organization (WHO), up to 95% of newborns will present a health problem in vulnerable populations such as ethnic minorities, displaced populations, or without satisfied minimum basic needs. Recognizing maternal vulnerability as a risk factor for neonatal disease may be the first step to achieving childhood social justice.”

One element amenable to improvement in prenatal care is the doctor-patient relationship. A Danish study published in 2022 revealed that even primary care physicians knew that socioeconomic vulnerability has increased in women of childbearing age, were familiar with indicators of vulnerability in pregnancy, and did not identify them during clinical practice. Not detecting vulnerability in pregnancy is a significant risk factor that contributes to maternal-perinatal inequity and generates adverse events (32). During the follow-up for our patients, mothers expressed feelings about their perception of the health team that led them to make appropriate or inappropriate decisions. This was also documented in a case-control study by Songco et al. (33).

According to the World Health Organization (WHO), up to 95% of newborns will present a health problem in vulnerable populations such as ethnic minorities, displaced populations, or without satisfied minimum basic needs. Recognizing maternal vulnerability as a risk factor for neonatal disease may be the first step to achieving childhood social justice.

Limitations and strengths:

One limitation of our study was the inability to verify other COVID-19-positive contacts due to the scarcity of samples during the overwhelming health emergency, and some relatives refused to be tested. The PAHO states that fear, worries, and stress when facing a situation of high uncertainty, such as the COVID-19 pandemic, can be the explanation for these behaviors that affect mental health in general.

This study occurred during the beginning of the COVID-19 pandemic when most mothers were not vaccinated against the disease. We suggest comparative vulnerability research in the maternal population with a complete vaccination scheme to analyze whether the association with neonatal COVID-19 persists or if it would be identified as a protective measure.

The main strengths of our study were the availability of performing all tests by governmental institutions and the national standardized classification for maternal vulnerability through the SISBEN-IV classification. In addition, the MACSA software and database allow a reliable post-discharge follow-up for maternal-newborn

bonds and maintain permanent contact with family members.

Our study had no demographic differences in the exposed and unexposed populations. Although the reference hospital belongs to the governmental service, the reorganization of the health system during the COVID-19 health emergency allowed the care of newborns from all SISBEN-IV classifications. The risk of having COVID-19 in the population studied was 6.2%. This is slightly higher than what has been reported in the literature, as it is a captive population from a departmental reference site (32-34).

“This is the first study to determine the association between maternal socioeconomic vulnerability and neonatal COVID-19. We found a higher risk of having COVID-19 in newborns from socioeconomically vulnerable mothers up to 2.2 times (OR a: 2.24 CI 1.06-4.69 p= 0.03). We suggest maternal socioeconomic vulnerability should be considered as a differentiating risk factor for prenatal care and weight control for neonatal disease; and health professionals to be effectively trained in their active detection. Restructuring and regulating the process of active detection of socioeconomic vulnerability in pregnant women must become a priority goal, guaranteeing time for its management and allowing the creation of a strong doctor-patient relationship in prenatal care.”

Conclusions and Recommendations:

This is the first study to determine the association between maternal socioeconomic vulnerability and neonatal COVID-19. We found a higher risk of having COVID-19 in newborns from socioeconomically vulnerable mothers up to 2.2 times (OR a: 2.24 CI 1.06-4.69 p= 0.03). We suggest maternal socioeconomic vulnerability should be considered as a differentiating risk factor for prenatal care and weight control for neonatal disease; and health professionals to be effectively trained in their active detection.

Restructuring and regulating the process of active detection of socioeconomic vulnerability in pregnant women must become a priority goal, guaranteeing time for its management and allowing the creation of a strong doctor-patient relationship in prenatal care.

TABLE 1*Mothers and Newborns Sociodemographic and Clinical Characteristics*

Maternal Sociodemographic Characteristics	N (500)	% (100)
<u>Age</u> (years)	24 (6,6 DE)	
<u>Nationality:</u>		
Colombian	281	56,2
Venezuelan	219	43,8
<u>Zipcode:</u>		
Rural	217	43,4
Suburbs	161	32,2
Rural	122	24,4
<u>Marital status:</u>		
Married	65	13
Single	107	21,4
Divorced or separated	1	0,2
Free union (common law marriage)	327	65,4
<u>SISBEN-IV Classification</u>		
A (Maternal Vulnerability marker)	158	31,6
B	195	39
C	127	25,2
D	20	4
<u>Education</u>		
Incomplete Elementary	22	4,4
Elementary	44	8,8
Incomplete High School	324	64,8
High School	31	6,2
Bachelor's degree	54	10,8
Technician	2	0,4
Professional	23	4,7
<u>Health Assurance</u>		
Yes	309	61,8
No	191	38,2
<u>Overcrowding</u>		
Yes	130	26
No	370	74

Maternal Clinical Characteristics	N (500)	% (100)
<u>Covid 19 vaccination</u>		
None	420	84
One dose	51	10,2
Two doses or more (Complete scheme)	29	5,8
<u>Control Prenatal</u>		
None	35	7
Less than 6 controls	279	55,8
6 or more 6 controls	186	37,2
<u>Maternal Covid-19 (during delivery)</u>		
Yes	27	5,4
No	473	94,6
<u>Comorbidity</u>		
None	385	77
Preeclampsia	45	9
Diabetes	8	1,6
Obesity	1	0,2
Asma	13	2,6
Other	24	9,6
Neonatal Sociodemographic Characteristics		
	N(500)	%(100)
<u>Age (Days)</u>	7 (10,7 DE)	
<u>Gestational age (weeks)</u>	37,5 SEM (2,7 DE)	
<u>Gender</u>		
Female	222	44,4
Male	278	55,6
<u>Gestational age</u>		
Pre- term	160	32
Full Term	337	67,4
Post-term	3	0,6
<u>Weight (in grams at admission)</u>	2,889 (665 DE)	

Neonatal Clinical Features	N (500)	% (100)
<u>Birth Route</u>		
Vaginal	198	39,6
Cesárea	302	60,4
<u>Nutritional status (weight)</u>		
Appropriate birth weight	440	88
Low birth weight (IUGR)	14	2,8
Large birth weight	46	9,2
<u>Feeding</u>		
Exclusive breast milk	219	43,8
Formula	147	29,4
Mixed	1.34	26,8
<u>Risk Factors for Severity</u>		
Prematurity	25	5
Low birth weight (IUGR)	13	2,6
Low weight after birth	18	3,6
Bronchopulmonary dysplasia	1	0,2
Major malformation	3	0,6
More Than One Factor	60	12
None	380	76
<u>Perinatal complications</u>		
Asphyxia	19	3,8
Premature Membranes Rupture (PMR)	27	5,4
Intra-amniotic infection	22	4,4
Reanimation	17	3,4
2 or more complications	21	4,2
None	394	78,8

Covid -19 neonatal

Yes	32	6,4
No	468	93,6

Covid 19 Classification

Negative	468	93,6
Mild	13	2,6
Severe	11	2,2
Critical	8	1,6

Status at hospital discharge

Home	479	95,8
Transferred to higher level of care	17	3,4
Deceased	4	0,8

Status 6 months after discharge (496)

Alive	488	98,3
Deceased	0	0
No data	8	1,6

TABLE 2*Characteristics of Population According To Maternal Vulnerability Exposure*

Maternal vulnerability

(SISBEN A/extreme poverty)	Yes (158)	%	No (342)	%	P-val
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Maternal Nationality

Colombian	94	59,1	187	54,8	0,313
Venezuelan	64	40,9	155	45,2	

Marital status

Married	12	7,6	53	15,5	0,081
Single	38	24	69	20,1	
Separate	0	0	1	0,3	
Free union (Common-law marriage)	108	68,4	219	64,1	

Education

Complete Elementary	15	9,5	29	8,5	0,832
Incomplete Elementary	7	4,4	15	4,4	
Completed High School	11	7	20	5,8	
Incomplete High School	96	60,7	228	66,6	
Technician	18	11,3	36	10,5	
Professional	1	0,6	1	0,3	

None	10	6,5	13	3,9	
<u>Overcrowding</u>					
Yes	44	27,9	86	25,1	0,522
No	114	72,1	256	74,9	
<u>Ethnicity</u>					
Mongrel	152	96,2	313	91,5	0,061
Afro	2	1,3	6	1,7	
White	4	2,5	8	2,3	
Other	0	0	15	4,5	
<u>Health Assurance</u>					
Yes	99	62,6	210	61,4	0,788
No	59	37,4	132	38,6	
<u>Mother vaccinated for Covid 19</u>					
None	134	84,8	286	83,6	0,459
One dose	14	8,8	37	10,8	
Two doses or more (Complete scheme)	10	6,4	19	5,6	
<u>Maternal Comorbidity</u>					0,155
None	113	71,5	272	79,5	
Preeclampsia	16	3,8	29	0,2	
Diabetes	1	0,6	7	2	
Obesity	0	0	1	0,3	
Asthma	7	4,4	6	1,7	
Other	10	6,3	12	3,5	
Two or more	11	13,4	15	12,8	
<u>Mother Covid 19 (during Delivery)</u>					0,020
Yes	14	8,8	13	3,8	
No	144	91,2	329	96,2	
<u>Control prenatal</u>					0,147
None	6	3,7	29	8,5	
Less than 6 controls	89	56,3	190	26,3	
More than 6 controls	63	40	123	65,2	

Newborn	n(158)	%	n(342)	%	P-val
<u>Gender</u>					
Female	67	42,4	155	45,3	0,542
Male	91	57,6	187	54,7	
<u>Birth Path</u>					
Vaginal	63	39,9	135	39,4	0,932
Cesarean Section	95	60,1	207	60,6	
<u>Neonatal perinatal complications</u>					
Asphyxia	9	5,7	10	3	0,321
Premature rupture of membranes	8	5	19	2,6	
Intraamniotic infection	10	6,3	12	3,5	
Post-resuscitation	7	4,4	10	3	
2 or more	5	3,1	16	4,7	
None	119	75,5	275	83,2	0,867
<u>Newborn Nutritional Status</u>					
Appropriate birth weight	138	87,3	302	88,3	
Low birth weight (IUGR)	4	2,5	10	3	
Large birth weight	16	10,2	30	8,7	
<u>Risk for severe neonatal Covid-19</u>					
Prematurity	10	6,3	15	4,4	0,660
Growth restriction	4	2,5	9	2,6	
Low weight	4	2,5	14	4	
Bronchopulmonary dysplasia	0	0	1	0,3	
Major malformation	2	1,2	1	0,3	
More than 1 risk factor	20	12,6	40	11,7	
No risk factors	118	74,9	269	76,7	0,021
<u>Neonatal Covid-19 positive</u>					
Yes	16	10,1	16	4,7	
No	142	89,9	326	95,3	0,106
<u>Classification of neonatal Covid-19</u>					
Mild	6	3,8	7	2	
Severe	5	3,2	6	1,8	
Critical	5	3,2	3	0,9	
No Covid	142	89,9	3260	95,3	

TABLE 3

Relationship between crude and adjusted ORs from significant variables

(β :2.24; SD=0.183; p value<0.001)

** Covid 19 neonatal positive	OR	IC 95%	Adjusted OR	IC95%	P-val
Maternal Vulnerability (SISBÉN A)	1,6	1,13 – 2,39	2,24	1,06 – 4,69	0,033
Colombian Nationality	2,3	1,07 – 5,10	2,22	0,96– 5,11	0,61
Newborn small weight	1,3	0,48 – 3,60	1,45	0,47- 4,50	0,51
Newborn big weight	0,65	0,32 – 1,34	0,22	0,04 – 1,14	0,072
Covid -19 Family Contact	2,83	1,08 – 7,43	2,91	0,86- 9,80	0,83

*Sisbén A (extreme poverty): Yes/No

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High-Reliability Organizing (HRO): Objectivity and the Loss of Subjectivity

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

Abstract:

In dangerous work domains, such as firefighting and military aviation, subjective reasoning, adaptability, and social knowledge play crucial roles alongside technical expertise. However, prevailing views often prioritize objectivity over subjectivity, leading to a skewed understanding of effective practices. Drawing on anecdotes from a Los Angeles City Fire Captain and experiences aboard Nimitz class aircraft carriers, this manuscript explores the interplay between subjectivity and objectivity in High-Reliability Organizing (HRO). It argues that objectivity and subjectivity are not opposing forces but complementary aspects essential for navigating complex and dynamic environments. Through examples spanning from WWII bomber crews to modern-day research in combat zones, the manuscript emphasizes the importance of embracing both perspectives to enhance organizational effectiveness and safety. By recognizing the inherent duality of objectivity and subjectivity, this work advocates for a more nuanced approach to HRO that integrates experiential and experimental empiricism, thus fostering a deeper understanding of organizational resilience and adaptability.

Introduction:

Common themes across work domains in dangerous contexts include subjective reasoning, fear suppression, trust, helping the novice, protecting your partner, recognizing fear in fellow workers, and local leadership (1, 2). These themes are not privileged in today's sciences and characterizations of HRO. Instead, credibility derives from an overly masculinized view, if not a caricature, of the priority of objectivity while diminishing the supposed passiveness of subjectivity (3–9).

“Common themes across work domains in dangerous contexts include subjective reasoning, fear suppression, trust, helping the novice, protecting your partner, recognizing fear in fellow workers, and local leadership. These themes are not privileged in today's sciences and characterizations of HRO. Instead, credibility derives from an overly masculinized view, if not a caricature, of the priority of objectivity while diminishing the supposed passiveness of subjectivity.”

A Los Angeles City Fire Captain described his participation in promotion interviews for a mid-western US metropolitan fire department. This was in the mid-1970s. The department had brought him for candidate interviews for promotion to reduce local bias in the promotional process. Because distinct cultural differences exist between West Coast and East Coast fire departments, he did not know their slang or jargon and was unfamiliar with their operations. During the interviews, he identified applicants with formal knowledge and used the proper terms for the department's equipment, policies, and procedures. However, the captain noted that these candidates lacked adequate operational knowledge and the ability to develop adaptive contingent solutions. On the other hand, he found candidates who did not give formal “prope” information but accurately described their operations and demonstrated their adaptability to unexpected contingencies. The distinction is vital to those who work in dangerous contexts.

Some who read this anecdote would emphasize those candidates with higher cognitive abilities and mastery of policies and protocols. Others would emphasize the importance of adaptability and practical problem-solving. The former approach has greater objectivity, while the latter relies on subjective judgments.

Objectivity is independent of contextuality and individual perspectives to provide standardization and easy reproducibility. Faithful to facts, objectivity more correctly describes the world. Value-free objectivity is strengthened by rationality and reason (10). The absence of personal bias facilitates communication and translation of information to other areas. Finally, objectivity supports metrics and measurability—objectivity makes experiences quantifiable.

“Objectivity is independent of contextuality and individual perspectives to provide standardization and easy reproducibility. Faithful to facts, objectivity more correctly describes the world.”

During the 1970s, the Los Angeles City Fire Department averaged one to three firefighter line-of-duty deaths yearly. For the fire captain, knowing how to operate and adapt within dangerous contexts had greater importance than mastering technical terms and procedures. Operational capabilities save more lives than mastery of concepts and procedures.

In their probation year, firefighters learned subjective reasoning, understanding how information has value to the individual and its context in space and time. They learned from anecdotes, not the kind dismissed by outsiders, but instead placing rich experience into context. This social knowledge, not easily shared with outsiders, creates a culture that protects its members as it strengthens them. These are a culture's hidden social parts, poorly visible even when directly observed.

We too quickly mistake subjectivity as a loosening of standards to accommodate individual taste, pleasure, and even a person's emotions. As a *preference* in judgment, subjectivity does contain

elements of emotion and feeling, sensations that enhance, rightly or wrongly, a person's sense of intuition. But subjectivity also includes a person's attitudes and values, forming the foundation for decision-making under uncertainty. Subjectivity's strength lies in adapting attitudes and values to a fluctuating environment (11, 12).

“We too quickly mistake subjectivity as a loosening of standards to accommodate individual taste, pleasure, and even a person's emotions. As a preference in judgment, subjectivity does contain elements of emotion and feeling, sensations that enhance, rightly or wrongly, a person's sense of intuition. But subjectivity also includes a person's attitudes and values, forming the foundation for decision-making under uncertainty. Subjectivity's strength lies in adapting attitudes and values to a fluctuating environment.”

This highlights the instrumental use of objectivity, that is, using objectivity for purposes other than problem-solving. A person may focus on their greater “objectivity,” bolstering their perspective against the perspectives the others rather than the substance of their argument. What makes this easy to do is contextual values and disagreement on the strengths of different options (10, 12).

HRO emerged from operations in dangerous contexts. As an identified entity, HRO developed in the Nimitz class aircraft carriers of the Pacific Fleet of the US Navy (below). The nature of the experiences and environment will limit visibility into the liminal operating environment of an HRO. The power of subjectivity is less visible, contributing to the privileging of objectivity when HRO is translated to other domains.

Pacific Fleet Nimitz Class Nuclear Aircraft Carriers:

During the roughly 30-year period from WWII through the Vietnam War, the Pacific Fleet had conducted most of the US Navy's combat operations, making death a part of operations and creating “rules written in blood.” The exigencies of combat made it imperative for everyone to identify effective actions and retain what they learned. Safety is vital even during wartime, and accidents are investigated. Safety in combat has an additional function: avoidable operational loss causes unaffordable shortages of men and planes and increases vulnerability to enemy activity. This gives meaning to the adage “Safety through operations and operations through safety.”

Early in the Vietnam War, US Navy Aviators engaged Surface-to-Air Missiles (SAM) for the first time. Because their training officers were WWII and Korean War veterans, they had no training for engaging or avoiding SAMs. Some aviators flew low to avoid them and were hit by ground fire. Other aviators flew high, which markedly decreased accuracy, leading to return missions. Effective aviators learned to watch the SAM approach and wait for the radar

to lock on the jet, confirming that the aviator was targeted. Then, the aviator waited to maneuver with the SAM sufficiently close so that the aviator could outmaneuver the missile. This was an interactive combination of objective and subjective characteristics (13, 14).

During this time, nuclear aircraft carriers began joining the fleet. Captains of a US Navy aircraft carrier are nuclear trained and, by act of the US Congress, must be aviators. They now serve a three-year tour in carrier command after a nominal six years of prior qualifying assignments. In addition to the eighteen months of nuclear power and Naval Reactors training, the program includes a two-year tour as the Executive Officer of a nuclear carrier and command of a conventionally powered deep draft vessel. This brought together three independent, otherwise disparate domains within a single individual: 1) aerial warfare experience with initiative, improvisation, and flexibility; 2) nuclear propulsion engineering experience with rigor, detail, and conformity to procedures; and 3) previous aircraft squadron and large ship command of complex operations and organizations in demanding circumstances (13). HRO, as codified by the UC Berkeley HRO (High-Reliability Organizing) Project, emerged from the Nimitz class nuclear aircraft carriers of the US Navy's Pacific Fleet (1, 15).

Nuclear training in engineering and nuclear safety theory gave these Captains a greater appreciation of highly reliable operations and expanded their leadership capabilities. The nuclear propulsion engineers' training and professionalism helped form the basis for increased safety awareness and reliability of operations throughout the carrier and embarked air wing. HRO had emerged on the nuclear aircraft carrier by merging the emergency-type responses of aerial combat with the control-operator functions of a nuclear reactor.

“HRO had emerged on the nuclear aircraft carrier by merging the emergency-type responses of aerial combat with the control-operator functions of a nuclear reactor.”

Liminality and Subjectivity:

New members of an organization learn how to operate in the liminal zone through experience and social learning. WWII American bomber crews arriving in the theater of operations were insecure and defensive. They were overly self-assured in action, though some were remarkably diffident (16). About their tenth raid (the airmen had entered and remained in liminality):

“the man had experienced fear and by now knew that he could deal with it; he found that care and skill and coolness in the pilot and crew had a real bearing upon the question of his return; he saw that his crew and his airplane could withstand catastrophe; he developed an ‘esprit de corps’ in regard to his squadron, and was now really part of it. He developed for the first time a sense of his responsibility to his mates and to formation. At this stage...the men were effective, careful, fighting men, quiet and cool on the ground and in the air. They attained a sort of tranquility in spite of their anxiety. *They had very little need for defensive mechanisms of any sort to deceive themselves or anyone else.* [Author's emphasis.] They talked easily and quietly” (16).

In the early months of World War II, a psychiatrist joined a B-17

crew on a mission “to a distant target in enemy-occupied Europe.” He observed a crew of diverse personality types in action, everyone wounded, the plane badly damaged, and flying alone, with a successful return to England in doubt (16):

“It was striking that the emergency did not tend to increase the differences in the reaction patterns of the differing personalities; rather, they came to act in much more similar fashion than usual. . . . The reduction of all personality types to a common reaction pattern appears to be a matter deserving contemplation.”

About 80 years later, three mental health academicians entered the operational environment during combat operations (17, 18). Their research findings were criticized because they did not comport with knowledge developed from a scientific methodology developed away from combat. Three academic sociologists criticized the study’s findings:

“Their findings are intriguing because they appear to contradict long-standing research in organizational theory and sociology on the relationship between cohesion and performance, as well as more recent studies of unit cohesion and military effectiveness” (19).

The privileging of objectivity over subjectivity leads to a rigid, normative stance for HRO, washing out its strength (20). The inability or failure to appreciate the HRO operating environment makes invisible the details and methods that give HRO its function (1, 21, 22). The result is a divide between the subjectivity-based mechanism of HRO and the objectivity-based teaching and design of HRO. Liminality has blurred the two methodologies, preventing HRO characterization as a duality of subjectivity and objectivity.

“The privileging of objectivity over subjectivity leads to a rigid, normative stance for HRO, washing out its strength. The inability or failure to appreciate the HRO operating environment makes invisible the details and methods that give HRO its function. The result is a divide between the subjectivity-based mechanism of HRO and the objectivity-based teaching and design of HRO. Liminality has blurred the two methodologies, preventing HRO characterization as a duality of subjectivity and objectivity.”

The duality of subjectivity and objectivity is similar to the problem of light having characteristics of *discrete* mass (photon) and *continuous* wave (electromagnetic radiation), the wave-particle duality of light. Either approach partially explains the nature of light but at the expense of the other. Albert Einstein’s resolution of this duality of light led to his winning the Nobel Prize in Physics in 1921. The duality of subjectivity and objectivity arises from the two contradictory interpretations of reality. To paraphrase Einstein, subjectivity and objectivity separately do not fully explain

how we can accurately observe and interpret the environment, but together they do.

The *discrete* concepts of categorizations and cognitions from objectivity combine with the *continuous* interpretations of the environment from subjectivity to produce the objective-subjective duality of HRO. According to Albert Einstein and Leopold Infeld (23),

“Duality can confound us, or it can lead us to more elegant models of sensemaking. As with theories of light, Einstein describes how ‘It seems as though we must use sometimes the one theory and sometimes the other, while at times we may use either. We are faced with a new kind of difficulty. We have two contradictory pictures of reality; separately, neither of them fully explains the phenomena of light, but together they do.’”

Empirical Knowledge: Objective and Subjective

Spectators claim the practice of HRO is anecdotal (as a pejorative) and is not empirical, meaning not developed through experimental design. We look to the work of Frances Bacon and Ronald A. Fisher to differentiate empirical knowledge as *experiential empiricism*, knowledge gained through experience, and *experimental empiricism*, knowledge gained by experiment.

HRO operates in the environment and not a laboratory. The two sources of empirical knowledge are at different levels of analysis. Arguing across levels of analysis creates false debate (24). The mistaken belief that the two views are related or the privileging of *experimental empiricism* leads to inaccurate models that can be deadly when not tested in the HRO environment (25).

“Spectators claim the practice of HRO is anecdotal (as a pejorative) and is not empirical, meaning not developed through experimental design. We look to the work of Frances Bacon and Ronald A. Fisher to differentiate empirical knowledge as experiential empiricism, knowledge gained through experience, and experimental empiricism, knowledge gained by experiment. Arguing across levels of analysis creates false debate. The mistaken belief that the two views are related or the privileging of experimental empiricism leads to inaccurate models that can be deadly when not tested in the HRO environment. Somehow, empiricism has shifted from knowledge developed through experience to knowledge reasoned by experimental design.”

Somehow, empiricism has shifted from knowledge developed through experience to knowledge reasoned by experimental design. Frances Bacon described how we gain empirical knowledge from inductive reasoning and sensed experience. (Sensed experience is not an everyday experience.) In the inductive process, we correct and extend our sensed data into facts that describe underlying physical, causal mechanisms of that experience. Empiricism extends our knowledge beyond the data that generated the data and facts. We can then test these theories by drawing out new predictions to confirm or reduce uncertainty about the theory (26).

Ronald A Fisher (27) introduced experimental design and statistical analysis in his 1935 book *The Design of Experiments*. Fisher advised that we design to randomize the subject to double restrictions:

“An essential condition of experimentation is that the experimental material is known to be variable, but it is not known, in respect of any individual, in what direction his response to a given treatment will vary from the average.”

“If single factors are chosen for investigation, it is not because we anticipate that the laws of nature can be expressed with any particular simplicity in terms of these variables, but because they are variables which can be controlled or measured with comparative ease.”

We test for the results’ significance through statistical analysis and calculate the comparisons’ precision between the two groups. In his words:

The Test of Significance

“It is usual and convenient for experimenters to take 5 percent, as a standard level of significance, in the sense that they are prepared to ignore all results which fail to reach this standard, and, by this means, to eliminate from further discussion the greater part of the fluctuations which chance causes have introduced into their experimental results” (27) [*p* value of 0.05, pages 15–16].

Precision of the Comparisons

“To form a preliminary opinion on the strength of the evidence, it is sometimes useful to consider how many similar comparisons would have been equally plausible from the start. Thus, in comparing the best with the worst of the ten tested varieties, we have chosen the pair with the largest apparent difference out of 45 pairs, which might equally have been chosen. We might, therefore, require the probability of the observed difference to be as small as 1 in 900, instead of 1 in 20, before attaching statistical significance to the contrast” (27) [*p* value of 0.001].

The Objectivity-Subjectivity Dichotomy

What academicians and professionals consider “objective” is often a selection from their subjective perspective. During a panel discussion at an international reliability and safety meeting, a retired police sergeant described his interactions when an incident began accelerating toward a physical fight. Not only did he reduce conflict through his rapid responses to how bystanders responded to his actions, but he also initiated cooperation from the group.

“What academicians and professionals consider “objective” is often a selection from their subjective perspective.”

A consultant on the panel corrected him, giving the consultant’s objective perspective of the volatile and dangerous situation. The objective perspective diminished the sergeant’s initiative and skilled, improvised actions, working alone under the pressure of physical threats.

It seemed that the sergeant’s perceived reality of threat developed from continuous negotiations between the bystanders and the sergeant following the local conventions and structures. Changing perceptions would have influenced negotiations and reduced the sense of threat. The consultant viewed the encounter from the basic tenet of *Social Constructionism* that “reality” is an outcome we experience through negotiations between people within a social context. The threat then becomes a possible reality outcome from such negotiations.

The moderator introduced the panel’s topic with a presentation on the neuroscience of fear and threat behaviors. The moderator then interpreted the described fear and threat behaviors and the methods that modulated the sergeant’s behaviors while calming the crowd. The consultant countered with recommendations that the sergeant could have socially negotiated the same result. The moderator asked if the sergeant could have created a new social construct by negotiating with a fist or a gun. There appeared to be some confusion of abstract, objective concepts with concrete, contextual information.

Alfred North Whitehead (28) had concern for “concrete facts [presented] under the guise of very abstract logical constructions.” For example, the reviewer strongly recommends strict application of an abstract concept to a specific situation. We create “the accidental error of mistaking the abstract for the concrete.” He described this as “an example of what might be called the ‘Fallacy of Misplaced Concreteness.’”

“The misplacing and fixing of abstractions is a big issue. Misplaced concreteness is the problem, and your [one of the authors, DvS] emphasis on moving, flow, trajectory, reduces ‘severe concreteness.’ I’m studying a disaster that sank the container ship *El Faro*. As they are entering the eyewall of hurricane Joaquin, without knowledge of winds and at 4 AM in darkness, the captain says, ‘This is a typical winter day in Alaska’ and sticks to his route straight toward the eye. Ship (790 feet long) capsizes 3 1/2 hours later, drowning all 33 crew. Typical day is a severe abstraction.”

Karl Weick (personal communication)

Using abstractions for concreteness is a fallacy more likely relied on at a distance with the moving trajectory of events reducing severe concreteness (Karl Weick, personal communication). The ship captain, a veteran of Alaska winter weather, was now navigating in a tropical hurricane thousands of miles distant from the area of his experience (29).

“Using abstractions for concreteness is a fallacy more likely relied on at a distance with the moving trajectory of events reducing severe concreteness (Karl Weick, personal communication)... The distance of a spectator from events, whether space or time, also increases the spectator’s feeling of objectivity.”

The distance of a spectator from events, whether space or time, also increases the spectator's feeling of objectivity. Following Whitehead's concern about substituting abstract constructions for concrete facts, we question the presentation of *subjective* information "under the guise of *objective*, abstract logical constructions." This accidental error of mistaking subjectivity for objectivity might be called the "Fallacy of Misplaced Objectivity."

Misplaced objectivity, over time, creates an ideology asserting that objectivity opposes subjectivity, thus denying the possibility of mediation between the two (4). Objectivity as a cognitive trait has become linked with autonomy, an affective trait (30), a linkage we disagree with because autonomy is contextual. We discuss in this article the subjectivity of contextuality.

“Misplaced objectivity, over time, creates an ideology asserting that objectivity opposes subjectivity, thus denying the possibility of mediation between the two. Objectivity as a cognitive trait has become linked with autonomy, an affective trait, a linkage we disagree with because autonomy is contextual.”

Conclusion:

Objectivity and subjectivity in the HRO act as a duality. We cannot understand one without the other. We cannot use one without the other. Because of fluctuating events, we develop knowledge with inductive processes through experiential empiricism as we rely on knowledge developed through experimental empiricism. These are not contradictions or paradoxes. They function as dualities.

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Cardiac Corner: Heterotaxy and the Multi-organ System Failures Due to Disorders of “Sidedness”

Gil Wernovsky, MD; Benjamin Hopkins, OMSIV (Discussant)

The X-ray and clinical history described at the beginning of this journal (see page 18) are pathognomonic for patients with heterotaxy syndrome, sometimes called isomerism. I like to consider heterotaxy as a “multi-organ system failure” from an anatomic rather than a physiologic perspective. Heterotaxy usually presents to the cardiologist and neonatologist because of abnormal oxygen delivery, clinical findings, or both. It usually involves two or more organ systems at the time of presentation. Heterotaxy represents the downstream manifestations of a single abnormality during organogenesis.

“I like to consider heterotaxy as a “multi-organ system failure” from an anatomic rather than a physiologic perspective. Heterotaxy usually presents to the cardiologist and neonatologist because of abnormal oxygen delivery, clinical findings, or both. It usually involves two or more organ systems at the time of presentation. Heterotaxy represents the downstream manifestations of a single abnormality during organogenesis.”

In the structurally normal heart (and patient), ciliary motion in the early phases of embryogenesis determines left-right differentiation. When ciliary motion is disordered, there is a loss of left-sided and right-sidedness of organ development, causing asymmetry or duplication of many organ systems. Disorders of “sidedness” frequently result in students and clinicians reciting a long or exhaustive list of potential abnormalities in this patient population. Please see Thiel and colleagues’ position paper from the Pediatric Cardiac Intensive Care Society for an in-depth discussion from an expert review of the anatomic considerations, surgical considerations, noncardiac issues, and long-term outcomes in this challenging group of patients (1) ([link](#)).

Let us think about anatomic disorders of sidedness resulting in multi-organ system abnormalities. We can start at the head, moving through the ears, sinuses, lungs, heart, liver, spleen, abdomen, and genitourinary tract.

Nervous:

In the brain, it has been shown that there is increased extra-axial cerebrospinal fluid volume, delayed brain maturation, subtle dysplasia, including the hippocampus and olfactory bulb, and, in many patients, a higher composite dysplasia score (2).

Some delayed maturation may be due to ciliary dysfunction and abnormal circulatory flow from the structurally abnormal fetal heart. One relatively interesting relationship that’s just been shown is an increased incidence of dyslexia in patients with cili-

ary disorders (3). In addition, there has not yet been conclusive research that traditional “left brain and right brain” findings differ in patients with heterotaxy.

Cardiac:

The heart is the organ that generally presents as the hallmark of heterotaxy. When one thinks about all of the things that could go wrong in the sidedness of the heart, many things come to mind. There may be one or two superior vena cava or one or two inferior vena cava; if there is one of either cava, it could be on either side. The anatomy of the atrium could look like a right atrium, anatomically, or a left atrium, anatomically. Usually, there are two atrioventricular valves. However, one of the more common abnormalities in heterotaxy is a common atrioventricular valve. Additionally, the two ventricles may be reversed, or there may be only one or two ventricles, with one being hypoplastic.

“The heart is the organ that generally presents as the hallmark of heterotaxy. When one thinks about all of the things that could go wrong in the sidedness of the heart, many things come to mind.”

Further, the pulmonary artery may be absent or severely stenotic, and the aortic arch may be on the right side. The pulmonary veins may be abnormally located on the right atrium or drain in an ipsilateral fashion. Finally, the conduction system may be abnormal. Typically, when there are two superior vena cava, there are two sinus nodes. There may be no sinus node when there is only a left superior vena cava, and AV node conduction, not surprisingly, can also be abnormal.

Although these abnormalities have been lumped under the terms asplenia/Right Atrial Isomerism and “poly”-splenia/Left Atrial Isomerism in the past, those terms are somewhat obsolete at this time, and it is best to describe the findings in detail, as there are many more exceptions to the rule.

“The next area that becomes clinically significant, particularly as the children age, is the respiratory tract’s ciliary dysfunction. These patients struggle with frequent ear infections, sinusitis as children, bronchitis, and deeper respiratory infections.”

Pulmonic:

The next area that becomes clinically significant, particularly as the children age, is the respiratory tract’s ciliary dysfunction.

These patients struggle with frequent ear infections, sinusitis as children, bronchitis, and deeper respiratory infections. In addition to the functional abnormality of ciliary dysfunction, there are increased postoperative respiratory complications in heterotaxy patients with respiratory ciliary dysfunction (4). In the short term, primary ciliary dyskinesia affects postoperative recovery and has been associated with the increased need for tracheostomy (4).

In addition to functional abnormalities, the lungs may be abnormally structured. The right lung is normally a three-lobed structure, and the left is a two-lobed structure. There can be two anatomically right lungs, two anatomically left lungs, or a reversed nature of the normal lung lobar arrangement. In addition, the right pulmonary artery and left pulmonary artery take a typical course where, in structurally normal condition, the right pulmonary artery passes in front of the right main stem bronchus, and the left pulmonary artery traverses over the left main stem bronchus. These anatomic relationships are frequently abnormal in children with heterotaxy. Finally, the venous anomalies of the IVC and portal venous system can complicate cardiac reconstruction and may contribute either to pulmonary hypertension or pulmonary arteriovenous malformations.

“Some patients with anatomically two left atriums, “poly”-splenia, may develop signs of biliary atresia at the typical time frame long after a surgical intervention has been considered and undertaken (5).”

Gastrointestinal:

The liver is frequently involved in patients with heterotaxy, and there is often a propensity for gallstones. Some patients with anatomically two left atriums, “poly”-splenia, may develop signs of biliary atresia at the typical time frame long after a surgical intervention has been considered and undertaken (5). In addition, in the abdomen, at least 70% of patients have malrotation and will require a LADS procedure (5). They may present with volvulus and a small bowel obstruction.

There is a propensity for pancreatitis and an annular pancreas and, curiously, a higher incidence of diabetes mellitus (5). Duodenal and anal atresia affects approximately 10% to 15% of these children. Both duodenal and anal atresia are more common with bilateral right-sidedness. All patients have functional asplenia, even in the presence of “poly”-splenia. There is an increased risk of infection with encapsulated organisms, and lifelong antibiotic prophylaxis, similar to sickle cell disease, is recommended (5).

“The American Academy of Pediatrics recommends that pneumococcus and H. flu vaccines be given, in addition to seasonal vaccinations that should be considered, including influenza, salmonella, and meningococcus.”

The American Academy of Pediatrics recommends that pneumococcus and H. flu vaccines be given, in addition to seasonal vaccinations that should be considered, including influenza, salmonella, and meningococcus.

“A single horseshoe kidney and a hypoplastic, dysplastic, or even solitary kidney are common. Due to ureteral abnormalities, patients with heterotaxy are predisposed to urinary tract infections, pelvic-ureteral obstruction, and nephrolithiasis.”

Genitourinary:

Finally, there are genitourinary and reproductive abnormalities. A single horseshoe kidney and a hypoplastic, dysplastic, or even solitary kidney are common. Due to ureteral abnormalities, patients with heterotaxy are predisposed to urinary tract infections, pelvic-ureteral obstruction, and nephrolithiasis. In boys, there can be bilateral cryptorchism and infertility in many of the men. This has been described in the past as Kartagener’s syndrome, with a risk of testicular cancer in young adults. The impact of the genitourinary system abnormalities might become more apparent with longer patient survival.

Survival:

Finally, it is essential to talk about counseling babies with a fetal diagnosis of heterotaxy. Frequently, the heart is the primary focus of our counseling, mainly as a result of the birth of a baby. As it relates to many of these babies, having a functionally univentricular heart and requiring staged reconstruction toward a Fontan operation (6).

“In heterotaxy, the five-year survival is only about 40% to 50% if there is one functioning ventricle (7). However uncommon, it is also essential to mention the abnormalities mentioned above, including the potential for respiratory infections, the potential for developmental disabilities, the potential need for abdominal surgery, and, in men, infertility issues.”

In heterotaxy, the five-year survival is only about 40% to 50% if there is one functioning ventricle (7). However uncommon, it is also essential to mention the abnormalities mentioned above, including the potential for respiratory infections, the potential for developmental disabilities, the potential need for abdominal surgery, and, in men, infertility issues. Full body evaluation, prenatal or

System	Multi-organ System Failure	Specific in Left Atrial Isomerism	Specific in Right Atrial Isomerism
Nervous	CNS dysfunction		
Cardiac	Cardiac complexity generally determines the outcome. TAPVR particularly troublesome association	Two left atrial appendages, cardiac defects, congenital heart block, interruption of the IVC with azygous vein continuation.	Two right atrial appendages, severe cardiac defects, malposition of IVC with IVC and aorta parallel on the same side of the spine
Pulmonic	Pulmonary Hypertension	Bilateral bilobed lungs	Bilateral trilobed lungs
Gastrointestinal	Volvulus, biliary atresia	Polysplasia	Asplenia
Genitourinary	Horseshoe kidney, hypoplastic, dysplastic, or solitary kidney. Cryptorchidism, infertility in men		

Table 1. Disorders of "Sidedness"

antenatal, is necessary for the workup of patients found to have heterotaxy. Prenatal counseling for parents is challenging due to the ever-evolving nature of a multi-organ system dysfunction.

Suggested Reading:

1. <https://pubmed.ncbi.nlm.nih.gov/36085154/>
2. <https://pubmed.ncbi.nlm.nih.gov/33731242/>
3. <https://pubmed.ncbi.nlm.nih.gov/32000924/>
4. <https://www.atsjournals.org/doi/pdf/10.1513/AnnalsATS.202202-116OC>

Answers for abnormal findings:

1. Dextrocardia.
2. Midline liver.
3. Right-sided UA line, indicative of right-sided aortic arch
4. Left-sided UV line, indicative of a left-sided IVC
5. As marked by the endotracheal tube, the trachea is deviated to the patient's left, another sign of a right-sided aortic arch.

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Your Pregnancy and Substance Use

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



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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



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



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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



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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It Seemed Like a Good Idea at the Time: Reflecting on 35 Years of Clinical Practice in the NICU

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.

My love affair with all that is NICU started in the fall of 1988 with my clinical rotation as a student respiratory therapist in the Women's College Hospital (WCH) unit in Toronto. I witnessed a team approach to care that was inclusive and respectful, allowing members of each discipline to utilise their respective scope of practice fully.

Dr. Andrew Shennan's (the founder of the unit) philosophy is aptly described by an expression he used: "Why have a dog and bark too?" Nurses know how to nurse; pharmacists know medication; dietitians know nutrition; and last but not least, respiratory therapists know how to ventilate. While the physician in charge acted as a care coordinator, it was accepted that the knowledge and expertise each allied health sub-specialty brought to the table amounted to more than could be expected of any one member of the team, including physicians. The staff physicians and fellows received input from the team and acted as care coordinators. It is a model that has stood the test of time and continues today.

"While the physician in charge acted as a care coordinator, it was accepted that the knowledge and expertise each allied health sub-specialty brought to the table amounted to more than could be expected of any one member of the team, including physicians."

Just as importantly, allied health is practiced with a great deal of autonomy. This autonomy is a key component of unit philosophy; it removes roadblocks that may hamper a clinician's ability to provide appropriate care promptly. Employee satisfaction improves work performance, and it improves when the job they are tasked with

can be done without interference.

My cocky attitude, typical of a fresh graduate (abundant in the relative comfort of my base hospital), faded quickly upon joining the WCH NICU, usurped for the next year by a state of perpetual terror. Regardless, I have never looked back. February 2024 marks the last month of my employment as a full-time RRT in the NICU at Sunnybrook Health Sciences Centre and the beginning of my semi-retirement. Having spent more than half my life in the unit (relocated in 2010 to the Bayview Campus of Sunnybrook Health Sciences Centre), there is far too much NICU blood in my veins to stop practicing; it is in my DNA.

Change is a part of life. Ideally, clinical practice evolves as knowledge and evidence to support it (or not) increases. While we all come to the table intending to do well for our patients, sometimes our actions miss the mark. As the saying goes, "The road to ruin is paved with good intentions." Here are some.

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Chest physiotherapy:

Hoping to mobilise and clear secretions, chest physiotherapy (CPT) was once routinely performed on ventilated infants. Some units used electric toothbrushes; at WCH, the masks from resuscitation bags were cupped in hand and "gently" tapped on the babies' chests. The evidence to support this practice is inconclusive (1), often not stratified by post-menstrual age (PMA), and various CPT methods may be utilised. A 1998 paper raised concerns about brain damage associated with CPT (2). Regardless, CPT remains a controversial therapeutic intervention, one not performed in the NICU at Sunnybrook in many, many years. One method that appears to be safe is Vojta reflex stimulation (3). A 2018 study found that prone positioning had a more significant benefit to lung function than CPT (4). Regardless of the method, CPT should be avoided during the first few days of life when the risk of brain

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bleeds is most significant and on those infants at high risk of intracranial bleeds (5).

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Resuscitation:

FiO₂ of 1.0 was often initially used to bring oxygen saturation up into the 90s as quickly as possible. At WCH, 0.60 was used, possibly because that is at the top of the blender dial. Regardless of activity and respiratory drive, virtually all infants <30 weeks PMA were intubated, and babies were rarely extubated before 30 weeks PMA.

PEEP:

Reminiscent of the Ford Model “T,” PEEP could be dialed into whatever level desired, as long as that was 5 cmH₂O. “PEEP-O-PHOBIA” was the order of the day. Worse than the arbitrary selection of pressure, pulmonary interstitial emphysema (PIE) was treated by decreasing PEEP, sometimes to zero. In the day, PIE was very often a death sentence.

“Reminiscent of the Ford Model “T,” PEEP could be dialed into whatever level desired, as long as that was 5 cmH₂O. ‘PEEP-O-PHOBIA’ was the order of the day.”

Non-Invasive Ventilation (NIV):

Before the availability of commercial NIV devices such as the Infant Flow System®, nasopharyngeal tubes (NPTs) (regular endotracheal tubes cut to a shorter length) were inserted to provide non-invasive support. Some units performed laryngoscopy to establish NPT length by advancing the tube and cutting it to the length visible past the soft palate. Aside from issues with discomfort (which was minimised if the NPT was advanced far enough and mitigated with acetaminophen), this system worked very well.

The biggest problem was how NIV support settings were set. The circuit wye was occluded, and the desired pressure (invariably PEEP at 5 cmH₂O and inspiratory pressure of 12 cmH₂O at 12/minute should a rate be desired) was set on the ventilator. Inspiratory time was usually 0.4–0.5 seconds. Unlike today’s ventilators, the machines of the day lacked mechanisms to compensate for leaks and maintain pressure. NIV would undoubtedly have been more successful if it was set based on delivered pressure. (Aside, we were delivering NIPPV decades before it gained favour with others.)

Invasive Ventilation:

Once intubated, all babies were placed on the ventilator at a rate of 40–60, initial inspiratory pressure of 20 cmH₂O, PEEP of 5 cmH₂O, and inspiratory time of 0.4–0.5 seconds. When weaning, the rate was always decreased before pressure. Exogenous surfactant was finishing clinical trials when I joined the NICU team, and this approach assured the babies got the “best” of both barotrauma and volutrauma. This ill-advised but well-intentioned approach notwithstanding, the unit at WCH still boasted some of the lowest chronic lung disease (CLD, or BPD as it was called then) numbers in the world.

Volumes/Pressures:

When the first ventilators to offer volume monitoring came into service, we were shocked to see how much volume babies were receiving, even at relatively low pressures. Inspiratory pressure had always been set based on chest movement, a very imprecise method. Even after we were able to see volumes in real-time, tidal volume selection was typically 5–8 or more mL/kg, and chest tubes were a much more common sight then than now. “Conventional” ventilation is now rarely used in the Sunnybrook NICU; instead, oscillation with volume targeting and high-frequency jet ventilation are first-line modalities.

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Blood gases and PaPCO₂ targets:

During the first week of life, babies were ventilated to “normal” blood gas values. It was not until after this time that orders might be written to “accept chronic blood gases.” Realistically, after bashing their poor little lungs for a week, there was little choice but to accept lower pH/higher PaCO₂. At the time, normal pH was considered to be 7.35–7.40 with PaCO₂ maintained at <45 mmHg, and pH of 7.3 and PaCO₂ 45–55 were acceptable chronic blood gas values. We now have no firm upper limit on PaCO₂, provided metabolic compensation exists to keep pH above 7.24, sometimes 7.20.

The frequency at which blood gases were drawn meant the most significant part of an RT’s workload was doing them. Babies

who were intubated had blood gases drawn every 4 hours if the ventilator rate was 40–60, every 6–8 hours if the rate was under 40, and every 12 hours if the baby was on NIV. Contrast this with current guidelines, which allow 48–72 hours between gases on stable, chronically ventilated babies. Babies receiving NIV have blood gases drawn only if there is a compelling reason to do so.

“During the first week of life, babies were ventilated to 'normal' blood gas values. It was not until after this time that orders might be written to 'accept chronic blood gases.’”

Blood work:

When I started working at WCH, the laboratory staff did all routine blood work in the morning. A cacophony of babies screaming filled the air each morning, and bruised heels were the norm. The lancets used then were solid metal pieces with a sharp spike at one end. They were jabbed into the heel, and at one time, the bottom of the heel was used. Former premies were often recognisable by their odd walk – on tiptoes with arms outstretched wide as if they were intent on hugging whomever they approached. The bedside RN did non-routine blood work, which was not coordinated with RRTs.

Today all blood work is done by the bedside RN or the RRT, depending on whether blood gases are required or not, and the timing of the draw is coordinated with handling times to minimise disturbing the babies. The frequency of routine bloodwork has also been significantly decreased. Lancets are spring-loaded blades that slice at a controlled depth so quickly it is hardly noticed, and we know not to poke the bottom of the heel. Sucrose is also often given prior to puncture-derived blood work (see below).

Pain management:

Perhaps the darkest stain on the history of neonatology is the mistaken belief that infants do not feel pain. Until the late 1980s and beyond, despite the growing body of evidence to the contrary, this belief persisted, and analgesia was often not prescribed for babies. When it was, dosing was often insufficient (6). Rapid sequence induction (RSI) was rarely performed for intubating until the 2000s. Ground-breaking research by Dr. Sharyn Gibbons

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(formerly of WCH) on sucrose and pain management in premature infants changed all this (7). Today, RSI for intubation and sucrose for minor procedural pain are standards of care.

Circuit changes:

Since circuits were changed every 48 hours, a significant part of the daily workload for an RT consisted of changing circuits. During these circuit changes, one person was “dirty,” and the other was “clean.” The dirty person would remove the circuit, and the clean person would put on the new one while the bedside nurse hand-bagged the baby. Eventually, circuit changes were pushed to weekly, and today, circuits are not changed unless they fail or become visibly soiled.

Developmental care:

It was common to pin down the baby’s limbs like a frog being readied for dissection to reduce the chances of a baby removing its IV(s). (This practice contributed to the odd walk described above.) Incubators were not covered, light levels were very bright, and noise levels were very high. A boom box is often added to the

“It was common to pin down the baby’s limbs like a frog being readied for dissection to reduce the chances of a baby removing its IV(s). (This practice contributed to the odd walk described above.)”

din. Now, incubators are covered, light levels are lowered, and noise is minimal. Positioning aids assist in positioning babies in developmentally appropriate ways, and every effort is made to minimise disturbing babies.

“This process would also cause the baby to rise and fall on top of the mattress. Each fall startled the baby and spurred breathing, but it kept the baby from sleeping soundly. Even back then, we should have known this was not desirable.”

The “Bird Bed”:

The original “Bird” family of pneumatic/magnetic controlled ventilators was retired once more reliable electronically controlled ventilators such as the Sechrist® came to market. While the “Baby Bird” was no longer used for mechanical ventilation, it fit the bill for another therapy—persistent apnea. A glove was placed under the incubator mattress and secured to the end of a circuit connected

to a “bird.” A rate was set on the ventilator; each time the glove inflated/deflated, the mattress would rise and then fall. This process would also cause the baby to rise and fall on top of the mattress. Each fall startled the baby and spurred breathing, but it kept the baby from sleeping soundly. Even back then, we should have known this was not desirable.

Dexamethasone:

In the late 1980s–early 1990s, a seemingly miraculous drug, dexamethasone, came on the scene. Given to premature babies with evolving CLD, it seemed to work miracles and allowed them to be extubated, drastically reducing FiO_2 requirements. Soon, “dex” was being prescribed in NICUs everywhere with great regularity and in doses that might make Lance Armstrong blush.

“As we now know, [dexamethasone] is a double-edged sword, and concerns about catabolism and brain growth surfaced. For years dexamethasone fell out of favour until the “DART” protocol (tiered dosing at lower levels) was developed and is now accepted as an effective therapy in the treatment of CLD, the lower doses resulting in far fewer adverse effects.”

As we now know, the drug is a double-edged sword, and concerns about catabolism and brain growth surfaced. For years dexamethasone fell out of favour until the “DART” protocol (tiered dosing at lower levels) was developed and is now accepted as an effective therapy in the treatment of CLD, the lower doses resulting in far fewer adverse effects.

Thirty-five years from now, someone peering back through the retrospectoscope at practices we currently think are good ideas will no doubt raise an eyebrow. Until then, we will try our best to identify practices that fall short of the mark.

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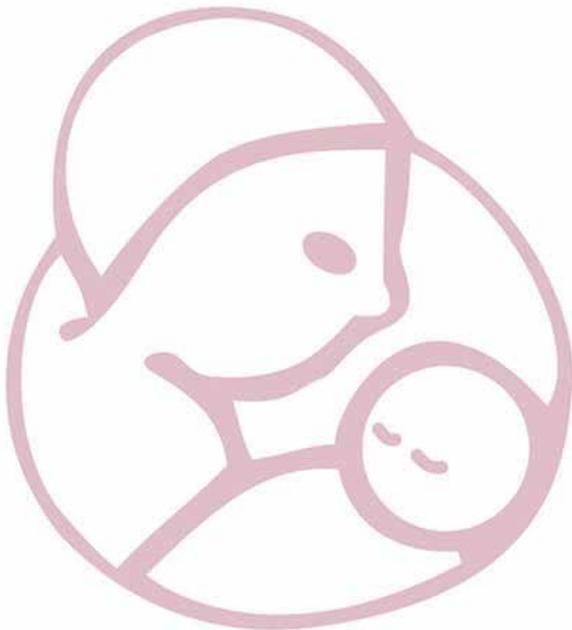
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PAC/LAC's core values for improving maternal and child health have remained constant for over 30 years – a promise to lead, advocate and consult with others.

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Providing 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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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



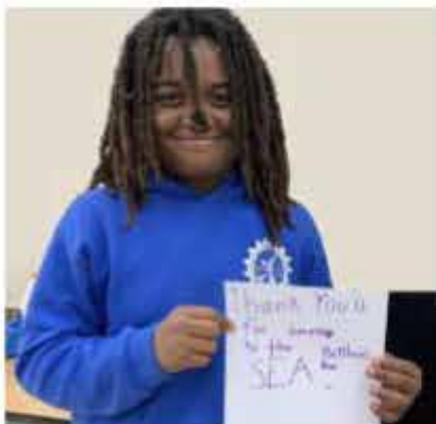
Each year, the Emily Shane Foundation SEA(Successful Educational Achievement) Program provides academic and mentoring support to over 100 disadvantaged middle school students who risk failure and have no other recourse. We have served over 700 children across Los Angeles since our inception in the spring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

The Village Son



A Life's Journey

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

Houchang D. Modanlou

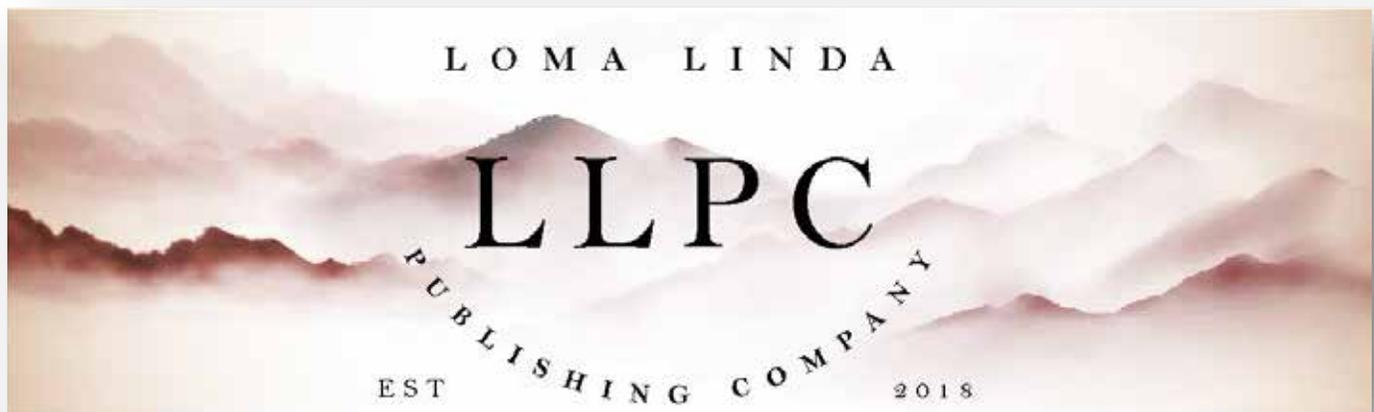
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National Network
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Psychologists

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COVID-19

FREE RESOURCES for your NICU

- Helping Children and Families Cope
- Bonding with Your Baby
- Caregivers Need Care Too

COPING WITH COVID-19

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



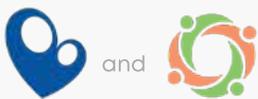
Provide culturally-informed and respectful care.

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



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

myNICUnetwork.org



National Perinatal Association
NICU Parent Network

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

2024

Respiratory Syncytial Virus:

How you can advocate for babies this RSV season

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



Identify the babies at greatest risk



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

Teach families how to protect



their babies from respiratory infections

Advocate for broader insurance coverage for both vaccination and 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



www.nationalperinatal.org/rsv

First Candle: Minister Brown's Emotional Reaction to our Work

Alison Jacobson



Saving babies. Supporting families.

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

"This past February weekend, First Candle held a facilitator training for our Let's Talk Community Chats in partnership with Healthy Mothers, Healthy Babies Coalition of Georgia."

This past February weekend, First Candle held a facilitator training for our [Let's Talk Community Chats](#) in partnership with Healthy Mothers, Healthy Babies Coalition of Georgia. (1)

This program educates trusted community members on the reasons behind safe sleep practices and the benefits of breastfeeding so they can converse with their community's families. We educate dads, grandparents, doulas, social workers, and faith-based leaders.

These trained facilitators are then sent out in groups of three: a

doula/lactation consultant, a father, and a grandparent. They meet with families in high-traffic locations such as laundromats, community centers, churches, playgrounds, or retail establishments.

" They are available at a set day and time every month at the location to meet with families and have extended conversations about safe sleep and breastfeeding, help problem-solve obstacles to safe sleep, and provide resources and products. "

They are available at a set day and time every month at the location to meet with families and have extended conversations about safe sleep and breastfeeding, help problem-solve obstacles to safe sleep, and provide resources and products. They also inform families of social service programs available to them. The facilitators are compensated for their time, and families are incentivized to sign up for a texting program to follow up.

Minister Myra Brown was one of the attendees at the training. Listening to her talk about the families she meets and their oftentimes dire needs brought me to tears. As she explains in this video, this program is helping her provide support, resources, and education to the most vulnerable in our communities – moms and babies. [You can watch the video here.](#) (2)

" Minister Myra Brown was one of the attendees at the training. Listening to her talk about the families she meets and their oftentimes dire needs brought me to tears."

There is a tremendous need for the community-based program, and our goal for 2024 is to expand into five more communities.

If you or someone you know would like to discuss bringing our



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

Let's Talk Community Chat program to your community, please contact Abby Lundy at abby@firstcandle.org.

References:

1. <https://firstcandle.org/lets-talk-community-chats/>
2. <https://vimeo.com/914778749?share=copy>

Disclosure: The author is the Executive Director and Chief Executive Officer of First Candle, a Connecticut-based not-for-profit 501(c3) corporation.

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www.firstcandle.org

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.

NPA 2024 CONFERENCE

Towards — Trauma-Responsive Perinatal Care

Featured Presentation

All We Need
is Love

Trauma-
Responsive Living

with Mary Coughlin



May 15-17 in Anaheim
California

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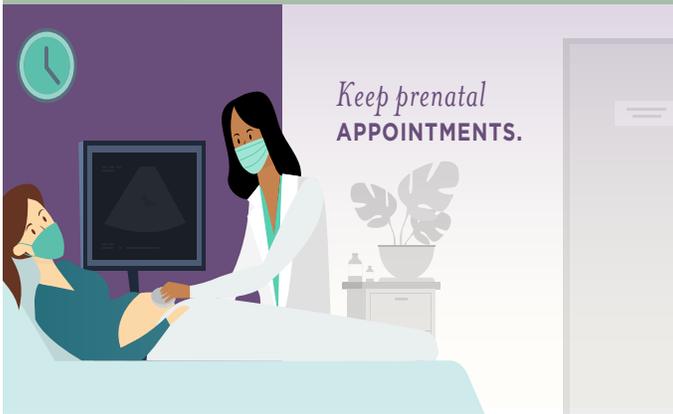
The PREGNANT MOM'S Guide To Staying SAFE DURING COVID-19



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



Keep prenatal **APPOINTMENTS.**



Talk to your health care provider about **STAYING SAFE DURING COVID-19.**

[LEARN MORE >](#)

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



National Perinatal Association

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

NPN
NICU PARENT NETWORK

eLearning Courses

Health and Racial in the NICU

Meet Our Faculty



+ Jenné Johns, MPH
Once Upon A Premie Academy



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



+ Dawn Godbolt, Ph.D.
National Birth Equity Collaborative



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



+ Chavis A. Patterson, Ph.D.
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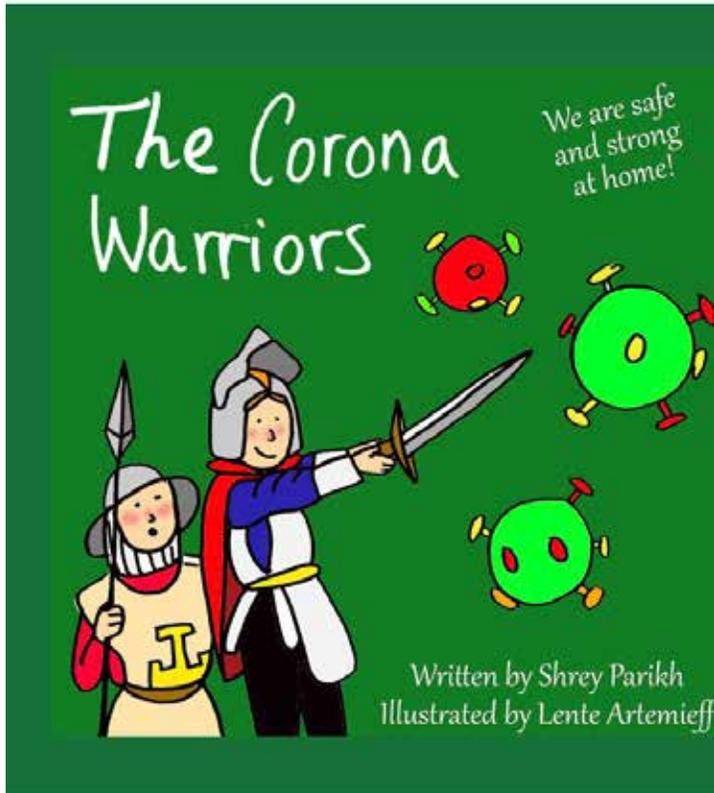
Raising Global Awareness of RSV

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.





National Perinatal Association
PERINATAL MENTAL HEALTH

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

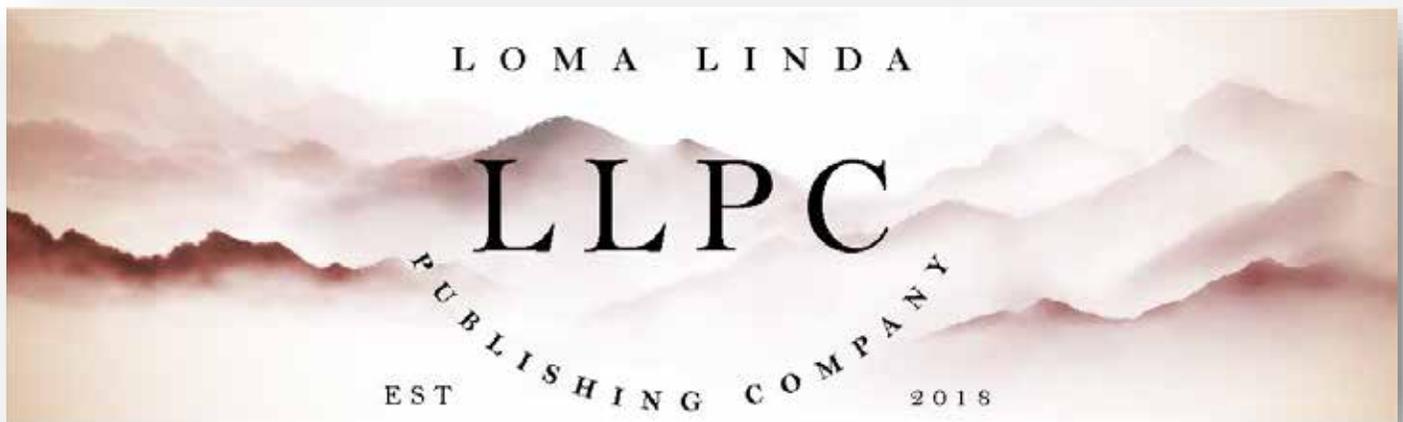
SCREEN DADS TOO

10% of fathers experience depression and anxiety during the perinatal period.



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Neonatology Grand Round Series
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In Loving Memory

August 9, 1996 - April 3, 2010



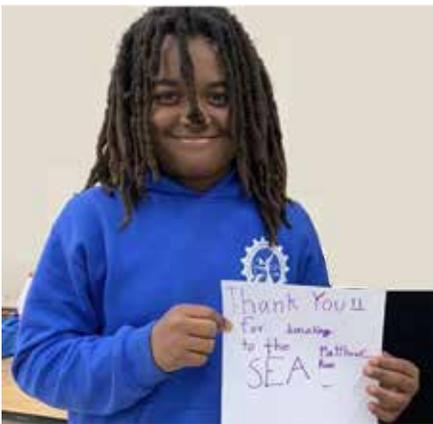
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Middle School_____	\$3,240

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Gravens By Design: Rating your NICU's Developmental Support

Robert White, MD, Mitchell Goldstein, MD, MBA, CML

“Caregivers in the NICU are entrusted with babies during a crucial time in their development – much or all of the third trimester and sometimes at least a month of the second trimester.”

Caregivers in the NICU are entrusted with babies during a crucial time in their development – much or all of the third trimester and sometimes at least a month of the second trimester. *In utero*, an exceptionally rapid and extensive level of brain organization, growth, and development is occurring – unmatched by any other period of life. We are all cognizant of this and doing our best to support it, yet it seems likely that we have not yet settled on the best way.

In the early days of neonatology, NICUs were full of noxious stimuli - they were bright and noisy, and infants were frequently disturbed to check blood gases and vital signs, information that we now obtain mostly through non-invasive means. At the same time, babies were deprived of nurturing stimuli – parental presence was limited, and direct interaction with their babies was even more so.

“In the early days of neonatology, NICUs were full of noxious stimuli - they were bright and noisy, and infants were frequently disturbed to check blood gases and vital signs, information that we now obtain mostly through non-invasive means”

More recently, we have done much better to limit the noxious stimuli and improve parental interaction with their babies. However, in reaction to our earlier days of excessive noxious stimuli, the pendulum has now swung to sensory deprivation in many NICUs for many babies. A substantial driver of this newer trend was the development of bundles to prevent IVH in ELBW babies. In this more recent era, we have reduced the incidence of IVH but may, in the process, have introduced a new danger – that of sensory deprivation and isolation for these high-risk babies. In many cases, the bundles contain elements that were never adequately evaluated on merit – keeping the head in a midline position, for example. Often, the precautions studied for 72 hours continue beyond 72 hours and are applied to groups of babies who were never in-

cluded in RCTs, such as many long-term intubated infants. These practices are not well-supported by evidence and, although well-intentioned to protect babies, probably do not adequately consider potential harm.

If we understand that proper growth of the developing brain develops with both metabolic and sensory intake, NICU best practices might be best understood through the following matrix:

Stimulus	Nurturing	Deprivation	Noxious
Sound	Words, music, especially if delivered through a human, multisensory interaction (as opposed to a tape recording)	Silence	Loud, sudden noises, such as alarms
Touch/movement	Holding, stroking, gentle ROM	“hands-off”	Painful stimuli
Taste/smell	Mother’s milk	“sterile” environment	alcohol, cleaning solutions
Visual	Circadian lighting	Constant dim lighting	Bright, direct lighting

The crucial thing to understand in this concept is that eliminating noxious stimuli is not in itself enough if the baby is left with sensory deprivation. We must avoid noxious stimuli whenever possible but simultaneously provide appropriate amounts of nurturing stimuli to optimize what the baby’s brain can utilize for growth and development. What that looks like is certainly open to discussion; there are many well-structured systems for developmental support and parental interaction. However, it may be most important to adopt a philosophy of nurturing intervention and parental interaction rather than choosing a given program.

“The crucial thing to understand in this concept is that eliminating noxious stimuli is not in itself enough if the baby is left with sensory deprivation. We must avoid noxious stimuli whenever possible but simultaneously provide appropriate amounts of nurturing stimuli to optimize what the baby’s brain can utilize for growth and development.”

So, how does your NICU rate – not only for your “feeders and growers,” but even more so for your highest-risk babies – the VLBW and ELBW babies who are no longer at risk for IVH but remain at high risk for abnormal neurodevelopment, with lifelong consequences? If your “matrix” trends more toward deprivation than nurturing stimuli, it may be time to embrace a system that enhances these stimuli, especially when incorporated as part of extensive parental interaction.

“To determine where the transition from “noxious” to “normal” and from “normal” to “deprivation” occurs, it is imperative to closely examine the sensory stimuli provided to infants in the NICU environment (1, 2). Caregivers must balance minimizing harmful stimuli and ensuring adequate sensory input for optimal brain development.”

To determine where the transition from “noxious” to “normal” and from “normal” to “deprivation” occurs, it is imperative to closely examine the sensory stimuli provided to infants in the NICU environment (1, 2). Caregivers must balance minimizing harmful stimuli and ensuring adequate sensory input for optimal brain development. In the past, NICUs were fraught with noxious stimuli, including bright lights and loud noises, while simultaneously lacking nurturing stimuli due to limited parental interaction. However, modern NICU practices have evolved to reduce noxious stimuli and enhance parental involvement, albeit sometimes swinging too far towards sensory deprivation, particularly in response to concerns like IVH prevention. This shift towards deprivation may inadvertently overlook the importance of nurturing stimuli for neurodevelopment. It is essential to understand that eliminating noxious stimuli is insufficient; we must also actively provide nurturing stimuli, such as gentle touch, soothing sounds, familiar scents, and visual comfort. Striking the right balance involves constant reassessment and adaptation of NICU protocols to ensure infants receive the optimal environment for healthy growth and development. Therefore, NICU evaluation should prioritize the absence of harmful stimuli and the presence of nurturing interactions, especially for the most vulnerable infants, to mitigate long-term neurodevelopmental risks.

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2. Restin T, Gaspar M, Bassler D, Kurtcuoglu V, Scholkmann F, Haslbeck FB. Newborn incubators do not protect from high noise levels in the neonatal intensive care unit and are relevant noise sources by themselves. *Children*. 2021 Aug 16;8(8):704.

Disclosure: The authors have no conflicts of interests to disclose.

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Gravens Conference Survey and Agenda

Robert White, MD, Joy Browne, PhD, PCNS, IMH-E(IV), Vincent Smith, MD, Mitchell Goldstein, MD, MBA, CML

The Gravens Conference has reached a crossroads: In-person meetings at nice places at attractive times of the year are becoming harder to produce - travel, lodging, and meeting room costs are going up while CME budgets at many medical centers are being cut. In-person meetings offer important opportunities to network and provide convenient opportunities for vendors to meet a large number of potential customers but are not feasible for many clinicians and families, especially those who come from outside the US – yet the Gravens message is of equal importance to them.

The Co-Chairs and Planning Committee of the Gravens Conference are brainstorming what our meeting should look like going forward in order to meet the needs of the largest number of our colleagues who are interested in the NICU Environment of Care. Please take a few minutes to follow the link and fill out our survey so we can best meet your needs and those of our babies and their families.

1. Early/mid March in Clearwater Beach, FL (our current time and location)

- a. 3-4 days in person
- b. 2 days in-person, 2 days virtual
- c. 3-4 days virtual

2. Mid April in Clearwater Beach

- a. 3-4 days in person
- b. 2 days in-person, 2 days virtual
- c. 3-4 days virtual

3. Early/mid March in Orlando, FL

- a. 3-4 days in person
- b. 2 days in-person, 2 days virtual
- c. 3-4 days virtual

4. Mid April in Orlando, FL

- a. 3-4 days in person
- b. 2 days in-person, 2 days virtual
- c. 3-4 days virtual

5. Early/mid March in Southern California

- a. 3-4 days in person
- b. 2 days in-person, 2 days virtual
- c. 3-4 days virtual

6. Mid April in Southern California

- a. 3-4 days in person
- b. 2 days in-person, 2 days virtual
- c. 3-4 days virtual



https://lu.co1.qualtrics.com/jfe/form/SV_3awgFtA9fUX6xBs

One possible win-win possibility we have considered is to partner with another conference that might permit some attendees to get to two conferences for the same travel costs as one, which might benefit both conferences by making it easier for more people to attend. Please comment on any conferences you currently attend that might make a good partner for the Gravens Conference.

Do you have any other comments or suggestions for the Gravens Planning team that would help us present you with a better, more useful meeting?



The 37th Annual Gravens Conference

On the Environment of Care for High Risk Newborns

“The Power of Voice: Using Your Voice for Babies, Families, Staff and Beyond”

Tuesday, March 5, 2024		
Time	Session/Event	Location
4:00 pm-7:00 pm	Registration Desk Open	Lobby II
7:00 pm-9:00 pm	Welcome Reception	Exhibit Hall-Island
Wednesday, March 6, 2024		
Time	Session/Event	
6:30am-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)	
8:00 am-5:00 pm Plenary Sessions (Grand Ballroom)		
Moderator: Joy Browne (8:00 am -12:30 pm)		
Time	Session/Event	Presenter
8:00 am-8:15 am	Welcome & Introductions	Joy Browne
8:15 am-9:00 am	Delivering Hope Through Words: The Power of Effective Communication in the NICU	Mia Malcolm
9:00 am-9:45 am	Music perception, action and emotion in the newborn	Petra Huppi
9:45 am-10:30 am	Parent's voice in the NICU- medicine for the infant brain	Natalie Maitre
10:30 am-11:00 am Break in Exhibit Hall		
11:00 am-11:45 am	A Taste of the Flavors of Touch	Jeff Alberts
11:45 am-12:30 pm	All Care is Brain Care: Building a Culture of Neuroprotective Care for better Outcomes	Elizabeth Rogers
12:30 am-1:45 pm Lunch on Own		
Moderator: Robert White (1:45 pm-4:45 pm)		
1:45 pm-2:30 pm	Finding your Voice and Amplifying It Through Systems	Scott Berns
2:30 pm-2:45 pm Gravens Award		
2:45 pm-3:30 pm	Overcoming resistance and making change happen	Cynthia Sparer & Laura Poltronieri
3:30 pm-4:00 pm Break in Exhibit Hall		
4:00 pm-4:45 pm	Words matter	Paige Church
4:45 pm-5:00 pm	Final thoughts & take home message	Bob White
6:30 pm-8:30 pm Exhibit Hall Reception & Poster Walk		
7:00 pm-7:45 pm Poster Authors Available		
8:10 pm-8:30 pm Door Prize Raffle-Vincent Smith		

Agenda is subject to change without notice.

Thursday, March 7, 2024

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)		
8:00am-1:00pm Themed Tracks			
Track A Developmental & Family Integrated Care Beach/Gulf Moderator: Joy Browne		Track B Newborn ICU Design Palm/Bay Moderator: Robert White	
Time	Session/Event	Time	Session/Event
8:00 am-8:15 am	Introduction & Announcements: Joy Browne	8:00 am-8:10 am	Introduction & Announcements: Bob White
8:15 am-8:45 am	Implementing IFCDC Standards of Care The Model and Systems Thinking: Carol Jaeger	8:10 am-8:50 am	Trauma-informed Design: Becca Ames and Mardelle Shepley
8:45 am-9:30 am	Implementing IFCDC Standards of Care Pain & Stress in Babies Neurodevelopmental Care for Infant Pain: Carol McNair & Jean Powlesland	8:50 am-9:30 am	Using Art and Design to create a sense of place and purpose in the NICU: Christina Mullen
9:30 am-10:15 am	Implementing IFCDC Standards of Care Feeding, Eating, & Nutrition Delivery: Britt Pados & Erin Ross	9:30 am-10:00 am	Families Belong Together: Tanya Ricci, Gloria Yennaco, Jessica Clem, Ashley Sartori
10:15 am-10:45 am Break (Exhibitors Break down after last break)			
		10:00 am-10:30 am Break (Exhibitors Break down after last break)	
10:45 am-11:30 am	Implementing IFCDC Standards of Care: Skin to Skin Care with Intimate Family Members: Christie Lawrence/KMC and brain development: new evidences supporting initiation as	10:30 am-11:10 am	The Cincinnati Children's NICU: Optimizing patient and family experience through innovation: Jim Greenberg

	soon as possible and for as long as possible: Nathalie Charpak		
11:30 am-12:15 pm	Panel Discussion Regarding challenges with Implementation of Evidence Based Standards	11:10 am-12:00 pm	NICU: Where the Little Things Matter - The Impacts of NICU Unit Design: Caitlin Potter & Colby Dearman
12:15 pm-12:45 pm	Panel Discussion with Audience Experts	12:00 pm-12:30 pm	Crowdsourcing: Experts in the Audience
12:45 pm-1:00 pm	Summary & Next Steps: Joy Browne	12:30 pm-1:00 pm	Summary & Next Steps: Bob White
Rest, Play & Network			

Agenda is subject to change without notice.

Friday, March 8, 2024

Abstracts & Workshops

(Continuing education will only be awarded for in person attendance)

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 (Lobby II)	
8:00 am-12:15 pm Topics will be didactic content. Workshops will center around engaging with participants		
Time/Room	Workshops and Topics	Presenter
8:00 am-9:15 am	J Workshops and Topics (75min)	
Room: Beach Moderator: Malathi Balasundaram	J-1 Topic: Family-Centered Care: Practical tips on how to implement and sustain it	Malathi Balasundaram & Keira Sorrells
Room: Gulf Moderator: Juzer Tyebkhan	J-2 Workshop: Neuroprotective and Neuropromotive Care guided by Infant State	Juzer Tyebkhan & Hussein Adamjee Burhani
Room: Palm Moderator: Mardelle Shepley	J-3 Workshop: Negotiating morality challenges in the NICU	Jeff Alberts
Room: Bay Moderator: Robert White	J-4: Workshop: Driving change in Children's Health	Scott Berns
Room: Island II Moderator: Mitchell Goldstein	J-5: Workshop: Writing for Publication in Neonatology Today	Mitchell Goldstein
9:15 am-9:45 am Break (30 min)		
Time/Room	Workshops and Topics	Presenter
9:45 am-11:00 am	H Workshops and Topics (75min)	
Room: Beach Moderator: Vincent C. Smith	H-1 Topic: The power of partnerships: Turning evidence into action within a community NICU	Cuyler Romeo, Ashley Lee, Nancy Gates
Room: Gulf Moderator: Mitchell Goldstein	H-2 Workshop: Alleviating pain and stress for babies	Jean Powlesland & Carol McNair
Room: Palm Moderator: Molly Fraust-Wylie	H-3 Workshop: Supporting Families Through Loss & Bereavement	Kimberly Novod & Bess Hart

Room: Bay Moderator: Christie Lawrence	H-4: Workshop: Skin to Skin Implementing into practice	Elizabeth Rogers
Room: Island II Moderator: Mardelle Shepley	H-5: Workshop: Color and Design	Mardelle Shepley
11:00 am-11:30 am Break (30 min)		
Time/Room	Workshops and Topics	Presenter
11:30 am-12:45 pm	I Workshops and Topics (75min)	
Room: Beach Moderator: Joy Browne	I-1 Topic: Working collaboratively with systems post discharge	Andy Gomm
Room: Gulf Moderator: Mitchell Goldstein	I-2 Workshop: Mother's voice in the NICU - Feasible solutions for brain optimization	Caitlin Kjeldsen & Natalie Maitre
Room: Palm Moderator: Judy Smith	I-3 Workshop: Dreams and Dilemmas	Tanya Ricci, Gloria Yennaco, Jessica Clem, Ashley Sartori
Room: Bay Moderator: Molly Fraust-Wylie	I-4: Workshop: Intersectionality and Privilege: How Identities Impact the NICU Experience	Mia Malcolm & Molly Fraust-Wylie
Room: Island II Moderator: Kelly McGlothen-Bell	I-5: Workshop: Feeding and eating in practice	Erin Ross & Kelly McGlothen-Bell
12:45 pm-2:00 pm Lunch on Own (1hr 15 min)		
2:00 pm-5:00 pm ABSTRACTS		
2:00pm-3:15pm	Abstract Sessions (75min)	
Room: Beach	A: Design- Moderator: Robert White	<ol style="list-style-type: none"> 1. <i>Acoustic Characteristics of Recorded Mother's Voice During the Preterm Period: Caitlin Kjeldsen</i> 2. <i>Differentiating between disturbing noise and nurturing voice during Skin to Skin Contact (SSC). The Skincubator may enable babies to hear gentle maternal speech during SSC while reducing the sleep disturbing monitor alarm noise: Itamar Nitzan</i>

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		<p>3. Evolution of the Auditory Environment of Hospitalized Very Preterm Infants in Relation to Room Type and Parental Presence: Gabriel Cote Corriveau (Virtual)</p>
Room: Gulf	<p>B: Feeding/potpourri- Moderator: Mitchell Goldstein</p>	<ol style="list-style-type: none"> 1. <i>Splanchnic and cerebral oxygenation during oral feeding near discharge as an early biomarker of later problematic feeding in high-risk infants:</i> John Wimmer 2. <i>The Neuroprotection of Oral Enjoyment by Offering Milk Drops:</i> Barb O'Rourke 3. <i>A Blueprint for Implementing Early Progressive Mobility in The Neonatal/Infant Intensive Care Unit for Infants with Severe Bronchopulmonary Dysplasia (BPD):</i> Meghan Burkhardt & Audrey Wood 4. <i>Introducing the Cardiac iRainbow: A developmental care path for infants in the cardiac intensive care setting:</i> Eilish Byrne & Kelly Kirby (Virtual)
Room: Palm	<p>C: Family Centered Care/DEIJ- Moderator: Kathleen Kolberg</p>	<ol style="list-style-type: none"> 1. <i>Improving Commitment to Family-Centered Care in the NICU: Phase 3 Efforts from the Family-Centered Care Taskforce:</i> Malathi Balasundaram 2. <i>Promoting Family Resilience Through Family-Centered Care: Evidence from a Multiple Regression Analysis:</i> Genevieve Laporte (Virtual) 3. <i>Improving Family Centered Care And Perception Of Competence Through Implementation Of Positive Sensory Input And Neuroprotective Care In Nicu Patients:</i> Radhika Narang & Sarah Von Ah 4. <i>Embedding Diversity, Equity, and Family Centered Care into an</i>

		<i>Orientation Curriculum: Connie Clauson</i>
Room: Bay	D: Developmental Care- Moderator: Paige Church	<ol style="list-style-type: none"> 1. <i>Is Early Kangaroo Care Safe in Preterm Infants under 28 weeks?: Maria Lopez Maestro (Virtual)</i> 2. <i>Implementation of a CPAP Bundle for Standardization of Care and Skin Protection: Natalie Dumer</i> 3. <i>Implementation of a Bundle to Prioritize Skin to Skin in the NICU: Colleen Calpin</i> 4. <i>Engagement of Families in a State-Wide Quality Improvement Initiative on Skin-to-Skin Care (SSC) in the Neonatal Intensive Care Unit (NICU): Susan Bowles & Lelis Vernon</i>
3:15 pm-3:45 pm Break (30 min)		
3:45pm-5:00pm	Abstract Sessions (75min)	
Room: Beach	A: Potpourri Moderator: Robert White	<ol style="list-style-type: none"> 1. <i>How to foster meaningful connections with families, and why it matters: Lessons from my life-threatening pregnancy and premature birth journey: Jennifer Degl</i> 2. <i>Safety trial of the Skincubator: A novel device for early prolonged skin-to-skin-care for very and extreme preterm neonates: Itamar Nitzan</i> 3. <i>Perceptions of Interdisciplinary NICU Staff on the Physical Environment in a hybrid design level-III NICU: Gabriel Cote Corriveau (Virtual)</i> 4. <i>Screening for Social Determinants of Health in a NICU Follow-Up Clinic: Amalia Lee</i>
Room: Gulf	B: Staff support or discharge/follow up- Moderator: Mitchell Goldstein	<ol style="list-style-type: none"> 1. <i>PIE Anyone? Building a program to promote and maintain NICU staff resiliency: KristiLynn Cedars</i>

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		<ol style="list-style-type: none"> 2. <i>Implementing a Developmental Care Team: Monika Reisenauer</i> 3. <i>NICU Infant Developmental Optimization (NIDO): A pilot program to support the development of post term babies in the NICU: Laura Gibbs & Leslie Anne Dietrich</i> 4. <i>Specificity of cortical responses of preterm infants to their recorded mother's voice: Caitlin Kjeldsen</i>
Room: Palm	C: Family Centered Care/DEIJ- Moderator: Kathleen Kolberg	<ol style="list-style-type: none"> 1. <i>The Long and Winding Road. Cultural Change in the NICU: Rafael Mendelsohn (Virtual)</i> 2. <i>Examining Measures of Family-Centered Care: Malathi Balasundaram</i> 3. <i>Using the First Family Update to Understand Parental Concerns: Emily Whitesel</i> 4. <i>Moving Forward from the Past with Equity, Inclusion and Cultural Humility: Contemporizing the Neonatal Intensive Care Unit (NICU) Family Centered Care Model: Katheleen Hawes & Beatrice Lechner (Virtual)</i>
Room: Bay	D: Developmental Care: Moderator: Paige Church	<ol style="list-style-type: none"> 1. <i>PRAMS Pain Recognition Model Classified Neonatal Pain with 98% Accuracy: Susan Horner</i> 2. <i>Developmental Sensory Care Map: Lisa Sampson</i> 3. <i>Addressing Adverse Childhood Experiences: Implications for the NICU: Jacqueline M. McGrath</i> 4. <i>Effects of Facilitated Tucking During Routine Caregiving Activities: A Case Series on Preterm Infant Pain Expression: Lillian Green</i>

Saturday, March 9, 2024		
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 (Lobby II)	
8:00am-12:00pm Plenary Sessions (Grand Ballroom)		
Moderator: Vincent C. Smith & Molly Fraust-Wylie		
Time	Session/Event	Presenter
8:00 am-8:15 am	Introduction to the morning	Vincent C. Smith & Molly Fraust-Wylie
8:15 am-8:45 am	Parents as partners in the NICU	Mia Malcolm & Emily Revelle
8:45 am-9:30 am	Teamwork in the Newborn ICU	Erick Rideout
9:30 am-10:15 am Break (45 min)		
10:15 am-11:00 am	The importance and impact of teamwork and kindness in high stress environments	Brian Goldman
11:00 am-11:30 am	The Impact of the Gravens Conference: One NICU Experience and Beyond	Malathi Balasundaram
11:30 am-12:00 pm	Wrap-Up	Bob White & Joy Browne
Farewell Until Next Year!		
Gravens 38th Annual Conference March 5-8, 2025		
(Welcome Reception 7:00 pm-9:00 pm March 4, 2025)		
Safe Travels!		

Agenda is subject to change without notice.

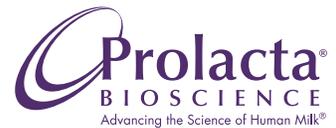


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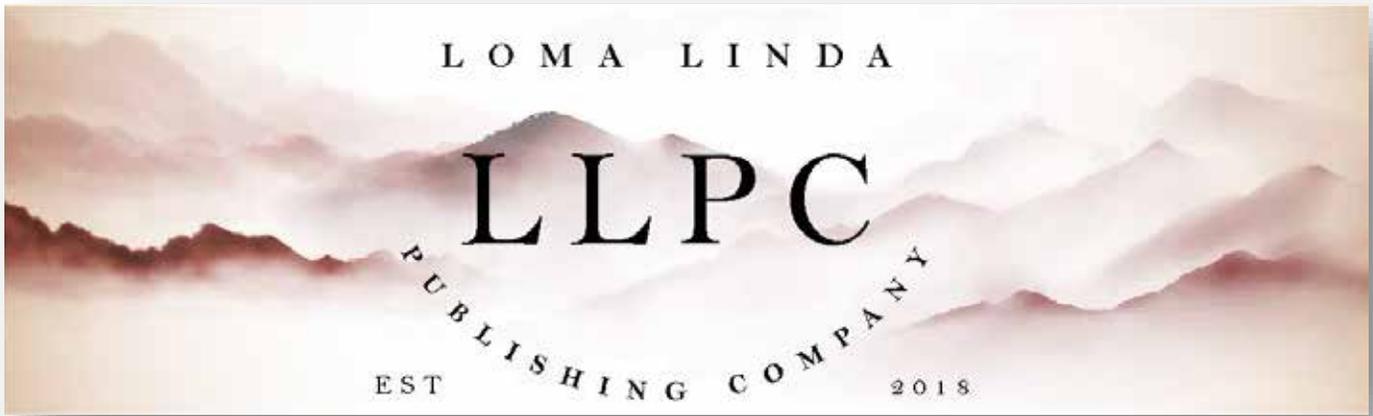
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Our message to the supporters, attendees, and participants in the Gravens conferences.

We want to acknowledge concerns regarding holding the 2024 meeting in Florida. For all those who have communicated your thoughts about attending the meeting, we want you to know that we appreciate your forthrightness and wish to offer a statement of our collective thinking on this crucial matter. As our society grows more diverse and connected, we must acknowledge how the social and political climates continue to affect how we live, move, and interact.

Our Gravens community seeks to affirm our commitment to addressing issues of racism and bias and audit our systems to ensure that we are proactive in implementing strategies that promote health equity and social justice. We strive to provide a supportive, inclusive, and welcoming space to all individuals involved in the physical and developmental environment of the neonatal intensive care unit (NICU), including family members, healthcare providers, designers, and industry supporters.

The Gravens community approach is to remain non-political. However, some of the current policies and practices in the state where the Gravens conference is historically held are not consistent with the ideals and values of the Gravens community. The Co-Chairs and Planning Committee are reviewing all opportunities to ensure that the individual identities and lived experiences of those most impacted by the current political landscape are valued and respected.

Should you choose to attend the conference in Clearwater in person, we hope you recognize that there are those whose livelihood depends on tourism and who do not hold the same views as Florida's current prevailing social and political environment. That way, you can support small businesses, specifically those owned by people of color.

As we plan for upcoming Gravens meetings, our priority is to ensure that all attendees can participate in a safe and welcoming environment. The Planning Committee for the 2024 Gravens Conference has discussed the pros and cons of going forward with holding our meeting in Florida, given the recent political decisions that threaten an open and inclusive society. We have explored the possibility of moving the conference to another state; however, we will not be able to do so for the 2024 conference due to fiscal and contractual obligations. We are actively exploring alternative sites for future meetings.

We understand that diversity, equity, inclusion, and justice are principles that must work together to result in fair treatment, access, opportunity, and advancement for all. Therefore, we respect each participant's decision to attend the conference in person or virtually, and we hope you will join us in whatever format suits you best. Through our perseverance and dedication to advancing the care of infants and families, we aim to continue to promote our message of inclusivity and health equity.

Regardless of your position on attending the Gravens conference, you might like to use these strategies right now to make a difference:

- Commit to learning and reflecting on how racism and bias impact us today and how our history led us here.
- Vote for political candidates that are in line with your values.
- Use your voice, lived experience, and privilege to bring awareness and action to address health outcomes and healthcare quality disparities.

We are continuing to work to ensure that the co-chairs, planning committee, and conference attendees reflect both the workforce and the people they serve so that we can best meet the needs of our field. You can support the Gravens Conference Diversity Fund to help ensure the participation and growth of our ever-changing society.

Together, we can create environments where every individual or group will be fully and authentically welcomed, respected, supported, and valued to shape the world for future generations equitably.

For questions or comments, please contact lomalindapublishingcompany@gmail.com.

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**
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Fragile Infant Forums for Implementation of IFCDC Standards: Infant and Family Centered Developmental Care Standards, Competencies, and Best Practices: Proposed Revisions to the Concept Model Using Systems Thinking

Carol B. Jaeger, DNP, RN, NNP-BC, Joy V. Browne, Ph.D., PCNS, IMH-E



“A Collective Effort to Improve the Experience of NICU families between the National Perinatal Association’s Discharge NICU Discharge Preparation and Transition Planning Guidelines and Recommendations as well as the Standards, Competencies, and Recommended Best Practices for Infant and Family-Centered Developmental Care in the Intensive Care Unit”

Overview:

The First Consensus Conference’s First Report on Standards, Competencies, and Best Practices for Infant and Family-Centered Developmental Care in the Intensive Care Unit, published in 2020, is under revision. (1) The second edition is expected to be posted on the <https://nicudesign.nd.edu/nicu-care-standards/> by the end of 2024. The objective of this article is to: 1. describe the proposed

revisions impacting Infant and Family-Centered Developmental Care (IFCDC) practice standards and competencies and 2. discuss the implementation of the IFCDC standards using systems thinking.

Consensus panel members agree on the following key foundational elements of IFCDC practice:

- IFCDC is central to medical care, NOT an additive, “fluff,” or “nice to do” comfort measure for the baby, and should be considered foundational to all intensive care.
- Systems Thinking guides the re-envisioning of intensive neonatal care, resulting in optimum baby and family outcomes throughout the baby’s lifespan.
- The baby is recognized as a competent interactor and can communicate needs through physiologic responses, expression, and behavior.
- Parents are not visitors; they are considered the baby’s primary caregivers.
- Parents are essential to developing a nurturing interactive relationship with the baby and should be considered partners in all care.
- Parents provide essential regulatory support from birth through in-patient care, the transition to home, and continuing care.

Key areas of revisions in IFCDC principles:

Additions — Systems’ Thinking within complex adaptive systems include new applications which influence all aspects of sustained change in caregiving practices.

Newly articulated principles — Focus on principles of infant and parent mental health including practice of non-separation of baby and parent.

Re-defined and emphasized — The baby as a competent interactor, parents as essential partners within the interprofessional team and the primary caregiver in practice, and individualized care of the baby and family.

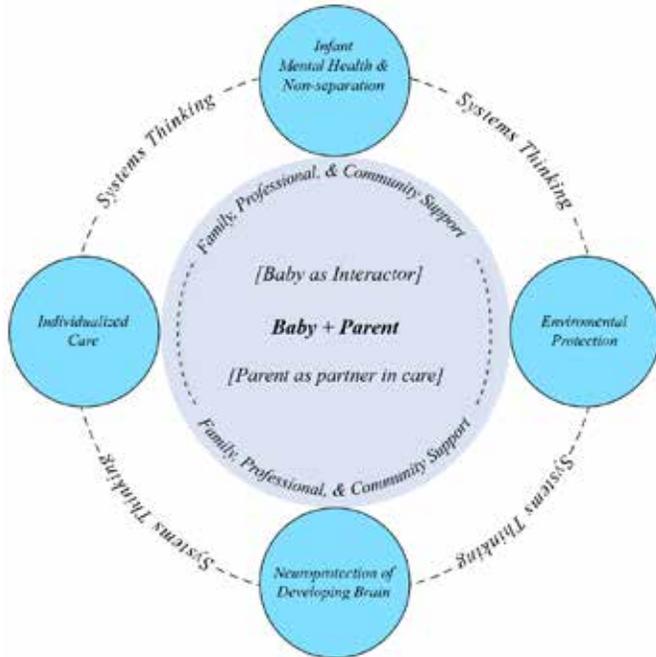
Broadened — Neuroprotection of the developing brain and environmental protection

Key areas of revisions in IFCDC standards and competencies:

New application within all standards — Updates in supporting evidence as well as assurance of supportive environments that diminish adverse responses from the baby and increases the opportunity for intimate interactions with parents

IFCDC Concept Model

The IFCDC consensus panel initially developed a Concept Model to provide guiding principles for caregiving. With evolving evidence and critical thinking, the panel proposes the following revisions to the model. Explanations of principles are



provided below and visualized in Figure 1.

Figure 1. IFCDC Concept Model (Revisions 2024)

Principle additions: Systems Thinking within a complex adaptive system:

In the Executive Summary: Standards, Competencies and Best Practices for Infant and Family Centered Care in the Intensive Care Unit, Browne, Jaeger, Kenner, et al. (2020) stated, "The principles of IFCDC are strongly influenced by the process of systems thinking within a complex, dynamic, and continually evolving system. Systems thinking examines the components of a system—human or organization—from a holistic perspective, considering each system component as interrelated, capable of influencing, and being influenced by each other." (2) Systems thinking guides to standardize neonatal care in the ICU for optimum outcomes of the baby's and family's lifespan. As a principle and a practice section of IFCDC, systems thinking is a process that guides the implementation of strategic vision, culture development, team collaboration, practice, and evaluation through all the IFCDC sections. Diversity, Equity, Inclusion, and Justice (DEIJ) has been added to the description of the principle of systems thinking to emphasize the importance and application of DEIJ to the communication and interaction among professionals, staff, babies, parents, and families. (3)

Advocacy has also been added to systems thinking to describe the support, promotion, activism, and commitment within the health care system/organization to effect change in perinatal practice that advances IFCDC. Advocacy includes practices that

empower both the baby's and the parent's family in their roles within the complex perinatal caregiving environment, recognizing their cultural, spiritual, and lifestyle belief systems. Changing the NICU policies, practices, culture, and performance competencies from healthcare-led to parent-led care of the baby is essential to support parent confidence and competence in caregiving and decision-making. (4)

"Diversity, Equity, Inclusion, and Justice (DEIJ) has been added to the description of the principle of systems thinking to emphasize the importance and application of DEIJ to the communication and interaction among professionals, staff, babies, parents, and families. Advocacy has also been added to systems thinking to describe the support, promotion, activism, and commitment within the health care system/organization to effect change in perinatal practice that advances IFCDC."

A description of NICU couplet care has been added as an example of IFCDC in practice using systems thinking, including aspects of diversity, inclusion, and advocacy. See the next section for further description of couplet care.

Newly articulated principles: Infant Mental Health Focus and the non-separation of baby and parent:

An Infant Mental Health (IMH) Focus has been added to the principles of IFCDC. IMH is "the developing capacity of the secure adult and peer relationships to experience, manage, and express a full range of emotions, and explore the environment and learn—all in the context of family, community, and culture." (<https://www.zerotothree.org/resources/1951-the-basics-of-infant-and-early-childhood-mental-health-a-briefing-paper>). IMH emphasizes the importance of developing effective physical, social, and emotional

Figure 2. The baby+parent



regulation between the baby and parent. This regulation establishes and depends on reciprocal relationships between the baby and parent/primary caregiver(s); as such, it is demonstrated in the inner circle of the model (Figure 2).

Providers should be able to reflect on the baby's experience to provide safe, individualized, nurturing, and regulating growth opportunities. Further, to promote and support the baby's social and emotional well-being, IMH should be part of the primary focus of caregiving in intensive care. (5, 6)

“The inner circle of the IFCDC Model illustrates the nurturing relationships essential to the baby/parent(s)/family from birth through in-patient care, transition to home, and continuing healthcare. The ‘baby + parent’ has replaced “baby + mother dyad = baby + m/other” from the previous concept model..”

The inner circle of the IFCDC Model illustrates the nurturing relationships essential to the baby/parent(s)/family from birth through in-patient care, transition to home, and continuing healthcare. The ‘baby + parent’ has replaced “baby + mother dyad = baby + m/other” from the previous concept model.

The inclusive term ‘parent’ is intended to encompass a range of individuals who may take on the baby's primary caregiver role, including the mother, father, grandparent, aunt, uncle, foster parents, or whomever the family designates as the primary caregiver. Family is defined as the individuals who are or will be the baby's primary caregivers before and after discharge from the hospital, whether biologically related or not. Family, professionals, and community support has been added to the circle of relationships to signify the importance of assistance and reinforcement.

An important addition to IMH is non-separation, the closeness and/or connection of the mother and sick or premature baby, defined in IFCDC practice as full access to the baby without restrictions from birth through the continuum of the baby's stay. There is no evidence to support the separation of mother and baby at/after birth. (7) The practice of separating the baby and mother to different specialty care areas after birth is residual from times when intensive medical support within designated areas was done for reasons of safety. (8) With better monitoring capability and portable technologic equipment, it is possible to maintain a close physical connection between primary caregivers and the mother/baby/parent dyad.

Non-separation is best described by “couplet care,” which is the practice initiative to provide care to both mother and sick or premature baby after birth in the same room by neonatal and obstetric caregivers without separation of the dyad. (9–11) The father/partner/family members can share in the care of physical connection with both mother and baby. Following the mother's

discharge, the baby can be moved from the NICU couplet room to a NICU single-family room (SFR), where the baby can remain until discharge from the NICU to home. The environment can provide care space, supplies, and equipment for the baby, and comfortable furnishings for the recovering mother and parent/partner to have unlimited access to the baby, share decision-making with the interprofessional team, learn care competencies, and become an active caregiver. (12)

“Non-separation is best described by “couplet care,” which is the practice initiative to provide care to both mother and sick or premature baby after birth in the same room by neonatal and obstetric caregivers without separation of the dyad.”

Re-defined and emphasized principles: The baby as a competent interactor, the parent as an essential partner, and the resulting provision of individualized care for baby and parent.

The principles of the baby as a competent interactor and the parent as an essential partner with the interprofessional team and the primary caregiver in practice are central to the baby + parent connection. Each baby has strengths and vulnerabilities and can lead individualized care by communicating distress, pain, comfort, and need for interaction. (13) Parents are care partners and must be empowered to support their baby competently and confidently as decision-makers and caregivers. Empowerment is the authority or power given to someone (baby/parents) through becoming stronger and more confident, especially in controlling one's life and claiming one's rights.

Individualized Care emphasizes the strengths, needs, and availability of the baby and family and the necessity to address physical and/or emotional distress identified by the parent(s), family, or interprofessional providers/caregivers. (13)

“While the focus is on “neuroprotection of the developing brain,” the IFCDC model has broadened the definition to recognize the need for attention to the neurophysiological development of the entire baby.”

Broadened principle: Neuroprotection of the developing brain:

The baby's brain develops faster and is more vulnerable during birth (regardless of the gestational age) than at any time in life. While the focus is on “neuroprotection of the developing brain,”

the IFCDC model has broadened the definition to recognize the need for attention to the neurophysiological development of the entire baby. (14)

“A Supportive Environment that diminishes adverse responses from the baby and increases the opportunity for intimate interactions with parents has been updated with references to include the NICU Design Standards.”

Principle: Environmental Protection:

A Supportive Environment that diminishes adverse responses from the baby and increases the opportunity for intimate interactions with parents has been updated with references to include the NICU Design Standards, 10th edition, 2023. (9, 10, 12, 15–18)

Changes in practice Sections of IFCDC Standards—revisions and new applications:

- **Systems thinking** in complex adaptive systems—applied to all IFCDC exemplars of evidence-based practices.
- **Reducing and managing pain and stress** in newborns and families
- **Positioning and touch** for the newborn
- **Sleep and arousal interventions** for the newborn
- **Skin-to-skin contact** with intimate family members
- Management of **feeding, eating, and nutrition** delivery

“The revisions of the practice standards and competencies will include updates based on new critical evidence published between 2019 and 2024, changes to reflect the application of the principles, and the addition of actions of implementation and measures and metrics for each standard.”

The revisions of the practice standards and competencies will include updates based on new critical evidence published between 2019 and 2024, changes to reflect the application of the principles, and the addition of actions of implementation and measures and metrics for each standard. (19, 20) As previously stated, the second edition of the Recommended Standards, Competencies, and Best Practices for Infant and Family Developmental Care in Intensive Care is expected to be published before the close of 2024 on the website <https://nicudesifn.nd.edu/nicu-care-standards/>

Implementing IFCDC—Re-imagining care in the ICU:

Systems thinking describes implementing IFCDC as integral to the ICU’s environment, operations, and practice. It does so by influencing the vision, values, infrastructure, education, performance competence, improvement process, evaluation, and sustainment of care. Systems thinking aims to achieve optimal outcomes for the baby by integrating a diverse, equitable, inclusive, and just culture of communication, supportive behavior, and shared decision-making between parents/family and the interprofessional team.

Implementing IFCDC in the ICU begins with creating or reimagining the vision—what should IFCDC be like in our ICU? What do babies and parents want? The environment should keep the baby and parent(s) together in a comfortable private family-centered space, i.e., labor, delivery, recovery and postpartum (LDRP) birthing space, NICU couplet care, single family rooms (SFR), and/or a multi-space pod. (9, 10, 16) Collaboration among the interdisciplinary team of specialty providers, caregivers, and parent advisors is necessary to be able to guide and support the baby and parent(s) through the continuum of care—the antenatal period through birth, in-patient management, transition to home, and continuing care in the community. (21, 22) A partnership between parents and the professional team should include baby- and parent-led decision-making and caregiving. Further, the ICU should provide a culture of respect for diversity, equity, inclusion, and justice for babies, parents, families, staff, and professionals.

“Implementing IFCDC in the ICU begins with creating or reimagining the vision—what should IFCDC be like in our ICU? What do babies and parents want? The environment should keep the baby and parent(s) together in a comfortable private family-centered space, i.e., labor, delivery, recovery and postpartum (LDRP) birthing space.”

IFCDC practice within the ICU system can be developed through education, simulation training, and utilization of clinical guidelines to standardize performance competence for all collaborative team members and the parents/family. Promoting and evaluating competent performance for all team members can improve the outcome of practice and the baby’s health and well-being. Monitoring the outcome(s) to assess and trigger improvement is essential. Continuous improvement can help better understand the baby, parent, and family and improve the baby’s lifespan neurophysiologic outcomes. Competent and confident caregiving by parents and family members through the transition to home and continuing care in the community improves decision-making and the health and well-being of the baby, parents, and family. (23) The dissemination of improvement methods and data expands ICU providers’ and caregivers’ evidence and experience.

Summary and conclusions:

The consensus panel members are committed to providing ongoing evidence surveillance to support practice and adhering

to the foundational principles of IFCDC. With new evidence and changes in scientific knowledge and practical and ethical practice, the original standards and competencies published in 2020 are due for revisions and expansion. New to the work is the infusion of IFCDC principles into all practice standards, including the essential care components of diversity, equity, inclusion, and justice; advocacy and non-separation of babies and their parents; and including parents as partners in the care team. Although these recommendations may be challenging to implement in professional practice, using systems thinking to guide implementation should give babies and families the best start possible.

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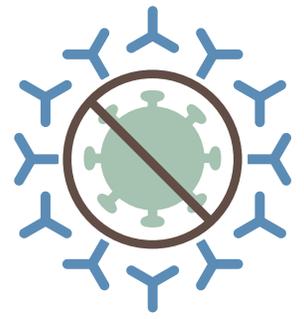
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Protecting your baby and family from

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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In the event in-person attendance is canceled or capacity limits modified per CDC or public health guidelines, the conference will be modified accordingly or presented entirely as a live virtual activity.

Conference Registration

We suggest you register early.

To register online, please go to:

Conference Registration, please register:
<https://www.eventbrite.com/e/the-37th-annual-gravens-conference-tickets-668446410207?aff=oddtcreator>

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Refund Policy

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Conference Agenda

<https://paclac.org/wp-content/uploads/2023/08/Gravens-Agenda-2024-1.pdf>

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A limited number of rooms have been reserved for this meeting at a special rate of \$224 (plus tax). For reservations, call the hotel directly* at (727) 595-1611 (not the national sales office) and identify yourself as a participant of the Gravens Conference to receive the special group rate.

*If no one picks up at the local number, the call is automatically transferred to the national reservation line. The phone reps at the national reservations line will not know of the group and special rate. Continue to call the local number.

If you prefer to make online reservations,

Online Reservations

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Book your group rate for Annual Gravens Conference (This will avoid the problems with reaching the national reservations line.)

The deadline to receive the group rate is February 4, 2024. This assumes the block has not sold out. If so, you will be quoted the standard rate, which is considerably higher than the group rate. The hotel sells out every year. Do not wait until the last minute. (The status of the pandemic will impact how quickly the room inventory sells out. Still, better to reserve the room in advance. You can always cancel, so long as it is within the allowable window.)

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

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

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The Gravens Diversity, Equity, Inclusion, and Justice (DEIJ) Committee will provide travel awards to individuals from historically underrepresented groups (i.e., people from racially and ethnically diverse backgrounds, members of the LGBTQ+ population, individuals with cognitive disabilities, individuals with physical disabilities). Please contact Kelly McGlothen-Bell (mcglothen@uthscsa.edu) or Christie Lawrence (Christie_Lawrence@rush.edu) for questions regarding an application.

37TH ANNUAL GRAVENS CONFERENCE ON THE ENVIRONMENT OF CARE FOR HIGH RISK NEWBORNS

Conference Background

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

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You will have access to recorded presentations after the conference is over.

Early Bird Full Conference In-Person Registration Early Bird Ends 1/22/2024	\$725.00
Remote, in real time	\$725.00
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Group In-person Registration 3 and more	\$650.00
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NICU Parent Registration In-person	\$300.00
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International Low Income Country Zoom Registration	\$85.00
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Course Objectives

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

Target Audience

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

Competencies to be addressed

PATIENT CARE AND PROCEDURAL SKILLS;
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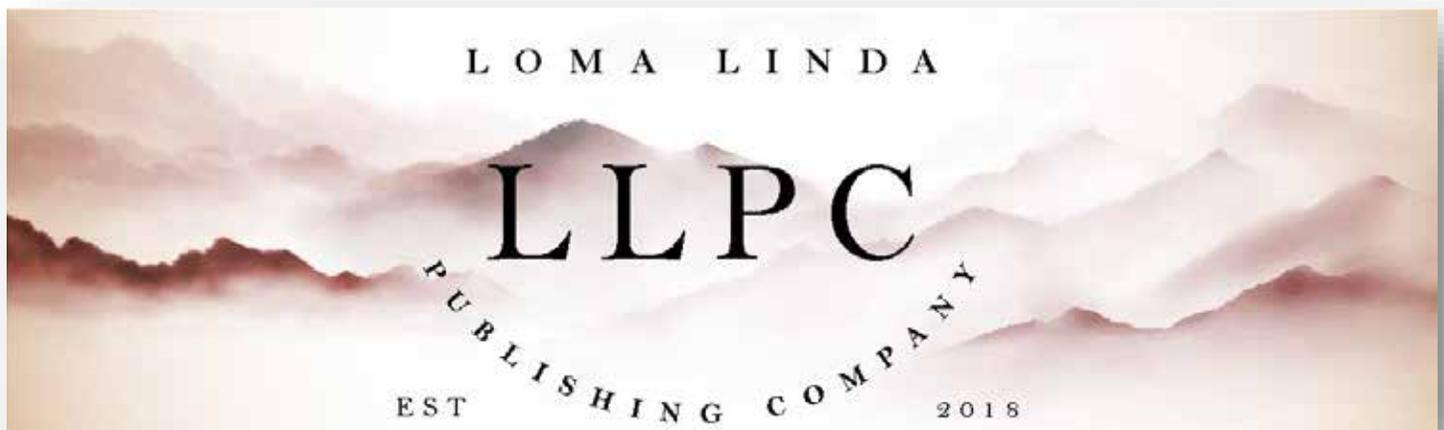
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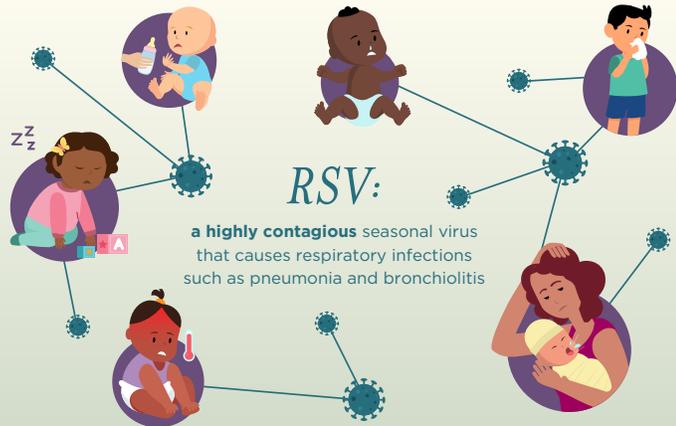
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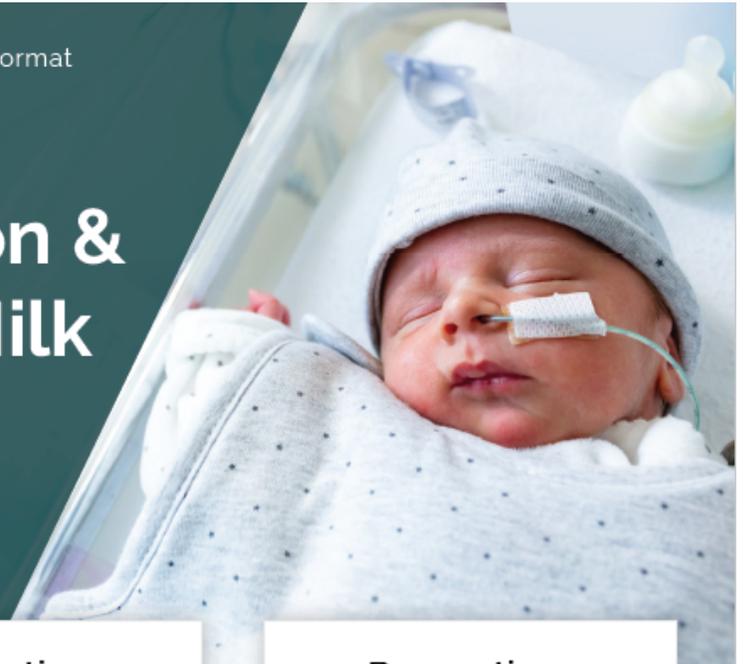
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As we indicated last month, we look forward to a number of new features as well.

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.

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

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

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Opinion: Alabama Rules Against Families

Aden Copeland OMS III, Carisa Swason OMS III, Nicole Lin OMS III, Lexi R M Lavell OMS III, PdTF, Mitchell Goldstein, MD

“On February 16, 2024, the Alabama Supreme Court ruled that frozen embryos are children under the state constitution and thus have all the same allotted rights (1). The decision came in response to a case regarding the wrongful death of a minor brought by several couples against The Center for Reproductive Medicine, an in-vitro fertilization (IVF) clinic in Mobile after several embryos became unviable due to mishandling.”

On February 16, 2024, the Alabama Supreme Court ruled that frozen embryos are children under the state constitution and thus have all the same allotted rights (1). The decision came in response to a case regarding the wrongful death of a minor brought by several couples against The Center for Reproductive Medicine, an in-vitro fertilization (IVF) clinic in Mobile after several embryos became unviable due to mishandling. In the ruling, the Alabama Supreme Court asserted that “an unborn child is a genetically unique human being whose life begins at fertilization and ends at death (1).” This statement is in accordance with a 2018 amendment to the Alabama Constitution that states, “The public policy of this state is to recognize and support the sanctity of unborn life and the rights of unborn children (2).” It should be noted that there is no scientific basis for the idea that life and personhood begin at conception. Instead, the foundation for this belief is largely biblical (3). The Chief Justice of the Court, Justice Tom Parker, went so far as to quote verses from the bible as part of his decision (1).

When this ruling was handed down, we were genuinely surprised. With the separation of church and state so deeply rooted in the United States, it seemed unconstitutional that a state ruling could be based on religious beliefs. Though we are painfully aware of many states’ attempts to define personhood and limit reproductive autonomy, IVF seemed relatively innocuous. People of diverse backgrounds, religions, and political leanings choose to undergo

IVF as a method to start a family. The only suggestion that IVF might be controversial was Pope Francis’s statement early in January, reiterating the Vatican’s opposition to IVF and surrogacy (4). Even with the consideration of religion, we had a hard time accepting that eight of the nine Alabama Supreme Court Justices concluded that a frozen embryo should have the same rights as a five-year-old child.

“IVF aims to build families, and the Alabama Supreme Court ruling will undoubtedly reduce access to this vital service. Over six hundred thousand embryos are estimated to be frozen in the United States (5). After a person has concluded their IVF treatment, extra embryos are often donated to other couples or to research (5). However, due to resultant legal repercussions, individuals will be less willing to donate spare embryos.”

IVF aims to build families, and the Alabama Supreme Court ruling will undoubtedly reduce access to this vital service. Over six hundred thousand embryos are estimated to be frozen in the United States (5). After a person has concluded their IVF treatment, extra embryos are often donated to other couples or to research (5). However, due to resultant legal repercussions, individuals will be less willing to donate spare embryos. This will restrict couples who rely on donated embryos to start families and hinder scientific advancement in the field of reproductive medicine. Some may argue that the ruling will promote better storage and handling of the embryos, providing better outcomes for families. However, the verdict will disproportionately hinder same-sex couples and older people seeking families.

We pose to you, readers, this thought experiment: Imagine you are a firefighter. You are called to a disastrous fire at an IVF clinic in the middle of the night. Imagine there are a thousand embryos in a freezer at this clinic and one security guard. You, a firefighter,

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run into the burning building and realize you only have time to save the security guard or the box of embryos in the freezer. You only have a moment to decide. What do you choose?

This thought experiment was presented to one of us in a medical ethics class in undergrad. We should disclose that we all chose to save the security guard. As medical students, scientists, future providers of reproductive health services, and people with uteruses, this ruling feels like just one of many blows to our autonomy. We worry that we will grow apathetic in the face of injustice and tolerant of our rights slowly being chipped away. However, we would like to take this opportunity to remind ourselves and others that we are not without agency. We have a voice, a vote, and a duty to protect our patients.

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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.

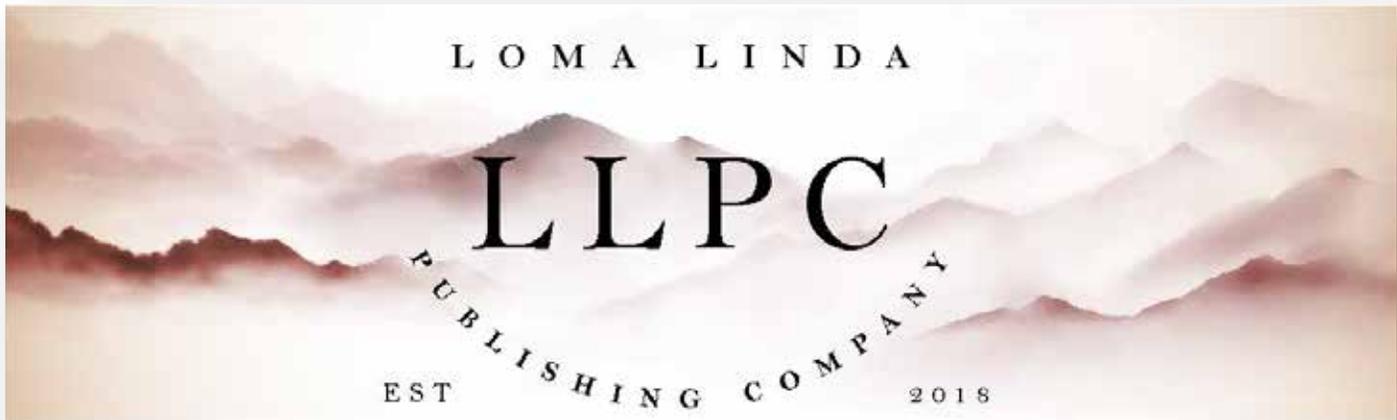


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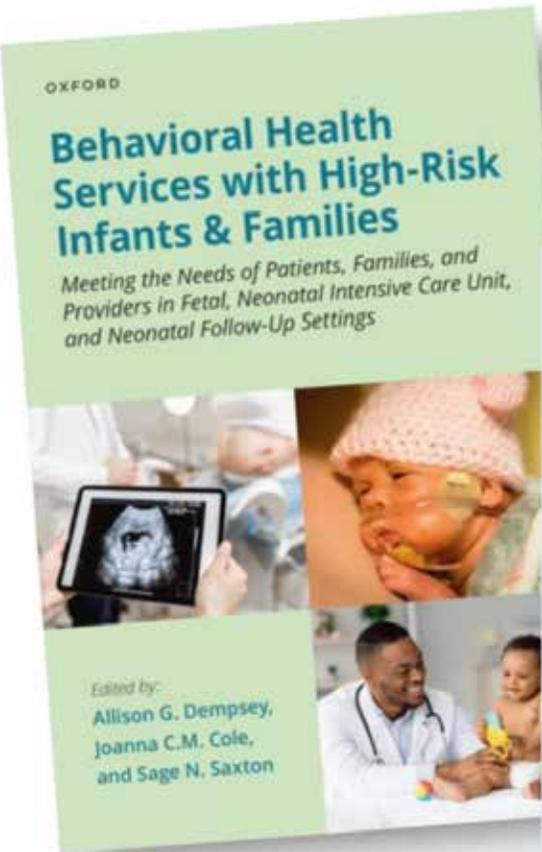
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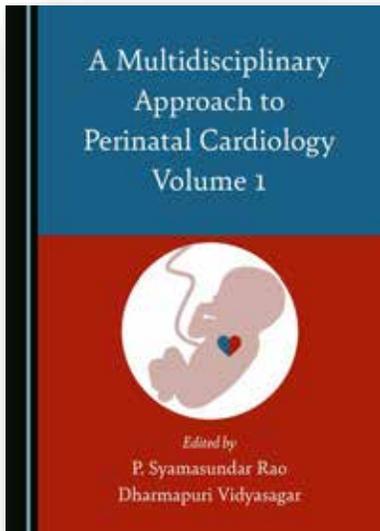
Second Edition

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A Multidisciplinary Approach to Perinatal Cardiology Volume 1

Edited by P. Syamasundar Rao and Dharmapuri Vidyasagar



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Book Description

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

About the Editors

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

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

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



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Caring for Pregnant Patients & Their Families:
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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

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Faculty

Linda Baker, PsyD

Psychologist at Unstuck Therapy, LLC, Denver, CO.

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

Angela Davids

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Crystal Duffy

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

Tracy Pella, MA

Co-Founder and President, Connected Forever, Tecumseh, NE.

Erin Thatcher, BA

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CANCELLATIONS AND REFUNDS

For Individual Subscribers:

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- 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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Congress Moves to Reduce Stillbirths

Josie Cooper

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



“Following an unprecedented uptick in stillbirths, Congress may be getting serious about reducing the number of babies who never take their first breath. (1) ”

Following an [unprecedented uptick](#) in stillbirths, Congress may be getting serious about reducing the number of babies who never take their first breath. (1)

A bipartisan group of [senators recommitted](#) (2) to prevent stillbirths in September 2023 when the [Maternal and Child Health Stillbirth Prevention Act](#) passed the Senate. (3) If the legislation passes the House of Representatives, it would fund research on stillbirth prevention. Previously introduced bills, such as the [Stillbirth Health Improvement and Education](#) (SHINE) for Autumn Act, have attempted to improve data collection and increase education about stillbirth. (4)

Stillbirth is defined as the death of a fetus after 20 weeks ges-

tation. Though progress has been slow, congressional leaders seem [interested](#) in addressing the issue. (5)

“A bipartisan group of senators recommitted (2) to prevent stillbirths in September 2023 when the Maternal and Child Health Stillbirth Prevention Act passed the Senate. (3) If the legislation passes the House of Representatives, it would fund research on stillbirth prevention.”

Australia's Approach Reduced Tragic Outcomes

Congress might look to Australia's approach as a template.

The commonwealth implemented a \$40 million national stillbirth plan in 2020, uniting the medical and policy communities to address the issue. The plan's measures encompass research, education, public awareness, and support services for stillbirth. Since implementing the plan, Australia has reduced stillbirths more than twice as quickly as the U.S. has.

More than [one in four such deaths](#) (6) may be preventable, and in the final weeks of pregnancy, that number rises still higher. Prevention requires clinical research, patient support, and active programming, all of which take the investment of national resources.

“Any mother-to-be may suffer the heartbreak of stillbirth, but rates are higher among Black, American Indian, and Alaskan Native women. Race is one of the highest differentiating risk factors, along with poverty, cigarette smoking, and maternal health challenges like diabetes or eclampsia.”

Disparities Reflect Lack of Access, Education

Any mother-to-be may suffer the heartbreak of stillbirth, but rates are higher among Black, American Indian, and Alaskan Native women. Race is one of the highest differentiating risk factors, along with poverty, cigarette smoking, and maternal health challenges like diabetes or eclampsia.

Experiencing a stillbirth brings complications of its own, particu-

larly to the grieving mother's physical and mental health.

“Educating mothers about safe practices, like sleeping on their sides, and when to seek help is vital to raising public awareness about the issue. Clinicians rarely conduct autopsies, which can reveal placental anomalies or other contributing factors. Often, doctors cannot deduce what went wrong.”

Educating mothers about safe practices, like sleeping on their sides, and when to seek help is vital to raising public awareness about the issue. Clinicians rarely conduct autopsies, which can reveal placental anomalies or other contributing factors. Often, doctors cannot deduce what went wrong.

The Centers for Disease Control [tracks stillbirths](#) (7) and develops [recommendations](#) (8) for healthcare providers, but most of that information does not reach patients who need it.

A national plan to coordinate education strategies and research into the causes of stillbirth would help bridge that gap.

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2. <https://www.booker.senate.gov/news/press/booker-merkley-grassley-adams-and-hinson-introduce-national-stillbirth-prevention-day-resolution>
3. <https://healthybirthday.org/advocacy/stillbirth-prevention-act/>
4. <https://www.congress.gov/bill/117th-congress/senate-bill/3972>
5. <https://www.propublica.org/article/stillbirth-prevention-legislation-heads-to-house>
6. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5785410/>
7. <https://www.cdc.gov/ncbddd/stillbirth/activities.html>
8. <https://www.cdc.gov/ncbddd/stillbirth/features/pregnancy-infant-loss.html>

Disclosure: Josie Cooper is executive director of the Alliance for Patient Access. This article was also published at healthpolicytoday.org.

NT

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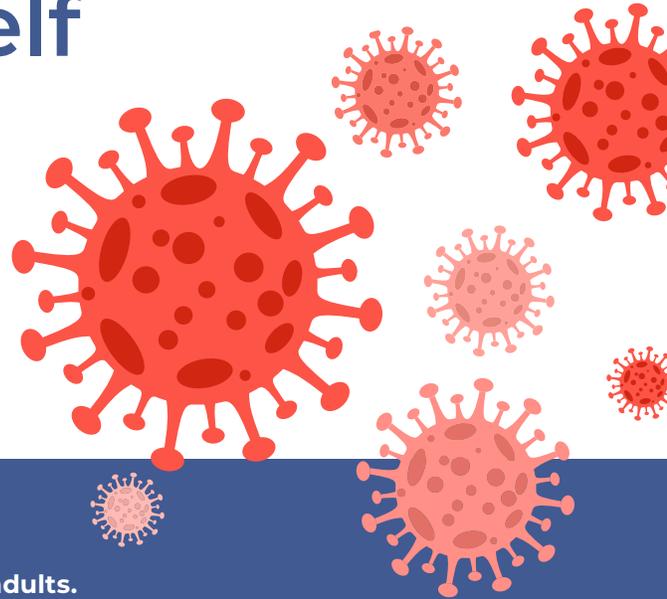
Sign up for free membership at 99nicu, the Internet community for professionals in neonatal medicine. Discussion Forums, Image Library, Virtual NICU, and more...”

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



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

1. <https://www.mayoclinic.org/diseases-conditions/coronavirus/symptoms-causes/syc-20479963>
2. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8782520/>
3. <https://www.nejm.org/doi/full/10.1056/nejmc2107717>
4. <https://royalsocietypublishing.org/doi/full/10.1098/rsif.2020.0683>
5. <https://www.cdc.gov/vaccines/covid-19/clinical-considerations/interim-considerations-us.html>
6. <https://doh.wa.gov/emergencies/covid-19/vaccine-information/safety-and-effectiveness>

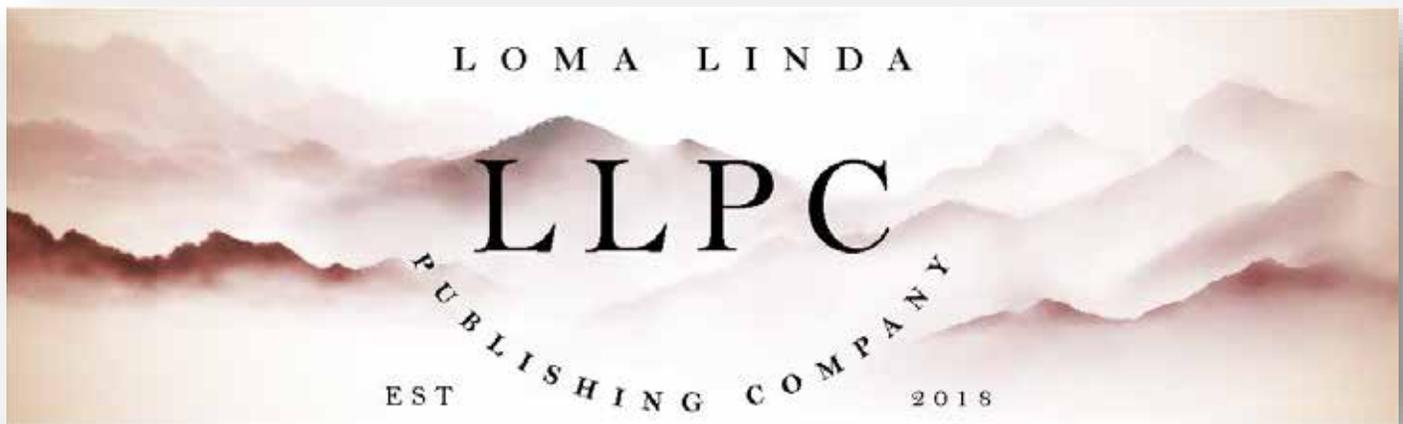
7. <https://doh.wa.gov/emergencies/covid-19/vaccine-information/safety-and-effectiveness>
8. <https://www.fda.gov/emergency-preparedness-and-response/coronavirus-disease-2019-covid-19/covid-19-vaccines>
9. <https://www.ema.europa.eu/en/human-regulatory/overview/public-health-threats/coronavirus-disease-2019-treatments-vaccines/vaccines-covid-19/covid-19-vaccines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

Join Us!
For the 37th International
GRAVENS meeting on the
Environment of Care for
High Risk Newborns and
their Families

March 6-9, 2024

Sheraton Sand Key Resort
Clearwater Beach, Florida

For more information go to <https://paclac.org/https-paclac-org-gravens-conference/> or [PACLAC.org](https://paclac.org)



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Trauma-Responsive Perinatal Care

Featured Presentation

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Trauma-Responsive Living

with Mary Coughlin



May 15-17 in Anaheim California

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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 Updates: Ask the Experts Recap, iCAN Kid is College Bound, Chapter Engagement, Parents' Publication, Upcoming Research and Advocacy Summit

Sabina Schmidt Goldstein-Becerra



Get involved today and Join the iCAN Parent Council!

“iCAN, or the International Children’s Advisory Network, is committed to providing numerous opportunities for the pediatric community to come together and hear from the most crucial stakeholders in healthcare: the patients. Our organization empowers all pediatric patients worldwide by facilitating their active participation in innovation, research, and medicine.”

iCAN, or the International Children’s Advisory Network, is committed to providing numerous opportunities for the pediatric community to come together and hear from the most crucial stakeholders in healthcare: the patients. Our organization empowers all pediatric patients worldwide by facilitating their active participation in innovation, research, and medicine. Whether you are a patient, family member, healthcare professional, or supporter of the cause, we welcome you to visit our website at icanresearch.org to learn more about our mission, various programs, and initiatives. Join us to ensure that every child’s voice is heard and that their unique experiences are taken into account to improve healthcare outcomes for all pediatric patients.

Ask the Experts - February Recap and Looking Ahead



Uma 8:35 AM



I currently work in clinical research and have had some experience working with regulatory. I'm curious to learn what are some advancements or things to look forward to in the future?

Ask the Experts with Martine Dehlinger-Kremer and Victor Garcia, A Dynamic Duo in Regulatory Expertise!

In our latest installment of the *Ask the Experts* series, we hosted two remarkable figures in regulations – Martine Dehlinger-Kremer and Victor Garcia! Their presence illuminated our February session with their wealth of experience and infectious enthusiasm.

Dr. Martine Dehlinger-Kremer’s expertise spans over three decades in the research industry, mainly focusing on global regulatory affairs, medical affairs, and pediatric leadership. Before her tenure at iCAN, she held executive leadership roles at global CROs, contributing significantly to global drug development in over 40 countries. Dr. Dehlinger-Kremer’s visionary leadership

extends to various professional organizations, including her roles as an observer member of the Coordinating Group of the European Network of Pediatric Research (Enpr-EMA) at the European Medicines Agency and as President of the European CRO Federation (EUCROF). Her remarkable contributions have earned her recognition, including being named one of PharmaVOICE's 100 Most Inspiring People in Life Sciences in 2015.

“Dr. Dehlinger-Kremer’s visionary leadership extends to various professional organizations, including her roles as an observer member of the Coordinating Group of the European Network of Pediatric Research (Enpr-EMA) at the European Medicines Agency and as President of the European CRO Federation (EUCROF).”

Victor Garcia, our Global Vice President for Regulatory Affairs, Environment, Health, Safety, and Quality Assurance Compliance, brings extensive subject matter expertise in regulatory policies affecting medical product classifications across global markets. With foundational experience in biopharmaceuticals, combination products, and companion diagnostics, Victor has been instrumental throughout various product lifecycles, from conception to full commercialization and post-market support. His dedication to the field is reflected in his roles as Chair of the Utah Regulatory Affairs Professional Society (RAPS) Chapter and as a founding member of the BioUtah Life Sciences regulatory, compliance, and quality committee. Victor’s commitment to education and mentorship is evident through his engagements as a lecturer for the RAPS continuing education community and as a guest lecturer at various universities.

“His dedication to the field is reflected in his roles as Chair of the Utah Regulatory Affairs Professional Society (RAPS) Chapter and as a founding member of the BioUtah Life Sciences regulatory, compliance, and quality committee. Victor’s commitment to education and mentorship is evident through his engagements as a lecturer for the RAPS continuing education community and as a guest lecturer at various universities.”

During our session, Martine and Victor’s insights underscored the

importance of their vast experience and unwavering dedication to advancing regulatory standards and practices in the medical industry.

Mark your calendars!

You are invited to an insightful Ask the Experts session titled “Warriors Unite: Conquering Childhood Pain and Nurturing Mental Health,” featuring Dr. Melissa Geraghty and Casey Cashman from the U.S. Pain Foundation. Join us on March 16, 2024, at 8 AM PST, 11 AM EST.

[Secure your spot by registering here today!](#)

Let us introduce our amazing speakers:



Casey Cashman (right) uses her voice to fight passionately for the rights of people with pain, especially children. She has lived most of her life with multiple serious health conditions, including reflex sympathetic dystrophy and Ehlers-Danlos syndrome, among others.

Over the years, she began to connect more with patient organizations and realized she had a passion for helping others like her. In 2015, she was featured as a participant in the INvisible Project, which led to her joining the U.S. Pain Foundation as a staff member.

Before the U.S. Pain Foundation, Casey spent many years working in Human Resources.

She brings this knowledge and experience to the table in her role as director of the Pediatric Pain Warriors Program, where she pro-

vides compassionate support to kids with pain and their families as they travel along their pain journeys. Casey also spearheads U.S. Pain's fundraising efforts and has helped create various programs and collaborations to support the organization's free programs and services.

Her son, Tyler, is also a budding advocate for the pain community. In honor of his mom, he founded Points for Pain, a fundraising program that has raised more than \$100,000 for pediatric patients.



Dr. Melissa Geraghty, Psy.D., is the Director of Mental Health and Support at the U.S. Pain Foundation. She is also a Licensed Clinical Health Psychologist, CEO of Phoenix Rising with Dr. G, Stanford Trained Empowered Relief Instructor™, and a Medical Gaslighting Sensitivity Trainer. Dr. Geraghty has received recognition for her clinical excellence and patient advocacy as a Keynote and International speaker. She has over a decade of experience fostering the mental health, self-management, and perseverance of patients and their families. Dr. Geraghty specializes in chronic pain, complex medical, and eating disorders. Her resilience and grit as a chronic pain and rare disease patient inspire others.

Do not miss this opportunity to gain valuable insights and support from our speakers. Register now to reserve your spot!

iCAN Spotlight!

Spotlight on Kalee Polk: Championing Pediatric Patient Advocacy with iCAN KIDS on Her Way to JAX State!



Let us highlight Kalee, a remarkable iCAN KIDS member who has received fantastic news – she has been accepted into JAX State! Originating from KIDS Georgia, Kalee has been a beacon of light in the realm of rare pediatric patient advocacy since she became a part of iCAN at a young age.

Kalee's journey has been incredibly inspiring. Her courage, compassion, and innate leadership skills have touched the lives of those around her profoundly. Whether advocating for children in medicine, sharing her narrative as a writer, or leading the charge as a youth advocate, Kalee has left an indelible mark.

Through her engagement with iCAN, Kalee has impressed the iCAN team and garnered admiration from doctors, researchers, and other influential figures in the pediatric sphere. She has shared her story at prominent events like the iCAN Research and Advocacy Summits and has even spoken at the 2018 Georgia Bio conference.

“Through her engagement with iCAN, Kalee has impressed the iCAN team and garnered admiration from doctors, researchers, and other influential figures in the pediatric sphere. She has shared her story at prominent events like the iCAN Research and Advocacy Summits and has even spoken at the 2018 Georgia Bio conference.”

Recently, Kalee was privileged to participate in the “What I Want Doctors to Know” panel at the 2023 iCAN Research and Advocacy Summit. Can you believe she shared her journey with over 400 doctors, researchers, patients, and parents? It is truly remarkable!

However, Kalee is not just a speaker but also a leader. Serving as the President of KIDS Georgia, she has established nurturing environments for children to exchange their experiences and knowledge. Additionally, she has mentored other young advocates, guiding them through interactive activities as a Pod Leader at conferences.

Kalee's dedication to assisting children in the medical realm extends beyond her leadership roles. She has earned scholarships, contributed to significant publications, and has even been featured in videos shared by iCAN!

We are immensely proud to have extraordinary individuals like Kalee in our iCAN family. With her determination and compassion, there is no doubt that she will continue to make a meaningful impact in the medical field and beyond. Keep shining bright, Kalee!

Highlighting KIDS Rady: Celebrating an Incredible Chapter Meeting!



Recently, KIDS Rady held a remarkable chapter meeting brimming with engaging activities! They collaborated and acquired knowledge on ways to promote children's well-being.

Moreover, they undertook a profoundly impactful initiative for their community! They assembled food bags for families experiencing food insecurity and crafted specialized kits for children managing diabetes, aiding them in maintaining their health.

“Moreover, they undertook a profoundly impactful initiative for their community! They assembled food bags for families experiencing food insecurity and crafted specialized kits for children managing diabetes, aiding them in maintaining their health.”

KIDS Rady epitomizes the ethos of compassion and community service! Their actions exemplify the significance of assisting those in need and extending kindness to all. Let us applaud KIDS Rady for their outstanding contributions!

Special Bonds: Leaders of our Parent Chapter Share How Nurses and Parents Make Hospitals Better



“We are thrilled to share that Jennifer Degl and Deb Discenza, co-founders of the iCAN Parents Chapter, have recently been published in Frontiers in Pediatrics!”

We are thrilled to share that Jennifer Degl and Deb Discenza, co-founders of the iCAN Parents Chapter, have recently been published in Frontiers in Pediatrics! Their article, “Beyond a Connection: Enhancing Hospitals through the Relationship Between NICU Parents and Nurses,” delves into the profound impact of the unique bond between NICU parents and nurses on enhancing families’ hospital experiences and improving infant outcomes.

[Click here to access the full article.](#)

iCAN’s Inaugural Fundraising Challenge: Join Us in Shaping Pediatric Healthcare!

 iCAN’s 10 Challenge: Striving Towards Pediatric Healthcare Excellence

 Date: March 30, 2024

 Time: 24- Hour

 Location: Global Fundraising

Website: bit.ly/iCANchallengeof10

About the Event: Join us in our first-ever iCAN Challenge, a community-driven initiative for children living with rare or complex conditions, dedicated to fundraising for our 2024 Annual Research and Advocacy Summit in Bari, Italy. This event is a collective effort to help provide pediatric patients with a powerful voice in medicine, research, and innovation. Your participation will play a pivotal role in empowering young voices and advancing critical initiatives that will mold the future of pediatric healthcare.

To celebrate our 10th anniversary, we encourage you to take on

challenges based on the number 10.

Here are some inspiring ideas: Bake ten cakes, read ten books, complete ten sketches, pick up ten pieces of litter, do ten good deeds, plant ten trees, run or walk ten blocks, bike ten miles, knit ten things, dance ten dances, decorate ten rocks, or swim ten laps. The challenge is up to you!

How to Get Started:

1. Decide whether you want to do the challenge as a group or if each member can do it independently and choose a fun challenge.
2. Set a fundraising goal; we suggest aiming for \$2500.
3. Find sponsors, either individually or as a group
4. Use Zeffy to collect money – download the app or visit the website, and donors will receive a donation email automatically.
5. Have a blast during the event. Wear iCAN gear (if you have it) and take lots of pictures! 6. Send the pictures to abbyc-lark@icanresearch.org

Get Involved!

[Upcoming Events: Mark Your Calendar!](#)

Visit icanresearch.org to learn more

Annual Research & Advocacy Summit Registration Opens-.March 13, 2024

Ask the Experts- March 16, 2024

iCAN Challenge of 10-March 30, 2024

Ask the Experts-April 6, 2024

Ask the Experts-May 18, 2024

Exciting News: iCAN’s 2024 Summit Presented by Jumo Health in Bari, Italy!

To sponsor our summit, visit bit.ly/iCANsponsorships

Our upcoming 2024 Summit Presented by Jumo Health is set to unfold in the picturesque city of Bari, Italy, from July 15 to 19th! The anticipation among our enthusiastic young participants is palpable as they eagerly await this remarkable event. But, to make it truly unforgettable, we need your support!

Our annual summit serves as a transformative platform for nurturing innovation, compassion, and collaboration in pediatric healthcare among youth.

If you believe in the power of education and inspiration, we invite you to be a part of this life-changing event. You can contribute in two meaningful ways:

1. Sponsor the 2024 Summit: Your sponsorship plays a pivotal role in the seamless organization of the summit. Your generous support ensures an impactful experience for all attendees.
2. Sponsor a Child to Attend: Your sponsorship directly impacts a child’s life, granting them the chance to attend the summit in Bari. Covering travel, accommodation, and participation, your support offers a world of learning and empowerment.



Together, we shape a brighter future for pediatric healthcare by nurturing the potential of our young members. Your contribution, no matter the size, makes a significant difference in fostering innovative advancements.

Thank you for considering this opportunity to support the next generation of healthcare leaders. Your generosity and dedication are deeply valued. Let's unite in Bari, Italy, to create a summit experience that empowers young minds for years to come!

Disclosures: There are no reported disclosures

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Join iCAN's Virtual Focus Group!



We warmly welcome all individuals within the age ranges of 8-10 and 12-18, including those with:

- Learning disabilities (example: dyslexia)
- Speech or language disabilities (examples: stuttering, understanding others, hearing)
- Physical disabilities (examples: epilepsy, cystic fibrosis)
- Autism Spectrum Disorder (ASD) or Attention-Deficit/Hyperactivity Disorder (ADHD)

Every voice counts!

It's a one-minute survey to see if you qualify for a one-hour focus group to be scheduled at a later date.

Survey Link: bit.ly/icanxkismet



Fill out the recruitment survey now and let your voice be heard!
Together, we can make a real difference in pediatric healthcare!

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



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



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



Academy of Perinatal Harm Reduction



www.perinatalharmreduction.org | www.nationalperinatal.org

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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?

- SEEK PARTICIPATION
- HELP EXPLORE OPTIONS
- ASSESS PREFERENCES
- REACH A DECISION
- EVALUATE 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

National Perinatal Association

nationalperinatal.org

Thank You, from iCAN



#iCANMakeADifference

Continue to Support at iCAN.health

*Education.
Anytime, Anywhere.*

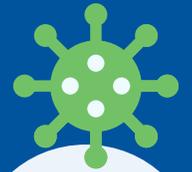
Academy of Neonatal Care



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.

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

NPA 2024 CONFERENCE

Towards

Trauma-Responsive Perinatal Care



Featured Presentation

Neonatal Sleep Assessment Optimizing Sleep as a Trauma-Responsive Approach

with

Eline de Groot PhD

Christine Gliniak PhD, OTR/L, CNT, CPXP, NTMC

May 15-17 in Anaheim, California

npaconference.org



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Survey Says: RSV

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

- Hospitalization
- Lifelong health complications
- Death

for infants and young children.



ACCORDING TO A NATIONAL SURVEY,

Specialty Health Care Providers say:

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



But Parents are Unprepared.

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



RSV EDUCATION & AWARENESS CAN HELP

After parents learned more about RSV, they were:

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



NCfIH National Coalition for Infant Health
Promoting Access for Perinatal Infections through Age Two

Learn More about RSV at:
www.infantHealth.org/RSV

Online survey conducted September 2018. Excluded 17% specialty health care providers and 80% parents of children 4 and under.

Briefly Legal: Guidelines for the Management of Labor – Evidence-Based?

Barry Schifrin, MD, Wayne R, Cohen, MD, Maureen E Sims, MD

In January 2024, the American College of Obstetricians & Gynecologists (ACOG) published updated guidelines on labor management (*Guidelines*). (1) In theory, organizational guidelines under the imprimatur of professional medical organizations are an essential and influential resource. They should help bring updated and reliable information to the physicians within their organization and others who practice in the field. In guidelines dealing with obstetrical care during labor, this would include anesthesiologists, nurses, midwives, and nurse practitioners. Such guidelines should be readily accessible and serve as the foundation for many hospital and departmental clinical protocols. As such, they are likely to strongly influence practice modes and likely to be cited in litigation to support the position of one side or the other.

“Because of the many unresolved issues and controversies over how to identify and treat dysfunctional labor in the face of the rising cesarean section rate, in 2014, ACOG issued Guidelines for the management of labor that represented a significant departure from previous guidelines that had stood, with minor alterations, for about half a century. (2) (3)”

Because of the many unresolved issues and controversies over how to identify and treat dysfunctional labor in the face of the rising cesarean section rate, in 2014, ACOG issued Guidelines for the management of labor that represented a significant departure from previous guidelines that had stood, with minor alterations, for about half a century. (2) (3)

The 2014 doctrine spurred considerable controversy with the publication of several studies designed to test the impact of the Guidelines on maternal and fetal outcomes and the cesarean section rate (CSR). (4) Attempting to assess the impact of guidelines for the conduct of labor on the CSR creates insurmountable difficulties. The long-standing attempts to rein in the prohibitively high and rising CSR in much of the world are confounded by wide disparities in CSR among and within countries. (5) (6) There are disparities related to social class, private or public facilities, availability of insurance, income, and even a patient’s BMI. There are even disparities among those of low obstetric risk births, especially among more educated women. (5) (6) The question arises: can we use definitions and guidelines for labor conduct to lower the CSR safely? Our primary goal should be determining the cesarean rate associated with optimal maternal and neonatal outcomes and not lowering the rate for its own sake without regard

to consequences.

“The 2014 doctrine spurred considerable controversy with the publication of several studies designed to test the impact of the Guidelines on maternal and fetal outcomes and the cesarean section rate (CSR). (4) Attempting to assess the impact of guidelines for the conduct of labor on the CSR creates insurmountable difficulties.”

Various studies on the 2014 Guidelines either failed to show benefits or produced contrary results irrespective of any effect on CSR. (7) In 2017, Rosenbloom et al. commented that “Despite significant changes in labor management that have occurred over the initial years since the publication of the new labor curves and associated guidelines, the primary cesarean delivery rate was not reduced and there has been an **increase** in maternal and neonatal morbidity in our institution.” (8) They called for a randomized controlled trial (RCT). Notably, a theoretical study showed no advantage to substituting the more recent Zhang formulation of progress in labor over the labor curves promulgated over many decades by Friedman. (9) (10)

“These various conceptual and clinical challenges to the 2014 Guidelines made their revision necessary and eagerly anticipated. (4) Regrettably, however, the new Guidelines offer little to quell the issues related to the earlier guidelines. (1)”

These various conceptual and clinical challenges to the 2014 Guidelines made their revision necessary and eagerly anticipated. (4) Regrettably, however, the new *Guidelines* offer little to quell the issues related to the earlier guidelines. (1) With its unbalanced assessment of the literature, they have exacerbated the problems of basic definitions of dysfunctional labor and management considerations in the conduct of both the 1st and 2nd stages of labor. The new *Guidelines* cite certain studies that support their recommendations while ignoring many cogent challenges to their statistical approach and the clinical applicability of their recom-

mendations. (4)

A few examples will illustrate the problem.

“The Guidelines concede biologic variation as to when the latent phase of labor becomes the active phase but then preclude diagnosing an arrest of dilatation until dilatation has reached at least 6 cm without reference to the preceding pattern of cervical dilatation. (1, 11) Moreover, they conflate protraction (slow slope of dilatation) and arrest disorders (cessation of dilatation) despite their demonstrated differences in management and outcome (12).”

Guidelines for the 1st stage of labor:

The Guidelines concede biologic variation as to when the latent phase of labor becomes the active phase but then preclude diagnosing an arrest of dilatation until dilatation has reached at least 6 cm without reference to the preceding pattern of cervical dilatation. (1, 11) Moreover, they conflate protraction (slow slope of dilatation) and arrest disorders (cessation of dilatation) despite their demonstrated differences in management and outcome (12). Some specific clinical situations that would be permissible under the new Guidelines would be contrary, we believe, to the instincts of the competent obstetrician. For example:

Case #1:

A nullipara presents in labor at term with her cervix 2 cm dilated and thin with the station of the fetal head at -2. One hour later, with strong contractions coming every 2-3 minutes, the cervix is found to be 5 cm dilated. She has progressed to 4 cm of dilatation in 1 hour. Five hours later, there is considerable molding without further descent, and the dilatation is only 5-6 cm.

Comment: Thus, according to the new guidelines, despite the very rapid dilatation from 1 to 5 cm, this labor is still considered as being in the latent phase - a designation that requires no further evaluation or intervention. (1) Experienced clinicians have observed problems with labor progress that will benefit from interventions prior to 6 cm of dilatation. (11) In Friedman's formulation, the latent phase ends with the upslope in the rate of cervical dilatation and not some arbitrary dilatation. (3)

Guidelines for the 2nd stage of labor:

The Guidelines recommend that pushing begin with the determination of full dilatation and that the duration of the 2nd stage should consider only the time when the patient is pushing. How, specifically, is the duration of the 2nd stage to be measured? “Laboring down” is no longer recommended as an acceptable alternative and does not count for time in the 2nd stage. Since laboring down does not count, how shall we apply the new definition? Should bedside nurses track “pushing time” episodes separately and then add up the episodes to determine 2nd stage duration? This seems

impractical, inaccurate, and wasteful of nursing time. It also compares with all the previously published literature that has defined the 2nd stage as the interval from full dilatation until delivery.

Assessment of the 2nd stage is governed by the critical notion that there should be progress in descent after full dilatation, irrespective of whether or not the patient is pushing. (13) What concessions the Guidelines make to the need to demonstrate true progress with pushing are confusingly and non-strategically, embedded within the document. The Guidelines establish definitions for “arrest in the 2nd stage of labor as greater than 3 hours in nulliparas and 2 hours in multiparas, with an additional hour if the patient is receiving epidural anesthesia. (1) The Guidelines suggest that the “diagnosis of 2nd stage arrest can be identified earlier if there is lack of fetal rotation or descent despite adequate contractions, pushing efforts, and time.” Ultimately, the Guidelines recommend an “individualized approach to diagnose 2nd stage arrest, incorporating ...progress, clinical factors... and patient preference.” These statements seem interpretable as allowing the practitioner to use any desired definition or treatment while ignoring this or any other guideline.

“Assessment of the 2nd stage is governed by the critical notion that there should be progress in descent after full dilatation, irrespective of whether or not the patient is pushing. (13) What concessions the Guidelines make to the need to demonstrate true progress with pushing are confusingly and non-strategically, embedded within the document.”

Guidelines for the management of labor – evidence-based?

Case #2:

The cervix eventually becomes fully dilated in a nullipara at term in slow, active labor. The position of the fetal head is occiput posterior (OP) with marked molding (overlapping of the cranial bones). The leading edge of the fetal head is at station 0. The biparietal diameter (BPD) is easily felt above the symphysis pubis. The fetal head is **not** engaged in the mother's pelvis, which has android features, including convergent sidewalls. According to the new Guidelines, this woman would be encouraged to push for at least three hours even if there were no further progress in descent.

Comment: In this case, while a brief period of pushing may be attempted, there can be little optimism for the feasibility of safe vaginal delivery. At the beginning of the 2nd stage of labor, the fetal head is unengaged, malpositioned (OP) with an unfavorable maternal pelvic architecture. The Guidelines offer no guidance on the duration of pushing without true descent. Pushing for 3 hours (about 90 contractions) with no progress in descent seems excessive and brutal and increases the risk of adverse outcomes (14). On the other hand, what is the indication for operative delivery if an arrest of descent is acted upon before the prescribed time?

The new Guidelines ignore evaluation of the maternal pelvic anat-

omy or cephalopelvic relations in the management of labor. Long-standing pillars of intrapartum observation, such as the position of the fetal head, its attitude, the presence of molding, caput, and asynclitism, and the bony architecture of the maternal pelvis, are mainly unconsidered. (15) (16, 17) The normality of the 2nd stage is determined purely by the duration of pushing. They draw no inferences from the pattern of descent over time. Parenthetically, although descent can occur without rotation, rotation cannot occur without descent.

The *Guidelines* do not comment on the pitfalls of determining fetal head engagement by pelvic examination, where such an important determination is confounded by position, attitude, and the amount of caput and molding of the fetal head. (18) There would be universal agreement that applying a vacuum device or forceps to an unengaged head would represent conduct below a reasonable standard of care.

In an article by Grobman, et al, cited by the *Guidelines*, the authors acknowledge the increase in maternal and fetal complications with prolongation of maternal pushing. Irrespective, both the *Guidelines* and Grobman et al. justify prolonged pushing because the absolute numbers of babies suffering adverse outcomes, including hypoxic-ischemic encephalopathy (HIE) and seizures related to prolonged pushing, are small! (1) (14)

The new *Guidelines* fail to address concerns about the maternal emotional or traumatic consequences of the prolonged labors they embrace. They fail to consider the associated risks of infection, injury to the birth canal or pelvic floor, exhaustion, disordered maternal-infant bonding, or their potential long-term maternal and fetal consequences, including the impact on subsequent deliveries and the willingness to undertake a trial of labor after a cesarean section. (8) (19) (20) (21) (7)

“Finally, we must consider the use of Guidelines in litigation where proper estimates of the progress in labor and feasibility of safe vaginal delivery are important considerations in determining the genesis of intrapartum fetal injury and subsequent outcome of the newborn.”

In their comments on the “individualized approach to diagnosing 2nd stage arrest,” the *Guidelines* disavow any unique or coherent definition of abnormalities of descent of the 2nd stage, falling back on the singular notion of “arrest of 2nd stage”. The *Guidelines* make no distinction between protracted descent (progress is slow), arrest of descent (cessation of descent after initial progress), and failure of descent where there is no descent initially despite full dilatation. These distinctions provide essential insights into the prospects of safe vaginal delivery. (12) The restricted terminology seemingly allows the practitioner to use whatever definition or treatment he or she desires. It encumbers conversations between obstetrical nurses and physicians in which each has a different understanding of the meaning and implications of the various terms used.

Finally, we must consider the use of *Guidelines* in litigation where proper estimates of the progress in labor and feasibility of safe vaginal delivery are important considerations in determining the genesis of intrapartum fetal injury and subsequent outcome of the newborn. Given the breadth of options seemingly permissible un-

der the new *Guidelines*, the allegations and counter-allegations of actions that are or are not permissible under “the standard of care” can confuse any judge or jury. The litany of disturbing disclaimers in the *Guidelines* throws this issue into bold relief. For example, “the publication is provided ‘as is’ without any warranty of accuracy, reliability, or otherwise...”. In these disclaimers, designed for defending allegations of negligence, the *Guidelines* have diminished their value and the value of enlightened care. They seem more concerned about avoiding culpability than maintaining safety. Ultimately, we are concerned by the promulgation of guidelines dealing with the conduct of labor whose unstated purpose is to reduce CSR. Such conflating makes the route of delivery (CSR) more important than safety for the fetus and mother.

“We believe the current Guidelines are poorly conceived, poorly written, inconsistent, and contradictory, with a biased interpretation of the available research. Optimal management of labor may or may not reduce the number of cesarean sections. Intelligent, teachable, coherent Guidelines will provide patient safety and physician respect.”

We believe the current *Guidelines* are poorly conceived, poorly written, inconsistent, and contradictory, with a biased interpretation of the available research. Optimal management of labor may or may not reduce the number of cesarean sections. Intelligent, teachable, coherent *Guidelines* will provide patient safety and physician respect. They will decrease the risks of labor, the urgency of interventions, and the risk of allegations of malpractice. They can provide meaningful communication among obstetrical care providers and honorable and defensible posture should allegations of negligence arise.

“Considering the above (abbreviated) litany of concerns, we fear that unless the Guidelines are replaced with more balanced, evidence-based terminology and recommendations for management, the problems of adverse maternal and fetal outcomes will persist, and the inconsistencies embedded in the CSR statistics will continue.”

Considering the above (abbreviated) litany of concerns, we fear that unless the *Guidelines* are replaced with more balanced, evidence-based terminology and recommendations for management, the problems of adverse maternal and fetal outcomes will persist, and the inconsistencies embedded in the CSR statistics will continue. Until then, we believe that practitioners should be cautious about embracing these *Guidelines*, and pregnant women

should be fearful of their implementation.

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Disclosures: *There are no reported disclosures*

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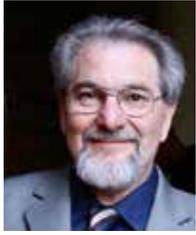
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2024

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

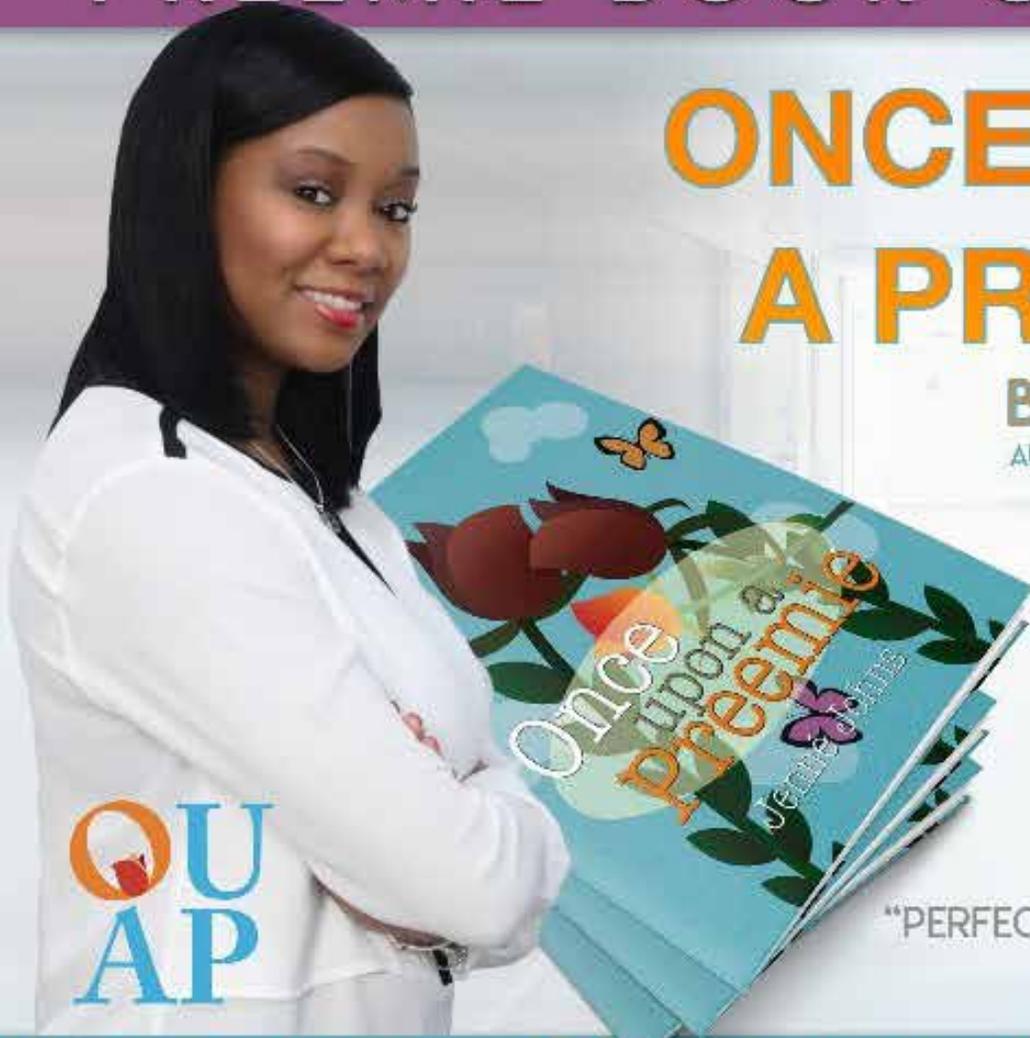


www.nationalperinatal.org/rsv

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”

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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

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- 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



heart&soul

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

HOLIDAY PARTIES MADE SIMPLE

THE ONCE UPON A PREEMIE STORY



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Still a Premie?

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

But that's not every preemie's story.

Born between 34 and 36 weeks' gestation?

STILL A PREMIE

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



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.**

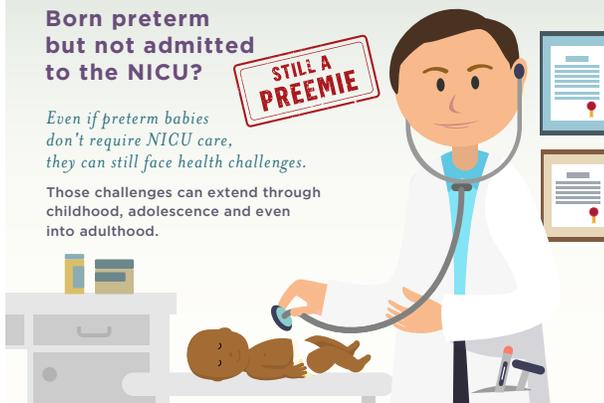


Born preterm but not admitted to the NICU?

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

NCJIH National Coalition for Infant Health
Protecting Access for Premature Infants through Age Two
www.infanthealth.org

How to Care for a Baby with Signs of Withdrawal

Use the Right Words



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

Treat Us as a Dyad



Parents and babies need each other. Help us bond. Whenever possible, provide my care alongside my parents and teach them how to meet my needs.

Support Rooming-In



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

Promote Kangaroo Care



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

Try Non-Pharmacological Care



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

Provide Lactation Support



Human milk is important to my gastrointestinal health and breastfeeding is recommended when my parent is HIV-negative and receiving medically-supervised care. Help my family reach our pumping and feeding goals.

Treat My Symptoms



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

Academy of Perinatal Harm Reduction
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National Perinatal Association
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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.

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Eunice Kennedy Shriver National Institute
of Child Health and Human Development



Medical News, Products & Information

Compiled and Reviewed by Sandeep Lankireddy, BA, OMS IV

Missing Outcome Data in Recent Perinatal and Neonatal Clinical Trials

NEWS PROVIDED BY

[American Academy of Pediatrics](#)

by Li, Guowei et al.

February 23, 2024

Abstract

Missing outcome data in clinical trials may jeopardize the validity of the trial results and inferences for clinical practice. Although sick and preterm newborns are treated as a captive patient population during their stay in the NICUs, their long-term outcomes are often ascertained after discharge. This greatly increases the risk of attrition. We surveyed recently published perinatal and neonatal randomized trials in 7 high-impact general medical and pediatric journals to review the handling of missing primary outcome data and any choice of imputation methods. Of 87 eligible trials in this survey, 77 (89%) had incomplete primary outcome data. The missing outcome data were not discussed at all in 9 reports (12%). Most study teams restricted their main analysis to participants with complete information for the primary outcome (61 trials; 79%). Only 38 of the 77 teams (49%) performed sensitivity analyses using a variety of imputation methods. We conclude that the handling of missing primary outcome data was frequently inadequate in recent randomized perinatal and neonatal trials. To improve future approaches to missing outcome data, we discuss the strengths and limitations of different imputation methods, the appropriate estimation of sample size, and how to deal with data withdrawal. However, the best strategy to reduce bias from missing outcome data in perinatal and neonatal trials remains prevention. Investigators should anticipate and preempt missing data through careful study design, and closely monitor all incoming primary outcome data for completeness during the conduct of the trial.

CONFLICT OF INTEREST DISCLOSURES: The authors have indicated they have no conflicts of interest to disclose.

NT

Sanofi launching reservation program for infant RSV immunizations in 2024-'25

NEWS PROVIDED BY

[American Academy of Pediatrics](#)

by Melissa Jenco

February 2, 2024

Pediatricians will be able to reserve doses of respiratory syncytial virus (RSV) immunization nirsevimab (Beyfortus) for the 2024-'25 season.

Sanofi is expanding its nirsevimab manufacturing network and rolling out a new reservation program Monday in hopes of mitigating the supply issues that plagued this season's launch. The program will apply to private purchases of the monoclonal antibody, which protects infants and high-risk toddlers from RSV.

From Feb. 5 through April 30, clinicians can work with Sanofi (via their representative or Beyfortus.com) to forecast their needs for the 2024-'25 season, which typically runs from October through March in most of the U.S. The manufacturer's forecast tool will consider the estimated number of newborns a practice sees monthly, anticipated immunization rates for those births and the percentage of publicly insured patients.

During July and August, program participants will be able to reserve doses and will be eligible for priority shipping, preferred monthly shipping schedules, 90-day payment terms and cancellation up to 14 days prior to scheduled shipments. Returns will be accepted on expired products.



NICU MENTAL HEALTH

OFFER ANTICIPATORY GUIDANCE

Parents need to know that they are more likely to develop depression and anxiety during the first year after childbirth than at any other time in their life.

Let's work together to improve support for NICU families.

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There is no minimum order to participate in the reservation program. Orders placed during the reservation period cannot exceed more than 10% above what was forecasted and submitted for each dose (50 milligram and 100 milligram). Customers would receive their reserved shipments beginning in late August or early September and throughout the season.

Clinicians are not required to participate in the reservation program. The normal ordering window for nonparticipants will

be September 2024 through February 2025 via vaccineshop.com. Clinicians ordering during this time would have payment terms of 60 days and no ability to schedule future shipments.

Announcement of the reservation program comes on the heels of a difficult launch for the long-awaited product. It received approval from the Centers for Disease Control and Prevention (CDC) in August 2023 and quickly saw demand outpace supply.

Sanofi has said it had to finalize its launch supply in March 2023 and aimed to provide enough immunization for 30% of the birth cohort within six months of launch, which was higher than the initial uptake of rotavirus and pneumococcal conjugate vaccines. The company noted implementation barriers like commercial payer coverage and coding issues resolved more quickly than expected, and orders quickly exceeded planned available doses.

The AAP has been working diligently with Sanofi and health officials on supply issues. In December, Sanofi announced it would be releasing 230,000 doses from supply originally intended for the Southern Hemisphere. Those doses are now available for ordering without an allocation on a first-come, first-served basis. Customers with questions about supplies for this season or next season can contact their representative, or call 855-BEYFORTUS.

New requirement to protect children's health care coverage takes effect

NEWS PROVIDED BY

[American Academy of Pediatrics](http://AmericanAcademyofPediatrics)

by Devin Mazziotti

February 1, 2024

States now are required to provide 12-month continuous eligibility for all children enrolled in Medicaid and the Children's Health Insurance Program (CHIP).

This long sought-after AAP priority marks important progress toward protecting children's access to health care and comes as millions of children have lost coverage while states continue to navigate the Medicaid unwinding process.

How we got here

Congress passed the continuous eligibility requirement as part of its sweeping, bipartisan federal government spending package at the end of 2022. The deal set January 2024 as the requirement's start date.

Before the new requirement took effect, about half of states already had 12-month continuous eligibility in place.

What it means

Under the new requirement, all states must provide children enrolled in Medicaid and CHIP with a full year of eligibility for the programs, regardless of changes in family circumstances. This policy change helps ensure children do not experience disruptions in their health care coverage over the span of the year or face unnecessary administrative barriers to stay enrolled in the program.

The Academy has long advocated for continuous eligibility so families have peace of

2024

Respiratory Syncytial Virus:

How you can advocate for babies this RSV season

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



Identify the babies at greatest risk



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

Teach families how to protect their babies from respiratory infections



Advocate for broader insurance coverage for both vaccination and 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





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mind that children will keep their coverage and can continue to receive the care and services they need to be healthy.

Notably, this new requirement went into effect as the Medicaid unwinding continues to play out across the country. Unwinding refers to the process states are undertaking to redetermine individuals' Medicaid eligibility after pandemic-era continuous coverage protection ended. Through this process, more than 3 million children have lost their health care coverage. Many of them are eligible for the program but have been unenrolled for procedural reasons, such as missed paperwork or data systems glitches.

While the new continuous eligibility requirement will not prevent children from losing coverage during the Medicaid unwinding, it creates a long-term best practice that ensures children enrolled in the programs do not experience unnecessary disruptions in care.

On the horizon

While 12-month continuous coverage is a critical first step, the Academy called for multiyear continuous coverage in its latest policy statement, which outlines bold reforms to Medicaid and CHIP.

Specifically, the AAP calls for required

continuous eligibility of children enrolled in Medicaid and CHIP starting at the newborn stage through age 6, and a minimum period of two-year continuous eligibility without renewal requirement for individuals ages 6 through 26.

Recognizing the benefits of continuous coverage, several states have taken promising steps in this direction. At press time, 10 states have moved toward multiyear continuous eligibility, with Oregon and Washington being the first two states with waivers approved by the Centers for Medicare & Medicaid Services to provide this eligibility through age 6.

AAP chapters have played a leading role, urging their states to advance these innovative policies to protect children's health care coverage.

As 2024 continues, the Academy will continue its multipronged approach at the federal and state levels to advance children's access to health care, protect against coverage losses and promote enrollment for those who have lost coverage.

Pediatrician videos highlight importance of firearm violence prevention research

The AAP recently released a series of videos featuring pediatricians speaking about the importance of continued federal investment in firearm violence prevention

research.

One video features Emily Lieberman, M.D., FAAP, (pictured here) speaking about her experiences as a survivor of the 2022 Fourth of July parade mass shooting in Highland Park, Ill., and her ongoing advocacy to protect children from gun violence. Watch the videos [here](#).

Federal emergency services program for children due to be reauthorized

The Academy is advocating for the Emergency Medical Services for Children (EMSC) Program to be reauthorized for five years, which for 40 years has worked to ensure that emergency medical systems are prepared to meet the needs of children.

It is the only federal program specifically focused on children's unique health needs during emergencies.

Every five years, lawmakers reauthorize the program so it can continue to serve children and help ensure access to timely and effective emergency services no matter where they live, go to school or travel. It is due to be reauthorized this year in Congress. As of press time, AAP-endorsed, bipartisan legislation to reauthorize the program was introduced in the U.S. House of Representatives. The Academy is urging its swift passage.

Long garnering bipartisan support, the EMSC program aims to improve the qual-



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ity of emergency medical care for children in several ways.

The EMSC program helps all states and territories expand and improve their capacity to respond to pediatric emergencies through state partnership grants. This funding helps provide pediatric training to paramedics and first responders; equip hospitals and ambulances with appropriate tools, equipment and medication for children; and bolster the emergency systems in place so that children can receive the care they need, when they need it.

The EMSC program also aims to ensure children in rural and tribal communities can receive emergency care. In fact, due to the program, 90% of EMS agencies in the United States have consistent access to online medical direction when treating a pediatric patient, and 85% have offline medical direction that includes protocols inclusive of pediatric patients.

Additionally, the program supports research on pediatric emergency medicine as part of the first and only federally funded network on the topic.

The Academy urges the continuation of the program's vital work. Significant improve-

ment is needed across emergency medical systems so that they are best equipped and prepared to care for children, especially as the COVID-19 pandemic and surge of pediatric respiratory illnesses exposed and exacerbated existing issues. Late last year, AAP Immediate Past President Sandy L. Chung, M.D., FAAP, joined leaders from the Emergency Nurses Association and the American College of Emergency Physicians in writing an op-ed that was published in MedPage Today about the importance of investing in pediatric readiness.

The Academy will continue to call on lawmakers to support a strong, five-year reauthorization of the EMSC program so children can receive timely emergency medical services designed for their needs.

NT



Frequently Asked Questions About RSVpreF (Abrysvo) Vaccine for Pregnant People

NEWS PROVIDED BY

[Center for Disease Control and Prevention](https://www.cdc.gov)

Last Updated February 2024

Avoid potential vaccination errors –

Pregnant people should ONLY receive Pfizer RSVpreF (ABRYSVO) vaccine.

RSVpreF (Abrysvo) vaccine is the ONLY Respiratory Syncytial Virus (RSV) vaccine approved for use during pregnancy to protect infants from RSV-associated lower respiratory tract infection (LRTI). The vaccine should be administered during weeks 32 through 36 of pregnancy (i.e., 32 weeks 0 days through 36 weeks 6 days). In most of the continental United States, the vaccine should be administered from Septem-



National Network of
NICU Psychologists



NICU MENTAL HEALTH

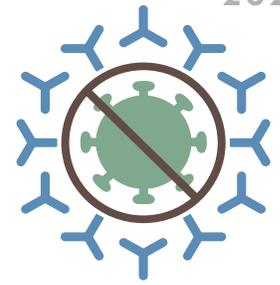
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Protecting your baby and family from



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. Now there are new vaccines for RSV for adults and antibody shots for babies that can help protect them.



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ber through January.

To prevent RSV-associated LRTI in infants, CDC recommends either

- *Administering RSVpreF (Abrysvo) vaccine to the pregnant person*

OR

- *Administering RSV monoclonal antibody, nirsevimab (Beyfortus) to the infant*

Most infants will not need protection from both products.

Please visit the CDC website [here](#) for a full list of FAQs.

NT

Drug, immunization, device shortages

NEWS PROVIDED BY

[American Academy of Pediatrics](#)

News last updated January 11, 2024

Supply chain issues, manufacturing difficulties and increased demand have contributed to supply issues with a variety of drugs, immunizations and medical devices. AAP News has been covering the shortages and alternatives for patients. Recent articles can be found below. Shortages should be reported to the Food and Drug Administration.

Adderall

FDA, DEA call on drug manufacturers to address shortages, increase ADHD medications

Aug. 1, 2023 — Agency leaders noted manufacturers are not producing as much as allowed and called on those who do not wish to increase production to relinquish their remaining 2023 allotment so other manufacturers can increase production.

Additional ADHD treatment options available during Adderall shortage

Oct. 17, 2022 — An AAP expert provides alternatives drugs to treat attention-deficit/hyperactivity disorder while the immediate release formulation of Adderall is in shortage.

FDA: ADHD medication Adderall in shortage

Oct. 13, 2022 — Teva Pharmaceuticals reported intermittent manufacturing delays impacting the immediate release formulation of Adderall.

Amoxicillin

New resource provides alternatives to amoxicillin suspension during shortage

Nov. 22, 2022 — Pediatricians who can't find amoxicillin oral powder for suspension should first turn to other formulations of amoxicillin. When amoxicillin can't be used, several alternatives can be considered.

Expert: Using antibiotics judiciously will help maintain supply during amoxicillin shortage, prevent resistance

Nov. 1, 2022 — Pediatricians grappling with a shortage of amoxicillin have other antibiotic options but should be judicious in using them to prevent resistance.

Bicillin

FDA allows importation of antibiotic during Bicillin shortage

Jan. 11, 2024 — The FDA is temporarily allowing importation of Extencilline (benzathine benzylpenicillin), which can be used to treat syphilis.

Long-acting injectable penicillin in short supply

June 20, 2023 — Bicillin L-A and Bicillin C-R prefilled syringes are in short supply. Bicillin is used to treat pregnant women with syphilis and babies with congenital syphilis. It also has been used as an option for treating strep throat, especially during the shortage of amoxicillin.

Cancer medications

Pediatricians advocating for increased production of cancer medications amid shortages

Nov. 1, 2023 — Health care providers are seeing shortages of vinblastine, dacarbazine, methotrexate, cisplatin, carboplatin and other drugs used to treat cancer in children.

Erythromycin ointment

AAP: Use ceftriaxone to prevent newborn eye infection during erythromycin ointment shortage

Jan. 8, 2024 — Erythromycin ointment is used to prevent ophthalmia neonatorum caused by *Neisseria gonorrhoeae*. The infection usually is transmitted during passage through the birth canal and can lead to blindness.

Nirsevimab (Beyfortus)

CDC: Immunize all eligible children against RSV 'as quickly as possible'

Jan. 5, 2024 — Clinicians can return to the original recommendations for using RSV immunization nirsevimab (Beyfortus) in infants and young children as supplies increase.

Sanofi to release 230,000 additional doses of RSV immunization nirsevimab

Dec. 14, 2023 — The additional supplies will include both 50 mg and 100 mg doses and will be distributed in January.

Additional supplies of RSV immunization to be released; shortages remain likely

Nov. 16, 2023 — Federal health officials are releasing more than 77,000 of the 100 milligram (mg) doses after identifying a batch awaiting final clearance and expediting processing.

CDC: During nirsevimab shortage, prioritize infants at risk, encourage maternal vaccination

Nov. 9, 2023 — During an AAP webinar, CDC officials continued to recommend prioritizing infants at highest risk, referring patients to other providers and encouraging vaccination during pregnancy.

Sanofi pausing new orders for nirsevimab; CMS sets payment rates



Postpartum Revolution

©ANGELINASPICER



Nov. 7, 2023 — Sanofi is pausing orders for 50 milligram (mg) doses of respiratory syncytial virus (RSV) immunization nirsevimab (Beyfortus) and will have limited supply available when it reopens ordering.

CDC offers guidance on prioritizing infants for limited nirsevimab supplies

Oct. 23, 2023 — The interim recommendations focus on the youngest children and those most at risk of severe RSV disease.

CDC reopens limited nirsevimab ordering through VFC program

Oct. 19, 2023 — The CDC will use an allocation system that initially will target awardees who have not yet ordered or who ordered a small amount.

CDC relaxes VFC rules for nirsevimab, COVID-19 immunizations

Oct. 18, 2023 — VFC program providers will not be required to keep a private stock of nirsevimab or COVID-19 vaccines during the 2023-'24 respiratory virus season if they are not vaccinating privately insured patients.

Supply issues plague nirsevimab ordering

Oct. 17, 2023 — Ordering nirsevimab through the Vaccines for Children program has been put on hold, and the 100-milligram formulation also is not available for ordering from Sanofi.

CDC director addresses COVID, RSV concerns; announces new CPT codes during AAP town hall

Oct. 5, 2023 — CDC leaders discussed new flexibilities in the Vaccines for Children Program, payment for counseling families on nirsevimab and what to do if an infant's insurance coverage is unclear when administering the immunization.

New VFC program flexibilities may improve access to nirsevimab

Oct. 3, 2023 — The CDC updated the provider agreement on inventory and borrowing rules, incorporating some of the strategies the AAP has been advocating for to ensure equitable access.

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Tracheostomy tubes

Tracheostomy tube shortage likely to impact pediatric patients; FDA offers guidance

Nov. 1, 2022 — The shortage of tubes, including Bivona tracheostomy tubes manufactured by ICU Medical, is more likely to impact pediatric patients because the supply of alternatives may be limited.

NT

COVID-19 vaccination and boosting during pregnancy protects infants for six months

NEWS PROVIDED BY

[National Institute of Health](#)

February 14, 2024

Women who receive an mRNA-based COVID-19 vaccination or booster during pregnancy can provide their infants with strong protection against symptomatic COVID-19 infection for at least six months after birth, according to a study from the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health. These findings, published in *Pediatrics* (link is external), reinforce the importance of receiving both a COVID-19 vaccine and booster during pregnancy to ensure that infants are born with robust protection that lasts until they are old enough to be vaccinated.

COVID-19 is especially dangerous for newborns and young infants, and even healthy infants are vulnerable to COVID-19 and are at risk for severe disease. No COVID-19 vaccines currently are available for infants under six months old. Earlier results from the Multisite Observational Maternal and Infant COVID-19 Vaccine (MOMIv-Vax) study revealed that when pregnant volunteers received

both doses of an mRNA COVID-19 vaccine, antibodies induced by the vaccine could be found in their newborns' cord blood. This suggested that the infants likely had some protection against COVID-19 when they were still too young to receive a vaccine. However, researchers at the NIAID-funded Infectious Diseases Clinical Research Consortium (IDCRC), which conducted the study, did not know how long these antibody levels would last or how well the infants would actually be protected. The research team hoped to gather this information by following the infants through their first six months of life.

In this portion of the study, researchers analyzed data from 475 infants born while their pregnant mothers were enrolled in the MOMI-Vax study. The study took place at nine sites across the United States. It included 271 infants whose mothers had received two doses of an mRNA COVID-19 vaccine during pregnancy. The remaining 204 infants in the study were born to mothers who had received both doses of an mRNA COVID-19 vaccine as well as a COVID-19 booster. To supplement data gathered during pregnancy and at birth, the infants were evaluated during at least one follow-up visit during their first six months after birth. Parents also reported whether their infants had become infected or had demonstrated COVID-19 symptoms.

Based on blood samples from the infants, the researchers found that newborns with high antibody levels at birth also had greater protection from COVID-19 infection during their first six months. While infants of mothers who received two COVID-19 vaccine doses had a robust antibody response at birth, infants whose mothers had received an additional booster dose during pregnancy had both higher levels of antibodies at birth and greater protection from COVID-19 infection at their follow-up visits.

While older children and adults should continue to follow guidance from the Centers for Disease Control and Prevention (CDC) to stay up-to-date on their COV-

ID-19 vaccines and boosters, this study highlights how much maternal vaccination can benefit newborns too young to take advantage of the vaccine: During the course of this study, none of the infants examined required hospitalization for COVID-19. Researchers will continue to evaluate the data from the MOMI-Vax study for further insights concerning COVID-19 protection in infants.

Article

CV Cardemil et al. Maternal COVID-19 Vaccination and Prevention of Symptomatic Infection in Infants. *Pediatrics* DOI: 10.1542/peds.2023-064252(link is external) (2024).

Who

Cristina Cardemil, M.D., a medical officer in NIAID's Division of Microbiology and Infectious Diseases, is available to comment.

NT

Intervention reduces likelihood of developing postpartum anxiety and depression by more than 70%

NEWS PROVIDED BY

[National Institute of Health](#)

February 26, 2024

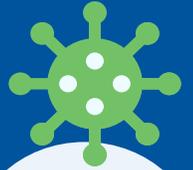
NIH-funded study shows prenatal mental health support is effective for women living in low-resource settings.

Results from a large clinical trial funded by the National Institutes of Health show that an intervention for anxiety provided to pregnant women living in Pakistan significantly reduced the likelihood of the women developing moderate-to-severe anxiety, depression, or both six weeks

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Keeping Your Baby Safe from respiratory infections



RSV
COVID-19
colds
flu

How to protect your little ones from germs and viruses

Cold and flu season can be dangerous - 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 hand sanitizers.



Limit Contact with Others

- Stay home when you can.
- Avoid sick people.
- 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 RSV, 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 can make it harder for them to breathe.
- Face masks and their straps pose a risk of suffocation and strangulation.
- Remember, a baby can't remove their mask if they're having trouble breathing.



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 viruses from spreading.
- Watch out for symptoms like fever, confusion, or trouble breathing.
- Ask for help caring for your baby and yourself while you recover.



2024

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

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after birth. The unique intervention was administered by non-specialized providers who had the equivalent of a bachelor's degree in psychology—but no clinical experience. The results suggest this intervention could be an effective way to prevent the development of postpartum mental health challenges in women living in low-resource settings.

"In low resource settings, it can be challenging for women to access mental health care due to a global shortage of trained mental health specialists," said Joshua A. Gordon, M.D., Ph.D., Director of the National Institute of Mental Health, part of NIH. "This study shows that non-specialists could help to fill this gap, providing care to more women during this critical period."

Led by Pamela J. Surkan, Ph.D., Sc.D. (link is external), of Johns Hopkins Bloomberg School of Public Health, Baltimore, the study was conducted in the Punjab Province of Pakistan between April 2019 and January 2022. Pregnant women with symptoms of at least mild anxiety were randomly assigned to receive either routine pregnancy care or a cognitive behavioral therapy (CBT)-based intervention called Happy Mother-Healthy Baby. The researchers assessed the participants (380 women in the CBT group and 375 women in the routine care group) for anxiety and depression six weeks after the birth of their child.

The researchers found that 9% of women in the intervention group developed moderate-to-severe anxiety compared with 27% of women in the routine care group. Additionally, 12% percent of women in the intervention group developed depression compared with 41% of women in the routine care group.

"Postpartum depression not only harms mothers, it is also associated with poorer physical growth and delayed cognitive development in their children," said Dr. Surkan. "The link between maternal and child health highlights the critical importance of developing effective ways to address postpartum anxiety and depression."

The Happy Mother-Healthy Baby intervention was created using input from pregnant women in a hospital in Rawalpindi, Pakistan. Pregnant women took part in six intervention sessions where they learned to identify anxious thoughts and behaviors, such as thoughts about possible miscarriage, and to practice replacing them with helpful thoughts and behaviors. The first five sessions were conducted in early to mid-pregnancy, and the sixth session occurred in the

third trimester.

Prior research suggests that up to 30% of women in the Global South, which includes South America, Africa, and most of southern Asia, report experiencing anxiety during pregnancy. Anxiety during pregnancy predicts the development of anxiety and depression after birth, making the prenatal period a prime target for intervention. However, it can be challenging for women living in low-resource settings to access trained clinical care. The findings from this study demonstrate that an intervention such as Happy Mother-Healthy Baby could be an effective way to help prevent the development of postpartum depression and anxiety in settings where specialist clinical care may be hard to access.

"In the future, we can build on these findings through implementation research. Having identified an intervention that works, the next step is to figure out the best ways to deliver effective treatment to the people who need it, bridging the gap between science and practice," said Dr. Surkan.

NT

The Sensitivity and Specificity of Procalcitonin in Diagnosing Bacterial Sepsis in Neonates

NEWS PROVIDED BY

[American Academy of Pediatrics](#)

February 28, 2024

by Rachael Beaumont, BBMED, MD; Kaley Tang, BBMED, MD; Amanda Gwee, MBBS, FRACP, DTMH, PhD

CONTEXT AND OBJECTIVES:

Neonatal sepsis accounts for 15% of all neonatal deaths. Early detection enables prompt administration of antibiotic treatment, reducing morbidity and mortality. This study aims to review the sensitivity and specificity of procalcitonin in diagnosing microbiologically-proven sepsis in neonates to determine the optimal procalcitonin cut-off value for use in clinical practice.

DATA SOURCES, STUDY SELECTION,

AND DATA EXTRACTION:

Medline, EMBASE and PubMed were searched on 3 May 2023 for original studies in symptomatic neonates in whom both blood culture and procalcitonin levels were taken, and a procalcitonin cut-off with either sensitivity or specificity reported. Studies that included asymptomatic or culture-negative neonates in the proven sepsis group were excluded. Risk of bias was assessed using the Qualitative Assessment of Diagnostic Accuracy Studies 2 tool.

RESULTS:

Nineteen original studies enrolling a total of 1920 symptomatic neonates (721 with proven sepsis) were included. Six studies used a procalcitonin cut-off of 0.5 ng/mL and found a sensitivity of 87% to 100% and specificity of 17% to 89%. Nine studies evaluated higher procalcitonin cut-off values between 0.99 ng/mL and 2 ng/mL, which were 67% to 98% sensitive and 41% to 89% specific. All other procalcitonin thresholds were neither sensitive nor specific. Meta-analysis was not performed because of high risk of bias within the identified studies.

CONCLUSIONS:

This review found that procalcitonin was highly sensitive (87% to 100%) at a cut-off value of 0.5 ng/mL, although specificity varied greatly across all cut-off values reviewed. The variation in diagnostic accuracy between studies suggests that procalcitonin may be useful to guide antibiotic cessation but should not be used alone as a diagnostic marker for neonatal sepsis.

NT





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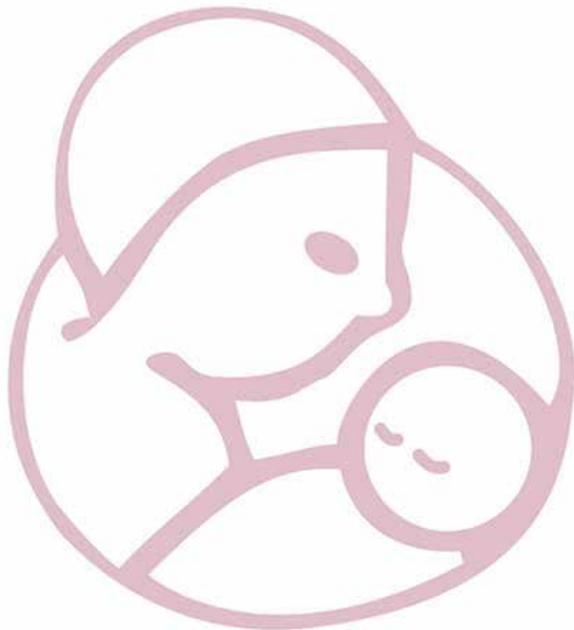
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We want as many children to come to the summit as possible. However, attending the Summit is not always possible for our families who often experience financial hardships. So iCAN pays for lodging, most food, and a transportation stipend in addition 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.



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April 11, 2024

MAIN CONFERENCE

April 12-13, 2024



LOCATION

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Genetics Corner: Resolved Fetal Hydrops in a Newborn with Noonan Syndrome

Robin Dawn Clark, MD, Jennifer Shin, MS

Case Summary

A 37-week 3-day gestation SGA male was admitted to the NICU because of respiratory distress and small size for gestational age. His prenatal course was complicated by transient fetal ascites, polyhydramnios (AFI 27), bilateral hydroceles, and abdominal wall edema, noted for the first time at 29-week 4-day gestation. Other complications were fetal growth restriction (<3rd %ile), echogenic bowel, liver calcifications, and preeclampsia without severe features. The fetal US at 19 weeks had been normal. A fetal echocardiogram was normal.

“A 37-week 3-day gestation SGA male was admitted to the NICU because of respiratory distress and small size for gestational age. His prenatal course was complicated by transient fetal ascites, polyhydramnios (AFI 27), bilateral hydroceles, and abdominal wall edema, noted for the first time at 29-week 4-day gestation. Other complications were fetal growth restriction (<3rd %ile), echogenic bowel, liver calcifications, and preeclampsia without severe features.”

The mother, a 29 yo G₃P₀Ab₂ woman with endometriosis, had conceived this pregnancy spontaneously. Both of her previous pregnancies, which were conceived with IVF, had been unsuccessful—one blighted ovum (twins) and one without a sac. Cell-free DNA screening was negative for common aneuploidies. Maternal blood type was A positive. Her hemoglobin electrophoresis was normal. An amniocentesis was performed at about 30 weeks' gestation. Chromosome microarray was normal. PCR studies were negative in amniotic fluid for Parvovirus B19, CMV, Herpes simplex virus, and Toxoplasma gondii. A gene panel for hydrops fetalis was pending at delivery. Fetal ascites, hydroceles, and polyhydramnios had resolved by the day prior to delivery when the fetal US showed that interval growth was less than expected, estimated fetal weight at the 2nd %ile, amniotic fluid volume was normal, echogenic bowel was slightly improved, and

liver calcifications were present.

Vaginal delivery was induced at 37-week 2-day gestation for fetal growth restriction and preeclampsia. The infant was born in vertex presentation with a tight nuchal cord x2. He was blue, without respiratory effort, with poor tone. He had a weak cry at 1 minute of life. He was resuscitated with positive pressure ventilation for 5 minutes, transitioning to bubble CPAP at 6 minutes of life. Apgar scores were 2¹, 6⁵, and 8¹⁰. Capillary blood gas at 45 minutes: 7.091/64.8/56.7/19.7/–11.8. Lactate 6.1. He did not meet the criteria for therapeutic hypothermia. His highest Sarnat score within 6 hours of life was stage 1, with an improved neurological exam by 2 hours of life. BW 2190 g (0.35th %ile), BL 46 cm (<2nd %ile), HC 29.5 cm (<0.01st %ile).

An echocardiogram showed a small PFO (patent foramen ovale). Head US was normal. US of the abdomen showed left renal calyceal dilations.

A genetics consultation was requested on the second day of life when the prenatally acquired fetal hydrops gene panel revealed a pathogenic heterozygous variant in *PTPN11*: c.794G>A, consistent with Noonan syndrome.

“A genetics consultation was requested on the second day of life when the prenatally acquired fetal hydrops gene panel revealed a pathogenic heterozygous variant in PTPN11: c.794G>A, consistent with Noonan syndrome.”

The physical exam showed a small for gestational age newborn male with mildly dysmorphic facial features: hypertelorism, prominent globes, downslanting palpebral fissures, infraorbital creases, and widely spaced, low-set nipples. There was no nuchal webbing, low posterior hairline, or edema.

We informed the parents of the diagnosis and tested them for the variant, which was then identified in the mother. She had not been previously diagnosed with Noonan syndrome. She had a short stature at 4'11". She described having learning problems in school that required extra resources and an individual educational plan. As an adult, she had endometriosis and an ovarian cyst but no known cardiac or other health concerns.

The baby was quickly weaned to ambient air. He had an evaluation for sepsis with negative cultures. Rubella IgG was positive, likely

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from maternal transmission. He achieved full enteral feedings on the second day. At discharge, he was taking breast or bottle on demand with adequate weight gain. He was discharged on the fourth day of life with outpatient follow-up in the Cardiology clinic.

“The physical exam showed a small for gestational age newborn male with mildly dysmorphic facial features: hypertelorism, prominent globes, downslanting palpebral fissures, infraorbital creases, and widely spaced, low-set nipples. There was no nuchal webbing, low posterior hairline, or edema.”

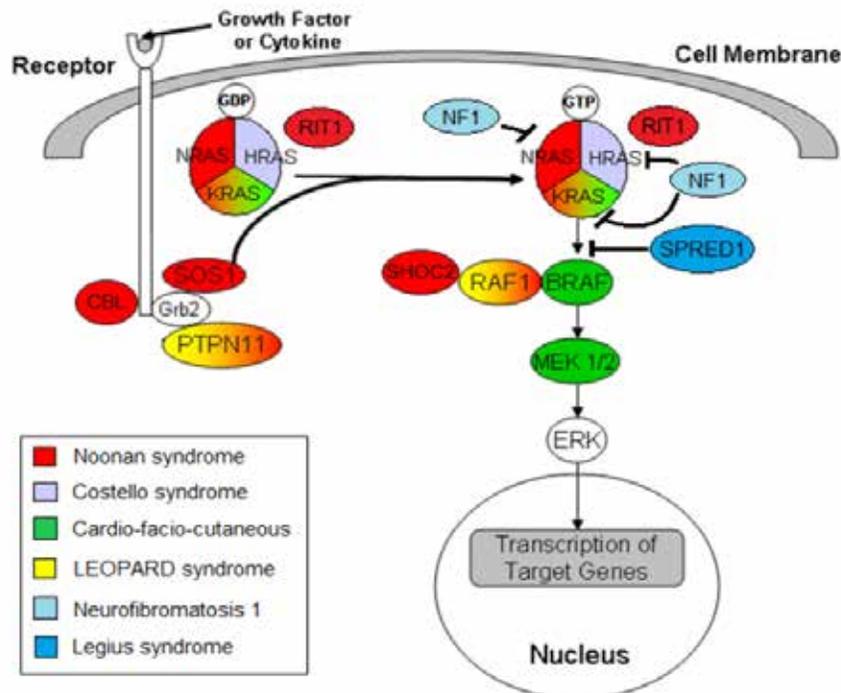
Discussion

Noonan syndrome (NS) is typically an autosomal dominant multisystem disorder with a prevalence of 1/1000 to 1/2500 live births (1). NS is one of six disorders known as RASopathies, caused by gain-of-function variants that activate the RAS-MAP-kinase pathway (2). Heterozygous variants in *PTPN11* are responsible for about half of Noonan syndrome, with the rest caused by other genes in the MAP-Kinase pathway (Figure 1).

“Noonan syndrome (NS) is typically an autosomal dominant multisystem disorder with a prevalence of 1/1000 to 1/2500 live births. NS is one of six disorders known as RASopathies, caused by gain-of-function variants that activate the RAS-MAP-kinase pathway.”

This infant with Noonan syndrome had a severe prenatal phenotype with poor fetal growth and significant, if transient, fetal hydrops. I found it difficult to reconcile my (erroneous) expectation for a poor postnatal outcome based on his prenatal ascites, polyhydramnios, and pleural effusions with the mild appearance of this infant and his affected mother. I wondered, had his mother decided against the amniocentesis, whether the two of them would have been diagnosed with Noonan syndrome postnatally? I had to conclude that probably not. Even though his difficult transition at birth brought him to the NICU, by the second day of life, he was doing well, and he and his mother had mild features of Noonan syndrome. This case offers several lessons. First, Noonan syndrome has a wide range of phenotypes, and many, if not most, mildly affected individuals are probably undiagnosed. Second, the prenatal phenotype of Noonan syndrome does not correlate with the postnatal phenotype.

Figure 1: This diagram (2) of the RAS-MAP kinase pathway illustrates the primary genes responsible for the group of disorders known as RAS-opathies: Noonan syndrome, Costello syndrome, Cardio-facio-cutaneous syndrome, LEOPARD syndrome, Neurofibromatosis 1 and Legius syndrome. Noonan syndrome can be caused by activating variants in several genes in the pathway, of which *PTPN11* is the most common. Note that variants in some genes have been associated with more than one disease phenotype.



Generally, the cardinal signs of syndrome identification rely heavily on a phenotype's more typical and/or more severe aspects. This means that the milder phenotypes associated with a syndrome receive less attention and are underappreciated. It should not be surprising that patients with fewer features of a disorder are less often recognized. It may not be evident that it can be more challenging to diagnose a mildly affected child than a severely affected one.

“Generally, the cardinal signs of syndrome identification rely heavily on a phenotype’s more typical and/or more severe aspects. This means that the milder phenotypes associated with a syndrome receive less attention and are underappreciated.”

Many of the classic features of Noonan syndrome are nonspecific: short stature, hypertelorism, down down-slanting palpebral fissures (Figure 2) (3). Even the more specific features: broad or webbed neck, low set, widely spaced nipples, and pectus carinatum can be seen in other syndromes and are not reliably present in Noonan syndrome. Lymphatic abnormalities, such as chylothorax and protein-losing enteropathy, develop in about 20% of patients with Noonan syndrome after birth. Coagulation defects and speech/language impairment are more common than the general population. About a quarter of individuals have mild intellectual disability (4).

“Many of the classic features of Noonan syndrome are nonspecific: short stature, hypertelorism, down down-slanting palpebral fissures (Figure 2). Even the more specific features: broad or webbed neck, low set, widely spaced nipples, and pectus carinatum can be seen in other syndromes and are not reliably present in Noonan syndrome. Lymphatic abnormalities, such as chylothorax and protein-losing enteropathy, develop in about 20% of patients with Noonan syndrome after birth. Coagulation defects and speech/language impairment are more common than the general population. About a quarter of individuals have mild intellectual disability.”

Figure 2: We could not include a photograph of our patient for this report. However, this image, which appears in an NIH patient recruitment notice for a RASopathy study (3), demonstrates some of the typical facial features of Noonan syndrome: hypertelorism and down-slanting palpebral fissures.



However, children with Noonan syndrome are rarely diagnosed based on their stature, learning disabilities, or dysmorphic features alone. Most patients with Noonan syndrome, 50–84% (4), come to medical attention because of a congenital heart defect. The characteristic cardiac lesion of NS, pulmonary valve stenosis, is present in 20–50%. Hypertrophic cardiomegaly, which occurs in 20–30%, is not always present at birth but can develop in infancy or childhood, so continued cardiac surveillance is necessary even when the initial echocardiogram is normal. Other structural heart defects: ASD, VSD, tetralogy of Fallot, and branch pulmonary artery stenosis can also occur. The math shows that 20–50% of individuals with Noonan syndrome have normal cardiac anatomy. Whether our patient's PFO is considered an ASD or not is a moot point because it was not appreciated as a sign or a possible sign of a multisystem syndrome. A PFO is so commonly encountered in newborns that it does not raise concern for an underlying diagnosis.

“However, children with Noonan syndrome are rarely diagnosed based on their stature, learning disabilities, or dysmorphic features alone. Most patients with Noonan syndrome, 50–84%, come to medical attention because of a congenital heart defect. The characteristic cardiac lesion of NS, pulmonary valve stenosis, is present in 20–50%. Hypertrophic cardiomegaly... is not always present at birth but can develop in infancy or childhood, so continued cardiac surveillance is necessary even when the initial echocardiogram is normal.

Patients with Noonan syndrome have an affected parent 30–75% of the time. Those affected parents with NS are more likely to have a mild phenotype, normal cardiac anatomy, and be undiagnosed, as was the case with our patient's mother.

“Patients with Noonan syndrome have an affected parent 30–75% of the time. Those affected parents with NS are more likely to have a mild phenotype, normal cardiac anatomy, and be undiagnosed, as was the case with our patient's mother.”

About 21–50% of patients with RASopathy have a prenatal phenotype (5,6). Studies have demonstrated that prenatal ultrasound features of lymphatic dysplasia do not predict an unfavorable postnatal prognosis for Noonan syndrome. The prenatal phenotype of Noonan syndrome includes cardiac and renal anomalies. However, NS can also cause a wide variety of lymphatic abnormalities, from enlarged nuchal translucency (NT), dilated jugular lymph sacs (JLS), cystic hygroma, pleural effusion, and ascites to fetal hydrops, which may resolve.

“About 21–50% of patients with RASopathy have a prenatal phenotype. Studies have demonstrated that prenatal ultrasound features of lymphatic dysplasia do not predict an unfavorable postnatal prognosis for Noonan syndrome. The prenatal phenotype of Noonan syndrome includes cardiac and renal anomalies. However, NS can also cause a wide variety of lymphatic abnormalities, from enlarged nuchal translucency (NT), dilated jugular lymph sacs (JLS), cystic hygroma, pleural effusion, and ascites to fetal hydrops, which may resolve.”

Stuurman et al. (7) reviewed the Dutch experience with gene testing in fetal lymphatic anomalies over six years (2011–2016). They identified a variant (likely pathogenic or pathogenic) in one of 14 RASopathy genes in 40/424 fetuses who had one or more of the following: increased NT/cystic hygroma (defined as NT ≥ 3.5 mm), distended JLS, pleural effusion, ascites, polyhydramnios, cardiac defects and/or renal anomalies and a normal chromosomal microarray result. The variant was in

PTPN11 in the majority of cases (27/40). Based on the postnatal phenotype, cardiac anomalies in this group of affected fetuses were less frequent than expected. The authors found that only 40% (16/40) of affected fetuses with RASopathy had a prenatally documented cardiac defect. They explained that “pulmonic valve stenosis and hypertrophic cardiomyopathy, the common cardiac defects described in Noonan syndrome, are difficult to visualise [sic] on fetal ultrasound,” which is a valid explanation for prenatal under-ascertainment. Although a RASopathy cannot be excluded when there is only one anomaly in the fetal US, especially when NT is markedly enlarged (5.5–13.0 mm), the authors found that most mutation-positive fetuses (23/40 fetuses, 57.5%) had more than one abnormality on the US.

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The final lesson that may be taken away from this case is that fetal hydrops that resolves before birth do not rule out a RASopathy. It supports the conclusion that the milder the phenotype, the more challenging the diagnosis.

Practical Applications

1. Recognize that in 21–50% of cases, NS presents prenatally with persistent or transient lymphatic disturbances: increased nuchal translucency, distended jugular lymph sacs, cystic hygroma, pleural effusion, ascites or hydrops fetalis.
 - a. Understand that cardiac anomalies may be under-ascertained prenatally in NS because the characteristic cardiac lesions, pulmonic valve stenosis and hypertrophic cardiomyopathy, are challenging to visualize with fetal ultrasound.
2. Remember that in Noonan syndrome (NS), a severe

prenatal phenotype of lymphatic dysplasia does not predict a poor prognosis after birth.

3. Not all infants with NS have a cardiac defect at birth.
 - a. 50–84% have cardiac anomalies: pulmonic stenosis, hypertrophic cardiomyopathy (which may develop after birth), ASD, VSD, and others.
 - b. 20–50% have no cardiac anomalies at birth.
4. Identify extracardiac features of NS that may be apparent at birth: hypertelorism, downslanting palpebral fissures; low posterior hairline; broad or webbed neck; low-set, widely spaced nipples.
5. Recall that parents of an infant with NS may be affected by NS.
 - a. In at least 1/3 of families, NS is inherited from an affected parent who may not be aware of their diagnosis.
 - b. When NS is diagnosed in an infant, test both parents for the pathogenic variant.

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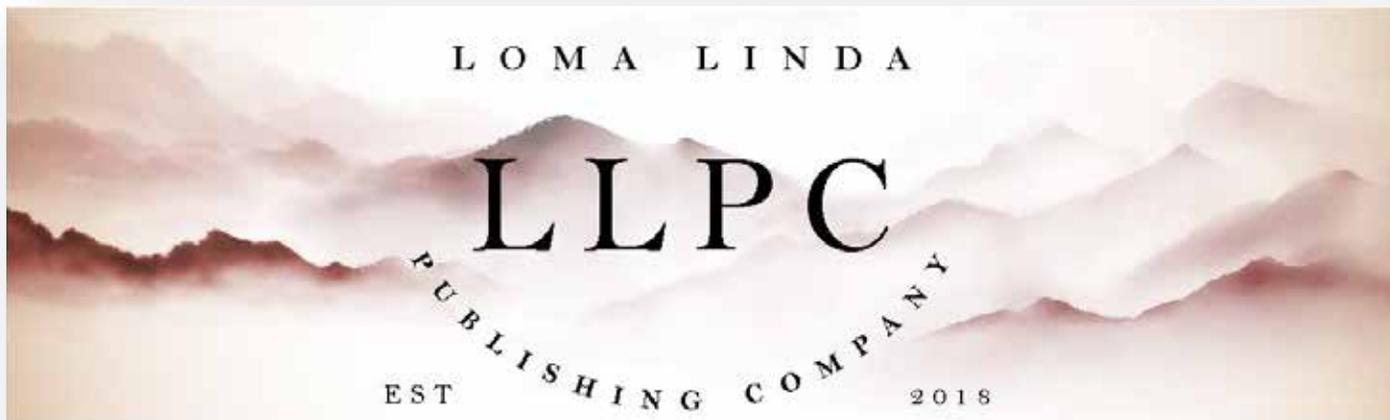
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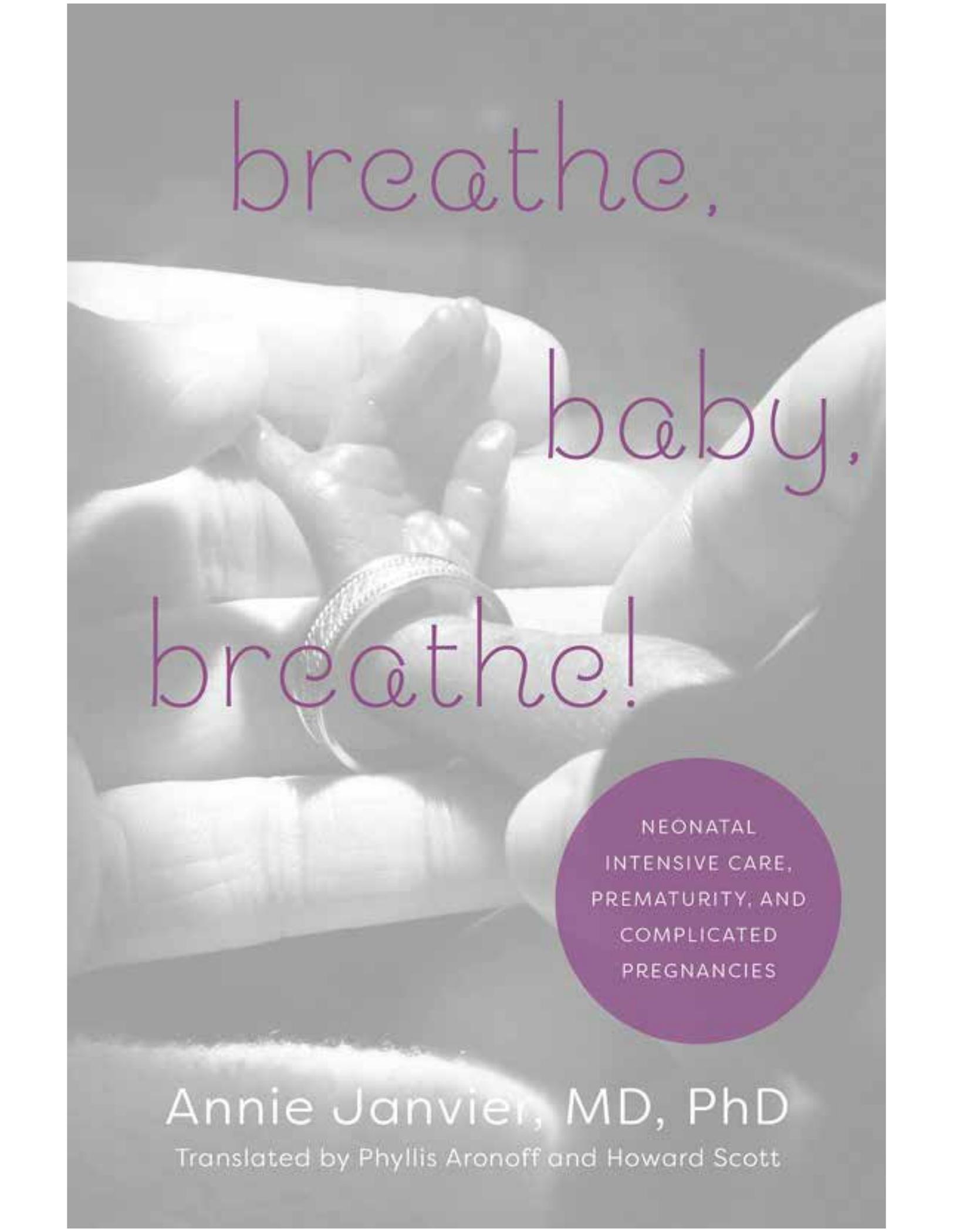
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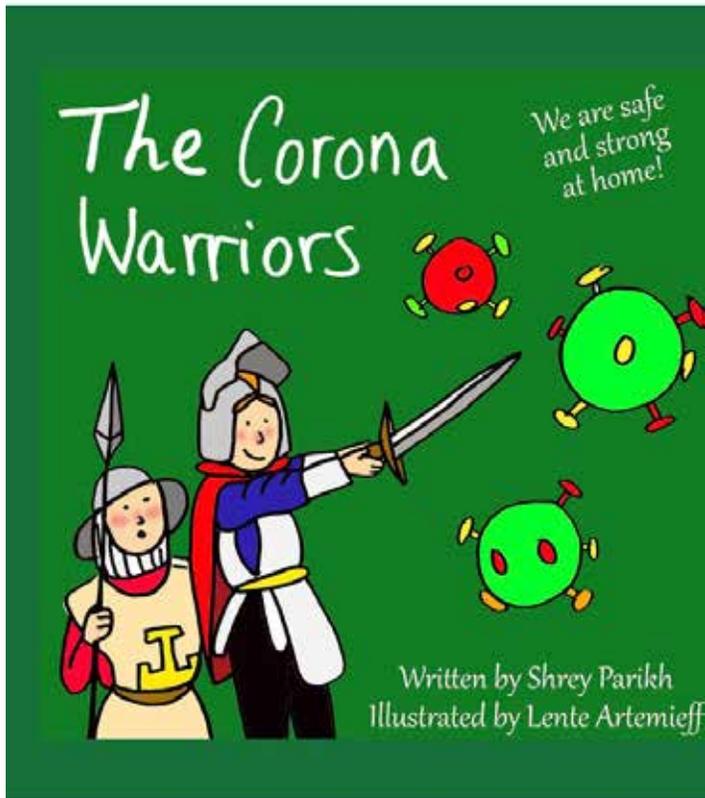
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Medical Coding: Creating A Game Plan: A Team Sport

Scott D. Duncan, MD, MHA

“The Kanas City Chiefs won the Super Bowl on February 11 over the San Francisco 49ers by a score of 25-22 in a thrilling overtime game. The majority of the time, each team huddled before the execution of the next play. You can imagine that both teams came prepared with a game plan, likely prepared by a number of the coaches, who conferenced before arriving in Las Vegas. So, it is with healthcare and optimal management of complex patients.”

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In neonatology, we have expanded the concept of huddles. We now have daily morning huddles, evening huddles, safety huddles, labor and delivery huddles, respiratory huddles, and environmental huddles, to name a few. Underlying all these daily huddles is the delivery of optimal care to the patient and their family, where the team caring for the patient has developed an overall care plan.

“In order to establish the care plan for the complex patient, multiple providers from different service lines may meet to discuss the approach to the patient. Further, these providers may also engage the patient and family to discuss the care plan and goals for care.”

In order to establish the care plan for the complex patient, multiple providers from different service lines may meet to discuss the approach to the patient. Further, these providers may also engage the patient and family to discuss the care plan and goals for care.

Q: An infant who suffered from NEC and now has short gut syndrome is being cared for in a surgical ICU, where the Pediatric Surgeons are the care providers. Neonatology has been consulted in the past to help formulate the plan for cyclic TPN. Neonatology last saw the patient approximately 14 days ago. The surgeons

would like to have a care conference with the treatment team, including the surgeon, neonatologist, gastroenterologist, home health infusion nurses, occupational therapist, and speech therapy. The conference is to formulate a plan of care in preparation for discharge. The family will meet with the care team the following week. The conference lasts 70 minutes. The proper code for the neonatologist would be:

- A. 99233 – Subsequent hospital inpatient care, 50 minutes met or exceeded
- B. 99366 – Medical team conference with an interdisciplinary team of health professionals, face to face with the patient/family, non-physician qualified healthcare professional, 30 minutes or more
- C. 99367 - Medical team conference with an interdisciplinary team of health professionals, patient/family not present, participation by a physician, 30 minutes or more
- D. 99368 - Medical team conference with an interdisciplinary team of health professionals, patient/family not present, participation by a non-physician healthcare professional, 30 minutes or more



Correct Answer: C – 99367 - Medical team conference with an interdisciplinary team of health professionals, patient/family not present, participation by a physician, 30 minutes or more

“Most conversations with families occur during or after rounds, via phone, or at the bedside. Those conversations are bundled within the daily global critical care, intensive care, and E/M services.”

Q: Following the medical team conference the previous week, the surgeons arrange a care conference with the surgeon, neonatologist, gastroenterologist, home health, including infusion nurses, occupational therapy, speech therapist, and the family. The conference will relay the care plan to the family in preparation for discharge. The conference lasts 60 minutes. No other E/M services were provided by neonatology on the day of the conference. The proper code for the neonatologist would be:

- A. 99233 – Subsequent hospital inpatient care, 50 minutes met or exceeded
- B. 99366 – Medical team conference with an interdisciplinary team of health professionals, face to face with the patient/family, non-physician qualified healthcare professional, 30 minutes or more
- C. 99367 - Medical team conference with an interdisciplinary team of health professionals, patient/family not present, participation by a physician, 30 minutes or more
- D. 99368 - Medical team conference with an interdisciplinary team of health professionals, patient/family not present, participation by a non-physician healthcare professional, 30 minutes or more



Correct Answer: A - 99233 – Subsequent hospital inpatient care, 50 minutes met or exceeded

Most conversations with families occur during or after rounds, via phone, or at the bedside. Those conversations are bundled within the daily global critical care, intensive care, and E/M services. The encounter is billable only when medical team conferences occur when providing consultative services.

Medical team conferences require a minimum of three qualified healthcare providers (QHP) from different specialties who provide direct care to the patient. These QHPs, like the coaching staff, are tasked with creating and implementing the care plan. In order to code for these services, the QHP must have provided direct services within the last 60 days.

These codes require a minimum of 30 minutes of conference time, exclusive to record-keeping or generation of records, and limit-

ed to the time the QHP communicates to other healthcare team members. Documentation should include the provider's contribution to the conference, treatment recommendation, and time. These codes do not apply when the conference is a scheduled facility or organizational service, such as weekly discharge planning rounds.

The second continuing scenario presents a medical team conference with a face-to-face encounter with the family. Given that the consulting neonatologist provided no other E/M services on the encounter date, they could bill for an E/M service based on time. As a previous consultation was performed, the neonatologist should code for subsequent hospital inpatient care.

“Despite a declining national birth rate, neonatology discharges continue to rise, and the complexity of our patients continues to grow. Not all payors may recognize medical team consultation codes, and the physician codes do not place a high RVU value on this service. Yet, creating and executing a comprehensive care plan is essential to the health of our NICU graduates.”

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Disclosures: Dr. Scott Duncan is a Fellow of the American Academy of Pediatrics and a member of the Coding Committee of the Section on Neonatal-Perinatal Medicine.

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- January '24 Webinar Review
- Quarterly Recommendations
- February '24 Poll
- Phase 3 QI Work Completion
- Small Group Office Hours
- FCC Taskforce Information



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"Usually our Social Workers, Child Life Specialist, nurses, and even providers will give names."

"Fliers are given at discharge and parents can register virtually through a link from hospital website"

"Our Family Support Specialists are in touch with many NICU families even after their babies graduate from our NICU, and that connection was very important for us to recruit families to the Council."

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WEBINAR REVIEW

“Evolution of a Family-Centered Care Program in a Safety Net NICU” with Priya Jegatheesan, MD and Sangeeta Mallik, PhD

Priya and Sangeeta of Santa Clara Valley Medical Center NICU in California shared their 15-year journey of implementing an impressive FCC Program that currently includes three Family Support Specialists, a Family Education Specialist, and an FCC Director. Their work began in 2009 when their center became one of the first of 10 to partner with March of Dimes to introduce FCC by providing parent education materials and a kiosk with staff education. Since then, Priya and Sangeeta have committed to promoting culture change that incorporates FCC in every aspect of NICU care, including the addition of bilingual peer support in 2012, and Substance Use Disorder peer support in 2019. Read more about their incredible work in the January 2024 FCC Column of Neonatology Today at no cost [here](#).

“What it takes to implement Social Determinants of Health (SDOH) screening and referral in the NICU” with Erika (Gaby) Cordova Ramos, MD

Gaby, a neonatologist at Boston Medical Center (BMC), has gone above and beyond to implement SDOH screening in her NICU and vets all resources and organizations families are referred to. In her talk, Gaby presented the steps her NICU went through to implement a SDOH screening and referral process. She reviewed the importance of screening for SDOH in the NICU, as studies have shown that adverse SDOH are common among families of preterm children and these hardships are often associated with worse outcomes. It's important for NICUs to be aware of families who are struggling and offer resources so that parents can be more present in the NICU.

Gaby's first step was choosing an appropriate SDOH screening tool and picking domains most relevant to NICU families and mandated by government agencies. The BMC NICU received input from parents focus groups before adopting their tool. The primary bedside nurses then used the tool to screen caregivers after their infants were in the NICU for at least one week. Over time, the unit created a detailed resource guide to offer families who screened positive for adverse SDOH. They had increased success with SDOH screening and helping families with use of SDOH champions, an SDOH navigator, and building partnerships with community organizations. Overall, this talk presented a truly excellent practical and doable blueprint for rolling out a SDOH screening and referral program in any NICU.

QUARTERLY RECOMMENDATIONS

Are you ready to implement a Social Determinants of Health (SDOH) screening in your unit?
The tips below will help get you started!

1. Decide **WHO**, **WHERE**, and **WHEN**. Then be sure to **TRACK** your screenings - you can't improve if you don't measure!
 - a. **WHO** will administer the screening tool?
 - b. **WHERE** will the screening be done?
 - c. **WHEN** during the visit will the screening be administered?
 - d. **TRACK** your screenings and measure the data using SDOH screening tools that suit your unit's needs.

Take a look at Boston Medical Center's Thrive Tool adapted for NICU use [here](#).

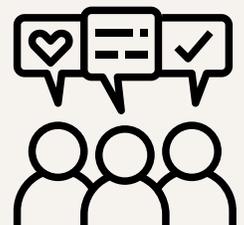
2. Explore existing local resources to address social needs. Build partnerships and **be sure to audit/get feedback** from families who are referred. Below are some great jumping off points:
 - a. Community resource aggregators
 - [Find Help](#)
 - [AAFP Neighborhood Navigator](#)
 - b. Local public health departments
 - c. Hospital social workers/family navigators
 - d. Community action agencies
 - [Community Action Partnership](#)
 - e. Non-profit and faith-based organizations (e.g., Catholic Charities)
 - f. 2-1-1 help line (availability varies by state)
 - g. [Benefits.gov](#)
3. Check out [this free resource](#) from the Vermont Oxford Network on Health Equity and SDOH.
4. Participate in the [28-day anti-racism challenge](#) through the Institute for Perinatal Quality Improvement.

Organizations who endorse SDOH screening:

National Academy of Medicine
American Academy of Pediatrics
Centers for Medicaid and Medicare Services
Joint Commission

FEBRUARY 2024 POLL

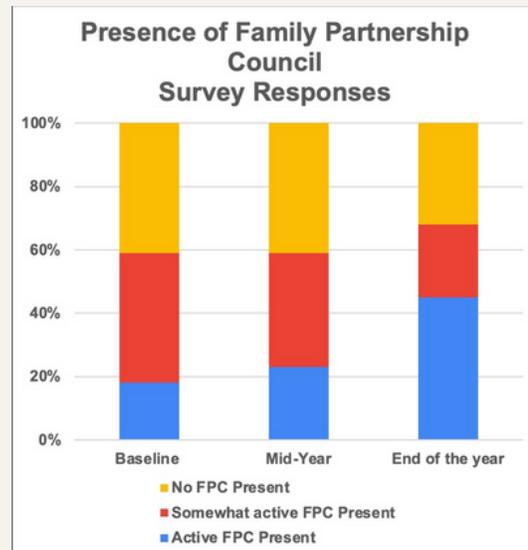
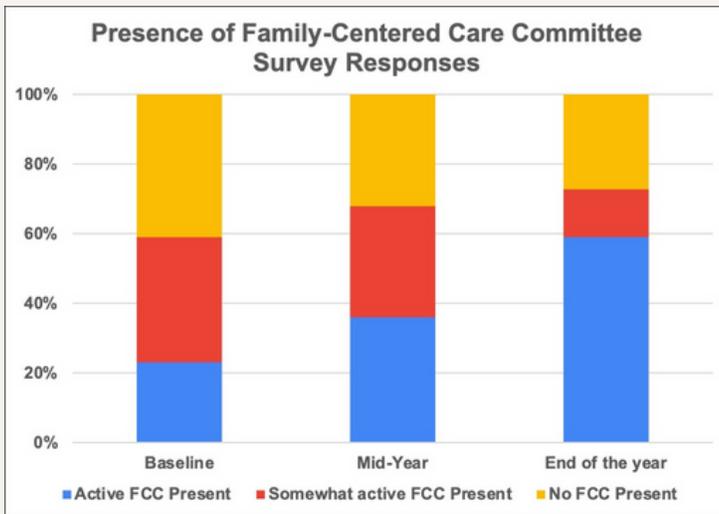
We want to hear from you, **especially those who serve as Family Partners**, as we address the following question for our [February Poll](#): Typically centers ask NICU parents to wait 1-1.5 years after discharge to join the Family Advisory Council. Considering this, **how long should a family who had a neonatal loss journey wait when they are eager to join?** Click this [link](#) to share your thoughts!



To view all past polls and responses, click [here](#).

PHASE 3 QI WORK COMPLETION

We are thrilled to share that among 22 global centers in just one year, **we exceeded our Phase 3 QI Work goals by increasing the percentage of NICUs with a very active NICU-specific FCC Committee from 23% to 59%, and the percentage of NICUs with an active Family Advisory/Partnership Council from 18% to 46%**, as outlined by the blue portion of the graphs below. We will be sharing these results at Gravens Conference next month. Please come say hi if you plan to attend! Thank you for your tireless efforts in implementing FCC practices in your local centers. We are incredibly proud of this Taskforce and look forward to Phase 4 QI Work, which will include global benchmarking of FCC measures and Phase 4.1, Small Group Office Hours.



Phase 3 QI Work was completed in December of 2023. Our goal was to increase the percentage of NICUs with a very active (defined as meeting at least quarterly) NICU-specific FCC Committee by 10% and to increase the percentage of NICUs with an active (defined as meeting at least 1-2 times/year) Family Advisory/Partnership Council by 10% from January through Dember of 2023.

SMALL GROUP OFFICE HOURS

To support our Small Groups, the FCC Taskforce holds monthly Office Hours to discuss challenges around implementing FCC practices and provide strategies for overcoming them. Office Hours are facilitated by healthcare professionals and Family Partners and include a variety of topics. If interested, please use the QR code below to register and receive calendar and Zoom invites!



Join us for Office Hours **Tuesday, 2/27 at 9am PT** to discuss discharge readiness and transitions home with Malathi Balasundaram, MD and Alex Zavala of The NICU Dad.



THANK YOU FOR READING!

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Want to strengthen FCC in your NICU? Click this [link](#) or scan the QR code to join the FCC Taskforce for **access to free webinars & resources.**

Mission Statement

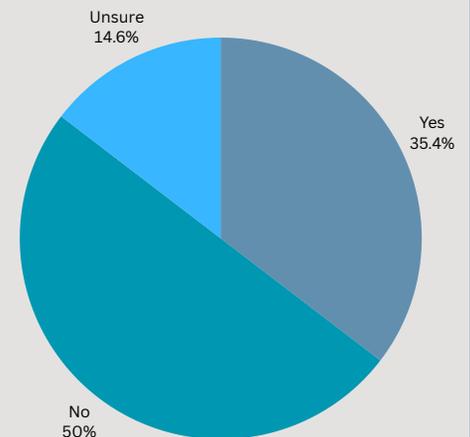
We exist to equip and support NICUs as they seek to begin or strengthen Family-Centered Care in their units.

Why We Exist

65% of 48 responders said they don't have FCC committee in their unit.

To address the challenges that exist in implementing FCC practices, we offer free educational webinars with engaging, live Q&A sessions and use a small-group QI collaborative model. **Our key strength is equal partnership between health care professionals and family partners.**

Does your institution currently have an FCC Committee?



Organizational Partners



Free Resources: www.fcctaskforce.org

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Subscribe to Our YouTube Channel: [FCC Taskforce](https://www.youtube.com/channel/UC...)

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FAMILY-CENTERED CARE
TASKFORCE

Corresponding Author



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FCC Committee Chair
El Camino Hospital
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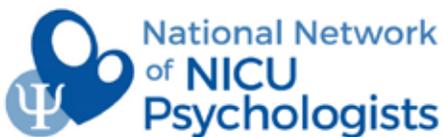
MISSION:

Optimizing care for all NICU infants and their families through

- direct family involvement
- staff support
- research
- education

VISION:

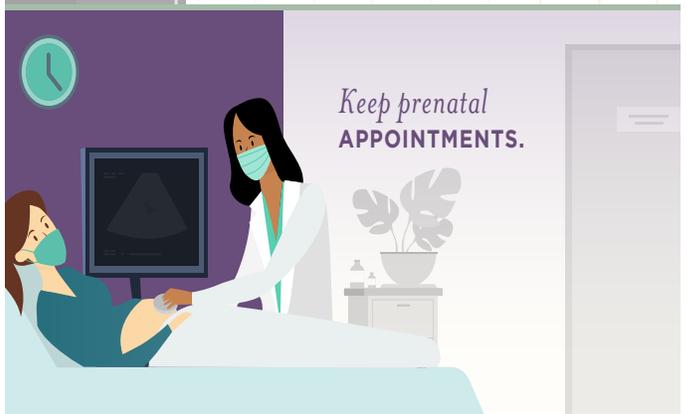
To be the leading voice and resource for mental health services in the NICU.



nationalperinatal.org/psychologists

nationalperinatal.org/membership

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



NCfIH National Coalition for Infant Health
Protecting babies from premature infants through life time



VACCINES

Teach the body to create antibodies that fight off a specific disease.

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.

Many vaccines are readily and easily available.
The technology behind vaccines has been around for decades.

Polio
Measles
COVID-19
And more

Yes



PREVENTIVE MONOCLONAL ANTIBODIES

Introduce antibodies that are ready to ward off disease in the body.

Instead of teaching the body to create antibodies and defenses, they provide antibodies that are readily available.

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.

RSV
COVID-19

Yes



How does it work?

Both support the immune system's defenses.



What are the benefits?

Both protect against disease and provide a public health benefit by decreasing the burden of disease.



What can this immunization protect against?

Both can provide tailored protection from a variety of diseases.



Is it safe?

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

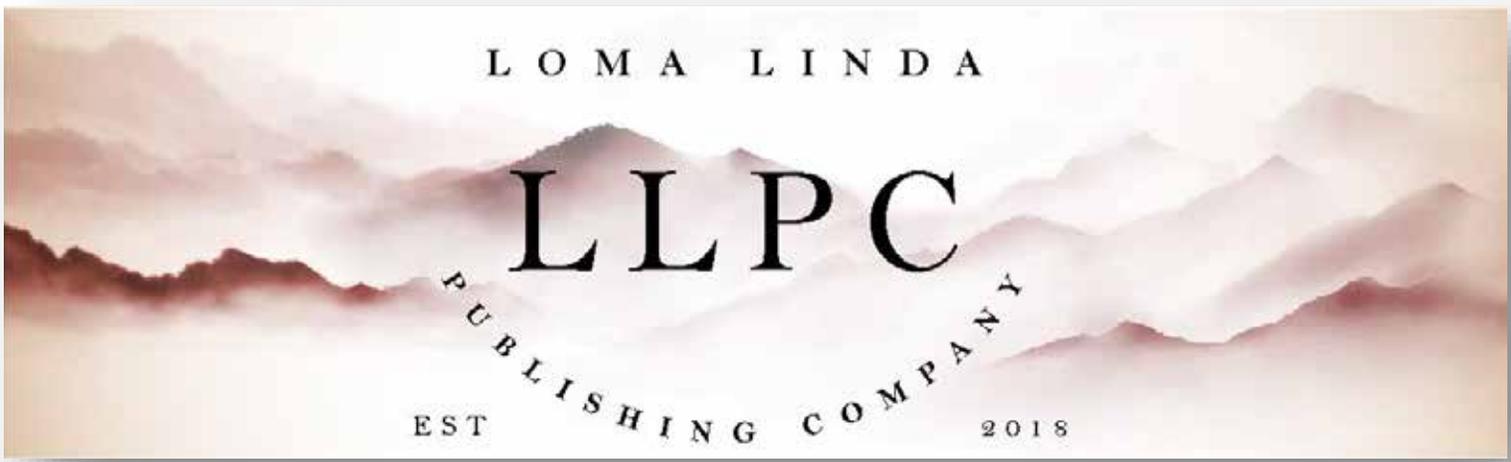
Vaccines and preventive monoclonal antibodies are two different types of immunization. While they function differently, they both serve the same purpose: protecting people from serious illnesses and diseases.

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.

https://static1.squarespace.com/static/5523ef7e4b01e011e688e6/v/62445af0134140ff954206/1648646910465/NCIH_Monoclonal+Antibodies+Inclusion+in+the+VFC+Program_Positon+Paper_Mar+2022.pdf



The Signs & Symptoms of RSV

RESPIRATORY SYNCYTIAL VIRUS

Know the Signs & Symptoms of RSV



Cough



Runny Nose



Struggling to Breathe
(breastbone sinks inward when breathing)



Difficulty Eating



Lethargy



Wheezing

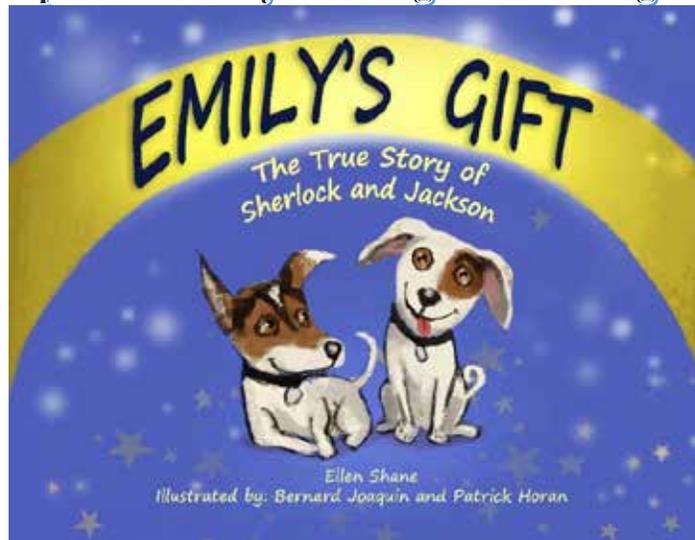
RESPIRATORY SYNCYTIAL VIRUS

is a highly contagious seasonal virus that can lead to hospitalization for some babies and young children.

Know the Signs.



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The Premie Parent's SURVIVAL GUIDE to the NICU

By

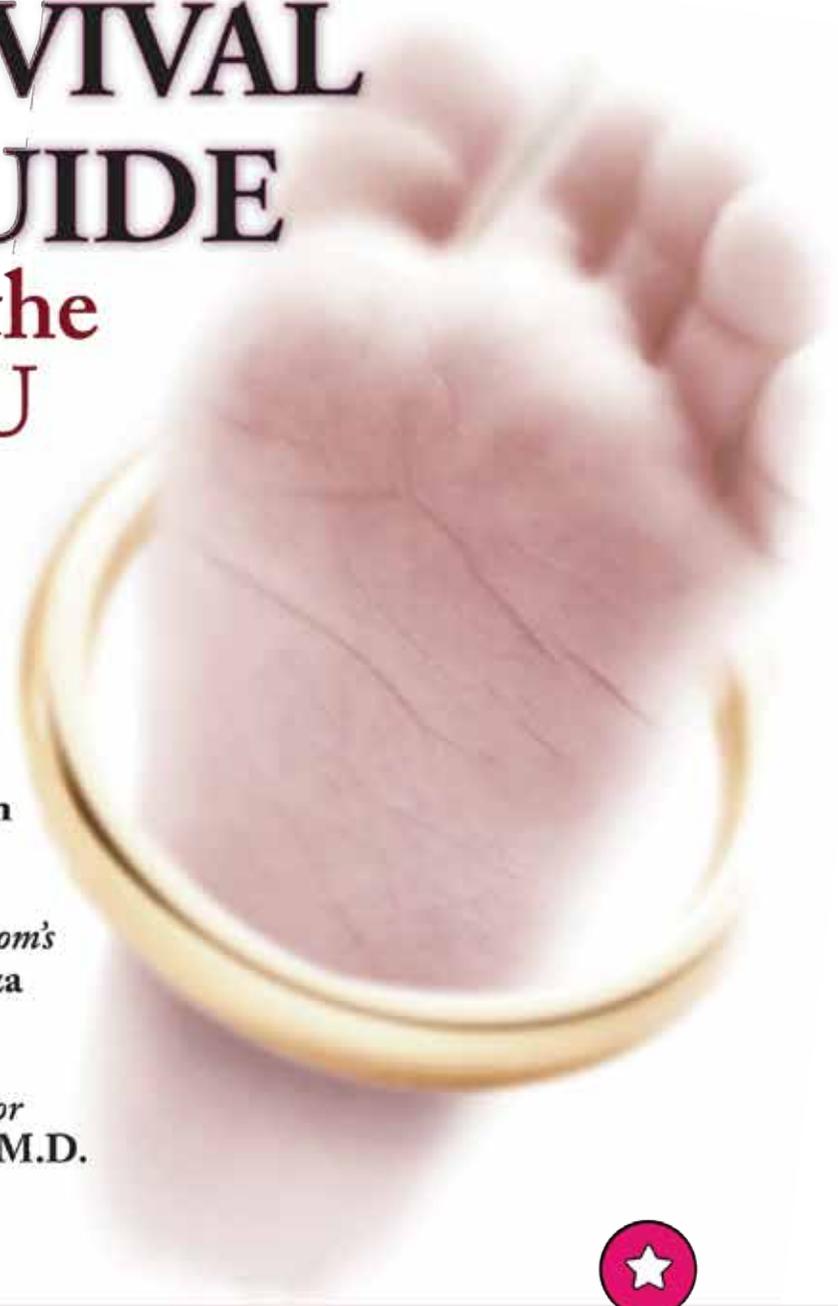
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Nicole Conn

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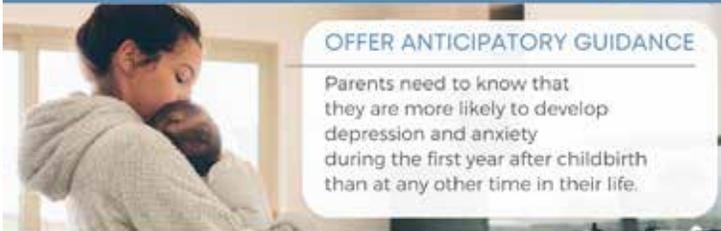
Let's work together to improve support for families.

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NICU Psychologists



NICU MENTAL HEALTH



Let's work together to improve support for NICU families.

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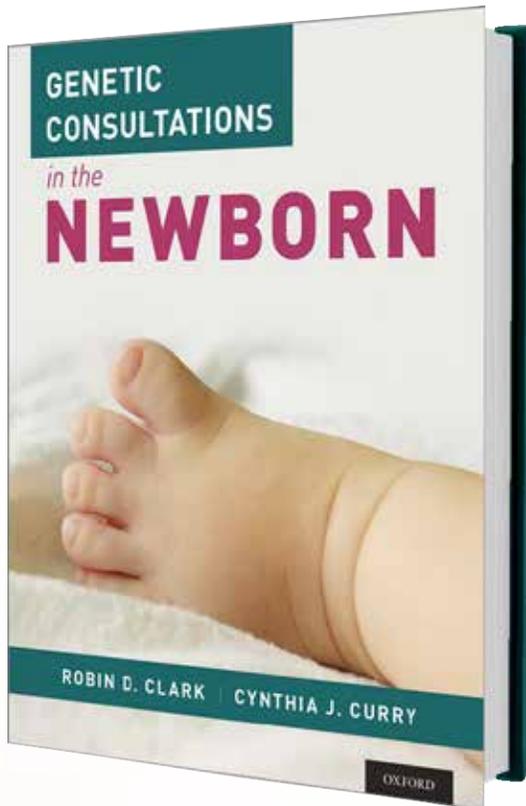


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Clinical Pearl: Does Zinc Supplementation Improve Growth and Neurodevelopmental Outcomes in Preterm Infants?

Joseph R. Hageman, MD, Kshama Shah, MD, Walid Hussain, MD, Mitchell Goldstein, MD, MBA, CML

“The baby was on full enteral feeds and developed hair loss and diarrhea, which bothered the medical team as much as it did him. Luckily, my attending considered zinc deficiency. With supplementation, there was a significant clinical improvement, including resolution of both diarrhea and hair growth.”

I first encountered zinc deficiency in a preterm infant in 1978 during my neonatal intensive care unit rotation at Prentice Women's Hospital. The baby was on full enteral feeds and developed hair loss and diarrhea, which bothered the medical team as much as it did him. Luckily, my attending considered zinc deficiency. With supplementation, there was a significant clinical improvement, including resolution of both diarrhea and hair growth.

“Preterm infants only absorb 20-35% of enteral zinc supplements (1,2). Zinc plays a distinctive role in growth via gene transcription, macronutrient metabolism, and hormonal activity (1). As with many nutrients, fetal zinc accretion occurs for the most part after 24 weeks gestation (1). Zinc is also vital in protein synthesis (1).”

I recently read an excellent meta-analysis article about the “effect of enteral zinc supplementation on growth and neurodevelopment of preterm infants: a systematic review and meta-analysis” by Alshaiikh and colleagues (1). The authors noted that preterm infants have low body stores and increased GI and renal zinc losses. The high demand for zinc exacerbates the deficiency due to high

growth velocity (1). Preterm infants only absorb 20-35% of enteral zinc supplements (1,2). Zinc plays a distinctive role in growth via gene transcription, macronutrient metabolism, and hormonal activity (1). As with many nutrients, fetal zinc accretion occurs for the most part after 24 weeks gestation (1). Zinc is also vital in protein synthesis (1).

In the eight randomized-controlled trials in the systematic review, which included 742 infants, seven studies reported anthropomorphic studies at 3-6 months of corrected age (1). Two studies reported neurodevelopmental outcomes at 6-12 months corrected age (1). The level of certainty for improved length and weight is moderate, whereas for improved head circumference and neurodevelopmental outcome, it was determined to be very low certainty (1).

“A common phrase we hear on rounds is “Feed the baby!” but research in our field should serve as the compass guiding not only what we feed preterm infants but also how much, ensuring that their nutritional needs are met optimally. This entails a comprehensive understanding of the nuanced interplay between various nutrients and their roles in supporting the fragile growth and development of these vulnerable infants.”

It will be essential to continue examining infant outcomes as zinc supplementation becomes more common in the neonatal intensive care unit. A common phrase we hear on rounds is “Feed the baby!” but research in our field should serve as the compass guiding not only what we feed preterm infants but also how much, ensuring that their nutritional needs are met optimally. This entails a comprehensive understanding of the nuanced interplay between various nutrients and their roles in supporting the fragile growth and development of these vulnerable infants.

References:

1. Alshaiikh B, Zeed MA, Yusuf K et al. Effect of enteral zinc supplementation on growth and neurodevelopment of pre-

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term infants: a systematic review and meta-analysis. *J Perinatol* 2022;42:430-439. [HTTPS://doi.org/10.1038/s41372-021-01094-7](https://doi.org/10.1038/s41372-021-01094-7).

- Wastney ME, Angelus PA, Barnes RM, et al. Zinc absorption, distribution, excretion, and retention by healthy preterm infants. *Ped REs* 1999;45:191-196.

Disclosures: The authors have no disclosures

NT

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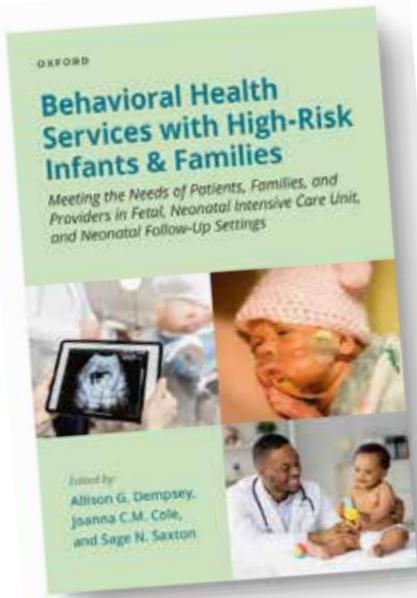
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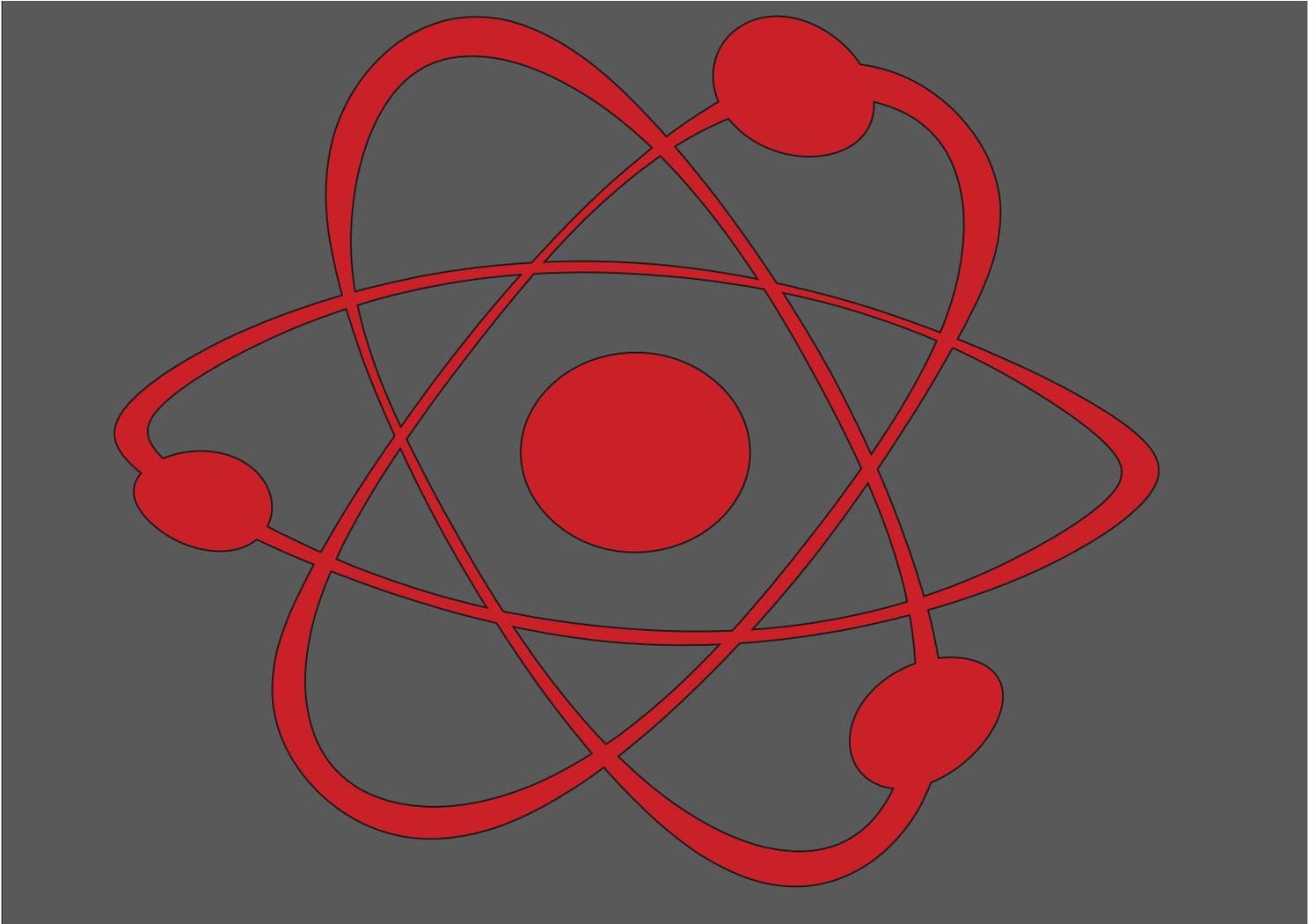
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Will your **PRETERM INFANT** need **EARLY INTERVENTION** services?

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



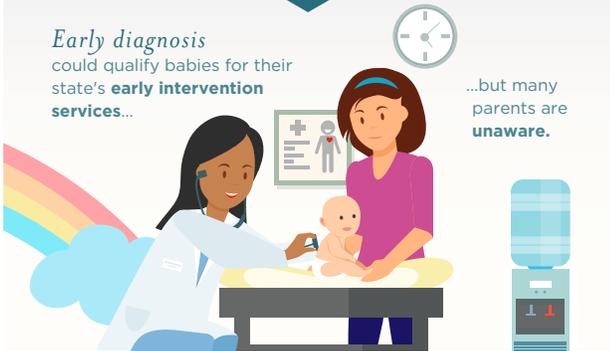
Address physical challenges



Prevent mild difficulties from developing into major problems

Early diagnosis could qualify babies for their state's **early intervention services**...

...but many parents are **unaware**.



NICU staff, nurses, pediatricians and social workers should talk with NICU families about the challenges their baby may face.

Awareness, referral & timely enrollment in early intervention programs can help **infants thrive** and grow.



NCFIH National Coalition for Infant Health
Protecting Access for Premature Infants through Age Two
www.infanthealth.org

Visit CDC.gov to find contact information for your state's early intervention program.

Las nuevas mamás necesitan acceso a la detección y tratamiento para **LA DEPRESIÓN POSTPARTO**



1 DE CADA 7 MADRES AFRONTA LA DEPRESIÓN POSTPARTO, experimentando



Sin embargo, sólo el **15%** recibe tratamiento¹

LA DEPRESIÓN POSTPARTO **NO TRATADA PUEDE AFECTAR:**

El sueño, la alimentación y el comportamiento del bebé a medida que crece²



La salud de la madre

La capacidad para cuidar de un bebé y sus hermanos

PARA AYUDAR A LAS MADRES A ENFRENTAR LA DEPRESIÓN POSTPARTO



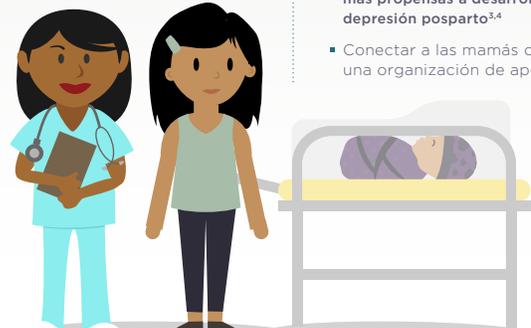
LOS ENCARGADOS DE FORMULAR POLÍTICAS PUEDEN:

- Financiar los esfuerzos de despistaje y diagnóstico
- Proteger el acceso al tratamiento



LOS HOSPITALES PUEDEN:

- Capacitar a los profesionales de la salud para proporcionar apoyo psicosocial a las familias... **Especialmente aquellas con bebés prematuros, que son 40% más propensas a desarrollar depresión postparto**^{3,4}
- Conectar a las mamás con una organización de apoyo



NCFIH National Coalition for Infant Health
Protecting Access for Premature Infants through Age Two
www.infanthealth.org

¹ American Psychological Association. Accessed on: <http://www.apa.org/women/resources/reports/postpartum-depression.aspx>

² National Institute of Mental Health. Accessed on: <http://www.nimh.nih.gov/health/publications/postpartum-depression-facts/index.shtml>

³ Journal of Perinatology (2015) 35, 529–536. doi:10.1097/JP.0000000000000147

⁴ Prevalence and risk factors for postpartum depression among women with problem and low-birth-weight infants: a systematic review. Vigod SN, Villages L, Dennis CL, Ross LE BJOG. 2010 Apr; 117(5):540-50.

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Neonatology**
Feb 21 – Feb 23, 2024
Las Vegas, NV

<https://www.pediatrrix.com/for-clinicians/neo-conference>

**Mednax: Specialty Review in
Neonatology**
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Las Vegas, NV

<https://www.pediatrrix.com/for-clinicians/specialty-review-conference>

**2024 Gravens Conference: The
Power of Voice: Using Your Voice for
Babies, Family, Staff and Beyond**
March 6-9, 2024

Sheraton Sand Key Resort
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<https://paclac.org/https-paclac-org-gravens-conference/>

**14th annual National Association
of Neonatal Therapists (NANT)
Conference in**

Miramar Beach, Florida,
April 11th - 13th, 2024
<https://nantconference.com/early-notification/>

PAS 2024
Toronto, Canada
May 2-6, 2024

<https://www.pas-meeting.org/>

*For up to date Meeting
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The Loma Linda University Health's Clinical Trial Center is actively seeking and recruiting top clinical research coordinator talent.

Our mission is to participate in Jesus Christ's ministry, bringing health, healing, and wholeness to humanity by Creating a supportive faculty practice framework that allows Loma Linda University School of Medicine physicians and surgeons to educate, conduct research, and deliver quality health care with optimum efficiency, deploying a motivated and competent workforce trained in customer service and whole-person care principles and providing safe, seamless and satisfying health care encounters for patients while upholding the highest standards of fiscal integrity and clinical ethics. Our core values are compassion, integrity, humility, excellence, justice, teamwork, and wholeness.

Able to read, write and speak with professional quality; use computer and software programs necessary to the position, e.g., Word, Excel, PowerPoint, Access; operate/troubleshoot basic office equipment required for the position. Able to relate and communicate positively, effectively, and professionally with others; provide leadership; be assertive and consistent in enforcing policies; work calmly and respond courteously when under pressure; lead, supervise, teach, and collaborate; accept direction. Able to communicate effectively in English in person, in writing, and on the telephone; think critically; work independently; perform basic math and statistical functions; manage multiple assignments; compose written material; work well under pressure; problem solve; organize and prioritize workload; recall information with accuracy; pay close attention to detail. Must have documented successful research administration experience focused on managing clinical trials function. Able to distinguish colors as necessary; hear sufficiently for general conversation in person and on the telephone; identify and distinguish various sounds associated with the workplace; see adequately to read computer screens and written documents necessary to the position. Active California Registered Nurse (RN) licensure preferred. Valid Driver's License required at time of hire.

The Clinical Trial Center is actively involved in many multi-center global pediatric trials, which span different Phases of research to advance health care in children. Please reach out to Jaclyn Lopez at 909-558-5830 or JANLopez@llu.edu with further interest. We would love to discuss the exciting research coordinator opportunities at our Clinical Trials Center.

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



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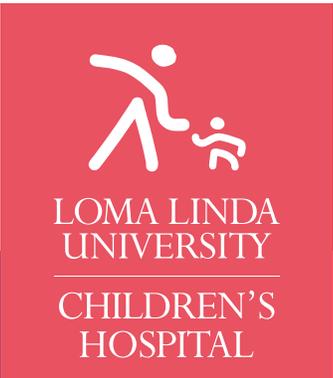
For more information, please contact:

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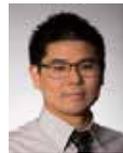
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Neonatology and the Arts

This section focuses on artistic work which is by those with an interest in Neonatology and Perinatology. The topics may be varied, but preference will be given to those works that focus on topics that are related to the fields of Neonatology, Pediatrics, and Perinatology. Contributions may include drawings, paintings, sketches, and other digital renderings. Photographs and video shorts may also be submitted. In order for the work to be considered, you must have the consent of any person whose photograph appears in the submission.

Works that have been published in another format are eligible for consideration as long as the contributor either owns the copyright or has secured copyright release prior to submission.

Logos and trademarks will usually not qualify for publication.

This month we continue to feature artistic works created by our readers on the next to last page as well as photographs of birds on rear cover. For this edition, our art was again graciously provided by Colleen Kraft, MD. It is a work called "A Reflection of What was Happening at the US Southern Border in 2018" done by her son Tim. This painting is on display at the University of Texas Rio Grande Valley. Our Bird is "An Owl" from my collection. The owl is perched on my hand and I took the picture with my i-phone as a "selfie."



Mita Shah, MD,
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Manuscript Submission: Instructions to Authors

1. Manuscripts are solicited by members of the Editorial Board or may be submitted by readers or other interested parties. Neonatology Today welcomes the submission of all academic manuscripts including randomized control trials, case reports, guidelines, best practice analysis, QI/QA, conference abstracts, and other important works. All content is subject to peer review.

2. All material should be emailed to: LomaLindaPublishingCompany@gmail.com in a Microsoft Word, Open Office, or XML format for the textual material and separate files (tif, eps, jpg, gif, ai, psd, 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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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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