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Pilot Study to Evaluate the Impact of NAVA Compared to SIMV on Cardiac Function in Preterm Neonates

Karen Hovsepyan, MD, Jeffrey Moore, MD, Kimberly S Firestone, MS, RRT, Daniele DeLuca MD, PhD, Howard M Stein, MD

Abstract:

Background: *Improved patient-ventilator synchrony with Neurally Adjusted Ventilatory Assist (NAVA) may not only benefit the respiratory system but may also impact the cardiovascular system. This study evaluated cardiac function in neonates on NAVA ventilation compared to SIMV.*

Methods: *Randomized, single-center, blinded, crossover pilot trial in premature neonatal subjects (23-36 weeks gestation) on invasive NAVA vs. SIMV. A quantitative assessment of left ventricular (LV) function was performed using echocardiographic imaging during each ventilatory mode.*

Results*: 14 subjects were randomized. During NAVA ventilation improvement was noted for LV output (194.1 ± 59.5 vs. 172.6 ± 45.4 ml/kg/min, p = 0.04), LV volume (69 ± 7.6 vs. 65.4 ± 5.2 %), p = 0.05) and cardiac index (1.9 ± 0.7 vs. 1.7 ± 0.6 L/min/m², p=0.04) compared to SIMV.*

Conclusion*: This pilot study demonstrates that neonates have improved cardiac function on NAVA ventilation compared to SIMV. Higher cardiac output during NAVA ventilation may result from better cardio-respiratory synchronization.*

Keywords: Neurally Adjusted Ventilatory Assist (NAVA), SIMV, premature neonates, cardiac output, cardiorespiratory synchrony, echocardiography, ejection fraction

"This pilot study demonstrates that neonates have improved cardiac function on NAVA ventilation compared to SIMV. Higher cardiac output during NAVA ventilation may result from better cardio-respiratory synchronization."

Introduction

Neurally Adjusted Ventilatory Assist (NAVA) uses the diaphragm's electrical activity (Edi) to allow the ventilated neonate to trigger on and off cycles of ventilatory assistance. Through the Edi signal, the neonate determines the peak inspiratory pressure, tidal volume, and duration of the respiratory support delivered by the ventilator. This signal is detected by embedded sensors within a specialized nasogastric tube (NAVA catheter) positioned at the crural diaphragm level, giving breath-to-breath feedback to the Servo ventilator (Getinge, Germany (1). Edi is not influenced by changes in muscle length, chest wall configuration, and/or lung volume (2-4) and correlates with phrenic nerve activity (5).

Multiple studies in the pediatric and neonatal population show improved oxygenation, work of breathing, and patient-ventilator synchronization on NAVA ventilation compared to synchronized intermittent mandatory ventilation (SIMV) or pressure support ventilation (2-4,6-8). Additionally, these studies demonstrate less trigger delay and a lower asynchrony index in non-invasive NAVA compared with non-invasive ventilation in Pressure Support mode (6) or when comparing invasive NAVA to SIMV in term and preterm patients (7,8).

"Cardiac output values in neonates increase linearly with advancing birth weight and gestational age (9). However, there is less information about the effect of positive pressure ventilation (PPV) on neonatal cardiac function."

Cardiac output values in neonates increase linearly with advancing birth weight and gestational age (9). However, there is less information about the effect of positive pressure ventilation (PPV) on neonatal cardiac function. PPV results in variations in pulse pressure and increases intrathoracic pressure, decreasing cardiac preload (10,11). Liet et al. compared conventional ventilation with NAVA in infants (7.8±4.1 months) who had undergone cardiac surgery and showed that on NAVA, there were lower peak inspiratory pressures, higher systolic arterial pressures, and increased cardiac index (12). The effects of NAVA effect on the cardiovascular system and hemodynamics in premature neonates have been poorly studied.

Point-of-care echocardiography has been used to study cardiac function in neonates (13). The most common technique for ventricular systolic function assessment in neonates is based on ventricular dimension and sizes, as recommended by international guidelines on Point-of-Care Ultrasound (14). Two-dimension images or M-mode have been used to calculate the ventricular volumes (end-systolic or -diastolic) (15).

This study aimed to evaluate cardiac function in neonates on NAVA ventilation compared to SIMV.

Methods

Trial Design: This was a randomized, single-center, blinded (to the cardiologist reading the echo), interventional, crossover pilot study.

Participants and Data Collection: This trial was performed in the neonatal intensive care unit (NICU) at ProMedica Russell J.

Ebeid Children's Hospital, Toledo, Ohio, USA. The study protocol was approved by the local Institutional Review Board (IRB18-035). Prior to enrollment, written consent was obtained from parents. Subject enrolment was performed by the study investigators. Echocardiographic data were obtained by either of two certified pediatric Echo technicians. A board-certified cardiologist read this data. Collected data were de-identified and recorded in a dedicated database.

Intervention: After a stabilization period of one hour, the first echocardiographic measurements were obtained. The subject was then switched to the other mode of ventilation, and after a stabilization period of one hour, the second echocardiographic measurements were obtained. The subject was then returned to the initial ventilatory mode (Fig 1). PEEP was kept consistent between the two modes.

Figure 1: Study flow chart

Ventilator data were downloaded from the Servo-I (Getinge, Germany) ventilators. Echocardiographic studies were performed using the Philips EPIQ 7 machine with a neonatal phased-array microprobe (12 MHz). Standard 2-D views were taken from apical 5-chamber, apical 4-chamber, apical 2-chamber, parasternal long and short axis. Simpson's volume measurements were made from an apical two-chamber view. Tissue Doppler was measured from a standard four-chamber view. Velocity Time Integral (VTI) was taken from a standard 5-chamber view. Left ventricular ejection fraction (E.F.) was calculated based on fractional shortening from M-mode in the parasternal short axis. Cross-sectional area (CSA) was calculated at the level of the aortic valve annulus at end-systole in the parasternal long-axis view. Velocity time integral (VTI) was measured from the aortic valve velocity, and heart rate (H.R.) was measured during the study. Stroke volume was calculated by VTI x CSA. CSA measurements obtained from the ECHO machine were matched to the results of manual calculation by using the formula: CSA = π x Aortic Diameter^2 / 4 (16). E.F., based on Simpsons 4-chamber and 2-chamber views, were obtained by appropriate software on the ultrasound machine. Left ventricular (LV) output was calculated as follows: LV output (ml/kg/min) = [VTI x CSA (at AV annulus) x heart rate (HR, bpm)] / body weight (in kg) (16,17). Cardiac index (CI) was calculated from LV output and body surface area.

Outcomes: The primary outcome was to evaluate LV output, CI, and E.F. Secondary outcomes evaluated were LV dimensions, SpO_2/FiO_2 ratio, and H.R.

Sample Size and Inclusion Criteria: No previous studies existed to determine sample size, so this was a pilot study with a convenience sample size. Inclusion criteria were preterm neonates 23 -36 weeks of gestation on invasive mechanical ventilation for Respiratory Distress Syndrome. Exclusion criteria were severe cardio-vascular instability, congenital heart defects, and sepsis.

Randomization and Implementation: A coin toss determined the initial ventilation mode (NAVA vs. SIMV). The investigators were responsible for allowing at least one hour of stabilization time between echocardiograms as well as the proper data collection and storage.

Blinding: This pilot study was designed as an assessor-blinded with the cardiologist reading the echocardiography blinded to the ventilation modes and parameters. Both echo-technicians were instructed to avoid discussions with the reading cardiologist, respiratory therapists, or nurses regarding the enrolled subjects or ventilator settings. Attending physicians were unblinded but were restricted in discussions with the reading cardiologist regarding the study subjects.

Statistical Methods: Paired t-test (Excel, Microsoft, 2019) was used to compare the variables on NAVA vs. SIMV. $P<0.05$ was considered significant.

Results

Recruitment: Nineteen subjects met eligibility criteria. Four subjects were excluded after consent was obtained (two were extubated before randomization; two were excluded at the parents' request due to clinical deterioration prior to the study). Fifteen subjects were randomized for this study. One subject in the SIMV group was excluded from statistical analysis, secondary to subsequently being diagnosed with sepsis. Two subjects expired weeks after the enrollment, unrelated to the study. Figure 2 depicts randomization and subject distribution.

Baseline Data: Baseline study population details are shown in table 1.

"All subjects were on NAVA before the study enrollment. Of the 14 subjects in the study, eight were randomized to start on NAVA ventilation and switched to SIMV, and six started on SIMV and switched to NAVA."

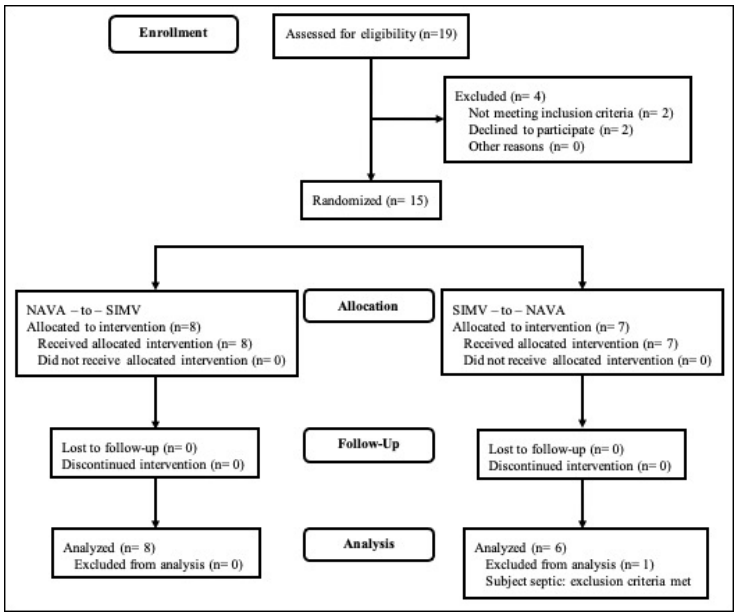

Figure 2: CONSORT participant flow diagram

Outcomes and Estimations: All subjects were on NAVA before the study enrollment. Of the 14 subjects in the study, eight were randomized to start on NAVA ventilation and switched to SIMV, and six started on SIMV and switched to NAVA. Ventilator settings and vital signs at the start of each study on NAVA and SIMV are listed in Table 2. Table 3 depicts the primary and secondary outcomes. Left Ventricular Output, CI, and LV volume were increased in the NAVA group. Cardiac output fell within previously described ranges using pulsed doppler (9).

Subjects	N=14
Gestational age (weeks)	25 (3.2)
Birth weight (grams)	923 (566)
Male (n (%))	9 (64)
Prenatal steroids (n)	12 (85.7)
C-section (n)	11 (78.5)
Apgar score -1 min (median)	5 (2,7)
Apgar score -5 min (median)	7 (6,8)
CRIB-II score	7.1 (3.5)
Postnatal age at the enrolment (days)	8.6 (5.9)
Weight at study (grams)	776 (411)

Table 1: Demographics of the study population. Data are shown as mean (standard deviation), median (interquartile range), or number (%).

	NAVA	SIMV	p
NAVA Level (cmH_2O/mcV)	1.25 (0.7)	n/a	n/a
Apnea time (sec)	1.96 (0.15)	n/a	n/a
PEEP (cmH_2O)	5.9 (1.1)	5.9 (1.1)	1
PIP (cmH_2O)	n/a	14 (1.5)	n/a
Vent Rate (breaths/min)	n/a	40 (7.1)	n/a
FiO_2 (%)	29.2 (6.8)	29.6 (7.3)	0.49
HR (beats/min)	158.9 (12.9)	155.7 (11)	0.39
RR (breaths/min)	46.5 (7.1)	47.8 (7.1)	0.69
SpO_2 (%)	93.3 (3.3)	93.6 (4.7)	0.84
SpO_2/FiO_2 ratio	335 (80)	331 (75)	0.64

Table 2: Ventilatory parameters during each ventilation mode. PIP – peak inspiratory pressure, HR – heart rate, RR respiratory rate. Data are shown as mean (standard deviation). There were no differences between the groups at the start of each study. Statistics were paired t-tests.

"Enhanced ventilator synchrony is achieved when there are shorter trigger delays, avoidance of premature cycle-off, and absence of failures to trigger a breath (4)."

Primary outcomes	NAVA	SIMV	p
LV Output (ml/kg/min),	194.1 (59.5)	172.6 (45.4)	0.04
CI (L/m^2/min)	1.9 (0.7)	1.7 (0.6)	0.04
EF (%)	73.9 (7.2)	72.05 (6.95)	0.23
Secondary outcomes			
LVEDV (cm)	1.1 (0.28)	1.13 (0.27)	0.11
LVESV (cm)	0.66 (0.16)	0.7 (0.17)	0.06
LV volume (Simpson 2c)	69.1 (7.6)	65.5 (5.3)	0.05
HR (bpm)	160.1 (15.4)	154.6 (15.3)	0.18

Table 3: Hemodynamic variables during NAVA and SIMV modes. LV Output – left ventricle output (ml/kg/min) and CI- cardiac index (L/m^2/min), were calculated. EF- Ejection Fraction (%), LVEDV – left ventricular end-diastolic volume (cm), and LVESV – left ventricular end-systolic volume (cm) were measured by m-mode. LV volume – left ventricular volume (EF%) was measured by 2-D. Data are shown as mean (standard deviation) and were normally distributed. Statistics were paired t-test.

Harm: All recruited subjects tolerated the study well. No immediate or late complications were related to the ventilation mode changes or echocardiograms. Thirteen of fifteen enrolled subjects were discharged from the NICU. Two subjects died later from reasons unrelated to the study.

"This is the first study to demonstrate/evaluate the improved cardiac function of premature neonates being ventilated with NAVA versus SIMV."

Discussion

This is the first study to demonstrate/evaluate the improved cardiac function of premature neonates being ventilated with NAVA versus SIMV.

Improved cardio-respiratory synchrony may occur due to the regulation of the heart's primary pacemaker (atrioventricular node), which is modulated by the same autonomic system that regulates respiratory rhythm. However, this only partially explains cardio-respiratory synchronization. For instance, when the innervation of the heart is interrupted in a patient post-heart transplantation, there are still respiratory modulations, mechanical coupling, and synchronization between cardiovascular and respiratory systems (18). This may be due to chest movement generating intrathoracic pressure variances. This increased preload stretches the sino-atrial node and alters the electrical properties of the myocyte membrane, ultimately influencing the heart rhythm. In addition, the synchrony between these two systems is regulated by the efferent nerves from the cardiorespiratory center of the brainstem, whose afferent nerves collect information about blood pressure, blood gas status, and heart rate via arterial baroreceptors and chemoreceptors (19). As a neonate matures, the coordination between the cardiovascular and respiratory systems increases, causing variability in the heart rate to respiratory synchronization ratio. In the first few weeks, neonates have synchronization ratios of approximately 5:2 (heart rate: respiratory rate). After 20 days of life, it lengthens to 4:1 (varying from 7:2 - 9:2) (20).

Enhanced ventilator synchrony is achieved when there are shorter trigger delays, avoidance of premature cycle-off, and absence of failures to trigger a breath (4). When the synchronization index is higher, intrathoracic pressure is decreased. Lower intrathoracic pressure increases the cardiac preload of both ventricles (Frank-Starling Law), which raises the left ventricle stroke volume. Lower intrathoracic pressure from improved synchrony also increases diastolic dilation of the LV and prolongs diastolic filling time. With the preserved systolic function of the myocardium, the larger volume yields a higher LV output. This hypothesis is supported by the fact that systolic blood pressure is higher during NAVA compared to conventional ventilation modes (12).

"Improved synchronization promotes oxygenation, which relaxes pulmonary vasculature. Lower right ventricular (R.V.) afterload can increase R.V. systolic function and increase LV preload, thus increasing C.O. Better synchronization prevents unnecessary hyperinflation avoiding compressing pulmonary vasculature mechanically, resulting in decreased LV preload and C.O."

Improved synchronization promotes oxygenation, which relaxes pulmonary vasculature. Lower right ventricular (R.V.) afterload can increase R.V. systolic function and increase LV preload, thus increasing C.O. Better synchronization prevents unnecessary hyperinflation avoiding compressing pulmonary vasculature mechanically, resulting in decreased LV preload and C.O.

During SIMV, variable pulse and intrathoracic pressure results in inconsistent stroke volume (S.V.), as well as R.V. and LV diastolic volumes that are not necessarily in synchrony with the needs of the neonate. Compared to SIMV, NAVA allows for variable inspiratory pressures, flow, and duration in synchrony with the neonate respiratory drive. As a result, intrathoracic pressure adapts in response to the patient's physiological needs. It may be hypothesized that variable intrathoracic pressure provides variable RV/LV systolic and diastolic functions and results in higher C.O. In addition, variable intrathoracic pressure may produce more intraventricular septal compliance and contractility (ventricular interdependence), which can increase LV end-diastolic volume and subsequently, CO. Lastly, variable intrathoracic pressure results in non-uniform compression of the lateral ventricular wall, which may also improve LV diastolic function and S.V.

Less than 5% of total body oxygen is consumed for metabolic needs of breathing (21). Patient-ventilator asynchrony during SIMV ventilation may increase consumption, leading to unnecessary total body oxygen consumption and oxygen demand. The initial compensatory mechanism is tachycardia with tachypnea. Both responses decrease LV refilling and S.V. via a combination of previously described mechanisms.

Limitations: LV cardiac output was challenging to measure using transthoracic echocardiography. Volumes lower than 1 ml were rounded up by the software program. The decision was therefore made to use VTI for LV output calculation, considering the very small sizes of the study subjects. LV cross-sectional area (CSA) is a stable parameter, easily measurable on echocardiography. Average H.R. was used for calculation of LVOT, as each echocardiography session lasted approximately 10-15 min and the H.R. changed dynamically during this period. Despite these limitations, our measurements were comparable to those reported by Boet et al. (22) and fell within the expected range for preterm neonates.

"This pilot study demonstrates that neonates have improved left ventricular function while ventilated with NAVA compared to SIMV."

Conclusion:

This pilot study demonstrates that neonates have improved left ventricular function while ventilated with NAVA compared to SIMV. Future studies are needed to investigate if these differences extend to other cardiac function parameters and evaluate the role of improved ventilatory synchrony in cardiorespiratory function.

Quick Look:

Current Knowledge

Neurally Adjusted Ventilatory Assist (NAVA) ventilation is known to improve patient-ventilator synchrony. NAVA is being used with increasing frequency in premature neonates. Evidence is lacking on the effect of NAVA ventilation on cardiac function.

What This Paper Contributes To Our Knowledge

In a study comparing cardiac function on NAVA ventilation and SIMV in premature neonates, subjects had improved left ventricular function, increased left ventricular output, cardiac index, and left ventricular volume. NAVA ventilation may provide cardiac benefits when used in premature neonates.

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Authors' contributions: K.H., J.M., K.F., and H.S. contributed to the literature search and study design. K.H., J.M., and H.S. performed the study and contributed to data collection. K.H., K.F., DDL, and H.S. contributed to the data analysis. K.H. wrote the first draft of the manuscript, and all authors contributed to subsequent versions. All authors read and approved the final manuscript.

Study location: The study was performed at ProMedica Ebeid Children's Hospital, Toledo, Ohio, USA

Meeting presentation: K.F presented this study at the 2020 virtual AARC meeting on 11/20/20.

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Conflict of interests: K.F. and H.S. are on the Speakers Bureau for Getinge and Chiesi. DDL received technical research assistance from Getinge. K.H. and J.M. have no conflict to disclose.

All authors approved the final manuscript as submitted and agree to be accountable for all aspects of the work.

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Karen Hovsepyan, MD
The University of Toledo Health Science Campus,
Toledo, Ohio, USA

Jeffrey Moore, MD
The University of Toledo Health Science Campus
Toledo, Ohio, USA
ProMedica Ebeid Children's Hospital
Toledo, Ohio, USA

Kimberly S Firestone, MS, RRT
Akron Children's Hospital
Akron, Ohio USA

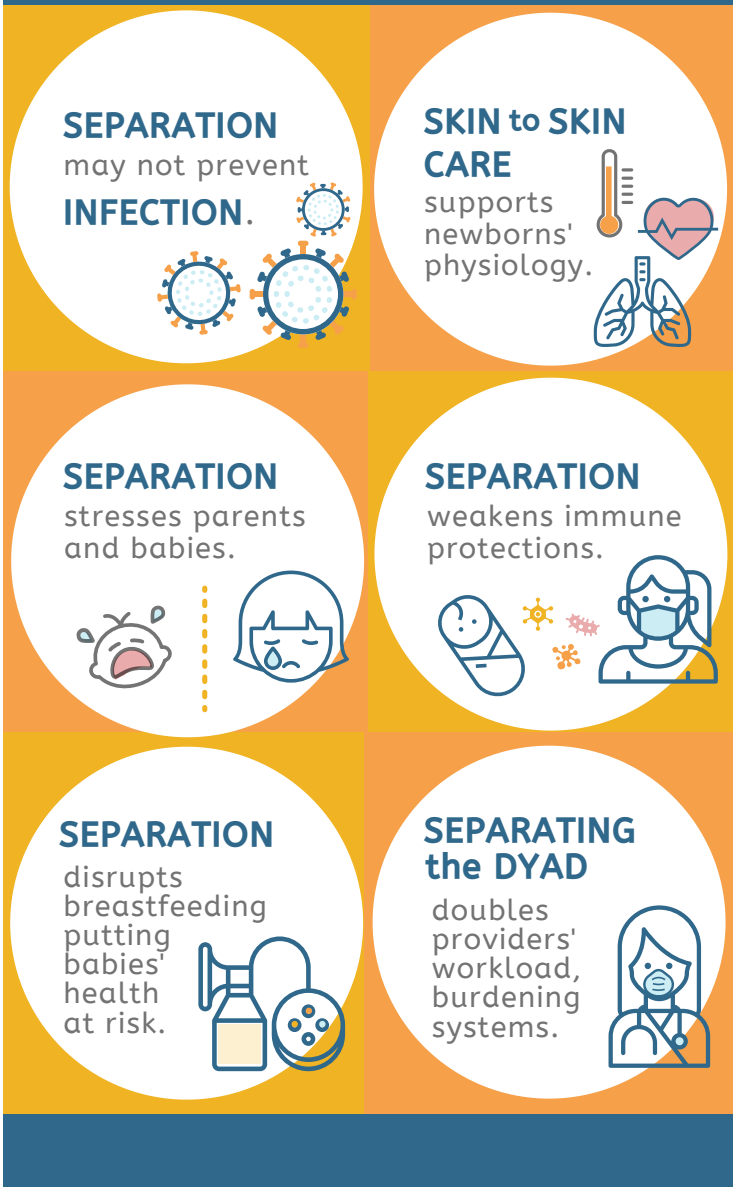
Daniele DeLuca MD, PhD
Division of Pediatrics and Neonatal Critical Care
Paris Saclay University Hospitals
"A. Beclere" Medical Center
Paris, France
Physiopathology and Therapeutic Innovation Unit-INSERM U999
Paris Saclay University
Paris, France

Corresponding Author

Howard M Stein, MD
The University of Toledo Health Science Campus
Toledo, Ohio, USA
ProMedica Ebeid Children's Hospital
Toledo, Ohio, USA
Email: howardstein@bex.net

Should Infants Be Separated from Mothers with COVID-19?

FIRST DO NO HARM



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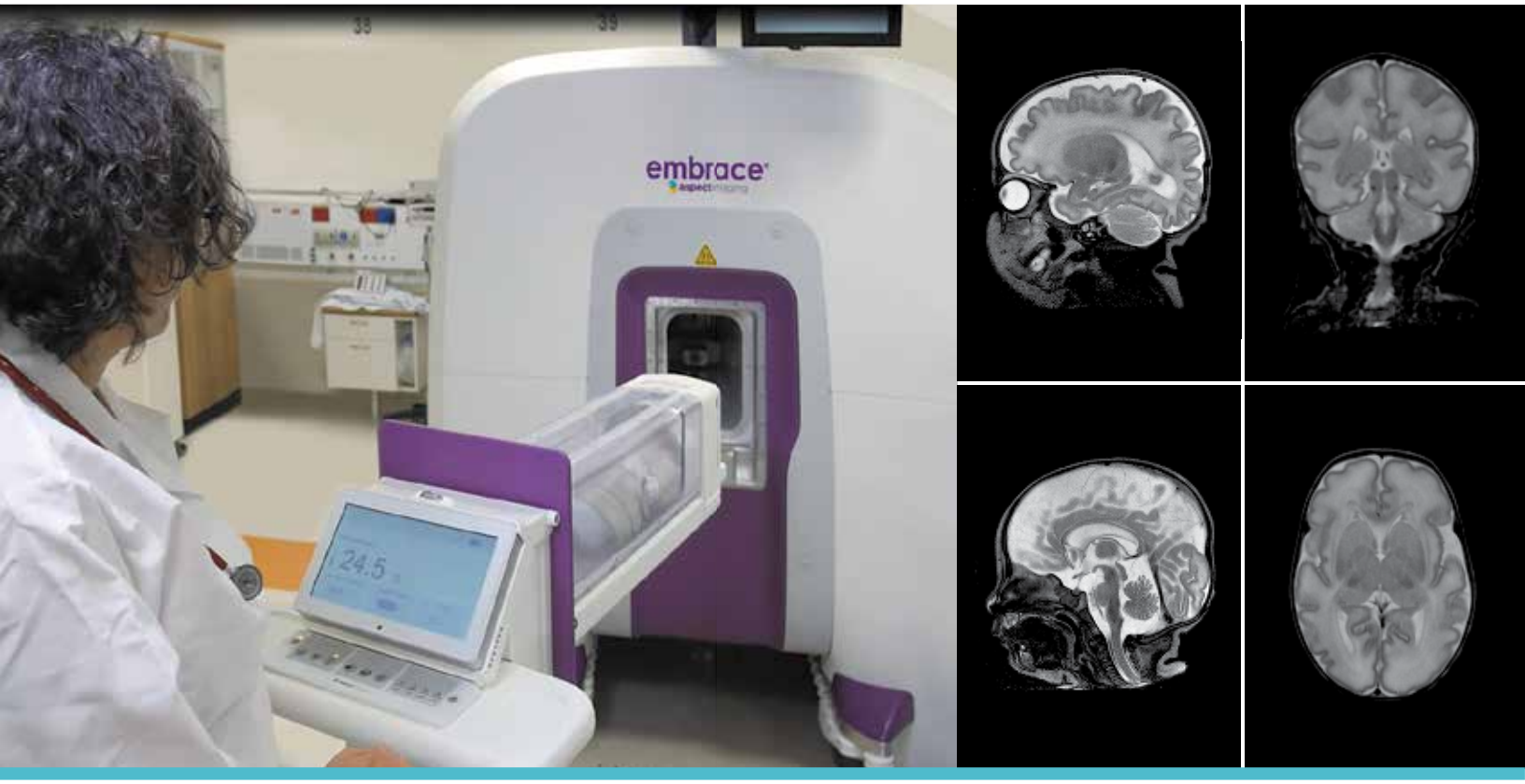

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Letters to the Editor

Spontaneous Intestinal Perforation in Neonates: What Is the Ideal Choice and Duration of Antibiotics?

Conflict of Interest: None

Funding Source: None

Keywords: Spontaneous Intestinal Perforation (SIP), Neonates, Antibiotics

Case:

A premature male infant was born at 24 2/7 weeks of gestation to a mother with pregnancy complicated by premature prolonged rupture of membranes, congestive cardiac failure (ejection fraction 15%), pulmonary hypertension, atrial fibrillation with atrial thrombus, cardiomyopathy, chronic kidney disease, and hypertension. At birth, the infant was intubated and transferred to Neonatal intensive care unit (NICU). After 48 hours, he was successfully extubated. On day 5 of life, some bloody nasogastric output was noted and abdominal X-ray was concerning for pneumoperitoneum. Decubitus view was obtained and showed free air (Figure). An urgent exploratory laparotomy was done and it showed isolated ileal perforation 12 cm proximal to the ileocecal valve with no signs of necrotizing enterocolitis.

"The infant was started on vancomycin and piperacillin-tazobactam. After 72 hours, piperacillin-tazobactam was discontinued (infant completed total six doses). Next morning infant was noted to have low blood pressure, so a septic work up was initiated and piperacillin-tazobactam was resumed. Gram stain of blood culture showed gram-negative rods, while on piperacillin-tazobactam, so this was changed to meropenem,"

The infant was started on vancomycin and piperacillin-tazobactam. After 72 hours, piperacillin-tazobactam was discontinued (infant completed total six doses). Next morning infant was noted to have low blood pressure, so a septic work up was initiated and piperacillin-tazobactam was resumed. Gram stain of blood culture showed gram-negative rods, while on piperacillin-tazobactam, so this was changed to meropenem, and all central lines were discontinued. Abdominal ultrasound showed no fluid collection, and echocardiogram showed no vegetation. Later, final identification and sensitivity report showed pan sensitive *Klebsiella pneumoniae*, so meropenem was deescalated to cefotaxime. This case brought the question of adequate duration for antibiotic treatment in cases of spontaneous intestinal perforation (SIP).

Discussion:

Spontaneous intestinal perforation (SIP) differs from necrotizing enterocolitis (NEC) in clinical manifestation, management, and outcome. (1 - 3) Recently, SIP was reported to be increasing in preterm infants in comparison to NEC. (4)

We presented a case of a 5-day-old preterm infant who developed SIP. Infant at the time of perforation had indwelling umbilical arterial catheter (UAC) and umbilical venous catheter (UVC) which were removed and replaced with a peripherally inserted central catheter (PICC), therefore vancomycin was selected for staphylococcus coverage. Regarding the antibiotic choice for intra-abdominal gram-negative organisms, piperacillin-tazobactam was preferred over gentamycin for two reasons. Firstly, risk of ototoxicity and nephrotoxicity associated Gentamicin and secondly, piperacillin-tazobactam provides anaerobic coverage eliminating the need for using metronidazole. Metronidazole has been associated with potential neurotoxicity in neonates. (5) Support to the use of empirical therapy with piperacillin/tazobactam plus vancomycin in late-onset sepsis (LOS) came from the study by Mariani et al (6). They found this combination effective on 98.5% of LOS isolates. A study by Ye et al (7) showed that neonates with SIP could be conservatively treated with a combination of piperacillin/tazobactam and meropenem. Nevertheless, the use of vancomycin plus piperacillin-tazobactam in extreme low birth weight (ELBW) infants is associated with an increased risk for acute kidney injury. (8)

"We have obtained information regarding the use of antibiotics in SIP and NEC at several national academic centers. Most institutions agree on 5 to 7 days of ampicillin, Gentamicin, and metronidazole. However, in a systematic review, no sufficient evidence was found for any recommendation on the choice of antibiotics. (9)"

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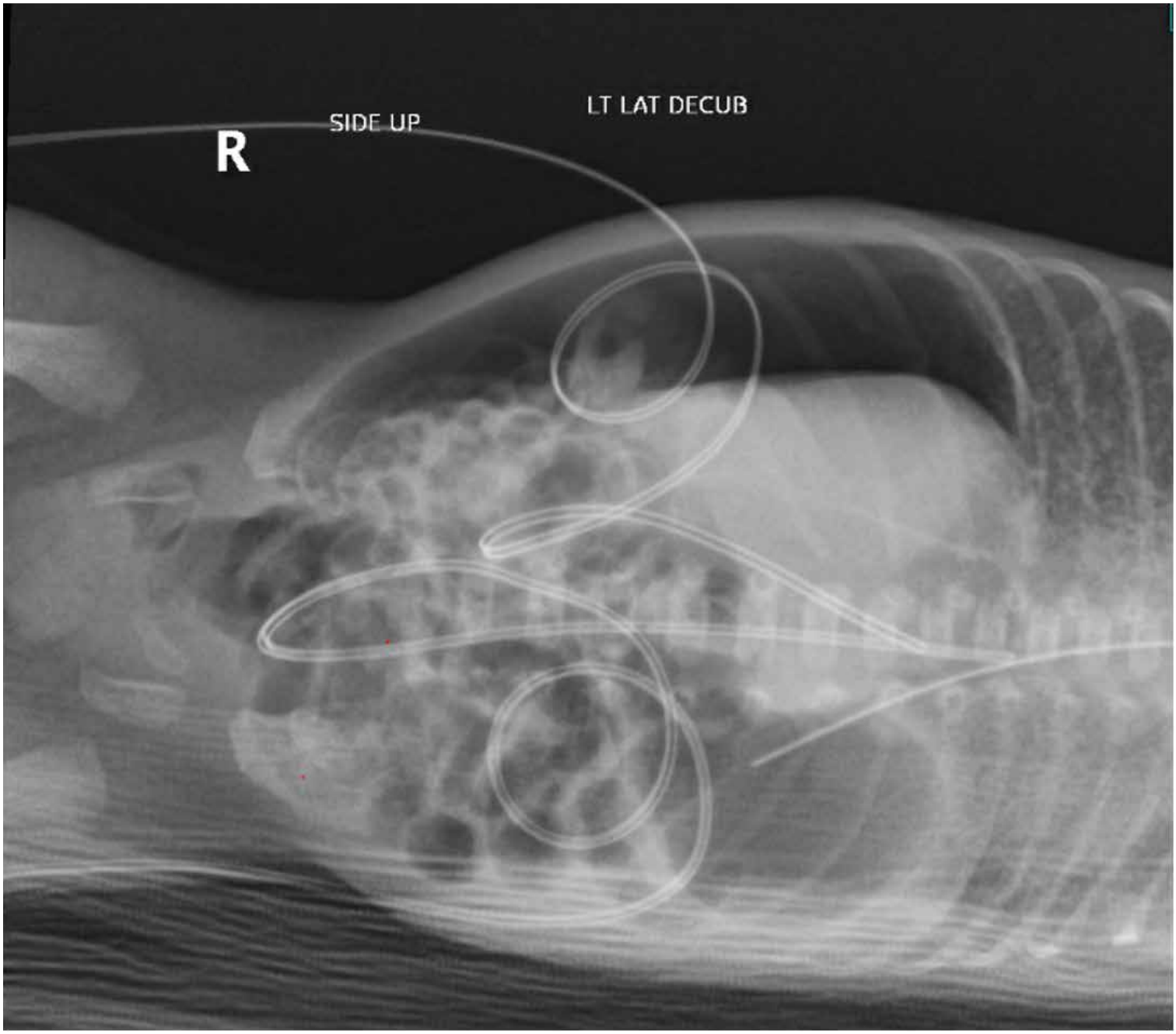
Antibiotic stewardship is challenging in NICU for number of reasons as stated above. (10) Institutional data and policies should be developed and adjusted to decide the type and duration of antibiotics. The case presented highlights on the need for develop-



Legend to Figure: Left lateral decubitus x-ray showing free air over the liver shadow, confirming pneumoperitoneum

ment of standard practice guidelines.

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Shabih Manzar, MD [1]

Maria Gabriela Dominguez, MD[1]

Patricia Pichilingue-Reto, MD[2]

[1]Division of Neonatology

[2]Division of Pediatric Infectious Diseases

Department of Pediatrics

School of Medicine

Louisiana State University Health Sciences Center

1501 Kings Highway

Shreveport, LA 71103

Correspondence:

Shabih Manzar, MD

1501 Kings Highway

Shreveport, LA 71103

Telephone: 318-626-1623

Fax: 318-698-4305

Email: shabih.manzar@lsuhs.edu

Dear Drs. Manzar, Dominguez, and Pichilingue-Reto,

This area is a crucial subject. Necrotizing enterocolitis and SIP account for significant neonatal morbidity and mortality. Although we have identified many diverse ways of preventing NEC or SIP by modification in infant feeding practices, these do not answer the issue of treatment when it is clear that it is necessary. The bacteria involved in NEC or SIP vary, as does the resistance pattern. Because these entities often involve bacteria contracted from other areas of the hospital, sensitivity patterns are vital in understanding what constitutes appropriate therapy. (1, 2)

"This area is a crucial subject. Necrotizing enterocolitis and SIP account for significant neonatal morbidity and mortality."

The concern about toxicities is well-founded. Aside from the traditional concerns of nephro and ototoxicity, there are additional concerns regarding antibiotics stewardship and the avoidance of creating more resistant bacteria by exposing more "sensitive" bacteria unnecessarily to antibiotics designated for only those bacteria that are already more resistant. The practice of using an approach of starting with an antibiotic designed to treat more resistant infections and then selectively discontinuing antibiotics or switching to an antibiotic to which the bacteria is sensitive once culture results are known has been used by many. However, whether the damage was done by using these "bigger" guns used sporadically or whether similar results could have been obtained by escalating as opposed to deescalating coverage has not been extensively studied. (1-3)

"The practice of using an approach of starting with an antibiotic designed to treat more resistant infections and then selectively discontinuing antibiotics or switching to an antibiotic to which the bacteria is sensitive once culture results are known has been used by many."

A better question may be, "is it ethical to study?" Given a severely ill neonate with numerous different possible bacteria, using a less broad coverage may be equivalent to a death sentence in the initial approach to NEC or SIP. Indeed, one could change course if the bacteria were not sensitive to the initial regimen, but who would use Penicillin monotherapy as a primary approach to treat NEC or SIP in a hospital where a highly resistant E. coli or Klebsiella was the dominant pathogen?(3, 4)

Instead, in these situations, it is essential to consult a hospital antibiogram in selecting an appropriate empiric course of antibiotics. Toxicities notwithstanding, one does not want to bring a knife to a gunfight. Where resistant bacteria prevail, bigger guns with higher toxicities may be indicated. Ampicillin and Gentamicin may be the appropriate first-line if antibiotic resistance is not significant. (5)

"Nevertheless, in this era of seemingly forever increasing MIC requirements and extended broad-spectrum lactamase prevalence, it would seem unlikely that a specified regimen could be agreed on for multiple centers or effective beyond the term customarily required to publish such a study."

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it would seem unlikely that a specified regimen could be agreed on for multiple centers or effective beyond the term customarily required to publish such a study.

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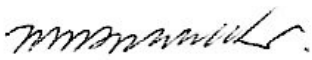

Mitchell Goldstein, MD, MBA, CML

Editor in Chief

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LomaLindaPublishingCompany@gmail.com

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Please address your response in the form of a letter. For further formatting questions and submissions, please contact Mitchell Goldstein, MD at LomaLindaPublishingCompany@gmail.com.

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Erratum (Neonatology Today May, 2022

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

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

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NT Behind the Scenes: FloweTry: A Collection of 108 Poetic Flows on Life, Love, and Liturgical Issues

Kimberly Hillyer, DNP, NNP-BC

The following is an amended transcript for Neonatology Today of Dr. Kimberly Hillyer and author/Physician Dr. Tiffanie Tate Moore. The following interview focused on her new book, **FloweTry: A Collection of 108 Poetic Flows on Life, Love, and Liturgical Issues.**

Click this link to go directly to our YouTube channel, Neonatology Today Media. Please subscribe and hit the notification button to enjoy viewing the interview when it is available. We would love to hear your thoughts, so leave a comment.

"The following interview focused on her new book, FloweTry: A Collection of 108 Poetic Flows on Life, Love, and Liturgical Issues"

Introduction

Thank you for joining us on today's broadcast. I'm Dr. Kimberly Hillyer, a Nurse Practitioner and the media correspondent for Neonatology Today. This segment features Dr. Tiffanie Tate Moore. Dr. Moore is the author of FloweTry: A collection of 108 poetic flows on Life, Love, and Liturgical issues. Candidly and poetically, she dives into the topics of our times which includes COVID, politics, black history, and police brutality. Through a challenging childhood being a young survivor of a drive-by shooting, Dr. Moore went on to serve in the U.S. Navy during Operation Enduring Freedom and the global war on terrorism. She became an OB-GYN, but after a hand injury forced her to retire from her beloved job in 2019, Dr. Moore faced yet another challenge. This compilation of poems is a testament to her journey and resilience.

Dr. Hillyer: Thank you for joining us, Tiffanie. In your book of poems, you shared your life. Can you tell me a little bit about your journey and how these poems influenced that or were influenced by your journey?

Dr. Tate Moore: Well, basically, my life journey has been a very interesting one, and my poetry took definitely a different turn because I did not consider myself to be a poet. I considered myself to be a Surgeon. When I started writing, I started writing out of necessity because I felt essentially down and depressed. I started writing when I could no longer practice medicine.

"I grew up in Compton, and both of my parents were essentially drug addicts. I was raised by my aunt, lovingly known as my mom-tee Mae. She has raised me basically from the age of two years old. I'd overcome so many different obstacles to become an obstetrician-gynecologist."

I grew up in Compton, and both of my parents were essentially drug addicts. I was raised by my aunt, lovingly known as my mom-tee Mae. She has raised me basically from the age of two years old. I'd overcome so many different obstacles to become an obstetrician-gynecologist. I could not believe that there would ever be a time that, after overcoming everything that I did, that I would not be able to practice medicine.

When I was injured and I could no longer practice medicine, I began to write poems to encourage myself. As I began to write the poetry, I didn't write them for other people; I wrote them to encourage myself. I began to share them with family and friends, and they said, "You should probably publish this." I was like, "No, I am not going to do that because I'm a doctor; I'm not a poet." They were like, "No, seriously, you should share this." I was like, "No, I am a surgeon; I'm not a poet." They're like, "No, seriously, you should really publish this." When I submitted my poems to two different publishers, both publishers were interested. I scratched my head, and I was like, "Oh, huh, maybe I'm a doctor and a poet." I had to rethink what I was because I had put myself in a box, and I did not consider myself to be a writer. I mean, I've always loved writing, but I did not consider myself a writer.

When I started out in undergrad, I actually started as an English major. I thought I was going to become an English teacher to pay my way through medical school at U.C. Santa Barbara. My counselor there, he laughed in my face, and he said, "Oh, sweetie, teachers don't make enough money to pay for medical school." I didn't know that at the time. He said, "If you want to be a doctor, you need to switch your major to biology," and so I did, and that was all she wrote. I put writing behind me. The joke's on me because here I am writing again.

Dr. Hillyer: A full circle. It went right back to your heart's passion. You said you just started putting the words to paper as you were going through these changes later in your life. Did you have this connection to poetry before then, before maybe even thinking about becoming an English major?

Dr. Tate Moore: Well, I've always loved poetry. I've loved the writings of Langston Hughes, Robert Frost, and Maya Angelou. I've always felt a connection to writing, but I've never considered myself a writer per se. I've always thought, well, one day, I'm going to write my life story and write an autobiography. I'm going to encourage people and write about how good GOD has been towards me. Even when I was in the hospital recovering from one of my complications, I began to negotiate with GOD. I was like, Lord if you get me out of this, I'm going to write my autobiography when I get out. I'm really going to do it.

" It's like a mantra per se, and I think it can be something that the world needs right now. A lot of times, we could use some encouragement, and a lot of these poems can encourage people."

So, when I got out of the hospital, I thought I was going to write an autobiography; I did not think I was going to be writing a poetry book. So again, this poetry book was still a curve ball. It was still a surprise. I did not expect to be writing a poetry book, and I'm still not writing my autobiography. So, it was still a very much hiccup, I guess a curveball, but I know that it is something that I felt I needed to write. It was very cathartic for me, and it was a good release, and I know that I feel encouraged. I still read a lot of my own poetry. I find it very encouraging. A lot of my family and friends say they read a lot of the liturgical sections before they go to sleep at night and find it reassuring. I read my own poetry at night sometimes and find it reassuring. It's like a mantra per se, and I think it can be something that the world needs right now. A lot of times, we could use some encouragement, and a lot of these poems can encourage people.

Dr. Hillyer: Now, I'll be honest, as I was reading the different poems. I felt, especially since I knew a little bit about your life story, that even though you're saying it's not an autobiography, I saw your life through it. You have been a Surgeon, an OB-GYN. You're a Navy veteran. Can you tell me a little bit about some of these influences and the way you've developed some of these poems? I could hear some of the resiliency as you've grown up.

Dr. Tate Moore: I believe that because I have served in the military, I look at things a little bit differently, and I think it gives me a different perspective. When I was at U.C. Santa Barbara, I minored in Black studies, so I look through history, and I apply a little bit of American history to some of my poetry. So, I try to incorporate a little bit of education into some of my poetry to enlighten people to a certain extent because I think that if we can always encourage and educate at the same time, it's always a good thing. I believe that uplifting and enlightenment go hand-in-hand.

Dr. Hillyer: I love that, and the enlightenment, the inspiration. Your book has 108 poems, I guess; what I'm wondering is, where did you come up with 108? Is there anything significant about that? Those are 108 moments of inspiration; can you tell me about some of those moments?

"Because anything that can foster emotions and stir up feelings, and make people feel better is something that's needed right now. There's just so much pain and so much suffering anything that can make people feel better is welcomed."

Dr. Tate Moore: Yes! As a member of Alpha Kappa Alpha Sorority Incorporated. My sorority was founded in 1908, and I was not about to write 1908 poems. But because of the 08 significance, I wanted to pay tribute by having an 08 in memory of that, so I did 108 poems to pay homage to that memory. I like the idea of going through the life, love, and liturgical sections. Just thinking and reflecting on different moments of my life and the lives of my family and friends and thinking about happy times and even some not-so-happy times to reflect and encourage and help people think about moments that can move and motivate. Because anything that can foster emotions and stir up feelings, and make people feel better is something that's needed right now. There's just so much pain and so much suffering anything that can make people feel better is welcomed.

Dr. Hillyer: Which poem, if you can remember, inspired some of your most joyful memories?

Dr. Tate Moore: Hum, which poem? There's my favorite, and then there's my son's favorite and my daughter's favorite. So, I think I like "*Better*."

Better says:

Is it better yet?

Do you have regret?

Just keep pressing forward and through the tough road ahead of you. Sometimes it is better to see things in the rear view,

Out of fear of things that are straight ahead in front of you.

Do not be afraid of what is to come.

Only you really know where you are actually coming from.

When departing a bad situation, anything better is a welcome invitation.

Better is on the way. Push aside any thoughts of dismay.

Yes, it will get better.

Dr. Hillyer: That's very powerful. As I remember some of your childhood or stories that I've seen or read, things did get better. Do you mind telling me a little bit about your childhood upbringing? How were you able to see it get better, now looking back?

"That's very powerful. As I remember some of your childhood or stories that I've seen or read, things did get better. Do you mind telling me a little bit about your childhood upbringing? How were you able to see it get better, now looking back?"

Dr. Tate Moore: As an adult, reflecting back on it was definitely difficult. I never met my father because my mother and father divorced when I was an infant. My father became addicted to drugs very early on, and he became homeless and lived on the streets. I subsequently met him after he died, and I claimed his body from the prison system and had to have a funeral for him, probably in 2019. So, that was just recently.

Well, my "mother" was my aunt's sister. My mom, unfortunately, was also addicted to drugs, so she lost custody of me when I was around two years old. But, because she was my aunt's sister, she was always there, and my aunt had a soft spot for her because that was her sister. So, I still spent summers and weekends, and holidays with her. I had the misfortune of watching drugs and the manifestation of drugs in her life. She still loved me, but I got to see how bad drugs can affect your life. So, she was the epitome of what not to do, even though she loved me. So, I don't drink, and I don't do drugs because I got to see how bad that can affect your life. She was also the poster child for resilience because she was in and out of rehab until I was at least about 25 years old.

"I had the misfortune of watching drugs and the manifestation of drugs in her life. She still loved me, but I got to see how bad drugs can affect your life. So, she was the epitome of what not to do, even though she loved me. So, I don't drink, and I don't do drugs because I got to see how bad that can affect your life."

As a physician, I can look back and see that it was the drugs, but as a child, I always thought that if I was smart enough, if I was better, maybe she would love me more than she loved drugs. So, I turned towards education. I bottled all of that up and was like, "Okay, maybe I needed to be a better kid." So, I focused on education, and I was like, okay, let me do what I can. Back then, they had all those commercials like, "Education is the key to the future," and you know Jesse Jackson, "I am somebody." You had the Reaganomics, and you had Nancy Reagan and all those commercials with the fried eggs. "This is drugs, and this is your brain on drugs, any questions! You had all these things, and you had all these images that I was being bombarded with. Then I had my mom, who I would actually see doing drugs and on drugs. Then when she was on drugs, she was verbally abusive.

My aunt, she would have different boyfriends. My aunt already had two kids, and I was her bonus kid. Some of her boyfriends were not very happy that she had kids, and therefore, to have an extra kid, they really weren't happy. There were some different issues with abuse from them, and I would get the extra brunt of it. My childhood was okay, but it was not necessarily the best childhood growing up. I had some issues; I had some abandonment issues that I had to work through as an adult. Essentially, I bottled all that up and used that to fuel myself, to get up, get out, and to change.

"So, I was like, okay, education is the key to the future. I wanted those keys, so I needed to focus on my education, so every time you saw me, I had a book in my hand or I was at the library. I was studying because I was about business. When I graduated from elementary school, I graduated as Valedictorian."

When I would hang out with my cousins, you could see that I was cut from a different cloth because they had both of their parents, and I always wanted what they had. But I didn't have it, so I wanted something more. I wanted the T.V. people, the mom, and the dad. I wanted the professional life. So, I was like, okay, education is the key to the future. I wanted those keys, so I needed to focus on my education, so every time you saw me, I had a book in my hand or I was at the library. I was studying because I was about business. When I graduated from elementary school, I graduated as Valedictorian. When I went to middle school, I went with a leather briefcase because I was that kid. I was about business, and I was ready to handle it. I didn't know any better, so they were like, okay, she's the weirdo, but I didn't care. I took my little burgundy briefcase, and it was leather because that's what my auntie said that's what she wanted, and they didn't tell me "No," when somebody should have told me "No" because I was that weirdo kid.

Eventually, I normalized and became a cheerleader. I calmed down a little bit, but I was special. I joined the Christian fellowship club, and GOD found me. It acclimated me, and I toned it down, and I began to go to church with different people. Now my aunt

was a workaholic. She didn't go to church per se; she was a good person. She just worked too much, and she was a single mother with three kids, you know. She had two of her own, and I was the third. She was a workaholic, and growing up in the Compton, Los Angeles area, there was a lot of violence, a lot of drive-by shootings, gang violence, everything. It was definitely a difficult time.

Dr. Hillyer: You actually were physically affected by the drive-by shootings. In fact, you were actually hit by a bullet.

Dr. Tate Moore: Yes, by bullets! I was at bible study. Who gets shot by at bible study? This kid! It was at a home bible study in an area of Compton called fruit town. We had bible study at a house, and there was a drive-by. It was around the 4th of July, and it was in the summertime. Usually, when you hear the popping, you know to get on the ground, but because it was around the 4th of July, we were thinking, "Oh, it's fireworks." Well, by the time we realized it wasn't fireworks, it was too little, too late. The bullet hit me in the back. A little bit to the right of my spine. It was actually a miracle because the bullet came through the wall, through the sofa, hitting me to the right of my spine. It didn't hit my spine, and it hit the right pair of spinal muscles. When the paramedics came, they were astonished, and they were amazed that I was up walking around. They were like, you should be paralyzed or worse. We need to take you to Martin Luther King hospital, and I was like, "No." At that time, it did not have a good reputation because by the time people went there, they were really in bad shape, and they tended to die. I knew better than to go there at that time. So, I refused medical care; of course, I was a teenager, so they let me. I did okay. They packaged me up; they put on a pressure dressing, and I was later seen at Kaiser that day.

"Well, by the time we realized it wasn't fireworks, it was too little, too late. The bullet hit me in the back. A little bit to the right of my spine. It was actually a miracle because the bullet came through the wall, through the sofa, hitting me to the right of my spine. It didn't hit my spine, and it hit the right pair of spinal muscles. When the paramedics came, they were astonished, and they were amazed that I was up walking around."

As a physician and as I've been doing some interviews as an adult. As I've been answering a lot of questions, and I think because it went through the wall and went through the sofa, it slowed down, and it partially went in. I think that that kind of slowed down how deep it went into me. I ended up walking with a cane for a few weeks, and I didn't have a lot of damage. At that point in L.A., there was a lot of violence. I was even in Roscoe's Chicken and Waffles when it was held up at gunpoint; I wasn't shot or anything, but it was two of my girlfriends and me. We were at the Roscoe's off of Manchester and Maine, and it was held up at gunpoint. We were just sitting there eating. There was just a lot of violence going on at that time. We lived off of 120th between Central and Avalon, and my aunt's boyfriend was mugged at Willowbrook Park, and he was shot walking through the park.

"When I went to that school, they refused to test me, they refused to put me in the honors program, and they refused to even give me an elective. They told me the only elective that they had was for me to work in the cafeteria."

At that point, we moved from L.A. to Garden Grove. I did my Junior year at Garden Grove High School. That was the year I experienced the epitome of educational racism. I had been in the GATE program and the honors program. When I went to that school, they refused to test me, they refused to put me in the honors program, and they refused to even give me an elective. They told me the only elective that they had was for me to work in the cafeteria. I was like, "Wow," and then they said, "Okay, we're going to put you on the basketball team." I'm like, I'm a cheerleader. I didn't know how to play basketball. But I shadowed shattered stereotypes; I proved to them that all Black people cannot play basketball. I sucked terribly; I was worse; I was absolutely terrible. I think I made one basket the whole season. So, I shattered stereotypes left and right. My English teacher was like, "Oh, wow, you can write." My chemistry teacher was like, "Oh, you're not like the other Black kids; you actually know how to do chemistry."

I told my aunt; I don't care what I have to do; I'm going back to Lynnwood. I will sleep on my other auntie's floor, but I am not graduating from this school. I said you can keep this house, and you can keep the room. I went and stayed with my other auntie. I left my auntie Mae in Garden Grove. I went back to Lynnwood, so I could graduate from Lynnwood High School because I said I'm not graduating from this school. That was my evolution. Realizing, wow, I can't believe this is as bad as this is right now. When I went back, I was able to pick back up. I was captain of varsity cheer, and it was like nothing had happened. They were like, "Hey, welcome back, Tiffanie, let's go." I graduated and went on to U.C. Santa Barbara, and everything was great.

"So, I'm hearing what fueled you as a child, and a young adult, the resiliency that you had developed in that period of time. Then you went on to become an OB-GYN and a Surgeon."

Dr. Hillyer: So, I'm hearing what fueled you as a child, and a young adult, the resiliency that you had developed in that period of time. Then you went on to become an OB-GYN and a Surgeon. I think at that point in time is when most people take a deep breath and say we've achieved what we've wanted, but it hasn't been smooth sailing for you in that department either. Can you tell me

a little bit about that?

"Yes. I just knew I had made it. I was a partner physician. I was just, I had made it in my groove. I was like, I hit my stride. I had just turned 40. I was walking out of a trailer, and my ankle rode, and my foot slipped through a step, and I did a swan dive onto the concrete. I fell face forward onto the concrete, and the concrete won."

Dr. Tate Moore: Yes. I just knew I had made it. I was a partner physician. I was just, I had made it in my groove. I was like, I hit my stride. I had just turned 40. I was walking out of a trailer, and my ankle rode, and my foot slipped through a step, and I did a swan dive onto the concrete. I fell face forward onto the concrete, and the concrete won. I injured both wrists, I injured both knees, I injured both ankles, and as I lay on the concrete struggling to get up, I was just like I think my life has just changed. I didn't want to believe it; as I struggled to get up off the concrete. My phone had flown across the parking lot because this was in the back of the hospital; I was like, this is terrible. I had to hobble up to go round on my patients, and the nurse made an ice pack to put on my wrist. I couldn't round on my patients. The oncoming physicians had to round on my patients, and I had to go to urgent care to be seen. I just knew my life; it was going to change.

I was in denial for two years. I had braces on both of my wrists, both of my knees, [and] both of my ankles. I had steroid shots and all of those joints for about two years. I went through physical therapy, and when the pain got so bad that I couldn't take it anymore, I finally had surgery. I talked to the chief of the department, and I said I needed surgery. I was trying to minimize my time away from my patients, and it was probably not the smartest thing that I did because I was prioritizing my patient's health over my health. Usually, when you have surgery, you take a good six months to recover when you have knee surgery. I was trying to do three months, and I was trying to batch my surgeries because I knew I needed so many surgeries. I needed both knee surgeries, and both wrist surgeries, and a left ankle surgery. I was trying to hurry up and get back to work, and so I figured if I did right knee surgery and three months later do a left knee surgery and three months later do the right wrist surgery and three months later do another a wrist surgery as opposed to doing six months, six months, six months. I was again just trying to hurry up and get back to work for the sake of my patients because patients they want to see their doctor; they don't want you in and out, in and out. It's hard to provide continuity of care when you're in and out and in and out. I didn't think that was fair for my patients, and I was so focused on what was fair for my patients. I wasn't thinking about what was fair for me in my own health.

So, after I had my first knee surgery, everything went so well; my surgeon was like, "Oh, okay yeah, we can do that next one in three months." I was thinking, okay, well, that'll be good because that'll still give me three months for the other knee to still be recovering. I'll also have three months for that other knee to recover while this knee is having surgery.

Well, ten days after my second knee surgery, I ended up in the emergency room, unable to breathe. Twenty-four hours later, they were like, okay, well, we think you're going to be able to go up [and] go home. They did a P.E. workup; it was negative. They took me off of oxygen, and when I tried to get up and walk, I became dizzy, I became lightheaded, and my oxygen saturations they continued to fall; they went from the '80s to '70s to '60s. Then they called the respiratory code, and the nurse came in, and she put me on a nasal cannula, and they continued to fall, and they had to put me on a face mask. They continued to fall, and they were like, okay was, they were debating on whether or not they were gonna have to intubate me. Basically, they ended up diagnosing me with acute post-operative pericarditis. I'm like, geez, can I catch a break. I ended up being hospitalized for four days, [and] three nights, being on chronic steroids and aspirin therapy.

Things like that, and I was just like, okay, but that still wasn't enough for me. I said, "Okay, well, instead of having my wrist surgery in three months, I'll have it in four months; I'll give myself an extra one month instead." So, see, I was still a knucklehead. I was like, "Okay, well, instead of having my surgery in three months." Still going to be a hard charger, so we'll have my wrist surgery in four months instead of three months, and my surgeon was like, "Okay, she's a doctor. She knows what she's doing." I wasn't a bright doctor because I was still trying to get back to my patients. I was all about getting back to my patients, and I went ahead and had my wrist surgery. It turns out that because I was on that chronic aspirin therapy after they did my wrist surgery, my bone wouldn't heal from the pericarditis therapy. It caused delayed bone healing that required me to be in a cast for a prolonged period. So, I ended up with a frozen wrist joint for my right wrist. I ended up with [a] permanent frozen right wrist joint. I lost [the] function of my right wrist.

Dr. Hillyer: Wow, that is a crazy time period that I'm listening to, and I can still hear the sorrow in your voice about this time. Was this also around the time of COVID when things were shutting down?

Dr. Tate Moore: Well, this was from 2016 to 2017 to 2018, so this is all from that period 2018. They retired me on the 20th of January 2019, so this is right before COVID. Is when they retired me say that you retired me right before COVID.

"I can only imagine the sorrow, possibly depression, that you can go through during this time, and is this the time that you start picking up that pen and paper and start putting these poems on paper?"

Dr. Hillyer: So now you've had this extremely traumatic event happen that has changed the course of your life. You're now getting ready to come up into the period of time where COVID is starting to lock us down. I can only imagine the sorrow, possibly depression, that you can go through during this time, and is this the time that you start picking up that pen and paper and start putting these poems on paper?

" I would say in January of 2019 when they retired me. First, I went through my little stages of grief; first, I went through denial. I was ready to fight it; I didn't want to accept it. I went through my denial phase, then when I realized that I couldn't fight it. I went through my depression stage. "

Dr. Tate Moore: I would say in January of 2019 when they retired me. First, I went through my little stages of grief; first, I went through denial. I was ready to fight it; I didn't want to accept it. I went through my denial phase, then when I realized that I couldn't fight it. I went through my depression stage. When I went through my different depression stages, I began to eat my way through and have my pity party. I just couldn't believe that God would bring me through everything God had brought me through to leave me. I'm like, "Okay, Lord, how could you let me make it through everything you brought me through and leave me at this point. How dare you, the audacity." I was angry. I had to come to Jesus, I was like, no, you need to come here, and we need to have a Powwow because I was hot, I was livid, I was angry. I was like, "Nah, Jesus" you coming in; come on, we need a one-on-one because I was not happy. I needed to let him know, and he was like, okay, are you finished, Tiffanie, because I have some words for you, are you finished now; I hope you're done. He gave me my couple of months, and he let me pack on my pounds. He said, "Okay, you finished, sweetie, all right, get up off your butt, exercise, and lose all the weight that you put on because I didn't give it to you. You did that to you, now get to moving, sweetie, exercise you put it on, you get it off. I want you to think about all the stuff that I've done for you. Yes, think about everything that I've done for you and write about it. Write about how good I've been. That's right, yeah, remember all the stuff I've done for you, write about it. Think about it and write about it."

"When I would wake up in the middle of the night, I would write. It was hard. Whenever I couldn't sleep, I would write. When I would wake up in the middle of the night, I would write. I would write myself to sleep. I would write myself awake, and it would help me go back to sleep."

In my little memo section of my iPhone that's where I wrote most of my poems. I went back because my hands didn't work, so my memo section of my iPhone. Most of my poems are written in the memo section of my iPhone; I wrote. In the middle section of my iPhone, I wrote my poems because I couldn't sleep; most of my nights were sleepless nights. I wrote my phone in the memo section of my iPhone when I couldn't sleep. When I would wake up in the middle of the night, I would write. It was hard. Whenever I couldn't sleep, I would write. When I would wake up in the middle of the night, I would write. I would write myself to sleep. I would write myself awake, and it would help me go back to sleep. It would make me feel better.

When George Floyd happened, I would write. Whenever I felt emotional, I would write. I found that writing made me feel better, and I began to have this catharsis. It helped me to essentially come up and come up out of the depression. To realize that I am more than my job. It doesn't matter that I'm not a doctor. Being a doctor didn't define me. I was more than a doctor when I was a doctor; I was still a mother, and my kids still love me. I still have value even if I can't practice medicine, even if I can't be a surgeon. It was important for me to realize that, and I needed to show myself some compassion. A lot of times, we give compassion to everyone else, but we don't show ourselves any compassion. I had not shown myself any compassion. All I could think about was the things that I did wrong. It didn't help that I had a partner who put me down and made me feel bad.

Dr. Hillyer: So, you had to struggle back. Talk to GOD. Find a new direction. What does this book, or what do you hope this book will give directions for others?

"Being a doctor didn't define me. I was more than a doctor when I was a doctor; I was still a mother, and my kids still love me. I still have value even if I can't practice medicine, even if I can't be a surgeon. It was important for me to realize that, and I needed to show myself some compassion. A lot of times, we give compassion to everyone else, but we don't show ourselves any compassion."

Dr. Tate Moore: I hope that it will encourage people and let them know that even in their darkest hour, they are not alone. Even when things look bleak that there's still hope for tomorrow. No matter what, as long as there is breath in their body, that they can keep going on, that they can persevere. I'm no more special than they are. So, if I can keep going, they can keep going too. Because I thought I had made it, and I was knocked off my little pedestal. So, if I could keep going, they could keep going too.

Dr. Hillyer: Excellent!

Then you use that hope, by I feel, to build your three sections. Can you tell me about the three different sections of your book?

Dr. Tate Moore: Yes, I have a section on life. The Life section is just about everyday things in your community, your family, politics, and even taxes. Black Lives Matter movement, just policy,

just different things that you encounter just about day-to-day life. Then there's love: the ups, the downs, the good, the bad, the ugly because love truly is a roller coaster. It takes you on a ride. Sometimes it's bliss, sometimes it's rocky, and sometimes it is absolutely terrible, but sometimes it's fun. But it's always worth the ride. Then there's the Liturgical section. The liturgical section is the spiritual side. If you've ever longed for a relationship with God or you wonder where God is, this is the section that's going to make you think and reflect on your spiritual side.

"Then there's the Liturgical section. The liturgical section is the spiritual side. If you've ever longed for a relationship with God or you wonder where God is, this is the section that's going to make you think and reflect on your spiritual side."

Dr. Hillyer: Your poems cover a wide range of topics from race to politics to police brutality. Was there any poem in particular in which you were concerned about publishing?

Dr. Tate Moore: Well, I was concerned about "*Dear Officer*" because there was so much going on with the Black Lives Matter movement at that time. I think, now, in light of the recent shootings. I think my poem "*The Skin You Are In*" is more relevant because of the mass shootings that are taking place because of people's color, which, again, our country just really needs to re-evaluate what we're doing. No one is pure anything. We're all a hodgepodge mixture of everything; everybody is everything. No one has any control over what color they came out [or] what their chromosomes are, and that's just the reality of it. I think that we really need to re-evaluate what price we want to put on a person's skin color. What value and credibility do you want to place on a person's color and creed. I think we just need to take a look at how we're raising our children and what type of values we are teaching them because racism and hatred are something that is taught. It's nothing that is inherent, and there's nothing that people are born with.

Dr. Hillyer: Absolutely, and you have no problem, as I was reading through the different poems taking on some of these charged topics. One of the topics that I would say, most recently, is Roe vs. Wade. As an OB-GYN, as a mother, and as a survivor of multiple traumas, how do you think you would start a poem for those that are in having emotional turmoil while politics is doing this tug of war with Roe vs. Wade?

Dr. Tate Moore: I would entitle it "*A Choice*."

Please don't take away my choice.

Please don't take away my voice.

Please don't take away what I want to do to my body. It is not your right to choose because it's something that the world will lose.

If we have to resort to pushing women; or women throwing themselves downstairs. It is something for everyone to care.

Please, Please don't take away my voice.

Please, Please don't take away my choice.

Dr. Hillyer: I love it. Thank you for sharing that and coming up with that right on the spot; that's amazing. I'm so thankful for these 108 poems in which you're able to lend your voice. If you have a chance to write another book, will your life journey be reflected in that book?

"I'm so thankful for these 108 poems in which you're able to lend your voice. If you have a chance to write another book, will your life journey be reflected in that book?"

Dr. Tate Moore: Actually, I have a children's book coming out later this year, and it is called "*Bad Touching*." It is a poetic illustrated children's book encouraging children to talk about and report verbal and physical abuse. It is, unfortunately, based partially on my upbringing as a child.

"The amount of trauma that I hear, the resiliency that you have, and the things that fueled you. You had to re-evaluate, you had to pivot, you had to make new developments in a direction. I'm very appreciative that you've been able to bring together a collection of works to help bring directions for others."

Dr. Hillyer: The amount of trauma that I hear, the resiliency that you have, and the things that fueled you. You had to re-evaluate, you had to pivot, you had to make new developments in a direction. I'm very appreciative that you've been able to bring together a collection of works to help bring directions for others. Is there anything you would like to say to our audience, one last big moment of inspiration?

Dr. Tate Moore: I would say, don't be surprised because God can always turn your ashes into beauty. If you give him the opportunity. So, always put your best foot forward. Always keep trying, always keep persevering. As long as there is breath in your body, life can get better.

"I would say, don't be surprised because God can always turn your ashes into beauty. If you give him the opportunity. So, always put your best foot forward. Always keep trying, always keep persevering. As long as there is breath in your body, life can get better."

Dr. Hillyer: Thank you, Tiffanie. Thank you so much for joining us on today's segment of Neonatology Today Media.

Dr. Tate Moore: Thank you for having me.

Disclosure: Dr. Tate Moore is the author of FloweTry: A Collection of 108 Poetic Flows on Life, Love, and Liturgical Issues

NT

About the Author: Kimberly Hillyer, DNP, NNP-BC:

Title: NT News Anchor and Editor

Title: Neonatal Nurse Practitioner & News Anchor, Editor for Neonatology Today

Organization: Loma Linda University Health Children's Hospital

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Bio: Kimberly Hillyer, RN LNC, NNP-BC DNP, completed her Master's degree specializing as a Neonatal Nurse Practitioner in 2006 and completed her Doctorate of Nursing Practice (DNP) at Loma Linda University in 2017. She became an Assistant Clinical Professor and the Neonatal Nurse Practitioner Coordinator at Loma Linda University. Her interest in the law led her to attain certification as a Legal Nurse Consultant at Kaplan University.

As a Neonatal Nurse Practitioner, she has worked for Loma Linda University Health Children's Hospital (LLUH CH) for twenty years. During that time, she has mentored and precepted other Neonatal Nurse Practitioners while actively engaging in multiple hospital committees. She was also the Neonatal Nurse Practitioners Student Coordinator for LLU CH. A secret passion for informatics has led her to become an EPIC Department Deputy for the Neonatal Intensive Care at LLUH CH.

She is a reviewer for Neonatology Today and has recently joined the Editorial Board as the News Anchor.

About the Author: Dr. Tiffanie Tate Moore

Originally from Compton, California, Tiffanie Tate Moore, M.D. is a Christian, mother, servant, listener, and medical doctor who now resides in the Inland Empire.

Her interest in becoming a physician began in middle school while volunteering with her church to help the homeless in Los Angeles. She saw people who were both hungry and sick. She wanted to do more than serve food. She wanted to help them in a meaningful way.

With love for science and math, she applied herself fully in school. This was not easy as she had many distractions. Both of her biological parents were addicted to drugs. And while she had never met her father, she had heard that he was homeless and could not help but wonder whether her father was one of the homeless she and her church were helping. With the loving support of her maternal family and, specifically, her maternal Aunt Mary Montgomery, known as "Auntie Mae, Momtee," Tiffanie received the love, support, and stability she needed to thrive.

Dr. Tate Moore earned a Bachelor's degree from the University of California, Santa Barbara, and a Medical degree from Meharry Medical School in Nashville, Tennessee.

She has served as a medical officer in the United States Navy during the Global War on Terror and as an obstetrician/gynecologist in Tennessee and California.

Dr. Tate Moore has served the local community, in her local church, and with her sorority in the numerous places where she has lived.

She began writing the poems in FloweTry, as she sought to heal from numerous surgeries caused by an accident, which caused her to retire as an obstetrician/gynecologist.

She has two spectacular children in college—Nathaniel and Mia. She enjoys singing, traveling, and spending time with family and friends.

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Implementation of High-Reliability Organizing (HRO): The Inherent Vice Characteristics of Stress, Fear, and Threat

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

Abstract

High-Reliability Organizations engage threats and adversity to maintain reliable operations. Human stress, fear, and threat responses drive safe and effective engagement of environmental threats. The executive functions integrate perception from opposite ends of the brain, hastily created plans, and motor activity. During a crisis, the hypothalamic-pituitary-adrenal (HPA) axis enables survival behaviors by releasing cortisol to "disarm" the executive functions. Novelty, uncertainty, and uncontrollability, in the domain of the executive functions, cause stress responses. Fear reactions at the subcortical level maintain a safe distance from the threat. Threat reflexes rapidly initiate protective behaviors. However, these same responses, when unmodulated, can harm the individual. The prevalence of unmodulated stress, fear, and threat makes them appear unpreventable, if not normal. This is the inherent vice of stress, fear, and threat. By describing their function and location in the brain, we can identify these behaviors to begin modulation for effective responses to threats.

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Introduction

Stress research and the consequences of stress focus on uncontrollability. Interventions focus on adding a sense of controllability by limiting exposure to uncontrollability or increasing controllability through rules and algorithms. These approaches, almost the foundation of risk management and management science, disregard the function of stress responses and the adaptive neurohormonal responses in the brain. The final product of stress is allostasis. Withdrawing from threat or adversity or seeking external authority such as executives, administrators, or experts also withdraws from experience. We lose the learning and development necessary to extend neonatal care to improve lives or healthcare to improve society (1).

Safer environments relax the selection pressure on behaviors necessary to survive, if not thrive, in a hostile or adverse environment. Suites of behaviors that developed for survival may remain in the repertoire of human behavior but modulate due to social custom. The loss of some behaviors has permanently modified other behavioral suites (2, 3). One residual effect is the transfer of fear from a physical object, such as a predator, to an idea, the fear of the predator. This effect creates the ecology of fear where, for example, the idea has a more destructive effect than the threat itself (4). We need only look at hospital programs for error prevention. The consequences of the criminalization of a medication error and the subsequent conviction of a registered nurse (5) have created a new ecology of fear.

"We need only look at hospital programs for error prevention. The consequences of the criminalization of a medication error and the subsequent conviction of a registered nurse (5) have created a new ecology of fear."

Stress, fear, and threat prepare the brain for adequate cognition and drive safe and effective engagement with that adversity. Not recognizing these strengths shifts the research and conversation to the unmodulated damage stress, fear, and threat can cause. This lack of acknowledgment is the inherent vice of stress (6). Karl Weick (7) described failure as not acting that the failure is not only invisible but also becomes organizational knowledge. The inherent vices from stress, fear, and threat also lead to not acting, and the behaviors to avoid threats have become organizational knowledge.

Relaxed Selection and Conserved Stress

Survival and defensive behaviors observed in mammals, particularly prey species, can be observed in humans, though in a relaxed form. These are *conserved behaviors;* those behaviors are passed down from ancestral lines. Functionally evolved for imminent physical danger, the stress-fear-threat cascade today reacts to thoughts and perceptions and can be modulated by thoughts and perceptions.

While the conserved stress system inhibits top-down cognitive control and enhances bottom-up reflexive actions, modulation by human executive processes can move mental processes toward effective cognitive flexibility.

Relaxed selection occurs when an environmental demand or threat is removed, relaxing selection pressure and altering the original suites of behavior (8). This concept is similar to animal domestication, which introduced domesticated traits unsuitable for survival in the wild (9). The relaxed selection for stress, fear, and threat alters the need for the motor and somatic components, yet the appraisal and motivational components may remain unaltered.

Viewing stress, fear, and threat responses in light of a relaxed selection of conserved behaviors allows us to discuss maladaptive behaviors objectively. We can identify the distinct effects of stress, fear, and threat. Stress impedes memory recall and working memory. Fear drives conscious self-protective behaviors. Threat reflexes, though not preventable, need not be sustained.

Executive Functions

Effective action responding to a changing environment integrates perception, hastily created plans, and motor activity from opposite ends of the brain. The *executive functions*, acting hierarchically, coordinate temporary behavioral structures and "integrate actions with perceptions in the presence of novelty and complexity" (10).

"Effective action responding to a changing environment integrates perception, hastily created plans, and motor activity from opposite ends of the brain."

The executive functions support motor attention, working memory, and inhibitory control:

- *Motor attention* to preparing for impending motor action – "memory of the future" (10)
- *Working (short-term) memory* for sensory stimuli mediates perception and action toward a goal in real-time (10)
- *Inhibitory control* protects goal-directed behavior from interference, distracting information, and impulsive or reflexive behavior (10); inhibits emotional memories (11, 12), well-established habits, and more easily processed intuitions (13).

Working memory has the attribute of rapidly 'forgetting' information as the motor actions evolve. During the action, we must release memories as we continually bring new things into our memory. Inhibition allows one to inhibit thoughts or prepotent responses, allowing selective attention to task-relevant information and engagement of goal-directed actions. Working memory refers to keeping the information in mind and updating/integrating current content with new information. Cognitive flexibility is the ability to shift between cognitive rules or modes of thought (14).

Anatomic location. The dorsolateral prefrontal cortex (DPFC) and the posterior parietal cortex (PPC) functionally cooperate during time-based contingencies between continuous perception and emerging motor action (10, 15). The DPFC mediates internal and external stimuli for *inhibitory control* (10).

Problems

We work with other people's executive functions. At all levels of operations, we can *identify* what is happening, then *interpret* with *our* expertise for salience and relevance, and *translate* it to give relevance to *their* expertise. We can use concrete words and action verbs for *motor attention*. By "chunking" information, we compress memory elements *working memory* rather than increasing elements by splitting ideas. Observing a person struggling with stress, fear, or threat, we support their *inhibitory control* by decomposing goals into more easily attained objectives and reducing distractions.

The brain's response to stress constrains executive functions and impairs abstract thought. During an emergency, using abstract words sends messages to areas of the brain impaired by stress. Motor attention initiates action – we think by acting. Motor cognition comes from the coupling of perception and action. The *sensorimotor neural network* processes sentences with concrete nouns and words as well as abstract words but with a preference for concrete terms (16). *Motor abstract* words will activate motor areas while visual abstract words elicit higher visual area activity (17). Concrete, active words facilitate action while abstract words tend to generate thinking, a problem in a stressful situation.

What not to do. It is common to hear "Don't do that!" rather than what *to do.* The brain processes verbs faster than nouns. Action verbs affect overt motor performance dependent on timing, interfering with a reaching movement in progress within 200 msec. The same words processed *before* movement will *assist* the movement (18). This action, fortunately, is category-specific. A quick shout to move a hand causes hands to move and not random body parts (19-21).

Descriptions become valuable packets of information that carry information, drive decisions, and frame the situation—a*rticulate*, *objective*, *succinc*t descriptions package situations for action.

In the first years of the paramedic program, emergency physicians often did not know what equipment paramedics carried, their capabilities, or what actions they were authorized to do (personal experience, DvS). This led to orders such as D5W boluses for hypovolemic shock. The physician who trained the paramedics, Ron Stewart, MD, taught the paramedics to give articulate, objective, succinct descriptions. If the discrepancy continued, we were to increase the accuracy of our description. This becomes a trait, changing disagreements into "dueling descriptions" that, rather than producing tension, produce ever-increasing accuracy. One thoracic surgeon, discussing his fellowship training, described why the surgical attendings did not like late-night calls from one of the fellows. He would obtain all necessary information and give an accurate description. The reason for the apprehension – was that the attendings asked for tests, not because they needed the results, but because it gave them time to think. The author remembered that whenever someone ordered a late-night chest x-ray.

"One thoracic surgeon, discussing his fellowship training, described why the surgical attendings did not like late-night calls from one of the fellows. He would obtain all necessary information and give an accurate description. The reason for the apprehension – was that the attendings asked for tests, not because they needed the results, but because it gave them time to think."

Stress

Causes. Novelty, uncertainty, and uncontrollability, in the domain of the executive functions, cause stress responses (22, 23). Uncontrollability alone causes minor stress to impair executive functions (24).

Functions. Cortisol inhibits memory recall in select memory systems while enhancing habit memory and learned behaviors. Cortisol also selects memory formation and transforms threat reflexes

into learned behaviors. The stress response functionally inhibits the executive functions.

Anatomic Location

The amygdala activates the sympathetic-adrenal-medullary (SAM) axis for the proverbial "flight-or-fight" response and the hypothalamic-pituitary-adrenal (HPA) axis for the release of peripheral adrenal hormones, including cortisol (25). Cortisol blocks memory retrieval in the prefrontal cortex and hippocampus (memory center), and the amygdala directly inhibits the prefrontal cortex

- Novelty is processed in the right and left cerebral cortex processes familiar perceptions.
- Uncertainty and ambiguity in decision-making occur in the ventromedial prefrontal cortex (vmPFC). The vmPFC is also involved in making decisions in uncertainty (26); see below.
- Uncontrollability or unpredictability is the stimulus for the HPA axis.

"If unrestrained neurological stress responses develop, then almost pure bottom-up control and self-preserving behaviors occur. Cortisol and the amygdala increasingly suppress the executive functions, and a defense cascade follows (27). "

Problems

If unrestrained neurological stress responses develop, then almost pure bottom-up control and self-preserving behaviors occur. Cortisol and the amygdala increasingly suppress the executive functions, and a defense cascade follows (27). Threats that are proximal (static distance) or approaching (changing distance) will mobilize one to move toward safety or fight in self-defense if escape is impossible.

Even though intuitions and scientific thoughts are abstractions, the loss of executive functions means that intuitive thought is not inhibited. Because intuitive responses are mentally faster than scientific responses, childlike misconceptions emerge, and the individual begins thinking in intuitions and superstitions. Without cognitive inhibition by the executive functions, intuitions during a crisis can predominate over scientific thought (28).

Novelty, uncertainty, and uncontrollability have made stress responses a normal part of operations. This unrecognized stress increases staff attrition and costs while compromising reliability and safety.

Novelty. We can find something familiar in any new situation, starting at that point. We can use metaphors for description and analogies for analogical reasoning. Metaphors carry meaning and assist interpretation when the person using the metaphor must experience the word or phrase. Analogies have greater applicability to support interpretation and reasoning when the comparison has plausibility, increased similarities, and correspondences between domains. Without analogical strength, the metaphors and analogies become thought-terminating cliches (29). We cannot describe or argue against a metaphor or cliché.

Becoming a "slippery slope." The authors have traversed, ascended, and descended slippery slopes. This involves a good description of the slope and conditions along with knowledge of the equipment and capabilities of those in the team. Unskilled, unprepared, and ill-equipped people are best advised to leave slippery slopes to those with the necessary experience – whether on a climb or as a cliché. The cliché may be the ultimate slippery slope.

Uncertainty. Collecting more data and information to reduce variance is counterproductive in a red noise environment. On the contrary, more information increases variance and uncertainty.

Early in his career in the fire rescue ambulance, one of the authors (DvS) learned the safety and strength by saying, "I don't know." As opposed to the thought-terminating cliché, the phrase would initiate investigations and generate learning. In healthcare, the phrase brought doubt about one's abilities. Compared to operations in dangerous contexts, certitude tends to bring more respect (30). One new attending told the author that the attending should always know the answer. Senior attendings would simply say it confidently, giving no opportunity for correction.

Reductionism is another way to address uncertainty. Red noise has long period forcing functions. Interacting frequencies develop autocorrelations. New properties emerge from nonlinear interactions. It is not only uncertainty but uncertainty in flux that we engage. Reverting to the originating elements, reducing events to basic measures, gives the tractability that reduces stress, but at the price of mistranslations.

"New properties emerge from nonlinear interactions. It is not only uncertainty but uncertainty in flux that we engage. Reverting to the originating elements, reducing events to basic measures, gives the tractability that reduces stress, but at the price of mistranslations."

Abstractions can be lifted from any situation. We cannot argue with abstractions. We cannot measure or act on abstractions. By design, abstractions fit any situation, misleading and arresting our sensemaking (31). Substituting abstractions into context can be deadly.

Controllability. The sense of control comes from how we choose and interpret our actions. When people used pencils for examinations, one of the authors (DvS) asked the residents why they brought five sharp pencils to the exam when one dull pencil would suffice. The degree of stress experienced by consulting physicians in an ICU room could be observed by how often they turned the display knob on a mechanical ventilator. They would observe the chest, turn the knob, read the numbers, observe the test, and repeat. What they saw on the ventilator was not a new setting but different displays.

Controllability is an inherent vice of command and distinguishes leadership authority from command authority. The leader creates a safe space for subordinates to operate, liberating behavior for effective operations. A firefighter quoted Capt. As they approached a structure fire, Bill Corr said, "OK, men, do your stuff." Uninformed command authority controls the behavior of subordinates, reducing the commander's stress while creating stress for subordinates. Karl Weick (personal communication) defined micromanagement as attending to details but without context.

Constraint on action is an inherent vice of rules and algorithms.

Rules and algorithms can free space in working memory, identify safe actions, and create boundaries for safety. Rules, however, can compete or conflict; a forcing function opens space between rules. The performance of an expert who follows the rules will deteriorate (32-34).

Error management is an inherent vice of risk management programs. Behaviors to reduce risk include "doing everything through channels," "refer all matters to committees," which should be "as large as possible — never less than five," "advocate caution," "urge your fellow conferees to be reasonable and avoid haste," "worry about the propriety of any decision — raise the question of whether such action as is contemplated lies within the jurisdiction of the group or whether it might conflict with the policy of some higher echelon," and "apply all regulations to the last letter."

The recommendations quoted in the previous paragraph exemplify a "type of simple sabotage' that requires "no destructive tools whatsoever and produces physical damage, if any, by highly indirect means." During World War II, the United States Office of Strategic Services (OSS) contributed to undermining industrial efforts by teaching these "simple sabotage" methods to civilian workers in occupied Europe (Office of Strategic Services 1944) (35). Executives and administrators commonly accept these methods as diplomatic means to prevent error and reduce liability (36).

"During World War II, the United States Office of Strategic Services (OSS) contributed to undermining industrial efforts by teaching these "simple sabotage" methods to civilian workers in occupied Europe (Office of Strategic Services 1944) (35). Executives and administrators commonly accept these methods as diplomatic means to prevent error and reduce liability (36)."

Predictability. Inference to know if therapy will succeed or the course of a disease commonly follows scientific logic and probability statistics. Modal and paraconsistent logics replace scientific logic (37, 38). We cannot develop probabilities because we do not have a Gaussian distribution in red noise environments. When families and staff asked one of the authors (DvS) the percent chance of survival, he answered, "Our job is to turn a 20% survival into a 30% survival, then into a 50% survival, and do this until it is over."

For an HRO, the prediction comes from what we can influence and the team's capabilities rather than what the circumstances tell us.

Fear

Fear reactions and threat reflexes. We use Joseph LeDoux and Daniel Pine's (39) description of "fear" as a conscious, subjective feeling generated in *cortical regions* of the brain. Therefore, fear is amenable to conscious interpretation, and consequently, the individual can modulate what we call "fear reactions." The objectively observable behavioral and physiological responses involve *subcortical regions*. The initiation of these responses occurs at levels below one's awareness but can be modulated if the individual is sensitive to their presence. While acknowledging the ability for modulation, we call these actions "threat reflexes" because the subcortical generation of the initial behavioral or physiological response cannot be prevented.

Though the initiation of threat reflexes is below the level of awareness, once in progress, the individual has awareness and often control. This distinguishes threat reflex behaviors from emotional fear reaction responses. We recognize that our extensive *in vivo* experiences may differ from academic publications. However, knowing the differences is vital to reaching a safe outcome during such an engagement.

"Though the initiation of threat reflexes is below the level of awareness, once in progress, the individual has awareness and often control. This distinguishes threat reflex behaviors from emotional fear reaction responses."

Causes. Proximity in time or space of a threat or an approaching threat.

Function. Fear motivates a person to act to reduce the potential danger from a threat. While it is common to discuss fear as a predator-prey interaction, it is more beneficial to view fear as a motivating drive that protects one's physical, mental, and emotional self from attack or collision (40).

Fear reactions are conscious sensations experienced when exposed to an imminent threat (39, 41). The amygdala sends signals to the brain's unconscious (subcortical) and conscious (prefrontal cortex) regions, accounting for the uncontrolled fear responses and the feeling of fear. The emotional response of fear is to diminish danger (42), creating the drive to avoid or escape, generally focusing on self-interest, self-protection, or protection of others.

Fear-flight is an escape reaction that increases the distance from the threat to maintaining a specific flight distance. Physically, we observe the individual running in a straight line, easily misinterpreted as "fleeing in panic."

In contrast to increasing distance by fear-flight, *fear-fight* is an escape reaction within the 'defense distance.' The individual fights in self-defense to enable escape. There is no further fighting once free of the threat.

Anatomic Location

The initial fear reaction is cortical. With increasing proximity of the threat, fear migrates to the midbrain.

The distant threat within the "flight distance," whether temporal or spatial, increases activity in the ventromedial prefrontal cortex (vmPFC), a region important for decision-making in uncertain, risky, ambiguous, or context-dependent conditions. The vmPFC uses conceptual information about specific outcomes to shape affective responses, such as determining a specific response that is most adaptive given the particular situation (43). The vmPFC connects to the amygdala for the determination of the motivational importance or degree of the threat (26). The amygdala connects to the bed nucleus of the stria terminalis (BNST) to control a repertoire of behavioral defensive states (44, 45).

The additional proximal threat will switch activity from the vmPFC

to the phylogenetically older midbrain periaqueductal gray (PAG) nucleus. The PAG identifies an approaching or receding threat to switch the repertoire of behaviors to fast reflexive behaviors functionally (e.g., fight, flight, or freeze) (40, 44, 46). This continuous switching within the PAG is a blend of the bottom-up responses to threats before they come to our awareness and top-down cortical neuromodulation from the vmPFC and the anterior cingulate cortex.

When the threat becomes proximal, we can observe increased PAG activity. This forebrain-to-midbrain switch is anatomically credible in light of descending connections between the vmPFC/amygdala and PAG

"Cognitive behaviors directed toward self-protection are organized into offensive and defensive actions. Offensive protections include prompt attacks, surprise, concentrated actions, fast tempo, and audacity to stop the spread of the problem."

Problems

Cognitive behaviors directed toward self-protection are organized into offensive and defensive actions. *Offensive protections* include prompt attacks, surprise, concentrated actions, fast tempo, and audacity to stop the spread of the problem. This aggressive projection of force secures the initiative but is pathological when directed toward people. The aggressor uses blame, accusation, and personal attacks.

Defensive protections come about when demands clearly and subjectively exceed a person's capabilities, performance, security, or survival ability. Ad hoc emergency plans will focus on personal survival or the person's sense of safety. The person may withdraw or move to a place of psychological or physical safety (42) – not going near the source of the threat, which could be the leader, an administrator, or a colleague. Whether a leader, administrator, or line worker, the individual keeps a safe distance from the situation, which impairs their ability to identify correlations or causations. As a result, rationalizations, analogies, clichés, metaphors, and abstractions are used to support reasoning, plans, and actions. The person will deflect, excuse, justify, or use prophylactic self-blame. This individual does not help protect others because of the primary focus on reducing their risk.

Intimidation through proximity. Social distance maintains a safe 'flight distance' or creates a sense of control. Social interactions or close physical proximity of a threatening person elicits the same reactions as any threat. Favorable or unfavorable social distance is subjective, but the peripersonal (i.e., near body) space is not. This is measurable space, where intrusion by others elicits discomfort and is encoded in the visual receptive fields of the ventral intraparietal area (VIP) and a polysensory zone in the precentral gyrus. Responses are sensitive to nearby or approaching objects. The VIP connects to the amygdala, then to the PAG for defensive and aggressive behaviors (40, 47).

Intimidation by countenance. The amygdala rapidly recognizes and processes facial expressions for safety. The instrumental use of countenance to intimidate is widely used. Another form of intimidation is to stare at the individual after a request, either by the superior or subordinate. After discussing this with others, one of the authors (DvS) then asked how people responded. One director of nursing answered quite succinctly, "Simple. I'm a woman. I'm used to being stared at. I stare back." Further exploration found this to be an effective response for those who use it.

Fear fight-or-flight. The proximity of the threat drives fear-flight. *Fear-fight* develops during the fear process to enable escape (48). Because humans can separate the motor and affective components of emotion, fear-flight can appear as physically leaving. Fear-fight, the self-defense fight, is a fight to escape and more likely consists of pushing, shoving, and poorly aimed punches. For the affective component, the person appears to avoid, ignore, or distract, perhaps by asking for more information (49). Verbal maneuvers include denial of a problem, dismissiveness of the individual's concerns, or depreciation of disconfirming information. Statements such as "Why wasn't I informed" or "The problem is that you complained wrong" are common. Fear fight for self-defense starts within the defensive distance to help the individual escape.

"Because proximity drives fear, the individual with extreme unmodulated fear has a narrow perceptual focus toward the threat and operates with severely concrete thinking. Concomitant stress from uncertainty and feelings of uncontrollability (hopelessness) generates a cortisol HPA response taking the prefrontal cortex 'off-line,' impairing cognition."

Because proximity drives fear, the individual with extreme unmodulated fear has a narrow perceptual focus toward the threat and operates with severely concrete thinking. Concomitant stress from uncertainty and feelings of uncontrollability (hopelessness) generates a cortisol HPA response taking the prefrontal cortex 'off-line,' impairing cognition. The reasoning is not practical. Physically, rather than running from the threat, the person escapes directly *toward* a safe place. There is no time horizon; only the fight focuses on escaping to run straight to a safe place. Once in safety, the affective and motor component is likely to cease.

Fear of decision-making. Fear can lead to more focused consideration for acting versus not acting and create a drive for more relevant information. In the red noise environment, however, more data and information will reduce variance, increasing possibilities. The situation will change, if not deteriorate while obtaining additional information. Avoiding decision-making becomes an inherent vice when it is instrumental for temporal distancing from threat, also discussed above as a method recommended by the OSS to sabotage factories. Reliance on "decision theory" for red noise environments is a form of distancing as the person creates structure (reduces novelty) and increases certainty.

When developing a new PICU, one of the authors (DvS) found resistance to making autonomous decisions from housestaff, nurses, and RCPs. In private discussions, all felt "the pit in their stomach." The author then queried veterans of major fires, riots, and military combat – all had that sensation during their first independent decision. This situation is like the first time an RCP or nurse decides to give a PRN medication without first check-

ing with someone. Physicians go through it. (See tonic immobility below.) The author decided to have staff make their first decision alone, which would be acted on without first reviewing it. However, "alone" meant alone in front of the author as a supporter. He had observed this from his fire captain, William J. Corr, who would ask individuals to give a plan, then he would act on that plan – startling those who had never experienced this approach. He always stood by, ready to comment to the individual if necessary.

One author (DvS) did this during a "low-risk" high-risk delivery, standing outside the delivery room as a hesitant intern received the newborn baby. Afterward, the intern released his anger for the abandonment, then calmed. The author explained he was outside watching and had confidence in the intern. After the episode, the intern began to engage in emergencies earlier with well-considered decisions.

To distinguish if the resistance came from lack of information or knowledge, undeveloped decision skills, or fear of decision-making, he would supply more information and decompose the problem into smaller elements. The decision did not matter at some point – now or in five minutes, 5 or 10.

Ron Stewart, MD, one of the first paramedic educators, trained paramedic students as if they were interns. "We didn't know how to train paramedics, so we trained them as interns" (personal communication and experience, DvS). He thought of sending emergency medicine residents to an EMS incident to model and support paramedic decision-making. He later remarked it was one of the worst decisions he made in EMS – the paramedics would wait for the resident to arrive, letting the resident make the decisions. The decision quality of paramedics had diminished.

"Removing decision-making from staff through comprehensive rules and protocols can decrease decision-making quality. Evaluation shifts from descriptive observation to identifying indicators for a specific rule or protocol."

Removing decision-making from staff through comprehensive rules and protocols can decrease decision-making quality. Evaluation shifts from descriptive observation to identifying indicators for a specific rule or protocol. Staff lose cause-and-effect for the action and pay less attention to outcomes since they "did everything right." This is a defense used by executives, administrators, and line staff.

Ecology of fear. Stress and fear can shape an ecology of fear (50) through linkage "to mere thoughts" (51). Fear responses can be generated by the *absence* of a predator (50, 52). In this way, a threat causes more significant damage by its absence than by its presence.

Threat

Causes. Imminent danger and existential threat.

Function. Reflexive action arises from subcortical structures for immediate response to threats before identifying the threat. These unconscious yet objective *threat reflexes* include the well-known fight, flight, and freeze reflexes (39).

Threat-fight is a survival fight; the person engages intending to disable or overcome the threat. Because it is intentional, the individual retains awareness, changes actions and behaviors, and may not stop after the threat is over.

In contrast to situations where the individual physically engages the threat, *threat-flight* rapidly increases the distance between the organism and the threat. The individual is cognizant of events, using reasoned and manipulative offensive and defensive protections.

Attentive freeze is the cessation of movement accompanied by attentive or hypervigilant awareness, allowing the collection of information necessary for effective action. The body is tense and poised to act, and the mind is watchful. Freeze is the brake on fight-or-flight reactions allowing one to learn more, avoid a fight, or prevent any futile flight to failure. Freezing is associated with faster subsequent cue-signaled responses (53).

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Tonic immobility, from the parasympathetic nervous system, is the initial response in many prey species, often accompanied by the evacuation of body contents to mimic carrion. (Predators do not notice immobile objects, nor do they routinely consume rotting flesh.) The person is "frozen" and, despite having muscle tone, *cannot* move (differing from attentive freeze). Full of fear but, despite awareness, consciousness, and emotional arousal, the person cannot call out or respond to pain (27, 54).

Startle reflexes give reflexive protection by rapid body movements to regain balance, change posture to protect vital organs, then quickly become poised for action. A stumble, a quick movement, and a sudden, loud sound cause the reflexive stumble. The common startle action is flexing into the fetal position for protection during a fall [55] or suddenly attending to a "distraction," often with a distinct vocalization. Mentally, one assesses information for the stimulus's salience, meaning, and relevance (55-57). Through convergent evolution, the startle combined the gait and postural balance reflexes with the acoustic startle reflex to protect the soft abdominal organs.

Emotional memory develops from a single, emotionally charged incident, preparing the individual for a similar circumstance. Emotional memory is the only way to learn a life-saving behavior from a single lesson.

Anatomic Location

The amygdala, prefrontal cortex, and the midbrain

The amygdala detects threats and then activates the sympathetic-adrenal-medullary (SAM) axis and the hypothalamic-pituitary-adrenal (HPA) axis, orchestrating the stress, fear, and threat cascade responses in the brain and body (25, 58).

- Cognitive consequences – direct inhibition of the prefrontal cortex and the executive functions
- Endocrine consequences – cause secretion of corticotropin-releasing hormone (CRH) from the periventricular nucleus

of the hypothalamus, CRH releases adrenocorticotropic hormone (ACTH) from the pituitary, ACTH stimulates the secretion of glucocorticoids from the adrenal cortex

- Autonomic consequences – activate the brainstem, which activates the sympathetic nervous system throughout the body

The midbrain periaqueductal gray (PAG) nucleus processes the subjective representation of threat and the degree to which it is felt. The PAG also coordinates behaviors essential to survival, including threat reflexes, rapid changes to subcortical behaviors, and the startle posture corrections (45).

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The vagus nerve mediates many of the features of tonic immobility: bradycardia (slow heart rate), life-threatening arrhythmias, decrease in respiration, nausea and vomiting, urination, and defecation.

Problems

The affective components are unrecognized manifestations of threat reflexes:

- The fight becomes anger or frustration.
- Flight becomes avoidance and distraction.
- Mental freeze becomes confusion, inability to recall knowledge, or loss of working memory.
- Attentive freeze becomes immobility with intense attention, while the mental freeze is the inability to recall knowledge or use working memory
- Tonic immobility prevents physical movement despite awareness of surroundings, but milder presentations are intense aversion, gastric upset, or nausea.
- Startle reflex scream, an involuntary jerk or "start."
- Emotional memory is a severe response independent of and disproportional to the event.

"If you feel your eyes glaze over – slow down," William J. Corr, Capt, LAFD; US Navy veteran, WWII South Pacific

Threat fight-or-flight. Threat fight-or-flight occurs reflexively from a sudden, unexpected, and immediate threat that stimulates the amygdala and SAM survival behavior. The individual retains cognition. As Hediger [48] described, when an enemy enters the critical flight distance, an animal will attack with emergency characteristics beyond self-defense. This is from territoriality, meaning threat fight-or-flight can rapidly emerge from physical proximity and encroachment into a space considered "owned" by the individual, somewhat physical, intellectual, or academic.

The motor component of a threat-fight is the apparent drive for physical harm against the target. Threat-flight contains cognitive, evasive actions as the person maneuvers *away from* the threat.

The prevalence and pervasiveness of the relaxed affective threat-fight responses give the impression that anger is a normal, if not a necessary, behavior in an urgent or emergency environment. The immediate reactions observed by the use of the fear responses of anger and force, for example, reinforce the belief in their effectiveness. The observed effectiveness, however, is the immediate change toward homeostasis at best while impairing allostatic strengthening

Reactive or Instrumental Anger as Fear. One of the authors (DvS), on the surgery service, attended a trauma resuscitation during his first hospital rotation. The chief resident became angry with the team and consulting physicians; voices were raised. This was the author's first experience where professionals became angry during an emergency. Such behavior in a rescue or fire incident would have been quickly curtailed, and the member counseled. For the next 40 years, there has been no change in the presence of affective anger or the use of instrumental anger in healthcare.

The acceptance of anger is such that, when discussed, the initial arguments are to explain it. "Anger is not always a fear response; sometimes it is necessary." After his PICU fellowship, the author spoke with a program director. Upon hearing where the author trained, the director forcefully said, "We don't treat people like [the PICU director] does." Immediately he hung up the phone.

"The acceptance of anger is such that, when discussed, the initial arguments are to explain it. "Anger is not always a fear response; sometimes it is necessary." After his PICU fellowship, the author spoke with a program director. Upon hearing where the author trained, the director forcefully said, "We don't treat people like [the PICU director] does." Immediately he hung up the phone."

The Scottish Highland paramedics invited one of the authors (DvS) to speak on decision-making. The lights came on during the presentation, and the group was told the lecture was over. Confused, the paramedics took the author outside and asked him to come to a paramedic station the next morning. Upon arrival, the paramedics told how the author was known overnight throughout the Highlands. When the author began discussing anger as a fear response, the medical director stood up and left the room, stopping the presentation. The medical director was known for frequent outbursts of affective anger and routine use of instrumental anger.

To convince staff of this, the author asks what they do when a superior is angry with them. They work harder. Shifting to anger as a fear reaction or threat reflex, they describe what they would do to reduce the fear. They quickly understand why they cannot reduce the superior's anger – working harder does not diminish the threat.

Misinterpretation of startle. A short yelp may accompany the startle reflex. Such vocalizations in the startle response may be

misinterpreted as "screaming in panic" when they are a singular involuntary reflexive response to regain posture, orient toward a threat, and prepare for voluntary movement.

The startle response, a reflexive behavior, combines the gait and postural balance reflexes with an acoustic startle to protect the soft abdominal organs.

The flexing into the fetal position, a reflex for protection during a fall or to protect soft, internal organs (59), has been misinterpreted as victims surrendering, giving up their chance to escape a threat.

Crossover Responses: Stress, Fear, and Threat

Fight and Flight in the Domains of Fear and Threat

Some people tend to show subtle signs of passive freeze during a crisis. In our experience, this does not predict a person's ability to perform. Instead, those individuals with a tendency to passively freeze are more likely to exhibit fear responses (anxiety), while those with less tendency to freeze are more likely to exhibit anger responses (fight). Discussing this with law enforcement officers and SOCOM operators, they also identified the individual who appears to have no signs of subtle, transient freezing. Anxiety has been associated with freeze and flight tendencies; aggression with reduced freeze but heightened fight tendencies (53). (Noted in the discussion about the freeze, below, we differentiate attentive/orienting freeze from passive freeze and tonic immobility.)

"Functional protective responses to a threat form a gradient – creating distance (escape) to disabling the threat (engagement). We can describe a functional flow for survival responses to a developing danger as apprehension leads to avoidance (flight) and engagement (self-defensive fight)."

Functional protective responses to a threat form a gradient – creating distance (escape) to disabling the threat (engagement). We can describe a functional flow for survival responses to a developing danger as apprehension leads to avoidance (flight) and engagement (self-defensive fight). The shift from contextual decision-making in the cortex (vmPFC) to reflexive decision-making in the more primitive midbrain (PAG) is parallel to increasing proximity. The threat becomes existential as proximity enters territoriality. The amygdala projects to the hypothalamus, midbrain, including the PAG, and lower brainstem for visceral support in the fight-or-flight response.

As a functional approach, the *fear reactions* (PAG) develop from distance-based assessments, while *threat reflexes* (amygdala) come from active danger. Both approaches contain emotional valence from the amygdala. The fight-or-flight of the *fear reactions* can appear to be the same as the fight or flight from *threat reflexes*. Depending on the anatomic site, the PAG functions shift to promote passive freezing, escape, or other active coping behaviors (45). Active coping strategies shift from moderate to the strong threat display, active to aggressive defense, and vigorous escape when the enemy is nearby. When escape from an enemy is impossible, passive coping strategies disengage from the environment, and behaviors shift to freezing, then with increasing proximity, moderate to strong immobility (60, 61).

We recommend a different level of analysis for the different systems (fear, threat) rather than different responses. Appreciating the functional distinctions between fear as escape and threat as attack reduces the response mismatch to the individual involved. Without this appreciation, we risk acceleration of the situation toward loss of control. Fight or flight as offensive and defensive fear responses or threat reflexes have different timelines, stimuli, and purposes. Fear-flight begins more slowly, mediated by the PAG, while the enemy is at a distance from the individual, initiating the movement to regain the "flight distance."

- *Fight-or-flight due to fear is an unengaged fear response.* By lacking neuromodulation, fear drives the individual to escape toward a safe zone, terminating the situation rapidly.
- *Fight-or-fight due to threat (anger)is an engaged threat reflex.* If the individual retains cognition, the person begins evasive actions and maneuvers away from the threat. Without neuromodulation, emotion dominates and drives the action toward what is causing the harm.

Fear Stress Anxiety

Some people are comfortable with novelty, and some are not. Novelty can trigger the HPA system to release cortisol. Decision-making under uncertainty occurs in the vmPFC. Uncertainty can trigger the HPA system to release cortisol. Events in flux can be uncontrollable, another releaser of cortisol from the HPA system. As an enemy comes closer, spatially or temporally, the origin of behaviors moves from the vmPFC to the PAG, where self-defensive behaviors begin to predominate. Cortisol, released due to novelty, uncertainty, or uncontrollability, begins to inhibit memory systems, drawing focus on learned behaviors rather than cognition. At some point, the threat becomes imperiling, and threat reflexes predominate. Cortisol release interferes with cognitive neuromodulating influence. Isolating the brain laterality, the HPA axis, and the SAM axis makes sense for research and developing models but misleads when attempting to understand and observe behaviors during an incident. Confounding factors include perceptions, experience, and social support, whether convergent, local, or from leaders. A vital trait factor influencing the manifestation of defensive reactions is anxiety. Those genetically predisposed to anxiety may show more freezing than those who are non-anxious (53).

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Agitation versus Aggression

A fundamental difference between *agitation* and *aggression* is intent and direction. Agitation consists of spontaneous, non-instrumental actions that may be triggered by, but are not necessarily directed at, external events. Hence, reducing external stimuli can reduce the degree of agitation. On the other hand, aggression has

intent, generally toward self-interest, and is instrumental toward manipulation or control.

Seemingly well-organized people, even leaders, may use instrumental aggression in response to frightening, uncontrollable events. Reducing external stimuli has less effect than engendering a sense of control. Some may respond to the person with faux obedience but more effective is to give the person an easily achieved objective.

"There is some consequence for not distinguishing between agitation and aggression. For example, an agitated person runs toward safety while an aggressive person runs from a threat. The agitated individual becomes increasingly disruptive, unpredictably causing damage while exhausting significant resources but not completely disrupting active, improvised plans."

There is some consequence for not distinguishing between agitation and aggression. For example, an agitated person runs *toward safety* while an aggressive person runs *from a threat*. The agitated individual becomes increasingly disruptive, unpredictably causing damage while exhausting significant resources but not completely disrupting active, improvised plans. The aggressive person engages in the threat or cogently escapes and evades. Aggressive individuals have intent and focus, harming targeted individuals and disrupting plans. Intentional aggression may appear reasonable, rational, and logical, making it insidious and more difficult to identify.

Cognitive Freeze, Attentive Freeze, Tonic Immobility

Information can have more than one meaning, and actions can have more than one effect, contributing to the hypervigilant freeze. This pause can be misinterpreted as denial, indecision, confusion, or waiting for leadership. With thousands of encounters in liminal states, the authors have become familiar with freeze reactions – the inability to think yet can act, the inability to act yet can think, and the inability to act and think. From the academic literature, we find our experiences described as cortisol-impaired cognition, attentive or passive freeze, and tonic immobility.

Cognitive Freeze. Excessive circulating levels of corticosteroids are associated with cognitive impairment and impair the acquisition and consolidation of information. Corticosteroids impair memory retrieval for working memory and declarative memory – the conscious or voluntary recollection of information. Declarative memory includes semantic memory for acquired knowledge, and episodic memory is the memory of experiences. Spared from corticosteroid impairment is procedural memory – the capacity to perform tasks (62).

As resuscitation began, one of the authors (DvS) needed an additional nurse. A nurse had just left an adjacent patient's room. In response to the author's request for assistance, the nurse described their patient's need for vital signs. The author asked if the nurse would mix a dopamine drip for infusion. The nurse brought the prepared infusion into the room, asking about beginning the infusion. Instead, the author asked the nurse for assistance with more pressing physical needs. Immediately, an effective, improvised team had formed, with the nurse demonstrating needed initiative. The author used physical activity to break the "cortisol freeze."

Attentive Freeze. Intimate discussions with those operating in dangerous contexts reveal the shared experience that feels like a freezing episode. Inquiry reveals that the individual had focused awareness and rapidly broke out of the freeze at the proper time. Invariably, they believe they have experienced fear and toxic immobility. They had experienced an attentive freeze.

Attentive freeze stops the excessive acceleration of the fight-or-flight responses to prepare the individual for an effective response to an uncertain situation. The PAG, vmPFC, anterior cingulate cortex, and amygdala facilitate the rapid shifting between attentive freezing and active defensive modes. Attentive freeze increases startle responses; alters perceptual sensitivity; facilitates processing coarse, rather than detailed, information; and accelerates subsequent cue-signaled responses.

"Attentive freeze stops the excessive acceleration of the fight-or-flight responses to prepare the individual for an effective response to an uncertain situation. The PAG, vmPFC, anterior cingulate cortex, and amygdala facilitate the rapid shifting between attentive freezing and active defensive modes. Attentive freeze increases startle responses; alters perceptual sensitivity; facilitates processing coarse, rather than detailed, information; and accelerates subsequent cue-signaled responses."

Tonic Immobility. Attentive freeze and tonic immobility responses appear similar to an observer but have distinct survival purposes. A person in the frozen state maintains attentiveness while remaining motionless, poised for action, whether to initiate fight or flight. A person in tonic immobility maintains awareness and will create memories during this phase but cannot respond to stimulation. Freeze is hypervigilant, attention poised to act. Tonic immobility is the alert, aware state during behavioral paralysis.

Tonic immobility, like freezing, is manifested by the absence of movement in response to severe threats. Importantly, however, while freezing can take place early in the defense cascade, tonic immobility occurs later when fight, flight, and freezing are not effective. In traffic accidents, a portion of victims will have experienced a small urine discharge from tonic immobility. Generally, bradycardia develops compared to tachycardia in attentive freeze. PAG is implicated in tonic immobility, the heart rate deceleration, and analgesia during freezing (53).

Without the behavioral component, tonic immobility appears as the feeling of nausea when faced with a difficult decision, the "pit of my stomach" feeling. For novices, nausea accompanies their first independent decision and, if not resolved, will inhibit future decision-making. The individual does not necessarily become

trapped in tonic immobility. Kozlowska et al. (27) described actions a Second World War Flying Officer would take when training pilots: he used a "firm voice devoid of fear to issue simple orders that the men had already learned and that was automatic: 'flaps,' 'raise the stick,' 'rudder.'

Vasovagal Syncope. The "common faint" occurs in an emotional context when the vagus nerve rapidly decreases blood pressure (63). Complete loss of consciousness distinguishes vasovagal syncope from tonic immobility, where the person remains fully aware. Vasovagal syncope could, like tonic immobility, be an adaptation to mimic death (64) or as a response to the sight of blood, injury, or injection. Syncope from seeing one's blood may have adaptive value in reducing blood loss by rapidly decreasing blood pressure through vagus nerve activation (65).

"Threat reflexes rapidly initiate protective behaviors. Modulating these behaviors brings the individual safely within the operational distance of a threat. Organizations that routinely operate in dangerous contexts recognize the utility of stress, fear, and threat while taking measures against their inherent vice."

Conclusion

We too readily view stress, fear, and threat behaviors as unfavorable – indicators of poor performance if not a disease. Human stress, fear, and threat responses drive safe and effective engagement of environmental threats. High-Reliability Organizations must engage in threats and adversity to maintain reliable operations. During a crisis, the hypothalamic-pituitary-adrenal (HPA) axis enables survival behaviors by releasing cortisol to "disarm" the executive functions. Novelty, uncertainty, and uncontrollability, in the domain of the executive functions, cause stress responses. Fear reactions at the subcortical level maintain a safe distance from the threat. Threat reflexes rapidly initiate protective behaviors. Modulating these behaviors brings the individual safely within the operational distance of a threat. Organizations that routinely operate in dangerous contexts recognize the utility of stress, fear, and threat while taking measures against their inherent vice.

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Corresponding Author

Daved van Stralen, MD, FAAP
Associate Professor, Pediatrics
Department of Pediatrics
Loma Linda University School of Medicine
11175 Campus Street
CP-A1121
Loma Linda, CA 92350
Email: DVanStra@llu.edu

Sean McKay
Executive Partner / Director, Disruptive Rescue & Austere Medicine
Element Rescue - Response Solutions within Nonlinear Complex Environments
Greenville, South Carolina, United States

Christopher A. Hart, JD;
Commissioner, The Joint Commissioner;
former Chairman, US National Transportation Safety Board

Thomas A. Mercer
Rear Admiral
United States Navy (Retired)

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Febra Johnson, Loma Linda University Children's Hospital

Peer Reviewed

Fellow's Column: The Blood Urea Nitrogen/Creatinine Ratio in Preterm Infants with Patent Ductus Arteriosus

Briana Hernandez, MD, Shabih Manzar, MD

Summary:

Elevated blood urea nitrogen (BUN) and serum creatinine (SCr) ratio has been associated with acute kidney injury (AKI). Preterm infants with patent ductus arteriosus (PDA) have unique fluid-electrolyte balance in the first few days of life and are at risk of pre-renal azotemia and AKI. We studied trends in BUN/SCr ratios within the first two weeks of life of four preterm infants (one 23-week GA, two 24-week GA, and one 25-week GA) with PDA. We found a significant correlation between the BUN and SCr level, r = 0.59, p = <0.001. The BUN/SCr ratio was noted to be higher in the first week of life, which trended down in the second week. We concluded that BUN/SCr ratios could be used as an adjunct in monitoring patients' kidney function within the first two weeks of life in the extremely preterm infant with PDA. Further studies are needed to look at the normal BUN/SCr ratio ranges in extremely premature infants.

"We concluded that BUN/SCr ratios could be used as an adjunct in monitoring patients' kidney function within the first two weeks of life in the extremely preterm infant with PDA. Further studies are needed to look at the normal BUN/SCr ratio ranges in extremely premature infants."

Introduction:

Patent ductus arteriosus (PDA) is common in preterm infants. The incidence is inversely proportional to the gestational age (GA). PDA causes significant steal in the blood flow (BF) during diastole, resulting in decreased BF in the descending aorta, compromising renal perfusion. This reduction in glomerular blood flow decreases the excretion of urea and creatinine, resulting in increased blood urea nitrogen (BUN) and serum creatinine (SCr). In addition, medications used to treat PDA inhibit prostaglandin, resulting in decreased urine output and further elevation of the BUN/Cr ratio. (1) High BUN/ SCr ratio has been associated with acute kidney injury (AKI) in critically ill children using nephrotoxic medications. (2) Preterm infants with PDA have unique fluid-electrolyte balance profiles within the first few days of life. They are at risk of pre-renal azotemia and AKI. We studied BUN/SCr ratios trends within the first 2 weeks of life of four preterm infants (one 23-week GA, two 24-week GA, and one 25-week GA) with PDA.

Case 1:

The patient was a Preterm infant with a gestational age of 23 2/7 weeks. The mother did not receive any steroids. Apgar scores were 0, 6, and 7 at 1, 5, and 10 minutes, respectively. The infant was intubated in the delivery room. One umbilical venous and two arterial catheters were inserted on admission to the NICU. The infant was placed on a high-frequency oscillator ventilator and was started on total parental nutrition. Serum electrolytes were monitored daily while on TPN. An echocardiogram was obtained on day 3 of life.

Case 2:

The patient was a preterm infant with a gestational age of 25 3/7 weeks. The pregnancy was complicated by no prenatal care, uncontrolled hypertension, and vaginal bleeding. Apgar scores were 3, 6, and 7 at 1, 5, and 10 minutes, respectively. The infant was intubated in the delivery room. One umbilical venous and two arterial catheters were inserted on admission to the NICU. The infant was placed on a high-frequency oscillator ventilator and was started on total parental nutrition. Serum electrolytes were monitored daily while on TPN. An echocardiogram was obtained on day 3 of life.

Case 3:

The patient was a Preterm infant with a gestational age of 24 2/7 weeks. The pregnancy was complicated by premature prolonged rupture of membranes. Apgar scores were 2 and 7, at 1 and 5 minutes, respectively. The infant was intubated in the delivery room. On admission to the NICU, one umbilical venous and two arterial catheters were inserted. The infant was placed on a high-frequency oscillator ventilator and was started on total parental nutrition. Serum electrolytes were monitored daily while on TPN. An echocardiogram was obtained on day 3 of life.

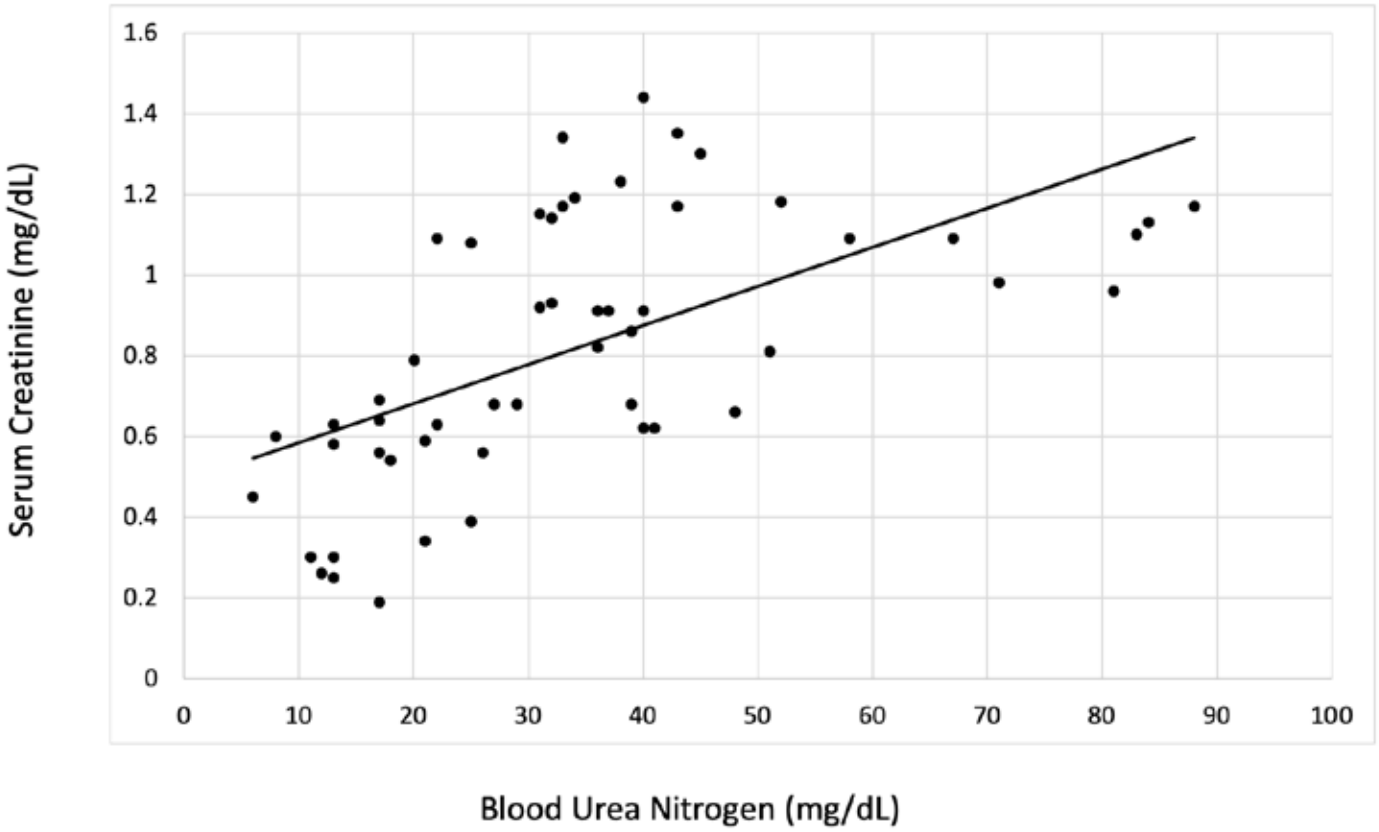
Case 4:

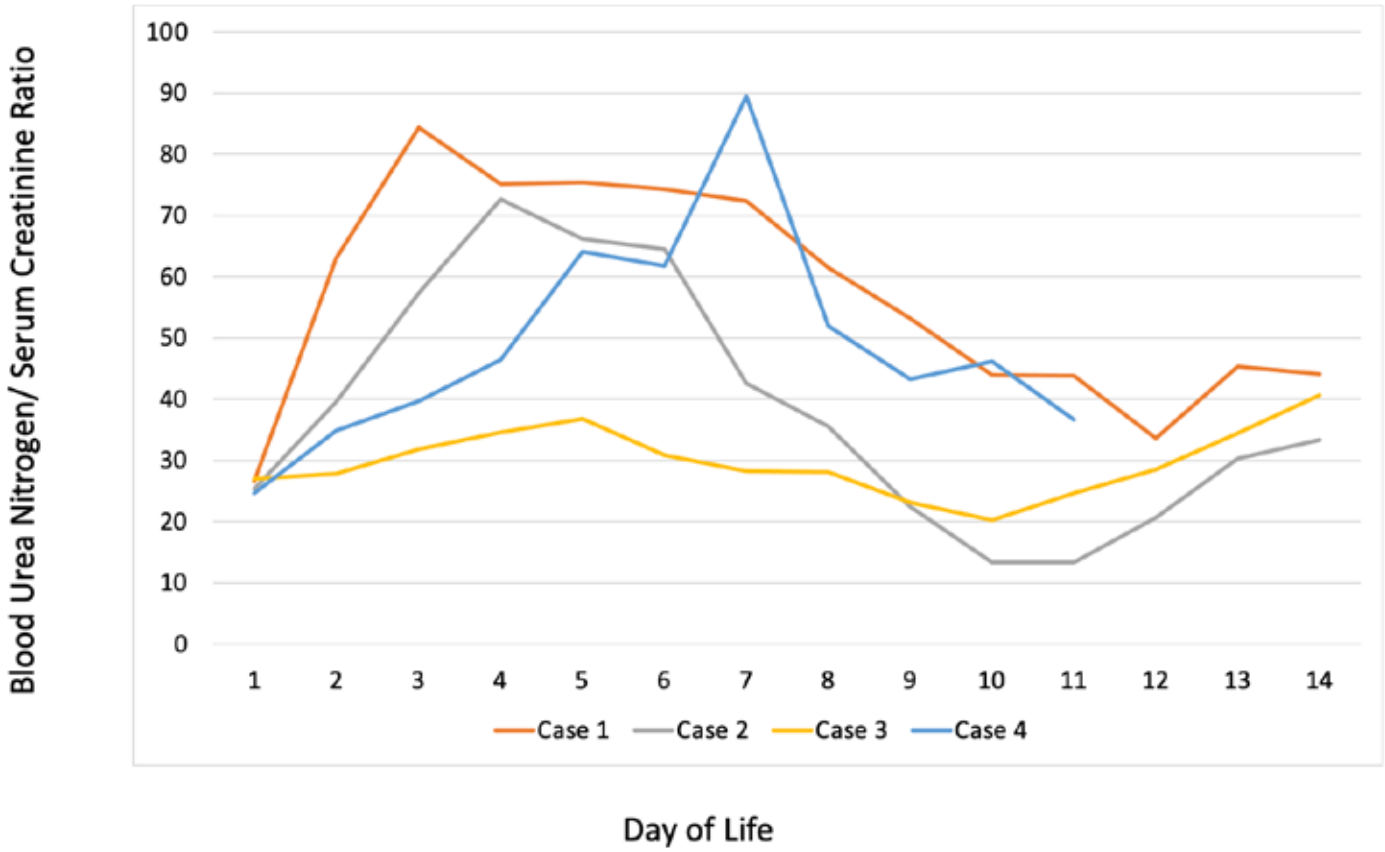
The patient was a preterm infant with a gestational age of 24 5/7 weeks. The pregnancy was complicated by concern for placental abruption. The infant was intubated in the delivery room. On admission to the NICU, one umbilical venous and two arterial catheters were inserted. The infant was placed on a high-frequency oscillator ventilator and was started on total parental nutrition. Serum electrolytes were monitored daily while on TPN. An echocardiogram was obtained on day 3 of life.

"We found a significant correlation between the BUN and SCr levels, r = 0.59, p < 0.001 (Figure 1). The BUN/SCr ratios were higher in the first week of life and trended down within the second week (Figure 2)."

Methods/Results:

The laboratory details were collected from the electronic chart. The BUN/SCr ratio (mg/mg) is represented in the metric system (the link http://www.scymed.com/en/smnxps/pspgh152.htm could be used to convert to the SI system). A total of 53 samples were reviewed; 14 consecutive days were trended for cases 1, 2, and 3, while 11 days were trended for case 4 (Table 1). We found a significant correlation between the BUN and SCr levels, r = 0.59, p < 0.001 (Figure 1). The BUN/SCr ratios were higher in the first week of life and trended down within the second week (Figure 2).





Legend to Figures: Figure 1: Correlation Between Blood Urea Nitrogen and Serum Creatinine Levels. Figure 2: Blood Urea Nitrogen / Creatinine Ratio Trends in Preterm Infants within the First Two Weeks of Life

"All infants studied had a PDA during the first two weeks of life, which was managed conservatively. In these infants, we observed high BUN/ SCr ratios within the first week of life, which trended down within the second week."

Discussion:

All infants studied had a PDA during the first two weeks of life, which was managed conservatively. In these infants, we observed high BUN/ SCr ratios within the first week of life, which trended down within the second week. The combined mean BUN was 34 ± 22 mg/dL, and the combined mean SCr was 0.82 ± 0.32 mg/dL, which were higher than reports from previous studies regarding the same gestational age (GA). (3,4) Zhang and Zeng (3) reported a mean SCr of 69.7 µmol/L (0.79 mg/dL) within the first 24 hours of life in healthy control groups, whereas infants born with a history of perinatal events had a mean SCr of 85 µmol/L (0.96 mg/dL) within the first 24 hours of life. The mean BUN levels reported were 5.26 mmol/L (14.73 mg/dL) and 5 mmol/L (14 mg/dL), respectively. Similarly, Cuzzolin et al. (4) studied SCr values within the first 28 days of life in preterm infants. In their study cohort, group A consisted of infants born between 22-25 weeks GA. The SCr values within the first two weeks of life among group A were 78.7 ± 19.4 µmol/L (0.89 ± 0.22 mg/dl) on day 1 and 84.9 ± 31.8 micro µmol/L (0.96 ± 0.36 mg/dl) at day 14, which were comparable to the values observed in our four cases.

" In our pursuit of a conservative approach, we noted improvement in patients' renal function over time. This ultimately concluded that observed AKI among preterm infants with PDA might reflect renal immaturity rather than pathologic conditions."

Based on the mean SCr levels of 0.82 mg/dL, none of the preterm infants would have qualified as having AKI based on the pRIFLE (pediatrics -risk, injury, failure, loss, end-stage) and KDIGO (Kidney Disease: Improving Global Outcomes) definition. (5,6) Gallo et al. (7) reported 27 % of AKI among preterm infants was associated with medical treatment for a hemodynamically significant PDA. Seo et al. (8) also noted a high prevalence of AKI without any adverse outcome among preterm infants whose PDAs were managed conservatively. In our pursuit of a conservative approach, we noted improvement in patients' renal function over time. This ultimately concluded that observed AKI among preterm infants with PDA might reflect renal immaturity rather than pathologic conditions.

In conclusion, BUN/SCr ratio could be used as an adjunct in monitoring kidney function in the extremely preterm infant with PDA within the first two weeks of life. Further studies are needed to define normal BUN/SCr ratio ranges in extremely premature infants.

Table 1: BUN, SCr and BUN/SCr Ratios Among the Preterm Infants

Case 1

Day	BUN	Creatinine	BUN: Creatinine Ratio
1	17	0.64	26.56
2	51	0.81	62.96
3	81	0.96	84.37
4	88	1.17	75.21
5	83	1.1	75.45
6	84	1.13	74.33
7	71	0.98	72.44
8	67	1.09	61.46
9	58	1.09	53.21
10	40	0.91	43.95
11	36	0.82	43.90
12	31	0.92	33.69
13	39	0.86	45.34
14	52	1.18	44.06

Case 2

Day	BUN	Creatinine	BUN SCr Ratio
1	20	0.79	25.31
2	36	0.91	39.56
3	39	0.68	57.35
4	48	0.66	72.77
5	41	0.62	66.12
6	40	0.62	64.51
7	29	0.68	42.64
8	21	0.59	35.59
9	13	0.58	22.41
10	8	0.6	13.33
11	6	0.45	13.33
12	13	0.63	20.63
13	17	0.56	30.35
14	18	0.54	33.33

Case 3

Day	BUN	Creatinine	BUN SCr Ratio
1	31	1.15	26.95
2	40	1.44	27.77
3	43	1.35	31.85
4	45	1.3	34.61
5	43	1.17	36.75
6	38	1.23	30.89
7	33	1.17	28.20
8	32	1.14	28.07
9	25	1.08	23.14
10	22	1.09	20.18
11	33	1.34	24.62
12	34	1.19	28.57
13	32	0.93	34.40
14	37	0.91	40.65

Case 4

Day	BUN	Creatinine	BUN SCr ratio
1	17	0.69	24.63
2	22	0.63	34.92
3	27	0.68	39.70
4	26	0.56	46.42
5	25	0.39	64.10
6	21	0.34	61.76
7	17	0.19	89.47
8	13	0.25	52
9	13	0.3	43.33
10	12	0.26	46.15
11	11	0.3	36.66

BUN: Blood Urea Nitrogen, mg/dL

Creatinine, mg/dL

SCr: Serum Creatinine

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NT

Briana Hernandez, MD
PGY-1
Pediatric Resident
LSU Health Sciences Center
1501 Kings Highway
Shreveport, LA 71103

Corresponding Author

Shabih Manzar, MD
Clinical Associate Professor
LSU Health Sciences Center
1501 Kings Highway
Shreveport, LA 71103
Telephone: 318-626-1623
Fax: 318-675-6059
Email: shabih.manzar@lsuhs.edu

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Briefly Legal: Fetal Heart Rate Patterns, Cerebral Palsy, and Accountability: Response to Dr. Steven Clark's Current Commentary in Obstetrics & Gynecology

Barry Schifrin, MD, Maureen E. Sims, MD

Introduction

This commentary represents a response to several articles commenting on the deficiencies of electronic fetal monitoring (EFM) and other indicators of intrapartum injury and their use in the courtroom. (1, 2) Because of its breadth, we focus more specifically on a recent "commentary" published in **Obstetrics & Gynecology**, the official publication of the ACOG, by Dr. Steven Clark, a prominent maternal-medicine physician, who covered a broad range of issues, but emphasized four major points, (3)

"This commentary represents a response to several articles commenting on the deficiencies of electronic fetal monitoring (EFM) and other indicators of intrapartum injury and their use in the courtroom. (1, 2)"

- "First, we need to get our own house in order. Publications describing electronic FHR monitoring must clarify the documented lack of benefit of such monitoring in preventing neurologic injury in language that cannot be misinterpreted."
- "Second, revising the category II designation is badly needed."
- "Third, professional organizations should make clear that any allegation that cesarean delivery in an individual patient based on any single or combination of FHR features not associated with a recognized sentinel event would likely have reduced the risk of cerebral palsy in a child represents the very definition of "junk science." Such opinions are not only not generally accepted in the scientific community, but universally rejected."
- "Finally, obstetricians need to realize that we are unique among medical specialties in our willingness to perform hundreds of thousands of major operative procedures each year without any evidence of benefit but with strong evidence of non-benefit. Initial enthusiasm for accepting this technology without demanding firm evidence of benefit has left current practitioners in an untenable situation in which myth has replaced reality. However, we are realistically prevented by the current legal system from getting off this train, even if our own anecdotal biases could be overcome."

Believing that the EFM lacks immediate or long-term benefits, Dr. Clark challenges fundamental precepts of monitoring and the provenance of CP relating to the events of labor and delivery and questions whether EFM should be abandoned. He also raises ethical questions about the continued teaching of the precepts and principles of fetal monitoring and its continued application in the clinical setting. In addition to editors of journals and directors of professional societies, part of the blame for this situation, it seems, lies with the legal system: in the courtroom, the interpretation of EFM along with clinical, neuroradiological, and neonatal data are permitted as part of the fact pattern to assist in determining the timing, mechanism, and preventability of a perinatal injury to the fetus or newborn. Taken to its most fundamental allegations, this and other articles raise fundamental questions about the value of obstetrical care using current EFM guidelines while at the same time attempting to reduce, based on medical uncertainty and dogma, legal accountability for adverse outcomes. (1)

"Believing that the EFM lacks immediate or long-term benefits, Dr. Clark challenges fundamental precepts of monitoring and the provenance of CP relating to the events of labor and delivery and questions whether EFM should be abandoned."

These articles challenging the use of EFM in major journals reflect broader distress over EFM in the obstetrical community. Despite the prolonged duration and ubiquity of its use and various modifications to the classification of FHR patterns over the past 50 years, there has been no apparent reduction in the rate of CP, while there has been a dramatic increase in the cesarean section rate – often considered unnecessary. To be sure, there is wide variability in the interpretation of FHR patterns and the responses thereto.

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The recent version of ***Up-To-Date*** avers no certain benefit to the use of EFM, insisting that it is equivalent to intermittent auscultation. (4) In a publication on the evaluation and response to Category II patterns, the 18 authors confess, "As a medical community, we seem to know less than we thought we did 30 years ago regarding the utility of this ubiquitous technology." They also aver that "Unfortunately, this body of work [EFM research] has primarily served to raise more questions than it has answered." (5) In a subsequent study, their proposed scheme to manage Category II patterns was found to be of very limited benefit. (6) Thus, under circumstances where FHR patterns continue to confound and be-

fuddle obstetric care providers, the perception is redolent that experts of "dubious experience" expound with existential "certainty" on the interpretation of patterns in the courtroom. As one author put it, "only individuals who know the outcome seem to be proficient at its interpretation." (2)

It is necessary to understand both the "befuddlement" of obstetric care providers and the sometimes overwrought allegations, pro, and con, on the use of EFM and the search for advantage in the medico-legal arena to look at Clark's positions from a different perspective. In this appeal, we try to be mindful of the principle that the absence of definitive evidence cannot be interpreted to mean the absolute absence of a relationship and that "strong inference" may point the way to definitive proof. We are also mindful of Einstein's caution about trying to solve problems using the same tools (or dogma) that have created the problem.

" In this appeal, we try to be mindful of the principle that the absence of definitive evidence cannot be interpreted to mean the absolute absence of a relationship and that "strong inference" may point the way to definitive proof. We are also mindful of Einstein's caution about trying to solve problems using the same tools (or dogma) that have created the problem."

Revising Category II FHR patterns

As emphasized by many authors, the currently popular, three-category classification of FHR patterns (Category I-III) was introduced in 2008 without proper vetting, attention to fundamental physiological principles, or reasonable editorial oversight. Indeed, the editorial accompanying the original publication, written by one of the authors, avers that attorneys were consulted about promulgating these guidelines (7). There is even the suspicion that the classification was designed more to protect the physician than the fetus.

The definition of terms and their collection into a therapeutic classification were based upon a presumed relationship of intrapartum hypoxic-ischemic fetal injury derived exclusively from systemic fetal hypoxia developing slowly during labor, resulting in a severely compromised newborn with severe derangements of pH (<7.0) and BD (>12) and very low Apgar scores at 1 and 5 minutes of age and specific forms of cerebral palsy (CP). (8, 9) Presumably, failure to meet these "essential criteria" required the conclusion that intrapartum events were not responsible for the adverse outcome. In 2014, this position was modified, and the "essential criteria" were removed. (10) Nevertheless, adherents continue to rely on the 2003 criteria in courtroom testimony – for the defense.

Dr. Clark and his colleagues, among others, have shown the limited value of determining pH for assessing the quality of obstetrical care or predicting immediate or subsequent disability. (11) The classification of FHR patterns based on the presumed relationship to acidemia imposed arbitrary definitions of "baseline heart rate" (perversely, the rate at present), tachycardia and bradycardia and derived no insight from the recovery of the fetus from the individual deceleration. There is no recognition given to the evaluation of fetal behavior or the potential for the prospective identification of fetal neurological injury or intracranial hemorrhage. (12, 13) The guidelines attach little importance to the comprehensive assessment of uterine activity and other mechanical forces and ignore the concept of using the individual FHR pattern over time as its control or in association with clinical circumstances. (13, 14)

Teleologically, the fetus must have robust defenses to adapt not only to the hypoxemic nature of recurrent uterine contractions during labor but must also defend against the pressures on the fetal head created by contractions and the passage through the birth canal. These defenses are evident in the vagally-mediated responses when hypoxic or ischemic threats are present. (15) (Lear) From a pathophysiological standpoint, however, there is no plausible way to beneficially use a 3-tier classification of FHR patterns to provide insight into the fetal responses to the various stresses it encounters during labor.

"A thoughtful interpretation of FHR patterns takes advantage of the presence of normal cyclic fetal behavior as a measure of fetal neurological integrity as well as the relationship of the rapidly responding heart rate (decelerations) to the intermittent mechanical/ischemic and hypoxemic stresses of uterine contractions and passage through the birth canal."

A thoughtful interpretation of FHR patterns takes advantage of the presence of normal cyclic fetal behavior as a measure of fetal neurological integrity as well as the relationship of the rapidly responding heart rate (decelerations) to the intermittent mechanical/ischemic and hypoxemic stresses of uterine contractions and passage through the birth canal. Fetal (and neonatal) behavior is assessed by rest/activity cycles of greater and lesser heart rate variability (HRV) and accelerations with epochal fetal activity or contractions. Decelerations in the heart rate pattern announce an interruption of blood flow ***to the fetus*** (*e.g.*, excessive uterine activity, maternal hypotension, etc.) or compromised blood flow ***within a fetal vessel*** (*e.g.*, umbilical, placental, carotid) and appear before any change in pH. Accordingly, assessing the impact of the decelerations is less dependent upon the duration or amplitude of the deceleration than on its impact on subsequent heart rate and variability, much as we determine cardiovascular competence (tolerance/reserve) in the adult from the rapidity of its recovery from an imposed stress. In the fetus during labor, that stress (hypoxic, mechanical) is created by uterine contractions. Category I patterns represent normal baseline features (a stable FHR, moderate variability, cyclic accelerations, and absent decelerations) and, despite Dr. Clark's assertion to the contrary, provide information about fetal neurological responsiveness and behavior and reasonably, the adequacy of fetal blood pressure and cerebral blood flow. The evolution to a Category III represents abnormalities of baseline rate and variability ***and*** the presence of decelerations. The fetus is being compromised by impaired blood flow, to which it meets with robust but not insurmountable nor in-

exhaustible defenses but may not yet be injured. Dr. Clark does not recognize any specific pattern of injury or nuance in interpreting patterns. Although unique patterns of fetal ischemic neurological injury have been identified (Category II or III), there is no controlled study of the relationship. (12, 16) .

"As agreed to by Dr. Clark and others, combining these disparate features and etiologies into a single classification and offering vague guidelines for their management, including "continued surveillance and reevaluation" (4, 20), appears to have created an unsatisfying clinical milieu with considerable uncertainty on how this should be managed."

Category II (present in 75-80% of laboring fetuses) is represented by an abnormality of either decelerations OR baseline features – but not both. Given the breadth of physiological and pathological conditions (some mutually exclusive) that may present with a Category II tracing, it is unreasonable to consider that the metabolic status, the tissue oxygen reserve, or the time to decompensation is the same for each fetus, or in the case of abnormal baseline features without decelerations that the problem is indeed asphyxial. (17) A "Category II" pattern does not exclude fetal acidosis or neurological injury. (16-19) As agreed to by Dr. Clark and others, combining these disparate features and etiologies into a single classification and offering vague guidelines for their management, including "continued surveillance and reevaluation" (4, 20), appears to have created an unsatisfying clinical milieu with considerable uncertainty on how this should be managed. Irrespective, both more and less detailed guidelines are promulgated by obstetrical societies – creating a conundrum not only for obstetrical care providers but for the various stakeholders involved in improving care and assessing preventability. Dr. Clark's proposed 3-category classification of tracings, with its limited detail, is offered with neither evidence nor logic to support its acceptance.

Cerebral Palsy and the Consequences of Obstetrical Care

Before the middle of the 19th century, the prevailing notion was that abnormal babies either survived intact or died. Beginning with the work of Little and later Freud and others, there evolved the notion of a "third option," related to a life-long physical and/or mental handicap whose genesis arose prenatally or at the time of birth. (21) In the 21st century, we acknowledge that fetal death and certain postnatal disabilities ***may*** be related to hypoxia-ischemia during the birth process.

It is generally accepted that EFM reduces fetal death compared to auscultation and that asphyxial harm suffered during labor may lead to subsequent CP in the previously normal fetus. The prevention of intrapartum fetal death would seem to be a compelling reason to use EFM. Dr. Clark forgot this notion and found no evidence (to a p-value < 0.05) that EFM reduces disability in the form of CP, which he embraces as the only long-term consequence of asphyxial harm during labor and delivery. He does not mention epilepsy, autism spectrum disorder (ASD), or perinatal stroke, each of which has an association with intrapartum events. (22) By no means are the studies definitive – in part related to the problem of accurately timing the mechanism and severity of fetal/neonatal neurological injury – but the associations do exist. We have also come to understand that the breadth of intrapartum injury may not be gleaned simply from an evaluation of the neonate and that significant injury may occur without immediate signs or symptoms in the newborn. Injuries sustained intrapartum may manifest as behavior and executive function problems later in life. (23)

Do fetal injury and death share a common pathway, differing only in duration/severity? Evidence suggests that severe systemic acidosis is a better predictor of subsequent death, while FHR patterns (which reveal fetal neurological function – see below) correlate better with injury than acidosis. Ischemic mechanisms during labor and delivery (*e.g.*, increased intracranial pressure during pushing) may threaten ***(regional)*** cerebral blood flow but may not be accompanied by ***systemic*** asphyxiation. In the face of preexisting fetal compromise, pushing, for example, will exaggerate any ischemia and the potential for harm. While inferential data seems compelling in these areas, definitive studies are lacking.

Dr. Clark does not confront these issues because he and the other commentators recognize no mechanism of subsequent injury other than that occasionally associated with severe hypoxia/acidemia. Even recent, highly regarded reviews of the subject (15) fail to consider other mechanisms of injury other than progressive asphyxiation, which ultimately compromises cardiac output, reducing cerebral blood flow (ischemia) with the potential for injury or death.

It is widely understood that the ultimate mechanism of hypoxic-ischemic injury is cerebral ischemia, facilitated, but not caused by, systemic hypoxia. In the experimental animal, it is very difficult to produce neurological injury without some specific hypotensive intervention (exsanguination) or ischemic compromises such as arterial ligation of a carotid vessel – a model of injury that, unlike systemic hypoxia, restricts blood flow, oxygen, and substrate (glucose) availability to the brain. (24) Further, consider that the model of injury which serves as the underpinning of therapeutic hypothermia (TH- cooling) resulted from studies in the lamb fetus subjected to direct, the primary interruption of the carotid circulation without preceding systemic hypoxia or acidemia. (25) Dr. Clark opines that except for injury suffered during a sentinel event, babies manifesting abnormal tracings during labor and neonatal depression were likely injured prior to labor. If true, they would be denied TH, which requires implementation within 6 hours of the presumed injury.

Cerebral Palsy

Dr. Clark anchors his arguments about the lack of long-term benefits of EFM to a simple notion that: given the apparent stability of the rate of CP over the past several decades, the failure to change that statistic despite the rising cesarean section rate and the widespread use of EFM (however misguided) must mean that cesarean section and EFM and care during labor do not impact the occurrence of CP.

Cerebral palsy is an umbrella term encompassing disorders of movement and posture attributed to non-progressive disturbances occurring in the developing fetal or infant brain. Cerebral palsy cannot be diagnosed at birth but is associated with diverse risk factors, causes, and timing and is diagnosed in approximately two per 1000 children. As such, it seems clear that no single strategy will prevent all CP. A recent Cochrane review addressed the issue of the impact of obstetrical interventions on preventing CP. (26) The authors point out that there has indeed been a changing pattern of risk in obstetrics over the last several decades; labors are longer, mothers are heavier and older, and they suffer from hypertension and diabetes. They are more frequently induced, have more complications, spend much more time on labor and delivery, and are more likely to be delivered by cesarean section.

If neonatal care is the reference point, CP rates have remained constant in the face of the increased survival of premature infants due to antenatal corticosteroids and MgSO4 and other medical advances, perhaps including intrapartum EFM cesarean section and new treatment modalities. Irrespective, as a group, premature infants remain at increased risk of CP and other disabilities. The survivability of term babies has also profited from modern NICU care and the benefits of monitoring and TH. The Cochrane review reminds us that not all interventions are beneficial and that using the CP rate to assess the quality of obstetrical care is problematic when we have not agreed on the timing or mechanism of the injury. The authors of this review underscore the urgent need for "long-term follow-up RCTs of interventions addressing risk factors for CP that are rigorous in their design and aim for consistency in CP outcome measurement and reporting to facilitate pooling of data, to focus research efforts on prevention."

"We would argue that given the burgeoning risk factors for adverse outcomes and the undeniable benefits of perinatal care – including EFM, it is remarkable that neurological injury cases most readily associated with perinatal care (CP) have remained stable."

We would argue that given the burgeoning risk factors for adverse outcomes and the undeniable benefits of perinatal care – including EFM, it is remarkable that neurological injury cases most readily associated with perinatal care (CP) have remained stable.

The Preventability of CP

When the issue of the preventability of CP or any other long-term outcome arises in a medico-legal encounter, population-based statistics (meeting a p-value < 0.05 – a probability > 95%) are of limited assistance. The question before the court relates to whether the injury in this particular baby was preventable by reasonable conduct of the obstetrical care providers based on a probability of 51%. As suggested above, it is too often believed that adverse outcomes for the obstetrician or pediatrician/neonatologist rest entirely with the obstetrical expert opining on some "pathognomonic squiggle" in the FHR pattern. This notion, however, has little to do with actual medico-legal jurisprudence, where many prerequisites must be met and agreed upon. (1, 27)

A risk factor is not the same as the diagnosis of CP. For example, IUGR is a well-known risk factor for subsequent CP. IUGR is also a risk factor for the appearance of abnormal patterns in labor. Irrespective, CP does not develop in most babies with IUGR. Is it reasonable to affirm that the baby with IUGR is less tolerant of the hypoxemic effects of contractions during its time in labor than the time it spends in utero without the challenge of frequent, hypoxemic uterine contractions? By any reasonable construct, the fresh appearance of decelerations in an IUGR fetus during (early) labor represents a deterioration of its tolerance (reserve) – its ability to tolerate the hypoxemic effects of contractions. Dr. Clark decries the conceptual term "fetal reserve" as "imaginary." He also considers the time spent in labor no more relevant to the outcome than the time before labor. These positions seem contradictory given his concession to the hypoxic nature of labor.

To be able to opine that an intrapartum injury was preventable by reasonable medical conduct, certain prerequisites must be present:

- There must be an injury whose timing and mechanism can be reasonably elucidated. In this respect, Dr. Clark's reference to the FHR patterns of an anencephalic has no bearing on the discussion of the standard of care or causation because it is not an acquired injury, it is not reasonably influenced by the obstetrical care and will not appear as an allegation in a court of law.
- Irrespective of risk factors, the fetus must be neurologically normal at the time of the initiation of monitoring, and the injury must be affirmatively timed to the events of labor and delivery using various clinical, obstetrical, and neuroradiological techniques.
- The mechanism of an injury must be biologically plausible and not be related to an earlier injury, a congenital anomaly, or an obvious metabolic or genetic disorder.
- There must be agreed-upon signs and timetables of intervention that are undertaken in a timely and predictable manner. Irrespective of a sentinel event, the injury must not develop so obscurely or quickly, or without sufficient warning (as some injuries do) as to preclude reasonable intervention.
- It seems necessary to add that you cannot create a management protocol that provides both "assistance" to the fetus and a "defense" to the obstetrical care personnel against the allegation of negligence when that protocol is violated.

"WAs mentioned above, FHR patterns may be used to help time injury, but only in conjunction with consistent clinical and radiological information. In studies of the FHR patterns preceding the subsequent development of CP, Evans et al. insisted that the fetus usually behaves on the initial tracing and that there be no clinical, obstetrical, or radiological evidence of earlier injury even in retrospect. (16) "

As mentioned above, FHR patterns may be used to help time injury, but only in conjunction with consistent clinical and radiological information. In studies of the FHR patterns preceding the subsequent development of CP, Evans et al. insisted that the fetus usually behaves on the initial tracing and that there be no clinical, obstetrical, or radiological evidence of earlier injury even in retrospect. (16) Thus, an abnormal tracing on admission or an anomaly or other basis to believe that an injury had occurred prior to labor or by a non-preventable mechanism will compromise the allegation that the injury occurred during labor and delivery irrespective of changes in fetal heart rate pattern throughout labor. Consider a case where the fetus enters labor with a normal Category I FHR tracing, is of normal weight and activity pattern, and demonstrates a normal amount of clear amniotic fluid volume. In association with excessive uterine activity and exuberant pushing, the FHR pattern deteriorates and shows evidence of injury during the 2nd stage of labor (a "conversion" pattern). (12) (16) At birth, the baby is depressed to various degrees with a variable pH and BD in cord blood. Apgar scores are modestly depressed. The infant seizes

on the first or second day of life. Further, the newborn shows a normal head ultrasound examination on day 1 of life (DOL1), followed on DOL 5 by an MRI showing basal ganglia-thalamic injury (BGT) or watershed (white matter injury) or a combination of the two with restricted diffusion. Reasonably the child has suffered an acute, recent, intrapartum injury.

Dr. Clark seems to discredit this exercise in jurisprudential truth-finding by underscoring the perceived limitations of the obstetrical, neuroradiological, and neurological deliberations among the caretakers that go into assigning the timing and mechanism and preventability of fetal neurological injury. He assails the use of both FHR patterns and neuroradiological investigations to inform such conclusions – except in the presence of a sentinel event. He insists that without evidence of normal pre-labor neurologic development and function (he does not offer an opinion on how this is best obtained), neither intrapartum FHR patterns nor abnormal postnatal imaging can be viewed as reliable indicators of the timing or preventability of such injuries. He argues that those fetuses who suffer a sentinel event will show unmistakable patterns (his new Category III), which are also detectable by auscultation and will not fail to spur the clinician to action.

Consider the question: how safe are automobiles? Why is the death toll from automobile accidents rising if cars are safer than previous? If cars are safer, that benefit can be overridden by poor or inattentive driving habits. Some may imagine safer cars promote faster speed and more reckless conduct behind the wheel. Reasonably, it is the habits of the driver that contribute to the adverse outcome statistics. Even Dr. Clark agrees that practitioners frequently do not use EFM wisely; they are poorly educated in the interpretation of tracings using Categories I-III for the management of labor, *i.e.,* "they frequently act based on the FHR pattern alone without considering the clinical circumstances" such as progress in labor or associated maternal high-risk conditions.

"Consider the question: how safe are automobiles? Why is the death toll from automobile accidents rising if cars are safer than previous? If cars are safer, that benefit can be overridden by poor or inattentive driving habits."

Clearly, FHR patterns do not fail to detect asphyxia; and presumably cannot fail to reduce its consequences; therefore, inarguably, they should make labor "safer"(28-29). How shall we evaluate the role of EFM under current circumstances when its underpinnings are suspect?. That will depend on the evidence, but how does one determine the predictive accuracy of EFM while it is used (sometimes inappropriately) by the practitioner to influence the conduct of labor and the timing and route of intervention. It becomes unreasonable to demand that EFM should both predict and prevent the adverse outcome.

Fetal monitoring in the courtroom

Finally, we come to using FHR patterns in allegations of obstetrical malpractice. This concern is so ubiquitous that it appears in many, if not most, articles on fetal monitoring. This is not without cause; the substandard response to FHR patterns is a conspicuous mainstay of preventable injury worldwide, whether the tribunal is the courtroom or in organizational reviews by medical authorities. (30, 31) Clark decries the introduction of the FHR tracing as evidence in the courtroom. As shown above, he avers that the allegation that an adverse outcome would have been avoided by a different response to the FHR tracing is "junk science."

Fueling the discontent are trials in cases where the child suffers from a life-long neurological handicap that result in large monetary awards and where the decision hung on "the disputed interpretation of the FHR pattern. (1) Discussions elsewhere highlight the relationship of large awards to the comportment of the defense and how large awards relate in part to the jury's disappointment with the actions of the defense that diminish the honor of the medical profession." (27) Indeed, it is rarely the medical issues that cause those runaway verdicts that create so much distress in the medical community, but rather, the humanity of the defendant that prevents "runaway" verdicts. It is inspiring and, we believe, award-limiting) when the defendant offers some solace (healing) to the parents while holding open the option of having learned something from the experience that will benefit a future patient. Arguing arrogantly and dogmatically that nothing different will be done in the future is a formula for large awards.

Imagine going into court or even an administrative hospital or governmental meeting to justify current practices armed with the arguments offered by Dr. Clark. The defense argues that tracings cannot be interpreted so that babies benefit, except perhaps with a sentinel event. The profession cannot show that obstetrical care matters; monitoring has no other effect than harmfully increasing the cesarean section rate. Would not the mindful stakeholder ask why monitoring was used in the first place, why are all these guidelines for management based on FHR patterns in vogue, and why have so many evaluations worldwide found so much intrapartum injury they consider preventable? (30) Fetal heart rate tracings are but one component of the compendium of perinatal data. While better evidence is urgently needed, it would seem that we need to focus on fundamental notions of what is being monitored with EFM and the importance of optimizing perinatal care using evidence – not dogma.

"However, we also have the inferential keys to understanding the imperfect but informative language of FHR patterns and the broad adoption of a less defensive posture that reorients our priorities so that we are more offended by bad outcomes than the specter of malpractice litigation. We must increase our support for the obvious concept that what we do as obstetrical care providers does matter – and that accountability – vulnerability to the allegation of professional negligence - acknowledges that value. "

Conclusion

Obstetrical health care providers continue to look for guidance in the poorly conceived, defensive three-tiered classification of FHR patterns (Categories I, II, and III) that are largely unrelated to our understanding of fetal-maternal physiology and predicated on

the notion of EFM as an instrument of rescue from "threatening" acidemia. In this, we can all agree. However, we also have the inferential keys to understanding the imperfect but informative language of FHR patterns and the broad adoption of a less defensive posture that reorients our priorities so that we are more offended by bad outcomes than the specter of malpractice litigation. We must increase our support for the obvious concept that what we do as obstetrical care providers does matter – and that accountability – vulnerability to the allegation of professional negligence - acknowledges that value.

We must at least consider employing measures to keep babies out of harm's way in the first place and attempt to convert category II to a category I tracing. (2) In this recommendation lies the likely reengineering of the approach to EFM as an instrument of preventive care rather than one geared to rescuing the fetus from a hostile, presumably acidemic environment. (32) In this respect, it seems especially necessary to scrupulously avoid excessive uterine activity irrespective of heart rate pattern and titrate the mother's expulsive efforts according to the fetus's response. We must attempt to minimize the need for urgent intervention – an effective measure of the quality of obstetrical care. There appears to be no clinical virtue to seeing how close one comes to catastrophe or a sentinel event before intervening (rescuing) – enlightened surveillance matters both to the outcome and the profession's self-esteem.

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NT

Barry Schifrin, M.D,
Western University of Health Sciences, Pomona, California
Formerly, Professor of Obstetrics & Gynecology
Keck School of Medicine, University of Southern California, Los Angeles

Corresponding Author:

Maureen E. Sims, M.D.
Professor of Pediatrics
Geffen School of Medicine,
University of California, Los Angeles
Los Angeles, California
email: mes@g.ucla.edu

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- SEPARATION AND TRAUMA

EVIDENCE

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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

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- POSTPARTUM CARE DELIVERY

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Gravens By Design: Racial Disparities in Preterm Birth are Rooted in Environmental Exposures

Heather H. Burris, MD, MPH

For decades, epidemiologic studies have shown persistent racial disparities in preterm birth. Compared with white infants, Black infants are 50% more likely to be born preterm and three times more likely to be born extremely preterm (<28 weeks of gestation). (1) Investigators have searched for the etiology of racial disparities in preterm birth, but the phenomenon remains poorly understood. The lack of meaningful progress in achieving equity with respect to preterm birth results from two major knowledge gaps. First, we lack a fundamental understanding of the pathophysiology of preterm birth (regardless of race). Second, we conflate race with genetics. As scientists work to delineate the biological processes that lead to preterm birth, we, as a society, must recognize that race is a social construct with biological implications. Given longstanding racial segregation in nearly all aspects of life in the U.S. (residential, occupational, recreational, etc.), environmental exposures differ by race and affect the chances of a healthy, long life.

"Given longstanding racial segregation in nearly all aspects of life in the U.S. (residential, occupational, recreational, etc.), environmental exposures differ by race and affect the chances of a healthy, long life."

Spontaneous preterm birth occurs without any intervention by a provider, while the medically indicated preterm birth occurs after induction or cesarean birth. As neonatal providers, we use many of the same clinical tools to provide intensive care for extremely preterm infants regardless of why a particular infant was born early. There are a few exceptions. We might be more likely to use antibiotics if there had been spontaneous preterm labor or less likely to feed soon after birth if there had been severe preeclampsia with significant placental insufficiency and intrauterine growth restriction.

However, for the most part, we treat infants very similarly, given their gestational age and set of presenting signs. Yet, the maternal processes that occur in the setting of preterm labor or preeclampsia, for example, are different. The former might be triggered by ascending intrauterine infection (2) and the latter by events that remotely occurred during implantation. (3,4) These etiologies of these distinct processes remain poorly understood and very difficult to prevent, reducing racial disparities in these conditions nearly impossible for clinicians. However, clues from other complex, multifactorial, heterogeneous health conditions may provide some insights.

All health exists along a continuum from genetic in origin to environmental and most conditions exist in between (Figure 1). During medical training, we learn about monogenic disorders such as sickle cell disease and cystic fibrosis caused by single-gene mutations. (5,6) These mutations have varying population frequencies in different racial groups. Thus, the racial disparity in these disorders is attributable to genetics. The connection between genes and race can become entrenched in clinical medicine because of the strong association between race and those monogenic disorders. However, race and genetics are not synonymous. There are a few ways to demonstrate this. First, there is more genetic variation within racial groups than between. (7) To conceptualize this concept, let us consider height. Some groups of people are shorter than other groups. However, there is a larger variation within a population than between populations; the average heights of various populations are more similar than the range of heights within a population. Second, there has been so much sharing of genetic information between racial groups in the U.S. that race is not a reliable way to determine whether individuals are at risk for sickle cell disease or cystic fibrosis.

"Finally, even if we recognize that some genetic sequences are more common in one racial group from shared ancestry, (10) for complex, multifactorial, heterogeneous conditions, (11,12) the role of genetics is dwarfed by environmental determinants of health."

Thus these conditions are now part of routine newborn screening for all infants since race is not a reliable screening tool for who should be tested. (8,9) Finally, even if we recognize that some genetic sequences are more common in one racial group from shared ancestry, (10) for complex, multifactorial, heterogeneous conditions, (11,12) the role of genetics is dwarfed by environmental determinants of health. Concerning preterm birth, the most compelling evidence regarding the critical role of the environment comes from studies of foreign-born and US-born Black birth outcomes. Foreign-born Black individuals have lower preterm birth rates (similar to rates among US-born white individuals) than US-born Black individuals, and this foreign-born advantage erodes after a single generation of living in the U.S. (13,14) Genetics do not change that quickly, and no single gene is going to be responsible for spontaneous rupture of membrane, preterm labor, preeclampsia, abruption, impaired fetal growth- all of which can lead to an infant being born preterm and all of which have large racial disparities.

"Genetics do not change that quickly, and no single gene is going to be responsible for spontaneous rupture of membrane, preterm labor, preeclampsia, abruption, impaired fetal growth- all of which can lead to an infant being born preterm and all of which have large racial disparities."

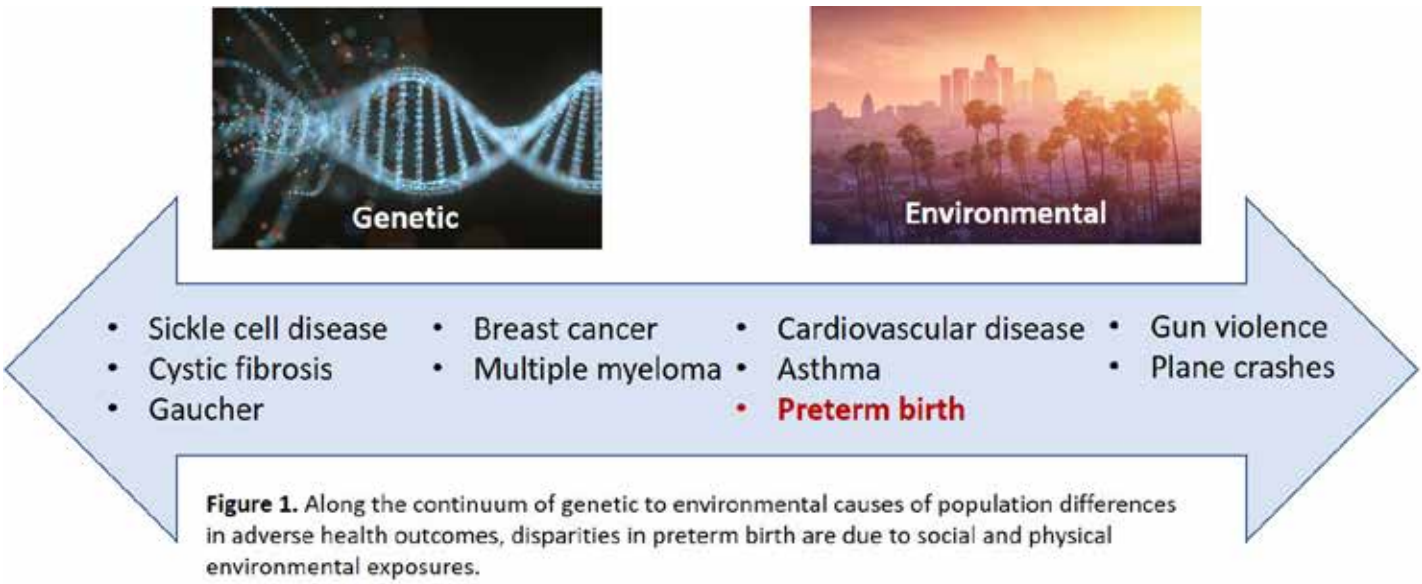

Figure 1. Along the continuum of genetic to environmental causes of population differences in adverse health outcomes, disparities in preterm birth are due to social and physical environmental exposures.

Clinicians alone will not be able to solve racial disparities in preterm birth. We must turn to our colleagues in public health, anthropology, and sociology. The critical question is why so many heterogeneous, multifactorial health conditions are more common among Black individuals in the U.S. There are two possibilities, differential susceptibility to, or differential doses of, harmful and beneficial exposures. Given the vastly different exposures to stressors (e.g., racism, poverty) (15) and toxicants (e.g., air pollution, heavy metals), (16) the differential doses of exposures are more likely to contribute to disparities in complex conditions. The mechanisms by which these exposures lead to complex disorders are an active area of investigation using "omic" technologies. Exposures can lead to differences in the microbiome, metabolome, epigenome, etc. These mechanisms change cellular and, ultimately, organ function leading to disease.

"However, simply because one can study these mechanisms does not mean the medical interventions will resolve disparities in health. It is possible, and even likely, that differences in omic signatures by race may be the result of environmental exposures. A societal movement to addresses the upstream structures of inequity resulting from historic and ongoing racism will be required to equalize the opportunity to lead healthy, long lives."

However, simply because one can study these mechanisms does not mean the medical interventions will resolve disparities in health. It is possible, and even likely, that differences in omic signatures by race may be the result of environmental exposures. A societal movement to addresses the upstream structures of inequity resulting from historic and ongoing racism will be required to equalize the opportunity to lead healthy, long lives. Potential interventions include providing a universal basic income, (17) expanding Medicaid, (18) greening vacant lots in urban settings, (19) and investing in Black neighborhoods. (20) Nothing short of a comprehensive effort to improve social and physical environmental exposures will achieve perinatal health equity.

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Corresponding Author

Heather H. Burris, MD, M.P.H.,
Associate Professor of Pediatrics,
University of Pennsylvania Perelman School of Medicine;
Attending Neonatologist, Children's Hospital of Philadelphia
Division of Neonatology, Roberts Center for Pediatric Research,
734 Schuylkill Ave, 19th floor, Philadelphia, PA, 19146, U.S.A.
Phone: 215-573-4916,
Email: burrish@chop.edu

COVID-19

STOP THE SPREAD AT HOME

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

HYGIENE TIPS

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

EYES
Wear protective eye gear (glasses)

HANDS
ALWAYS wash your hands

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

BATHROOM

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

PROTECT

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

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

SELF ISOLATION

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

6 FT

Practice social distancing

KITCHEN

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

TRACK COVID-19 NEAR YOU BY VISITING COVIDNEARYOU.ORG

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COVID-19

DETENER LA PROPAGACIÓN EN CASA

Qué hacer cuando usted o un ser querido está infectado.

CONSEJOS DE HIGIENE

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

OJOS
Use equipo de protección para los ojos (lentes)

MANOS
SIEMPRE lávate las manos

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

BAÑO

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

PROTEGER

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

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

AISLAMIENTO

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

6 FT

Practica el distanciamiento social

COCINA

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

SIGUIR COVID-19 VISTAR COVIDNEARYOU.ORG

#STOPTHESPREAD

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Ways to Manage Covid 19 @ Home

Household

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

Stop the Spread at HOME

MIORA

Sick

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

Maneras de manajer COVID-19 en casa

Hogar

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

Detén la propagacion en casa

MIORA

Enfermo

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

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PROTECT PARENTS + BABIES

COVID-19

When we all wear masks...

We protect parents and babies.

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COVID-19

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Protegemos a los padres y los bebés.

Project Sweet Peas + National Perinatal Association

Peer Reviewed

Fragile Infant and Family-Centered Developmental Care Evidence-Based Standards: Why Interprofessional Implementation Is Essential

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

Establishment of Fragile Infant Forums for Implementation of Standards

In July, we kick off the first Fragile Infant Forums for Implementation of Standards (FIFI-S) to bring together leaders and thought influencers in the intensive care field to develop guidelines for the implementation of the evidence-based Infant and Family-Centered Developmental Care (IFCDC) standards of care https://nicudesign.nd.edu/nicu-care-standards/. We invite all interprofessionals concerned with the appropriate implementation of the published standards, competencies, and best practices to be a part of developing guidelines for interprofessional IFCDC approaches. In this article, we outline the necessity of shared evidence-based standards to ensure that neurodevelopmental care is consistently applied, resulting in optimal interprofessional communication and collaboration.

"We invite all interprofessionals concerned with the appropriate implementation of the published standards, competencies, and best practices to be a part of developing guidelines for interprofessional IFCDC approaches."

Foundations of Developmental Care in Intensive Care

In the past few decades, the number of babies in intensive care has increased, and the gestational age at admission has decreased, resulting in significant improvement in outcomes due to enhanced medical and nursing care. Mortality and morbidity have decreased, yet at the same time, perplexing neurodevelopmental and mental health adverse outcomes have not been eliminated. However, the incidence and severity of these adverse neurodevelopmental outcomes appear to have decreased (1).

Emphasis on what we now recognize as developmental care, which focused on changing the outcomes of babies in intensive care, began in the early 1980s and 1990s with the work of Dr. Stanley Graven (2, 3), which focused on the environmental and caregiving approaches in neonatal intensive care. Dr. Heidelise Als (4-6) developed an individualized developmental care program that showed improvements in medical and neurodevelopmental outcomes. Other programs since those pioneering approaches have emphasized environmental, caregiving, and family-centered strategies to enhance the outcomes of these medically fragile babies. It may be that these efforts have contributed to the lessening of adverse neurodevelopmental outcomes.

Although early intensive care professional staff primarily included neonatologists and nurses, a gradual influx of professionals has occurred. Social Work professionals were likely the next group to provide essential services in the NICU, and more recently, NICU Psychologists have been recognized as contributing to supporting the mental health needs of families. Other therapy services such as Occupational Therapy, Physical Therapy, and Speech and Language Pathology have also begun to provide services to babies and families in intensive care and practice elements of supporting neurodevelopmental and family-centered care.

The rationale for Implementation of IFCDC Guidelines

Each of the mentioned professionals is expected to work as a team and share common goals for enhancing the outcomes of babies and families. Each profession has developed training and educational preparation for work in intensive care, and each has a vested interest in enhancing neurodevelopmental outcomes and caring for families. Importantly, each profession is committed to evidence-based approaches to their practice. Below are some examples of resources that address professional expectations by professional groups:

- Nursing: The Joint Position Statement from National Association of Neonatal Nurses (NANN) and Canadian Nursing Associations https://pubmed.ncbi.nlm.nih.gov/28841057/ (7)
- Medicine: Guidelines for acute care of the neonate https://relaped.com/wp-content/uploads/2018/08/Guidelines-for-Acute-Care-of-the-Neonate_2018.pdf
- Social Work: Standards for NICU Social Work practice https://www.napsw.org/assets/docs/NICU-standards.pdf#:~:text=Standard%201%20Every%20NICU%20shall%20maintain%20a%20written,it%20shall%20include%20clearly%20defined%20responsibilities%20and%20functions.
- Occupational Therapy: Knowledge and Skills document: https://www.aota.org/-/media/Corporate/Files/Practice/Chil-

dren/Browse/EI/Official-Docs/Specialized%20KS%20NICU.pdf

- Physical Therapy: Clinical competencies for NICU practice https://journals.lww.com/pedpt/Fulltext/2009/02140/Neonatal_Physical_Therapy__Part_I__Clinical.2.aspx
- Speech and Language Pathology: Competencies, knowledge, and skills to work in the NICU https://www.asha.org/policy/KS2004-00080/
- Mental Health: Psychosocial Program Standards https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4694191/

Of note, countries outside the United States have developed a variety of position statements for developmentally supportive, family-centered care that are recognized by their respective professions and organizations. Most notably are those in Canada (7) and Europe (8) https://www.efcni.org/activities/projects/escnh/ and Great Britain https://s3.eu-west-2.amazonaws.com/files.bliss.org.uk/images/Baby-Charter-booklet-2020.pdf?mtime=20210104142806&focal=none and https://hubble-live-assets.s3.amazonaws.com/bapm/file_asset/file/75/Service_Standards_for_Hospitals_Final_Aug2010.pdf

Each of the aforementioned professions and organizations has included neuroprotection and family-centered care components and addressed expectations for practice with infants and families. Each has a body of literature to support its respective practices. However, until recently, there has been no cross-discipline approach that would serve as the foundation for interprofessional communication, collaboration, and evidence-based practice.

The Gravens consensus panel members worked to develop interprofessional, evidence-based standards, competencies, and best practice recommendations for IFCDC (9). Each of the respective nationally known disciplines and family members was represented on the panel to ensure input with respect to their professional backgrounds.

"The Gravens consensus panel members worked to develop interprofessional, evidence-based standards, competencies, and best practice recommendations for IFCDC (9). Each of the respective nationally known disciplines and family members was represented on the panel to ensure input with respect to their professional backgrounds."

Collaborative efforts of panel members who contributed to the development of the IFCDC standards resulted in the identifying evidence that contributes to cross-discipline practice using accepted procedures and processes https://www.wolterskluwer.com/en/expert-insights/the-basics-of-clinical-practice-standards.

The next step is to develop approaches to ensure that developmental family-centered care is also available to babies and families in intensive care regardless of the professional providing services. This step in implementation will necessarily take a collaborative team approach. As noted by Manser et al.(10) and Tawfik et al. (11), teamwork and collaboration are essential to avoid errors, provide patient safety, and increase resiliency in the professional staff. That means having a consistently applied and articulated set of standards and best practices that the team can integrate into their day-to-day work. A systems-based approach to implementing the standards that a team of vested professionals can use is necessary to ensure that the IFCDC practices are consistently applied, evaluated, and documented.

"A systems-based approach to implementing the standards that a team of vested professionals can use is necessary to ensure that the IFCDC practices are consistently applied, evaluated, and documented."

Implementation of the standards is not easy, as each intensive care unit is different and has its management style, culture, resources, and strengths. In order to help with interprofessional implementation, concrete, specific yet flexible strategies are needed. The focus of the FIFI-S forums is to do just that—to provide structure and support for implementing the evidence-based IFCDC standards to support each interprofessional team with a reasonable and applicable road map.

A Forum to Address Standards Implementation

Please join us in developing interprofessional implementation strategies and materials at the first Forum that will focus on implementing the Feeding, Eating, and Nutrition Delivery Standards, Competencies, and Best Practices for Babies and Families in Intensive Care. Subsequent year Forums will focus on other standards, so come and help us kick off the 2022 Forum and help us get started on the development of useful implementation strategies. The Forum will be held July 13-15 with a nationally known group of professionals and practitioners (see more information and how to register in the June issue of Neonatology Today). We hope to see you there—in person or virtually.

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Disclosure: The author has no conflicts of interest

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Corresponding Author

Joy Browne, Ph.D., PCNS, IMH-E(IV)
Clinical Professor of Pediatrics and Psychiatry
University of Colorado School of Medicine
Aurora, Colorado
Telephone: 303-875-0585
Email: Joy.browne@childrenscolorado.org

Fragile Infant Forums for Implementation of Standards (FIFI S)
Formerly Fragile Infant Feeding Institute
July 13-15, 2022

Rationale: The FIFI S initiative is to promote, facilitate and provide strategies for implementation of the published standards of care for Infant and Family Centered Developmental Care in intensive hospital units in the US. Each of the forums will focus on one of the established sets of standards, competencies and best practices (feeding and nutrition, handling and positioning, promotion of states and arousal, pain and stress, skin to skin care and systems issues) with the goal of:

1. Raising awareness of availability of and need for implementation of current evidence based standards into practice.

2. Developing effective and reproducible strategies for assuring implementation of the competencies and best practices into intensive care and

3. Assuring that systems integration will lead to permanent changes in clinical practice.

The first of the forums will focus on the evidence based section of Feeding, Eating and Nutrition Delivery. Faculty will include influencers and researchers in the field. Audience participants will include professionals who will benefit from current research and systems implementation approaches to clinical care and contribute to discussion of best practices.

Hospitals will be encouraged to send their team of professionals who are leaders, influencers and those who have been selected to support change in their hospitals. A letter of support/commitment from the administration will be required for participation.

The two day intensive forum will bring together thought influencers, researchers, clinical professionals and parents who are invested in assuring practice excellence by implementing the IFCDC Standards, Competencies and Best Practices into baby and family intensive care systems.

Objecives:

- Discuss current best evidence based infant feeding practices
- Establish essential systems issues that guarantee implementation of best practices
- Determine best practice implementation strategies for the Feeding and Nutrition standards in national NICUs

Organizing Committee:

- Joy Browne
- Carol Jaeger
- Erin Ross
- Mitchell Goldstein

Program Consultants:

- Joan Arvedson
- Jacqueline McGrath
- Kelly McGlothen-Bell

Proposed Faculty:

- Suzanne Thoyre
- Barbara Medoff-Cooper
- Erin Ross
- Carol Jaeger
- Kelly McGlothen-Bell
- Carol Kenner
- Pamela Dodrill
- Britt Pados

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You are invited to register for the First Fragile Infant Forum for Integration of Standards—FIFI-S Hybrid Conference July 13-15, 2022

The initial Forum will address the Standards, Competencies, and Best Practices for Infant and Family-Centered Developmental Care, focusing on the *Best Practices for FEEDING, EATING, and NUTRITION* developed by the Gravens interprofessional consensus panel.

https://nicudesign.nd.edu/nicu-care-standards/

Registration: https://fifi_s.eventbrite.com

Registration: Hotel Reservations

The Forum allows discourse on current research and implantation of the Standards into intensive care practice. Scholars, administrators, and clinicians are invited to attend to develop a series of recommendations for implementing these competencies and best practices. An emphasis on evidence, system change, and adaptation to a new way of practicing will be the focus of workgroups. Dissemination of implementation recommendations will follow.

Supported by Loma Linda Publishing Company,
University of South Florida College of Public Health, and PACLAC

Objectives:

- Discuss current best evidence-based infant feeding practices
- Establish essential systems issues that guarantee the implementation of best practices
- Determine best practice implementation strategies for the Feeding and Nutrition standards in intensive care

Organizing Committee:

- Joy Browne
- Carol Jaeger
- Erin Ross
- Mitchell Goldstein

Faculty:

- Erin Ross PhD, SLP
- Carol Jaeger DNP, NNP
- Kelly McGlothen-Bell IBCLC, DNP
- Carole Kenner PhD, RN
- Pamela Dodrill PhD, SLP
- Britt Pados SLP
- Joy Browne PhD
- Debra Paul, OTR
- Joan Arvedson, PhD, SLP

AGENDA (subject to change without notice)

Date/time	Topic	Speaker/Facilitator
July 13	**FORUM DAY 1**	TBD
Afternoon	Optional visit to Prolacta	
6:00-7:00	Gathering/networking/ happy hour	Faculty
7:00-8:00	Keynote on Systems Change	TBD
July 14	**FORUM DAY 2**	
8:30-9:00 am	Welcome, introductions, instructions, and goals for the Forum	Browne
9:00-9:30 am	Overview of Feeding, Eating, and Nutrition Delivery standards development and current evidence	Ross Arvedson
9:30-10:30 am	2 Research presentations of current best practices in Feeding, Eating, and Nutrition delivery. 20-minute presentation, 10-minute discussion each	Ross Pados
10:30-11:00	Break	
11:00-12:00	Research presentations of current best practices in Feeding, Eating, and Nutrition Delivery: 20-minute presentation, 10-minute discussion each	Thoyre Dodrill

12:00-12:30	Discussion across speakers with generalities of the barriers they faced, who they included, and what they forgot	All am speakers Moderator: Browne
12:30-1:15	Lunch	
1:15 – 1:45	Systems thinking 20-minute presentation 10-minute discussion	Jaeger Kenner
1:45-2:00	Instructions and assigned to workgroups to develop strategies for implementation	Browne
2:00 – 2:45	Workgroup discussion of potential strategies for implementation (systems and eating integrated)	Faculty member to each group
2:45-3:15	Strategies for implementation workgroup feedback	Designated facilitator and recorder
3:15-3:30	Break	
3:30-4:15	Workgroups: Identifying barriers to clinical implementation	Faculty assigned to each workgroup
4:15-4:45	Reports from workgroups	Designated facilitator and recorder
4:45-5:00	Synthesis of Day 1 topics	Paul
5:00	Adjourn	

Day/time	**Content/Topics**	**Presenter/facilitator**
July 15	**FORUM DAY 3**	
8:30-9:00	Continued discussion, review of the previous day, and goals for the second day.	Browne
9:00 -9:30	System implementation: Realistic strategies	Kenner Jaeger
9:30-10:00	Clinical implementation approaches including how to address barriers	Paul
10:00-10:15	Break	
10:15-11:00	The importance of and how to measure progress (metrics)	Jaeger/Ross
11:00-11:45	Open forum discussion: Integration of standards into systems and clinical practice	Moderators Paul Kenner
11:45-12:30	Lunch	
12:30-12:45	Assign to workgroups	Browne

12:45-1:30	Workgroups: Recommendations for implementation of standards to include systems thinking	Faculty assigned to each workgroup
1:30-2:00	Reports from workgroups	Designated facilitator and recorder
2:00 – 2:45	Summary and discussion of recommendations from workgroups to include recommendations, system and clinical implementation strategies, barriers	Browne Ross
2:45-3:00	Break	
3:00-3:30	How to use systems thinking to address recommendations, implementation, and barriers (full circle)	Kenner Jaeger
3:30-3:45	What have we forgotten? Check-in with group	Arvedson
3:45-4:00	Next steps, action plan development and statement of accountability	Browne
4:00	Adjourn	

Location: **Courtyard by Marriott Los Angeles Pasadena/Monrovia**
700 West Huntington Drive, Monrovia, CA 91016

Costs for both in-person and virtual:

$395 for MDs
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$195 for students, residents, and fellows (documentation required)
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$225 each for groups of 3 or more from the same institution

Registration: **https://fifi_s.eventbrite.com**

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You are invited to Exhibit at the First Fragile Infant Forum for Integration of Standards—FIFI-S Conference July 13-15, 2022

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July 13-15, 2022

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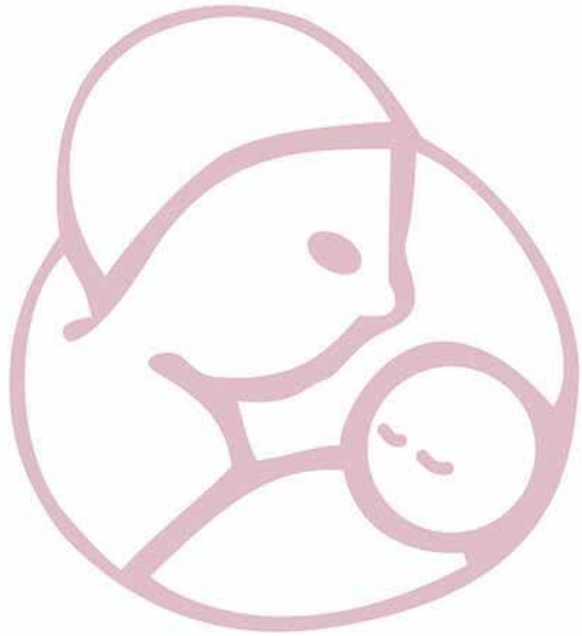

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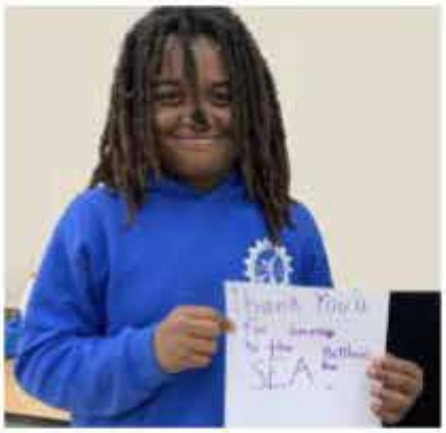

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1 week	$30
1 month	$120
1 semester	$540
1 year	$1,080
Middle School	$3,240

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A Decade of Sepsis Cases in a Level III Neonatal Intensive Care Unit: An Observational Study

Mark Baker MD, Laura Castro, MD, Julianna Diddle MD, Patricia Johnson DNP, MPH, APRN, NNP, Bikash Bhattarai PhD, Christine Wade, BSN, RN, Becky Micetic, BSN, RN, Kartik Mody, MD

Abstract:

Background: *Neonatal sepsis is a serious condition caused largely by group B Streptococcus (GBS), Escherichia coli (E. Coli), and Listeria monocytogenes. Prenatal screenings have decreased the incidence of GBS infections; however, it remains a leading cause of early-onset sepsis (EOS). Gram-positive organisms are often the cause of late-onset sepsis (LOS). While EOS is usually attributed to vertical transmission from mother to infant, LOS is secondary to pathogen exposure during delivery or hospitalization. We sought to identify the prevalent organisms in positive blood cultures in our NICU.*

Methods: *A retrospective chart review was completed from July 2009 to December 2019. If an organism was identified, a positive culture was included, and five or more days of antibiotics were administered. Infection occurring in the first three days of life was considered EOS, while LOS was any time after. Variables were evaluated using Fisher's exact and Wilcoxon rank-sum tests.*

Results: *Over ten years, there were 89 positive blood cultures. Of these, 28% of the cases were EOS, and 72% were LOS. Interestingly, the median birth weight for infants with EOS was significantly larger at 1810g compared to 1021g for LOS (P=0.004). The median gestational age for EOS cases was 31 5/7 weeks compared to 27 2/7 weeks for LOS (P=0.086).*

Conclusions: *Approximately half of EOS-causing organisms were GBS or E.Coli. Coagulase-negative staphylococcus and methicillin-susceptible Staphylococcus aureus were most prevalent in LOS.*

Abbreviations

CoNS	Coagulase-Negative Staphylococcus
DOL	Day of Life
EOS	Early Onset Sepsis
E. Coli	*Escherichia coli*
GA	Gestational Age
GBS	Group B *Streptococcus*
LOS	Late-Onset Sepsis
MRSA	Methicillin-Resistant *Staphylococcus aureus*
MSSA	Methicillin-Susceptible *Staphylococcus aureus*

Main points:

A ten-year review of sepsis in infants in NICU with positive cultures confirmed that over half of early-onset sepsis cases contained GBS and *E.Coli.* CoNS and MSSA were most prevalent in late-onset sepsis.

Keywords:

Neonatal Sepsis; Blood Culture; Intensive Care Units, Neonatal; Infant, Newborn;

"Approximately half of EOS-causing organisms were GBS or E.Coli. Coagulase-negative staphylococcus and methicillin-susceptible Staphylococcus aureus were most prevalent in LOS."

Introduction:

Neonatal sepsis is a serious threat affecting the health and survival of infants worldwide. It occurs in 1-50 per 1000 live births and causes 3-30% of infant and child deaths yearly. (1) In the United States of America, the incidence of neonatal sepsis is 0.77-1.0 cases per 1000 live births but rises to a rate of 8-26 cases per 1000 live births for infants between 1000-1500 grams (g). (2) Research has consistently shown a strong inverse relationship between gestational age (GA) and the incidence of sepsis. (3-7)

" Neonatal sepsis cases are categorized as early-onset sepsis (EOS) occurring within the first 72 hours of life or late-onset sepsis (LOS) developing after 72 hours with pathogens transmitted from the mother's genitourinary system before, during, or shortly after birth as the usual the cause. (1-3,8-9)"

Neonatal sepsis cases are categorized as early-onset sepsis (EOS) occurring within the first 72 hours of life or late-onset sepsis (LOS) developing after 72 hours with pathogens transmitted from the mother's genitourinary system before, during, or shortly after birth as the usual the cause. (1-3,8-9) Risk factors include antenatal antibiotics, maternal chorioamnionitis, multiple pregnancies, maternal Group B *Streptococcus* (GBS) colonization, maternal urinary tract infection, delivery before 37 weeks GA, prolonged maternal rupture of membranes (greater than 18 hours), low 5-minute APGAR score, and those requiring ventilation on the first day of life (DOL). (2,4,8) *Escherichia coli* (E. coli) and GBS are consistently the leading causes of EOS in the United States, with a prevalence of 29-37% and 18-43%, respectively. (2,4,8-11)This trend holds for most developed countries worldwide. (12-18) Among infants infected with GBS, about one-quarter progress in developing meningitis requiring prolonged antibiotic treatment and hospitalization with increasing chances of morbidity. (19-20) Other less common EOS organisms include *Listeria monocytogenes*; other strains of streptococcus (*pyogenes, viridans, pneumoniae*); enterococci, staphylococci, and non-typeable *Haemophilus influenzae*. (2,4,8)

Late-onset sepsis (LOS) occurs after 72 hours of life and is usually caused by pathogens in the surrounding environment, often transmitted to the infant by parents or health care workers. (1,2,8) The risk factors include premature birth, being small for GA, antenatal antibiotic use, delivery via Cesarean section, prolonged use of invasive interventions, breakage in skin or mucosa, prolonged total parenteral nutrition dependence, delayed initiation of breastmilk feeding, surgery, cardiac/pulmonary abnormalities, necrotizing enterocolitis, H_2-receptor blockage or proton pump inhibitor, and/or prolonged antibiotic use. (1,3,8,21) Coagulase-negative staphylococcus (CoNS) is the most common LOS pathogen in the United States of America, with other developed countries presenting similar results. (4,6,12-13,22-29)

"Interestingly, each NICU has its microbiome, and specific pathogens are common as the cause of sepsis at each site. (5) The objective of our study was to identify the most prevalent types of organisms in blood cultures for both EOS and LOS in our NICU over ten years."

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Methods:

Data were collected retrospectively from Valleywise Health Medical Center (formally known as Maricopa Medical Center), a 40-bed level III community NICU in Phoenix, Arizona, from July 2009 through December 2019. Researchers collected data on positive blood cultures using the Epic Electronic Health Record system (Epic Systems Corporation, Verona, WI). In the event of CoNS bacteremia, or another suspected contaminant, at least one positive blood culture and a full antibiotic treatment course with a clinical picture consistent with sepsis needed to be included. If there was a positive blood culture and it was not treated with antibiotics due to the absence of clinical sepsis, this was considered a contaminant and excluded. Infections were categorized as EOS if the septic workup occurred within the first three days of life, while LOS was defined as a sepsis workup initiated at DOL four or greater.

Statistical analysis included the association between categorical variables of EOS and LOS utilizing Fisher's exact tests. The differences in continuous variables were examined using the Wilcoxon rank-sum test. Human protection oversight was provided by the Maricopa Health Institutional Review Board, later known as Valleywise Health Institutional Review Board.

Results:

Over ten years, 89 blood cultures were positive. The infants with positive septic workups were 54% female (n=48), had a median GA of 28 1/7 weeks (22 5/7- 41 6/7), and median birth weight of 1155g (486-4240g). The median initiation of antibiotic treatment was at DOL 0 (0-292) with a median duration of 12 days (0-47) (Tables 1 & 2).

		EOS	LOS		
		n (%)		N	*P**
Gender	Female	16 (64)	32 (50)	48	0.249
	Male	9 (36)	32 (50)	41	
Mode of delivery	Cesarean	14 (56)	38 (59.38)	52	0.814
	Vaginal	11 (44)	26 (40.63)	37	
Mortality	No	20 (80)	50 (78.13)	70	>0.999
	Yes	5 (20)	14 (21.88)	19	
	Total	25	64	89	
*Fisher's exact 2-sided *P* value					

Table 1. Gender, Mode of Delivery, and Mortality

The most common pathogens were CoNS (23.6% of total positive cultures, n=21), methicillin-susceptible *staphylococcus aureus* (MSSA) (20.3%, n= 13), *E coli* (13.5%, n=12), GBS (10.1%, n=9), *enterococcus faecalis* (9.0%, n=8), and *klebsiella pneumoniae* (7.9%, n=7). No other organism was isolated more than four times (Table 3).

Of the 89 total positive blood cultures, 28% were considered EOS (n=25) while 72% were LOS (n=64). Gender, GA, mode of delivery, and mortality were not significantly different between EOS and LOS infants (Table 1). On average, EOS infants were somewhat smaller, with a median birth weight of 1810 g, while LOS infants had a median birth weight of 1021g (*P*=0.004). Infants with EOS also received a slightly shorter course of antibiotics, with a median duration of 11.0 days, compared to a median duration of 12.5 days for LOS infants (*P*=0.045). As expected, antibiotic treatment was initiated at a significantly younger age for EOS and the median initial treatment day was 0 with a mean of 0.14, while the median and mean initial treatment day of LOS infants was 6, with a mean of 22.4 (*P*<0.0001).

	All Culture Positive Sepsis						Type of Sepsis											
							Early (<3 days) Onset (n=25)						Late (4+ days) Onset (n=64)					
	N*	Mean	Median	Min	Max	SD	n*	Mean	Median	Min	Max	SD	n*	Mean	Median	Min	Max	SD	P**
Gestational Age, Weeks/Days	89	29 6/7	28 1/7	22 5/7	41 6/7	37.96	25	31 6/7	31 5/7	23 3/7	41 2/7	43.28	64	29 1/7	27 2/7	22 5/7	41 6/7	34.52	0.086
Birthweight, Grams	89	1553.43	1155	486	4240	968.21	25	2098.8	1810	486	4240	1175.78	64	1340.39	1021	530	3758	786.53	**0.004**
Duration of Treatment, Days	77	14.22	12	0	47	9.89	21	9.81	11	0	22	6.17	56	15.88	12.5	2	47	10.54	**0.045**
Initiation of Treatment, Day of Life	87	16.54	0	0	292	47.31	23	0.13	0	0	2	0.46	64	22.44	6	0	292	54.05	**<.0001**

*Some counts may be less than total due to missing values
**Wilcoxon rank-sum test comparing variables in the first column between EOS and LOS groups

Table 2. Gestational Age, Birthweight, Duration, and Initiation of Treatment

	n (% of cultures)		
	EOS	LOS	Total
Coagulase-negative staphylococcus	2 (8)	19 (26.4)	23 (23.7)
Methicillin-susceptible *Staphylococcus aureus*	0 (0)	13 (18.1)	13 (13.4)
Escherichia coli	6 (24)	6 (8.3)	12 (12.4)
Group B *Streptococcus*	7 (28)	2 (2.8)	9 (9.3)
Enterococcus faecalis	2 (8)	6 (8.3)	8 (8.2)
Klebsiella pneumoniae	1 (4)	6 (8.3)	7 (7.2)
Candida albicans	0 (0)	4 (5.6)	4 (4.1)
Listeria moncytogenes	1 (4)	2 (2.8)	3 (3.1)
Coagulase-positive staphylococcus	0 (0)	3 (4.2)	3 (3.1)
Micrococcus luteus	2 (8)	0 (0)	2 (2.1)
Corynebacterium species	1 (4)	0 (0)	1 (1.0)
Haemophilus influenza	1 (4)	0 (0)	1 (1.0)
Streptococcus pseudopneumoniae	1 (4)	0 (0)	1 (1.0)
Streptococcus viridans	1 (4)	0 (0)	1 (1.0)
Brevundimonas vesciularis	0 (0)	1 (1.4)	1 (1.0)
Enterobacter cloacae	0 (0)	1 (1.4)	1 (1.0)
Gram-positive cocci in clusters	0 (0)	1 (1.4)	1 (1.0)
Klebsiella oxytoca	0 (0)	1 (1.4)	1 (1.0)
Methicillin-resistant *Staphylococcus aureus*	0 (0)	1 (1.4)	1 (1.0)
Proteus mirabilis	0 (0)	1 (1.4)	1 (1.0)
Pseudomonas aeruginosa	0 (0)	1 (1.4)	1 (1.0)
Serratia marcescens	0 (0)	1 (1.4)	1 (1.0)
Streptococcus acidominimus	0 (0)	1 (1.4)	1 (1.0)
Streptococcus bovis	0 (0)	1 (1.4)	1 (1.0)
Streptococcus pneumoniae	0 (0)	1 (1.4)	1 (1.0)
Total	**25**	**72**	**97**

LOS Blood Culture Pairs	**n**
Methicillin-susceptible *Staphylococcus aureus*/ Coagulase-negative staphylococcus	2
Methicillin-susceptible *Staphylococcus aureus*/ Coagulase-positive *Staphylococcus aureus*	2
Coagulase-negative staphylococcus/*Brevundimonas veiscularis*	1
Enterococcus faecalis/*Escherichia coli*	1
Enterococcus faecalis/*Klebsiella pneumoniae*	1
Staphylococcus epidermidis/*Staphylococcus hominis* (Coagulase-negative staphylococcus x2)	1
Total	**8**

Table 3. Pathogens Present in Blood Cultures

There were 25 cases of EOS that were culture positive with a single pathogen, and there were no blood cultures positive for multiple species of bacteria. The most common being GBS (28%, n=7) and *E. coli* (24%, n=6). (Table 3) Late-onset sepsis accounted for 64 total cases of positive culture results, with 72 pathogens isolated, with the most prevalent as follows: CoNS (26.4%, n=19), MSSA (18.1%, n=13), *E. coli* (8.3%, n=6), *Enterococcus faecalis* (8.3%, n=6), and *Klebsiella pneumonia* (8.3%, n=6). There were three cultures containing coagulase-positive staphylococcus; however, the exact speciation was not recorded in the medical record. Eight blood cultures were positive for two different microorganisms with CoNS. No other pathogen was isolated more than two times. Only one blood culture was confirmed to have methicillin-resistant *Staphylococcus aureus* (MRSA), and another was positive for nonspecific gram-positive cocci in clusters.

Two separate pathogens were present in eight of the LOS blood cultures. (Table 3) Of these, two blood cultures were positive for both MSSA and an unspecified coagulase-positive *staphylococcus aureus*, and it is unclear whether it represented MSSA or MRSA. During some septic workups, cultures were obtained from other sites. Interestingly, only two infants with EOS had a positive blood culture and a positive culture from another site of a different pathogen, one of which had *E. coli* in the blood and a urine culture positive for cytomegalovirus, and the other, with *Haemophilus influenzae* in the blood and cerebrospinal fluid positive for herpes simplex virus. All remaining positive cultures from sites other than blood were in cases of LOS (n=21) (Table 4).

"Data collected over a ten-year duration showed that GBS was the most commonly occurring EOS organism, followed by E. coli. Of note, none of the infants' mothers received prophylactic antibiotics in all four cases of GBS sepsis."

Discussion:

Data collected over a ten-year duration showed that GBS was the most commonly occurring EOS organism, followed by *E. coli*. Of note, none of the infants' mothers received prophylactic antibiotics in all four cases of GBS sepsis. Since the initiation of GBS screening in the 1990s, the incidence has decreased by 70-80% in the United States of America, with a similar decline in other

Urine	
Candida albicans	2
Enterococcus faecalis	2
Candida albicans/Coagulase-negative staphylococcus	1
Enterococcus faecium	1
Cerebral Spinal Fluid	
Candida albicans	1
Escherichia coli	1
Enterococcus faecalis	1
Generically positive	1
Endotracheal	
Escherichia coli	2
Acinetobacter baumannii/*Enterobacter cloacae*	1
Methicillin-susceptible *Staphylococcus aureus*	1
Methicillin-susceptible *Staphylococcus aureus*/*Stenotrophomonas maltophilia*	1
Klebsiella pneumoniae/*Pseudomonas aeruginosa*/*Serratia marcescens*	1
Peritoneal	
Group B *Streptococcus*	1
Methicillin-resistant *Staphylococcus aureus*	1
Klebsiella aerogenes/*Klebsiella oxytoca*	1
Klebsiella pneumoniae	1
Wound	
Escherichia coli	1
Total	**21**

Table 4. Pathogens Present in Non-Blood Cultures

developed countries. (1,8) Despite this, it continues to be a leading cause of EOS in the United States of America and most other industrialized countries, and our findings are consistent with this previous research. Stoll et al. collected data from 16 large NICUs across the country from 2006 to 2009 and found that GBS was the most common offending pathogen in 43% of cases, followed by *E. coli* in 29% of cases. (10) Simonsen et al. reported at the North American Active Bacterial Surveillance Program from 2005 to 2008 that 33.7% of positive cultures isolated GBS, while 21.5% isolated *E. coli.* (2) Other studies have shown *E. coli* as the most prevalent NICU pathogen for EOS. Drs. Mukhopadhyay and Puopolo retrospectively reviewed 25 years of blood cultures at Boston's Brigham Women and Children's NICU from 1990 to 2015 and found 36.7% of positive EOS blood cultures, with GBS being only 20.2% of positive cultures. (11) Bizarro et al. (22) from the Yale University NICU reviewed data from 2004 to 2013 and found *E. coli* to account for 45% of EOS and GBS to be only 36%. Hornik et al. (4) reviewed data from 313 NICUs across North America and estimated *E. coli* to be the most common EOS pathogen at 33.4%, followed by GBS at 21.5% (although this was limited to infants <1500g). In all of these studies, GBS was the second-most common EOS pathogen, similar to our study's results. Besides *E. coli*, only two cases of other Gram-negative EOS were identified over ten years in our NICU: *Klebsiella pneumoniae* and *Haemophilus influenzae*.

Although *Listeria monocytogenes* was historically a common cause of neonatal sepsis, its prevalence remains relatively low at 2-13 per 100,000 live births in the United States of America and Europe. (2) Our NICU isolated only a single case of *Listeria monocytogenes* over ten years, consistent with previous studies. One meta-analysis from six hospital systems across the United States over six years did not find a single case of neonatal *Listeria* bacteremia in181 positive blood cultures. (30)

"For ten years, CoNS was the most common pathogen of LOS, followed by staphylococcus aureus. This agrees with many other studies conducted throughout the United States of America. (4,6,21,22)"

For ten years, CoNS was the most common pathogen of LOS, followed by *staphylococcus aureus*. This agrees with many other studies conducted throughout the United States of America. (4,6,21,22) Coagulase-negative staphylococcus is also the most-commonly isolated LOS pathogen throughout the developed and developing world. (22-29,31-35)The CoNS organism is not as virulent as many other types of bacteria, but it commonly colonizes human skin, mucous membranes, and artificial surfaces, forming an adhesive biofilm resistant to antibiotics and the immune system. (3,8) There is some difficulty in comparisons as most studies have unique definitions of contamination versus infection. Studies have also reported that efforts to implement improved hand hygiene and sterile technique with central lines can decrease late-onset CoNS infection rates.

Gram-negative LOS was more common in our NICU than gram-negative EOS (outside of *E. coli* bacteremia). However, they remained in the minority of bacteremia cases, and many specific Gram-negative species were isolated only once. Although our study did have a sizable number of cases of Gram-negative sepsis, even those not caused by *E. coli*, our LOS sepsis results were consistent with most studies.

Conclusions:

In our study, the most common cause of EOS was *E. coli,* followed by GBS and α-hemolytic streptococcus. This is in agreement with most NICU sepsis research. The most common cause of LOS was CoNS, which is consistent with most studies across the world, among all regions, races, and incomes.

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This study's strengths include a ten-year data collection period at a single medical center that serves a diverse population in one of the largest metropolitan areas in the United States of America. As this study was retrospective, its strength was in capturing the standard care practices occurring in the unit; however, this also may be seen as a limitation as to the decision of when to initiate

a sepsis workup could have varied between providers in addition to the antimicrobials used in the event of positive blood culture.

Limitations of this study are the relatively small sample size, its execution at a single medical center that may not be representative of other NICUs, and that we did not focus on the effect that race and/or ethnicity may have played at our institution. A large-scale prospective study would be helpful to evaluate these findings further and assist with the generalizability to other NICUs.

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NT

Corresponding Author

Mark Baker MD
Valleywise Health Medical Center (formerly known as Maricopa Medical Center), Phoenix, AZ
Phoenix Children's Hospital Pediatric Residency Program, Phoenix, AZ
Mailing: Loma Linda University, 11175 Campus Street, Coleman Pavilion Suite 11121, Loma Linda, CA 92354
Email: mebaker@llu.edu.

Patricia Johnson DNP, MPH, APRN, NNP
Valleywise Health Medical Center (formerly known as Maricopa Medical Center), Phoenix, AZ

Laura Castro, MD
Valleywise Health Medical Center (formerly known as Maricopa Medical Center), Phoenix, AZ
Phoenix Children's Hospital Pediatric Residency Program, Phoenix, AZ

Bikash Bhattarai Ph.D.
Valleywise Health Medical Center (formerly known as Maricopa Medical Center), Phoenix, AZ

Julianna Diddle MD
Valleywise Health Medical Center (formerly known as Maricopa Medical Center), Phoenix, AZ
Phoenix Children's Hospital Pediatric Residency Program, Phoenix, AZ

Christine Wade, BSN, RN
Pediatrix Medical Group/Arizona Neonatology, Phoenix, Arizona

Becky Micetic, BSN, RN
Pediatrix Medical Group/Arizona Neonatology, Phoenix, Arizona

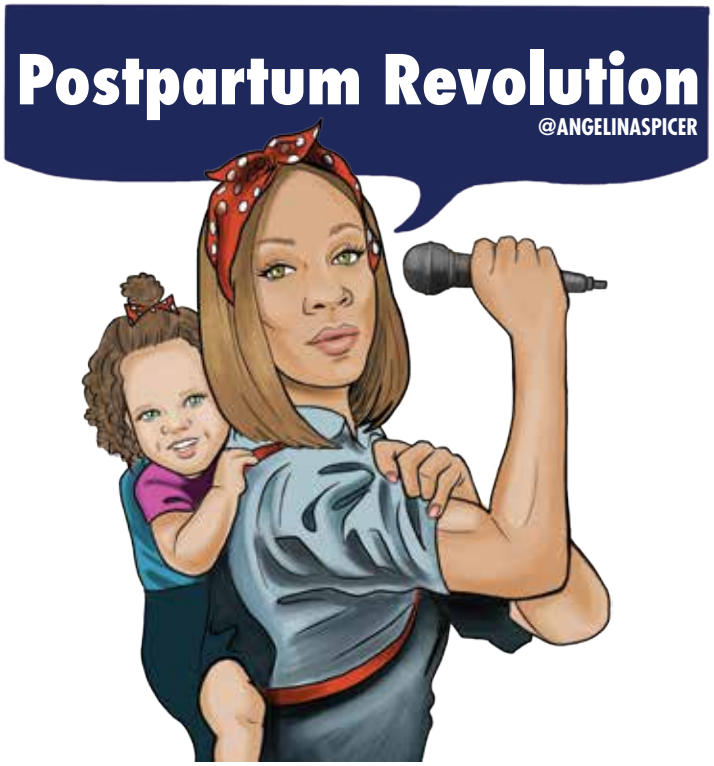
Kartik Mody, MD
Valleywise Health Medical Center (formerly known as Maricopa Medical Center), Phoenix, AZ
Pediatrix Medical Group/Arizona Neonatology, Phoenix, Arizona
University of Arizona, College of Medicine, Phoenix, Arizona
Creighton University School of Medicine, Phoenix, Arizona

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.

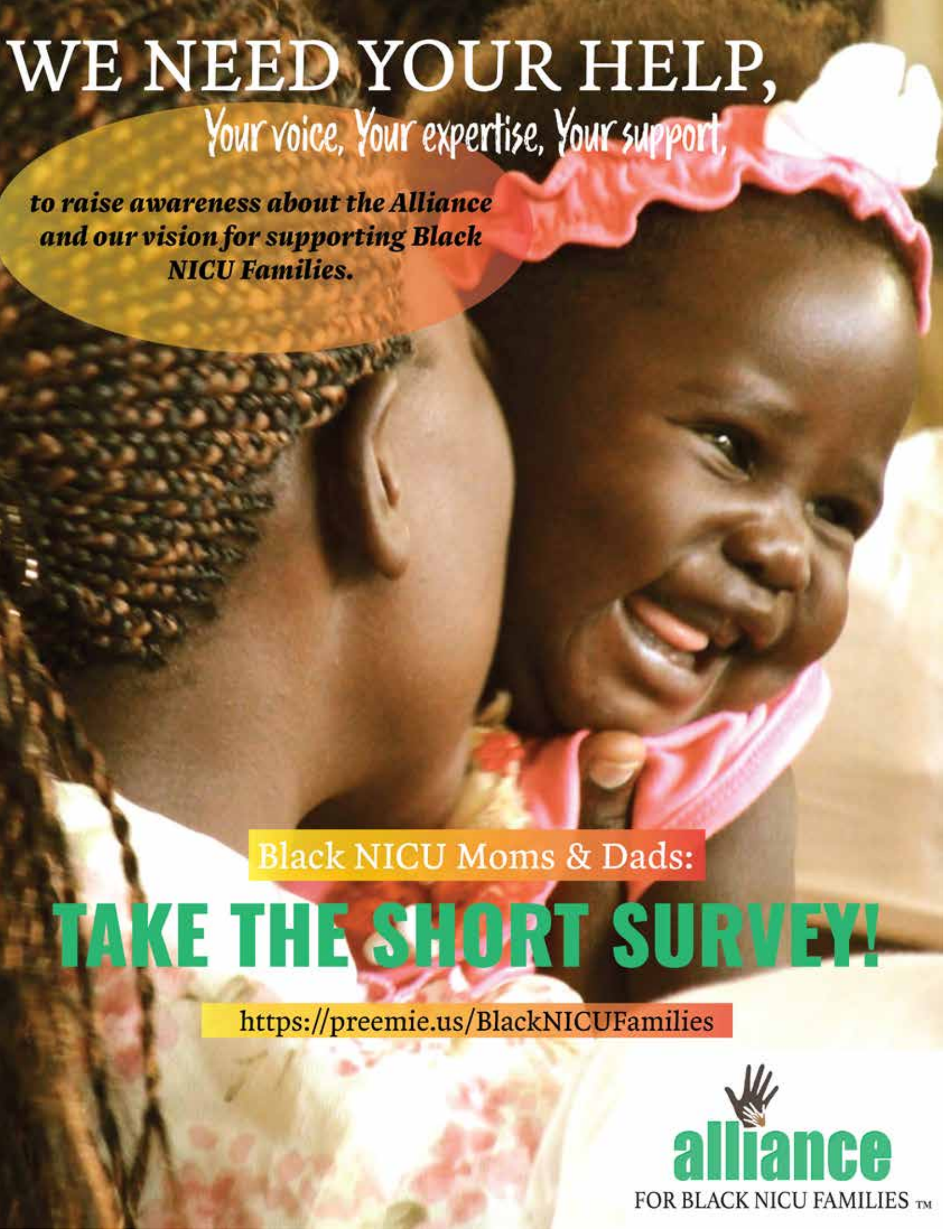
Houchang D. Modanlou



National Perinatal Association
PERINATAL MENTAL HEALTH

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

Educate. Advocate. Integrate.


WE NEED YOUR HELP,
Your voice, Your expertise, Your support,
to raise awareness about the Alliance and our vision for supporting Black NICU Families.
Black NICU Moms & Dads:
TAKE THE SHORT SURVEY!
https://preemie.us/BlackNICUFamilies
alliance
FOR BLACK NICU FAMILIES ™

Peer Reviewed

Media Fervor Versus the Realities Around Reducing the Risk of SIDS

Alison Jacobson

first candle

Saving babies. Supporting families.

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

"In a recent privately-funded study published in eBioMedicine (1), researchers in Australia analyzed dried blood spots previously collected as part of a newborn screening program (n = 600) and found levels of the enzyme Butyrylcholinesterase (BChE) were lower in the groups associated with Sudden Infant Death Syndrome (SIDS) than those that were not, and those in the healthy control group."

In a recent privately-funded study published in eBioMedicine (1), researchers in Australia analyzed dried blood spots previously collected as part of a newborn screening program (n = 600) and found levels of the enzyme Butyrylcholinesterase (BChE) were lower in the groups associated with Sudden Infant Death Syndrome (SIDS) than those that were not, and those in the healthy control group.

As BChE factors into the autonomic system and there has been ongoing exploration around possible autonomic impairment and SIDS, the report contributes to our knowledge about SIDS and should prompt further research. However, any suggestion in the media coverage that this is the cause of SIDS or a precursor to a SIDS prevention treatment is unwarranted and premature.

" The media energy around the study has reached a point where journalists themselves have felt the need to alert readers to beware of overreach."

The media energy around the study has reached a point where journalists themselves have felt the need to alert readers to beware of overreach. ("According to the study's authors, this suggests that, with further work, the protein 'could potentially be used as a biomarker to identify and prevent future SIDS deaths.' If that qualifies as a scientific "miracle," the bar is inches from the ground.") (2)

But this may not be apparent to families who are seeing reports on an array of media platforms, especially if they are preparing for childbirth and are looking to make the best decisions for the care of their baby. For this reason, their health care providers must provide clarity and context to breaking news and counsel about effective infant safe sleep practices.

More Than One Origin

As the researchers themselves note, there are multiple factors involving both internal and external stressors that can trigger SIDS, and while the study has contributed to identifying a potential biomarker (if confirmed in future research), this is not to suggest that the mystery of SIDS has been unraveled.

It is also important to recognize that SIDS is only one cause of Sudden Unexpected Infant Death (SUID), the other being Accidental Suffocation and Strangulation in Bed (ASSB.) ASSB results in at least 1,100 of the 3,500 SUID deaths in the U.S. every year, primarily due to babies sleeping on soft beds and/or with pillows, blankets, stuffed animals, and other soft objects nearby.

The Potential Moral Hazard

We are also concerned that putting too much weight on a test for vulnerability to SIDS could result in false positives or negatives, causing either panic in new parents or creating a false sense of security that could lead to adopting unsafe sleep practices.

"The reality is that following infant safe sleep practices as outlined by the American Academy of Pediatricians (AAP) continues to be the strongest tool families can have in reducing the risk of infant death from SIDS or ASSB."

The reality is that following infant safe sleep practices as outlined by the American Academy of Pediatricians (AAP) continues to be the strongest tool families can have in reducing the risk of infant death from SIDS or ASSB. Providing support would include a collaborative discussion with both parents around creating a safe sleep environment:

- Pre- and post-natal care for the mother and wellness visits for the baby.
- Making the home free of exposure to second-and third-hand smoke.
- Give infants their own separate sleeping space, with a flat, firm mattress and no loose bedding.
- Placing infants on their backs for sleep.
- The benefits of breastfeeding should also be discussed, and access provided to resources (lactation consultant, doula, etc.).

We realize that it can be difficult for families to sift through media messages as they try to understand what, if anything, this research means for them. For this reason, health care professionals must understand the study's context and its implications and remain prepared to help families make their infant care decisions.

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***Disclosure**: The author is the Executive Director of First Candle, a 501c (3) non-profit organization.*

NT

Corresponding Author

Alison Jacobson
Executive Director
Chief Executive Officer
First Candle
49 Locust Avenue, Suite 104
New Canaan, CT 06840
Telephone: 1-203-966-1300
For Grief Support: 1-800-221-7437
Email: Alison@firstcandle.org
www.firstcandle.org

About First Candle

First Candle, based in New Canaan, CT, is a 501c (3) committed to eliminating Sudden Infant Death Syndrome and other sleep-related infant deaths 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 3,600 infant deaths nationwide per year.

Neonatology Today's Digital Presence

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

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

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

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

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

fu-sheng.chou@neonatologytoday.net

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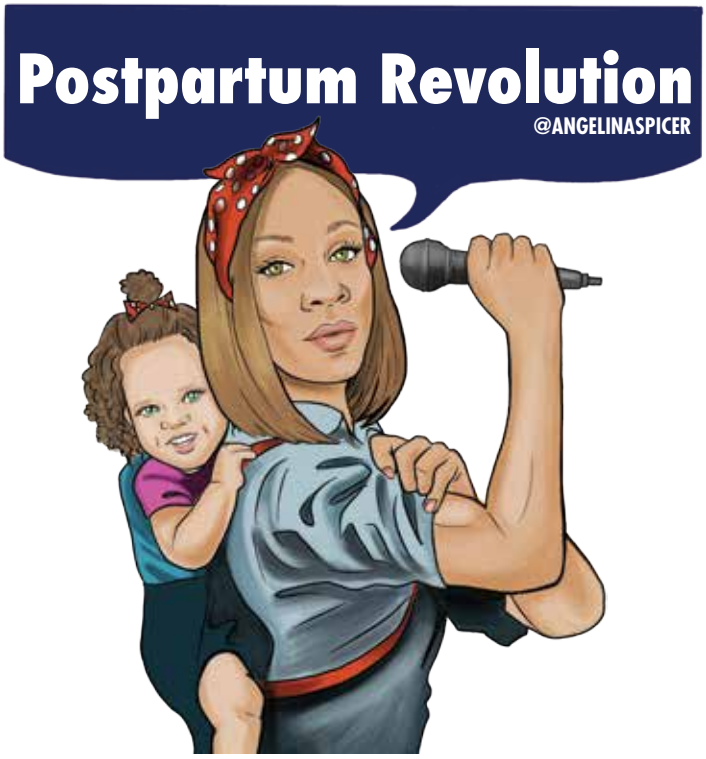

Remembering Chul Choon Cha, MD

Douglas D. Deming, MD

"Chul Choon Cha, MD, a long-time faculty member of the Department of Pediatrics, Loma Linda University Childrens Hospital passed away on June 7, 2022."

Chul Choon Cha, MD, a long-time faculty member of the Department of Pediatrics, Loma Linda University Childrens Hospital passed away on June 7, 2022.

Dr. Cha joined Loma Linda University School of Medicine on January 1, 1973, and served as an associate clinical professor in pediatrics. He was later named emeritus associate professor in pediatrics on July 1, 2008.

Dr. Cha received his neonatology training at Case Western University in Cleveland under Marshall Klaus. Dr. Klaus was noted for his studying of maternal-infant bonding. After completing his training, Dr. Cha came to Loma Linda and started the Neonatal Intensive Care Unit in late 1973. This was initially a six-bed unit that has now grown to be an 84-bed unit with over 1,200 admissions annually. Dr. Cha was certified by the American Board of Pediatrics in general pediatrics as well as neonatal-perinatal medicine.

"He was known for his kindness, deep caring, and his support of maternal-infant bonding. He was gentle and caring with his staff and trainees. He would spend hours talking with new, frightened mothers allaying their fears and answering their questions. He would also spend unlimited time with the parents of sick or dying infants, helping them process their fear and grief. "

He was known for his kindness, deep caring, and his support of maternal-infant bonding. He was gentle and caring with his staff and trainees. He would spend hours talking with new, frightened mothers allaying their fears and answering their questions. He would also spend unlimited time with the parents of sick or dying infants, helping them process their fear and grief. He seemed to have unlimited resources for helping parents.

He was also known for his incredible memory. He could quote journal articles he had read by giving you the author, journal, edition, page number, column, and paragraph. He had an incredible understanding of newborn and developmental physiology. That with his powerful skills of observation allowed to spend just a few moments watching a baby, and then he could expound on all the baby's diseases and necessary treatments.

"He had an incredible understanding of newborn and developmental physiology. That with his powerful skills of observation allowed to spend just a few moments watching a baby, and then he could expound on all the baby's diseases and necessary treatments."

As a teacher, he wanted his trainees to know not just what to do but the why and how of what we were doing. He was an excellent mentor and friend to many and inspired many of our current neonatologists to enter the field of neonatology.

His Loma Linda University School of Medicine family will greatly miss Dr. Cha.

A memorial service is scheduled for Sunday, June 26, 2022, at 7:30 p.m. at Loma Linda Korean Church, 11487 New Jersey Street, Redlands, CA

NT

Corresponding Author

Douglas D. Deming, MD
Professor of Pediatrics
Loma Linda Schol of Medicine
Division of Neonatology
Deparment of Pediatrics
Loma Linda University Childrens Hospital
11175 Campust Street
Suite #11121
Loma Linda, CA 92350
Office: 909-558-7448
Email: ddeming@llu.edu

A memorial service is scheduled for

Chul Choon Cha, MD

Sunday, June 26, 2022, at 7:30 p.m. at

Loma Linda Korean Church

11487 New Jersey Street

Redlands, CA

Readers can also follow

NEONATOLOGY TODAY

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COPING WITH COVID-19

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

Provide culturally-informed and respectful care.

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

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

myNICUnetwork.org

and

National Perinatal Association
NICU Parent Network

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

TOP 10

RECOMMENDATIONS FOR THE PSYCHOSOCIAL SUPPORT OF NICU PARENTS

SUPPORT 4 NICU PARENTS

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

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

1 PROMOTE PARTICIPATION

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

Welcome!

2 LEAD IN DEVELOPMENTAL CARE

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

3 FACILITATE PEER SUPPORT

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

4 ADDRESS MENTAL HEALTH

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

5 SCREEN EARLY AND OFTEN

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

6 OFFER PALLIATIVE & BEREAVEMENT CARE

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

7 PLAN FOR THE TRANSITION HOME

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

8 FOLLOW UP

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

9 SUPPORT NICU CARE GIVERS

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

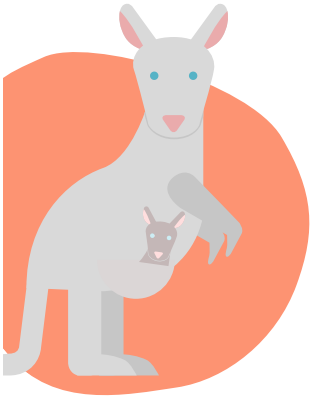
10 HELP US HEAL

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

SUPPORT4NICUPARENTS.ORG

SUPPORTING KANGAROO CARE

SKIN-TO-SKIN CARE DURING COVID-19



GET INFORMED ABOUT THE RISKS + BENEFITS

work with your medical team to create a plan

GET CLEAN

WASH YOUR HANDS, ARMS, and CHEST

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

PUT ON FRESH CLOTHES

change into a clean gown or shirt.

IF COVID-19 + WEAR A MASK

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

National Perinatal Association

nicuparentnetwork.org

NPN NICU PARENT NETWORK

nationalperinatal.org/skin-to-skin

Health Equity Column: A Black Neonatologist Perspective: Addressing Perinatal and Neonatal Inequities

Jenné Johns, MPH, Valencia P. Walker, MD, MPH

In this month's Health Equity Column, our feature is Dr. Valencia Walker, Associate Chief Diversity and Health Equity Officer for Nationwide Children's Hospital. She is also Associate Division Chief of Health Equity and Inclusion for Neonatology and Vice-Chair of Diversity, Equity and Inclusion for the Department of Pediatrics at The Ohio State University College of Medicine. Dr. Walker offers her personal and professional experiences leading institutional diversity, equity, and inclusion strategic priorities to ensure Black Birthing women and families admitted to the Neonatal Intensive Care Unit receive culturally appropriate and equitable care. She also pushes the healthcare community to place social determinants of health and implicit bias in context as we deliver care to families of all races, economic, and social levels. As you read this column, I encourage you to reflect on your institutional challenges, gaps, and opportunities for improvement to eliminate disparities based on race, culture, and socioeconomic status in perinatal and neonatal care.

"Dr. Walker offers her personal and professional experiences leading institutional diversity, equity, and inclusion strategic priorities to ensure Black Birthing women and families admitted to the Neonatal Intensive Care Unit receive culturally appropriate and equitable care. She also pushes the healthcare community to place social determinants of health and implicit bias in context as we deliver care to families of all races, economic, and social levels."

What is your definition of health equity?

Health Equity signifies that anyone within any community of society can access the resources needed to experience living in the healthiest state possible. Under sustained conditions that support Health Equity, everyone possesses the power to cope when faced with disease and/or crisis effectively. Achieving Health Equity is a prerequisite to attaining health justice, including eliminating racism as a structural driver of health and health outcomes.

"Health equity is focusing on creating conditions and circumstances where people cannot just survive but thrive and really attain their optimal health status. Not only that, but they have the ability to respond to crises and diseases because they have access to the resources that they need."

"Under sustained conditions that support Health Equity, everyone possesses the power to cope when faced with disease and/or crisis effectively. Achieving Health Equity is a prerequisite to attaining health justice, including eliminating racism as a structural driver of health and health outcomes."

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

Our organization seeks to provide equity in experiences and expected outcomes for pregnant people and their infants. This requires a multi-faceted strategic plan with interventions and initiatives that stretch across the continuum of

i) pre-conception (e.g., addressing Social Determinants of Health),
ii) pregnancy (e.g., advocating for high quality and safe access, education, and care), and
iii) postpartum (e.g., authoring anti-racist policies and programs) support.

As an organization, we must successfully

i) improve cultural intelligence among staff,
ii) increase financial commitments to these efforts by health system leadership, and
iii) insist on validating the lived experiences of minoritized and marginalized pregnant people and their families.

"When we think about our priorities, every institution should look at this very carefully because you may have different needs depending on where you are. There are some global needs that we know we need to address when it comes to infant mortality, the use of human milk, and the prematurity rate. But even with that, you have to really think about your own needs. So, we have opportunities to address those issues, that includes addressing

safe sleep and it includes addressing experiences that families have when they encounter the healthcare system. I always like to remind myself that when people come to us, they're looking for compassion and feeling. Even if we get the right diagnosis, if we haven't delivered that in a way that is culturally attuned and culturally appropriate, then we still haven't delivered that excellence in care that our families deserve."

" Realizing the profound suffering that accompanies the unjustifiable differences in deaths of Black and Indigenous infants as compared to other infants in the U.S. compelled me to intervene. This work, however, quickly humbled me. I learned that if I committed to it merely out of self-interest as a Black woman, I assured the inevitability of my failure."

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

In addition to my passion for taking care of critically ill infants, I developed an unshakeable interest in public health and advocacy. Through both my professional education and personal experiences, I gained an undeniable understanding of how racism exerts a direct, adverse impact on health and well-being. Realizing the profound suffering that accompanies the unjustifiable differences in deaths of Black and Indigenous infants as compared to other infants in the U.S. compelled me to intervene. This work, however, quickly humbled me. I learned that if I committed to it merely out of self-interest as a Black woman, I assured the inevitability of my failure. Achieving meaningful progress required constantly stripping away any aspects of my ego and professional identity that prevented me from embracing the "radical" fortitude necessary to disrupt the inequities currently built into healthcare's default system of status quo.

"Well, one I am a neonatologist. I love being a neonatologist; I think it's one of the best jobs in the entire world. But it's one thing to have heard about it, but once you really see the data, and not just see the data but see how the data is not changing. This means for all the things that we're saying about it, for all the things that we're trying to do about it, it is not enough. As someone who identifies as a black woman, to know and see my role that I have the ability to advocate and make a difference, there's no way I can unsee that. There's no way that I can block them. I think it's an honor to be entrusted with these responsibilities, and we have to do better, and if I don't do anything, and this might seem like a strange word to use, but I would see myself as derelict to my duty. Both to the families and patients that I have, but also to what I see as my connection to the black community. I have gone through a lot to become a physician. I've experienced people being racist or mistreating me, or things like that. I've had those experiences as someone seeking healthcare, and I've had those experiences when it came to my level, so as much as I love my profession and I love what I do, I know that there are absolutely opportunities and requirements to improve. When I'm at the bedside, and I see the black baby that doesn't make it, the grief and the devastation it causes their family. And when I think about my own friend's physicians that are black women physicians, and they have been ignored when they complained about their symptoms that were consistent preeclampsia, and knowing what it's like to be sick and not well, and being forced to advocate for yourself, gives a whole new visceral reaction. And so the data and statistics are horrifying, and those lived experiences that aren't always talked about every day."

" And when I think about my own friend's physicians that are black women physicians, and they have been ignored when they complained about their symptoms that were consistent preeclampsia, and knowing what it's like to be sick and not well, and being forced to advocate for yourself, gives a whole new visceral reaction. And so the data and statistics are horrifying, and those lived experiences that aren't always talked about every day."

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

Elimination of racialized health inequities requires engagement in rigorous and holistic methodologies:

- Acknowledge the pernicious and pervasive impact of racism on science and medicine, including within Neonatal-Perinatal Medicine
- Build therapeutic relationships with minoritized and marginalized racial/ethnic communities that confront their historical and ongoing issues with mistrust and experiences with mistreatment
- Commit to requiring anti-racist praxis in all aspects of Neonatal-Perinatal research and clinical care
- Diversify the Neonatal-Perinatal Medicine workforce, inclusive of all healthcare practitioners
- Establish clinical practice guidelines that specifically incorporate, value, and reward compassionate, inclusive, and respectful care
- Finance/Fund programs that remunerate the centuries of racialized disinvestment in the care of minoritized and marginalized infants and assist in ameliorating the racial wealth gap.
- Generate educational and professional standards for Neonatal-Perinatal Medicine aimed at mitigating bias, discrimi-

nation, and mistreatment

"As we seek to eliminate health and racial inequities in perinatal and neonatal care, I think we have to accept that what we have done and what we've been doing is not enough, and it takes both an enormous resource, human capital time, time-intensive commitment to change while pouring those resources into it. Does it mean that we're taking away from the well-being or success of others? It's not a 0-sum game. It is how do we right the wrongs of how many years we have accepted differences in mortality and difference in suffering as okay.

"As we seek to eliminate health and racial inequities in perinatal and neonatal care, I think we have to accept that what we have done and what we've been doing is not enough, and it takes both an enormous resource, human capital time, time-intensive commitment to change while pouring those resources into it."

So, the call to action is to get uncomfortable. To do the hard and exhaustive work. To recognize that the lives of babies matter and that we have to fundamentally change the conditions that are continuing to perpetuate and that means recognizing what's happened in the past historically and how that's continued to affect us in the present day but more than anything, it's not about what we can just change in a year or three years but really understanding this is a long term investment that we can't let go of, because it's hard or it's frustrating, and that we cannot accept anything other than success in reversing these horrible trends that we've seen."

Disclosure: *The authors have no disclosures.*

NT

About the Author: Jenné Johns, MPH:

Title: President and Founder

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

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

About the Author: Valencia P. Walker, MD, MPH

Name: Valencia P. Walker, MD, MPH

Title: Associate Chief Diversity and Health Equity Officer

Organization: Nationwide Children's Hospital/The Ohio State University College of Medicine

Bio: Dr. Walker is Associate Chief Diversity and Health Equity Officer for Nationwide Children's Hospital. She is also Associate Division Chief of Health Equity and Inclusion for Neonatology and Vice-Chair of Diversity, Equity and Inclusion for the Department of Pediatrics at The Ohio State University College of Medicine. Dr. Walker advocates for eliminating health inequities among pregnant people and their infants. She completed undergraduate studies at Florida A&M University and medical school at Emory University. She finished her Pediatrics residency at UT Memphis and her Neonatology fellowship at Cincinnati Children's Hospital. She also obtained an MPH in Health Policy from Harvard.

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Raising Global Awareness of RSV

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

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

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

RSV GOLD

A Global Mortality Database for Children with RSV Infection

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

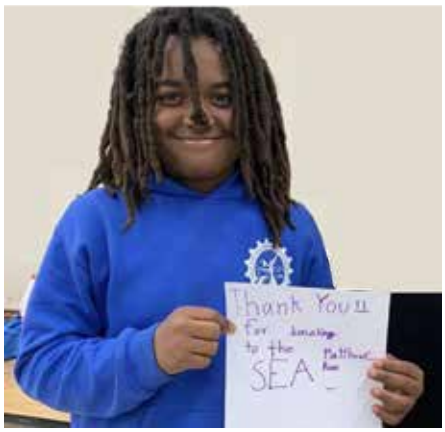
Thirteen-year-old Emily Rose Shane was tragically murdered on April 3, 2010 on Pacific Coast Highway in Malibu, CA. Our foundation exists to honor her memory.

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

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

Sponsor a Child in the SEA Program

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



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

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

NPA's 2022 Conference—An Essential Message that Almost did not Happen.

Cody M. Pyke, MD, JD, LLM, MS

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.

National Perinatal Association

Educate. Advocate. Integrate.

"What do you think of when you imagine an interprofessional perinatology conference? Many imagine doctors, perhaps in business attire or cleanly pressed white coats, presenting their latest research or midwives and neonatal nurses discussing innovative models of care."

What do you think of when you imagine an interprofessional perinatology conference? Many imagine doctors, perhaps in business attire or cleanly pressed white coats, presenting their latest research or midwives and neonatal nurses discussing innovative models of care. These feel like the usual offerings at a conference that purports to be about the field of delivering health care to pregnant people and their newborns.

But do you think of neonatal psychologists speaking both with parents of NICU babies? What about queer and BIPOC lawyers and birth workers speaking plainly about the harsh realities of racism, ableism, homophobia, and transphobia, which all perniciously persist in a profession that delivers care to the most vulnerable patients? Does the word "perinatology" evoke an image of a swollen belly in an orange prison jumpsuit?

" What about queer and BIPOC lawyers and birth workers speaking plainly about the harsh realities of racism, ableism, homophobia, and transphobia, which all perniciously persist in a profession that delivers care to the most vulnerable patients?"

The National Perinatal Association's (NPA) 2022 annual conference, *Perinatology at the Intersection of Health Equity and Social Justice*, had all these things and more. The first thing that drew me to NPA was its core mission to equitably integrate the diverse voices of everyone affected in the perinatal period. It is the only place I have encountered where a first-time parent with no medical background and the most highly subspecialized physician have an equal seat at the table. The 2022 conference theme emphasized that the aim and its message—although hard to hear at times—are *essential* to the betterment of perinatal health care and outcomes.

"It is the only place I have encountered where a first-time parent with no medical background and the most highly subspecialized physician have an equal seat at the table."

But it almost didn't happen.

In April 2021, when neonatal psychologist Dr. Tiffany Willis and I agreed to co-chair this conference, we expected the event to occur in December 2021. With COVID-19 cases declining since the previous winter's surge and increasing utilization of available vaccines in the United States, we optimistically set a goal for an in-person conference with a virtual option. In the wake of the 2020 conference being delayed and forced exclusively online for safety reasons, NPA had not had an in-person conference in just over two years. Dr. Willis and I wanted to ensure that important topics such as "equity" and "justice" were given due respect; online did not feel appropriate.

Unfortunately, the Delta variant of the COVID-19 virus didn't particularly care about conference plans or any plans for that matter. After multiple emergency meetings of the NPA board and staff, a decision was made to delay the conference five months, to May 2022, to build a truly hybridized conference—one that would be equally enriching for those who could safely attend in

person as well as remote attendees. While the decision was necessary to further the overall vision of the conference, it also meant that we had to rebuild a conference in a very short amount of time. For many folks, both conference speakers and registrants alike, the new date was a barrier to participation. About a month after the conclusion of the 2022 conference, however, I can confidently say it was well worth it.

Over three days, more than 180 people—the majority in person—gathered for 21 sessions dedicated to perinatal health equity and intersectional justice. We discussed the fate of *Roe v. Wade*, the incidence of obstetrical racism, and the ability of local communities to impact health care for pregnant and birthing people. Visual presentations showed graphs of cannabinoid pharmacokinetics were seen alongside beautiful medical illustrations that reflected diverse skin tones, body types, sexualities, and gender identities. During breaks, posters and exhibits lined the walls with novel work across disciplines, including nutrition, mental health, human milk, and accessible childbirth education.

"Over three days, more than 180 people—the majority in person—gathered for 21 sessions dedicated to perinatal health equity and intersectional justice. We discussed the fate of Roe v. Wade, the incidence of obstetrical racism, and the ability of local communities to impact health care for pregnant and birthing people."

As a professional and advocate, the opportunity to co-chair this conference was one of the highlights of my career thus far. As a queer, transgender person and older sibling to a few NICU veterans, seeing so much work being done to protect our most fragile and vulnerable patients was moving and uplifting. Yet the most gratifying, if not most important aspect of this conference, were the comments attendees provided about what they *learned*. After all, the entire point of an interdisciplinary conference is to foster education and integration. What would the audience take from the conference back to their clinics, hospitals, universities, and communities? We asked conference attendees how they would change their practices as a result of attending our conference, and I conclude this article with some of their answers.

- "I will view the patient and family holistically and keep in mind they may have cultures and priorities that I am not aware of, influencing their outcomes in my practice."
- "Listening more, helping without judgment, and holding others accountable."
- "I will view mental health as [a] priority…, and actively seek the appropriate resources and providers…in order to give my patients care that prioritizes their needs."
- "I plan to educate our staff on standardized questions for all families on how they would like [us] to refer to their familial makeup."
- "I will be more cognizant of my language when describing birthing parents."
- "I will ask a patient how they want to be called and referred to, to ensure I do not misgender someone, and to open up a space… for [sexual and gender minorities]."
- "Humanize more; pathologize less."
- "Reduce biases in my practice."
- "Utilize my position to advocate for patients birthing while incarcerated."
- "I will be kinder to myself as a provider when I make mistakes."
- "Incorporate an understanding of ancestral history and historical factors related to racism into my practice."
- "Practice self-assessment [to] identify blind spots [and] implicit biases."
- "Ask myself, 'Who is missing from the table?'"

And my personal favorite,

- "Challenge the status quo."

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

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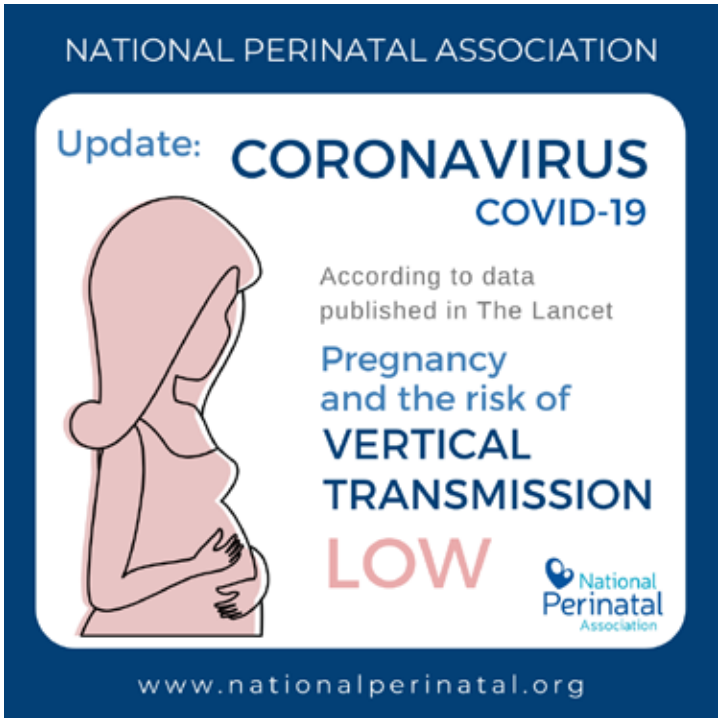
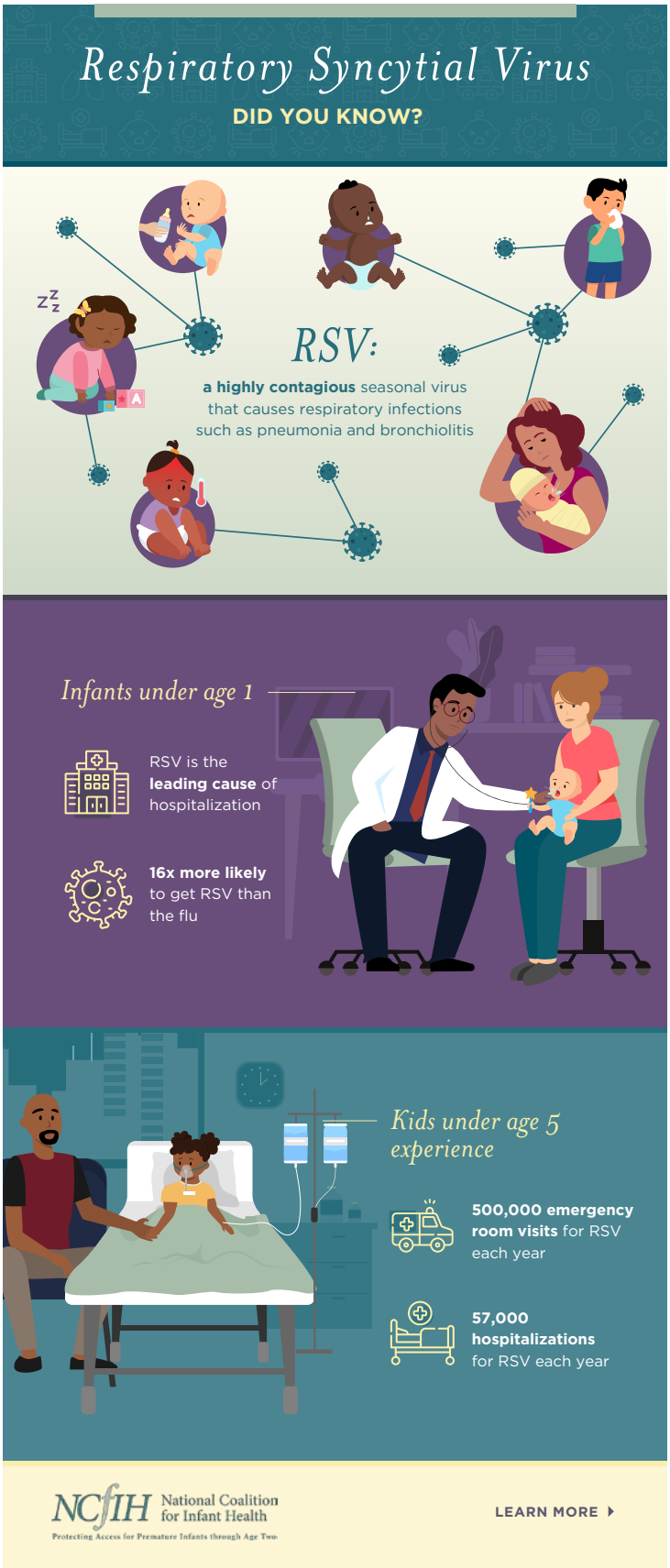
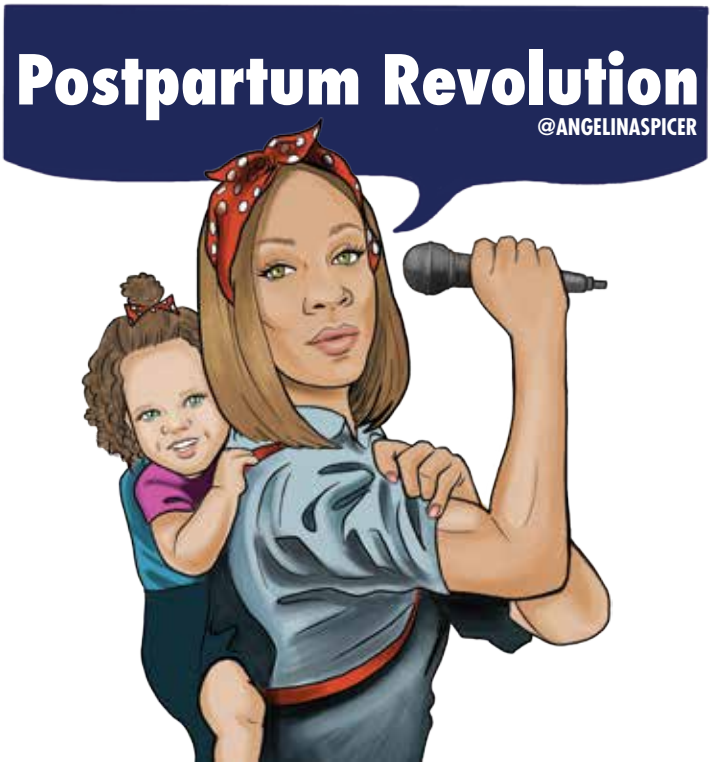
Corresponding Author

Cody Miller Pyke, JD, LLM, MSBE,
MD Candidate Class of 2022
Baylor Colllege of Medicine
Houston, Texas
Email: :cody.miller@nationalperinatal.org





The Gap Baby: An RSV Story



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The Cost of Healthcare on Our Own Health

Kelly Welton, BA, RRT-NPS

As a new grad Respiratory Therapist in 1983, I quickly learned the value of my career choice. For one, I could work just about anywhere I wanted in the USA. And another bonus: I could work as much overtime as I wanted. In my 20's, this was no big deal. With or without overtime, my choice of Healthcare as a profession started showing its wear and tear. It started with me wondering about inhaling all that Ribavirin. And then Pentamidine. And cleaning our own equipment with Amphyl and Cidex, the unforgettable smells of both are still fresh in my memory. Time ticks on as I become a 10-year veteran RT. Then 20. Then 30. Then I semi-retired to start an education company. At last, self-employed! Then, the dreams began.

"Time ticks on as I become a 10-year veteran RT. Then 20. Then 30. Then I semi-retired to start an education company. At last, self-employed! Then, the dreams began."

A mind is still a mysterious place even in the 21st century. Do a Google search for 'where does the mind go when we dream' or something similar, and we still get only hypotheses for answers.

I decided to see if other retired healthcare workers had similar dreams. I sent out a survey, and here is what I got back:

- Dreams of getting called into work, but the license is expired
- I went to work and spent the entire shift lost in the hospital
- At work and cannot find any ventilators or supplies
- Ventilators are alarming, and the silence button does not work
- I hear a heater alarming but cannot find the room it's coming from
- The department director is writing me up for something I would never do
- I get called in to make the day shift assignment, but there are no assignment cards, pens, or paper. I do not know any of the oncoming staff or what areas they can work in.
- I dream it is my first day at a new hospital, and I am running late, and when I finally get to work, I forget my shoes. And stethoscope.
- I dream I'm trying to get to the psych unit, but the hospital has tunnels you have to crawl through, and I never get there.
- I dreamed that the elevators only went up or down.
- Patient care corridors go off at odd angles, and I cannot find where I need to go
- I had to put together lots of pieces of a ventilator that no longer exists

My nurse friends tell me the same thing: Stressful nonsensical dreams that, upon waking, seemed so real.

All of us in Healthcare are committed to sacrificing our time, our sleep, and our bodies for years on end. My hips and knees feel better now that I'm not pounding them all day, every day. But the strange dreams persist. Are these dreams simply GIGO (Garbage in, garbage out)? It is said that during REM sleep, we revisit memories and process them without the stress chemicals.

"All of us in Healthcare are committed to sacrificing our time, our sleep, and our bodies for years on end. My hips and knees feel better now that I'm not pounding them all day, every day. But the strange dreams persist. Are these dreams simply GIGO (Garbage in, garbage out)? It is said that during REM sleep, we revisit memories and process them without the stress chemicals."

However, the scenarios talked about above never really happened. Is the stress of taking care of other critically ill humans so stressful that the brain imagines even more possible scenarios

after we retire? Maybe these are messages from other realms. Maybe we have sniffed SO MUCH secondary Albuterol over time that it has triggered a dormant storytelling center that only comes alive when we finally stop ingesting it. Whatever the reason, the laughable dream stories seem to get better the longer you have been in Healthcare.

"However, the scenarios talked about above never really happened. Is the stress of taking care of other critically ill humans so stressful that the brain imagines even more possible scenarios after we retire? "

Disclosures: The author is President of the Academy of Neonatal Care, A Delaware 501 C (3) not for profit corporation.

NT

Corresponding Author

--
Kelly Welton, BA, RRT-NPS
President,
Academy of Neonatal Care
La Quinta, California, United States
Website: www.AcademyofNeonatalCare.org
Phone: 877-884-4587
Email: Educator@academyofneonatalcare.org

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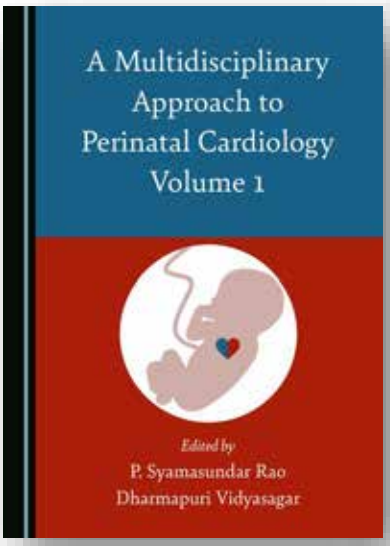
A Multidisciplinary Approach to Perinatal Cardiology *Volume 1*

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 PPROM Foundation, Denver, CO.

PROVIDING INTRAPARTUM SUPPORT CEUs offered: 1

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

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

PROVIDING POSTPARTUM SUPPORT CEUs offered: 1

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

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

SUPPORTING STAFF AS THEY SUPPORT FAMILIES CEUs offered: 1

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

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

Cost

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

Contact help@myperinatalnetwork.org to learn more.

Faculty

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

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

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

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

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

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

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

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

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

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

Parent/Patient Contributers:

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

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

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

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

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

CANCELLATIONS AND REFUNDS

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

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

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

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

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

KEEPING MOTHERS + INFANTS TOGETHER

Means balancing the risks of...

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

EVIDENCE

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

PARTNERSHIP

What is the best for this unique dyad?

SHARED DECISION-MAKING

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

TRAUMA-INFORMED

Both parents and providers are confronting significant...

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

LONGITUDINAL DATA

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

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

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

Partnering for patient-centered care when it matters most.

nann.org nationalperinatal.org

National Association of Neonatal Nurses

National Perinatal Association

FREE ONLINE EDUCATION

Coping with COVID-19

A viral pandemic

A racial pandemic within a viral pandemic

Will mental illness be the next inevitable pandemic?

WWW.MYNICUNETWORK.ORG

and

National Perinatal Association
NICU Parent Network

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

It Was Worse Than Open-Heart Surgery

Ashley Yeary

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.

AfPA
Alliance for Patient Access

"After my infant son had open-heart surgery, I thought we had been through the worst experience of our lives. Then he got RSV."

After my infant son had open-heart surgery, I thought we had been through the worst experience of our lives. Then he got RSV.

Five weeks after Sawyer's operations, things took a turn for the worse. He got very congested. His breathing was slow, then rapid. Thankfully, his pediatrician saw him right away.

RSV Positive

The doctor diagnosed him with the respiratory syncytial virus. I didn't know a lot about RSV then, but I was still scared. I knew any respiratory illness was going to be bad for him. His heart condition had allowed fluid to build up in his lungs, causing irreversible damage, and he was still recovering from heart surgery. Sawyer was admitted to the hospital close to our home but was soon transferred to Arkansas Children's Hospital because he needed higher-level care.

I will never forget the terror of those few days. I was helpless as he struggled to breathe. Alarms were constantly going off, and all I could do was step aside for nurses to rush to his aid. More than a week later, Sawyer finally turned the corner.

"In the end, Sawyer's RSV hospital stay was twice as long as his heart surgery stay. And it wasn't his last time there. Over the next year, Sawyer battled pneumonia and other respiratory issues – complications of his RSV, according to his medical team."

In the end, Sawyer's RSV hospital stay was twice as long as his heart surgery stay. And it wasn't his last time there. Over the next year, Sawyer battled pneumonia and other respiratory issues – complications of his RSV, according to his medical team.

Fighting For Protection

As fall rolled around, his pediatrician insisted we protect him with a medication called palivizumab. His lungs were weak and scarred, she told us. After fighting for coverage with our insurer, we got Sawyer his first injection.

Just a few weeks later, he caught RSV again. We started him on inhalers and antibiotics and watched him closely. He was sick, but this time his illness wasn't as severe. I credit palivizumab. I'm certain his second RSV experience would have been worse without it.

"Just a few weeks later, he caught RSV again. We started him on inhalers and antibiotics and watched him closely. He was sick, but this time his illness wasn't as severe. I credit palivizumab. I'm certain his second RSV experience would have been worse without it."

Sharing Our Story

Now, Sawyer is a rambunctious four-year-old. He still uses an inhaler every morning and night, but he fills the hours in between playing soccer, swimming, and roughhousing with his little sister and their dog.

It's refreshing for me to see Sawyer, who was once so delicate,

be so full of energy. It's what motivates me to share our story and to advocate for RSV awareness and access to treatments and interventions that will help protect all infants. Every parent deserves to see their child experience the same joy that Sawyer now has.

" It's what motivates me to share our story and to advocate for RSV awareness and access to treatments and interventions that will help protect all infants. Every parent deserves to see their child experience the same joy that Sawyer now has."

Ashley Yeary is a mom of two children and a member of the RSV Parent and Caregiver Advisory Council for the National Coalition of Infant Health, a coalition partner of the Alliance for Patient Access.

Guest blog posts like this one give life to policy, often discussed in technical jargon and sweeping generalizations. In reality, health care policy affects real people's access to life-saving medications. As noted, Sawyer's mother, Ashley, shares their family's story to help policymakers and others in power understand the serious implications of cost-cutting utilization management approaches.

This content article was also published at InstituteforPatientAccess.org

NT

Corresponding Author

Ashley Yeary
RSV Parent and Caregiver Advisory Council
National Coalition of Infant Health
2020 K Street NW, Suite 505
Washington, DC 20006
(202) 964-2625
Email: info@allianceforpatientaccess.org

Keeping Your Baby Safe

during the COVID-19 pandemic

How to protect your little one from germs and viruses

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

Here's what you can do...

Wash Your Hands

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

Limit Contact with Others

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

Provide Protective Immunity

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

Take Care of Yourself

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

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

WARNING

Never Put a Mask on Your Baby

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

If you are positive for COVID-19

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

We can help protect each other.

Learn more

www.nationalperinatal.org/COVID-19

National Perinatal Association

The Gap Baby: An RSV Story

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

The National Coalition for Infant Health advocates for:

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

www.infanthealth.org

I CAN Digitally Involved (I CANDI): Welcome summer!

Amy Ohmer

"As school wraps up around the world, the International Children's Advisory Network, Inc. (iCAN) is just getting started with a variety of projects designed by our clinical research and pediatric healthcare community."

As school wraps up around the world, the International Children's Advisory Network, Inc. (iCAN) is just getting started with a variety of projects designed by our clinical research and pediatric healthcare community.

To begin with, iCAN is partnering with Gambino Gesu Pediatric Hospital in Rome, Italy, through an iCAN Young Adult Professional (YAP) summer internship with Dr. Alberto Tozzi, President of the International Society of Pediatric Innovation (iSPI). This special opportunity allows four YAP members to practice clinical research skills to understand youth perception of vaccines better. With more to come, this project will be especially helpful to all through pediatric healthcare in learning how to better communicate with patients and families.

"To begin with, iCAN is partnering with Gambino Gesu Pediatric Hospital in Rome, Italy, through an iCAN Young Adult Professional (YAP) summer internship with Dr. Alberto Tozzi, President of the International Society of Pediatric Innovation (iSPI)."

Additionally, this month, iCAN youth members proudly share their patient feedback support for two clinical research projects focusing on Lyme Disease and Alopecia Areata. Globally, iCAN youth members are providing their expertise through the use of a survey to help ensure the best possible clinical outcomes.

Joining forces with our community partner, Rareartist.org, iCAN is pleased to share that the 2022-23 Rare Artist Advocacy Event is open. To learn more, visit www.icanresearch.org to learn how to submit your art to help spotlight rare and orphan diseases. All ages are welcome to participate. (1)

With just weeks remaining, there is still time to register for the upcoming 2022 iCAN Summit presented by Jumo Health. (2) This exciting week-long summit offers interactive and engaging sessions through the support and expertise of our youth members worldwide and our many adult community partners (scientists, doctors, researchers, pharma, parents, and many other stakeholders).

While the summit will be held in person in Lyon, France, from July 11th to July 15th, 2022, at the University of Lyon, there will also be an online registration link. To learn more about the summit, including how to register, reserve a discounted hotel room, receive the online link, or make a charitable contribution, please head to our website at www.icanresearch.org/2022-summit. (2)

"While the summit will be held in person in Lyon, France, from July 11th to July 15th, 2022, at the University of Lyon, there will also be an online registration link. To learn more about the summit, including how to register, reserve a discounted hotel room, receive the online link, or make a charitable contribution, please head to our website at www.icanresearch.org/2022-summit. (2)"

iCAN is proud to be a patient-engagement resource to many organizations worldwide with a dedicated focus on pediatric medicine, clinical research, medicine development, and medical device innovation. Do not forget to download the complimentary app designed by youth members of iCAN's KIDS France chapter at www.icanresearch.org/2022-summit to stay on top of the latest summit planning, speaker announcements, cultural activities & more. (2)

Did you know iCAN has multiple leadership and chapter opportunities? Read more to learn how you can join iCAN and share your voice.

iCAN Chapter Startups: iCAN welcomes interested hospitals to

2022 SUMMIT

iCAN
International Children's Advisory Network

SAVE THE DATE

July 13th through July 17th, 2022

To be held in-person at the University of Lyon, Franc

Hosted by iCAN KIDS France

Registration Opens May 15th, 2022

PROVIDING CHILDREN AND FAMILIES A VOICE IN MEDICINE, RESEARCH AND INNOVATION
around the world

Sign up for for updates at
www.iCANResearch.org

join at no cost. Chapter groups can be as small or large - with the emphasis on helping to spotlight the youth voice. To learn more, check out https://www.icanresearch.org/chapters. (3)

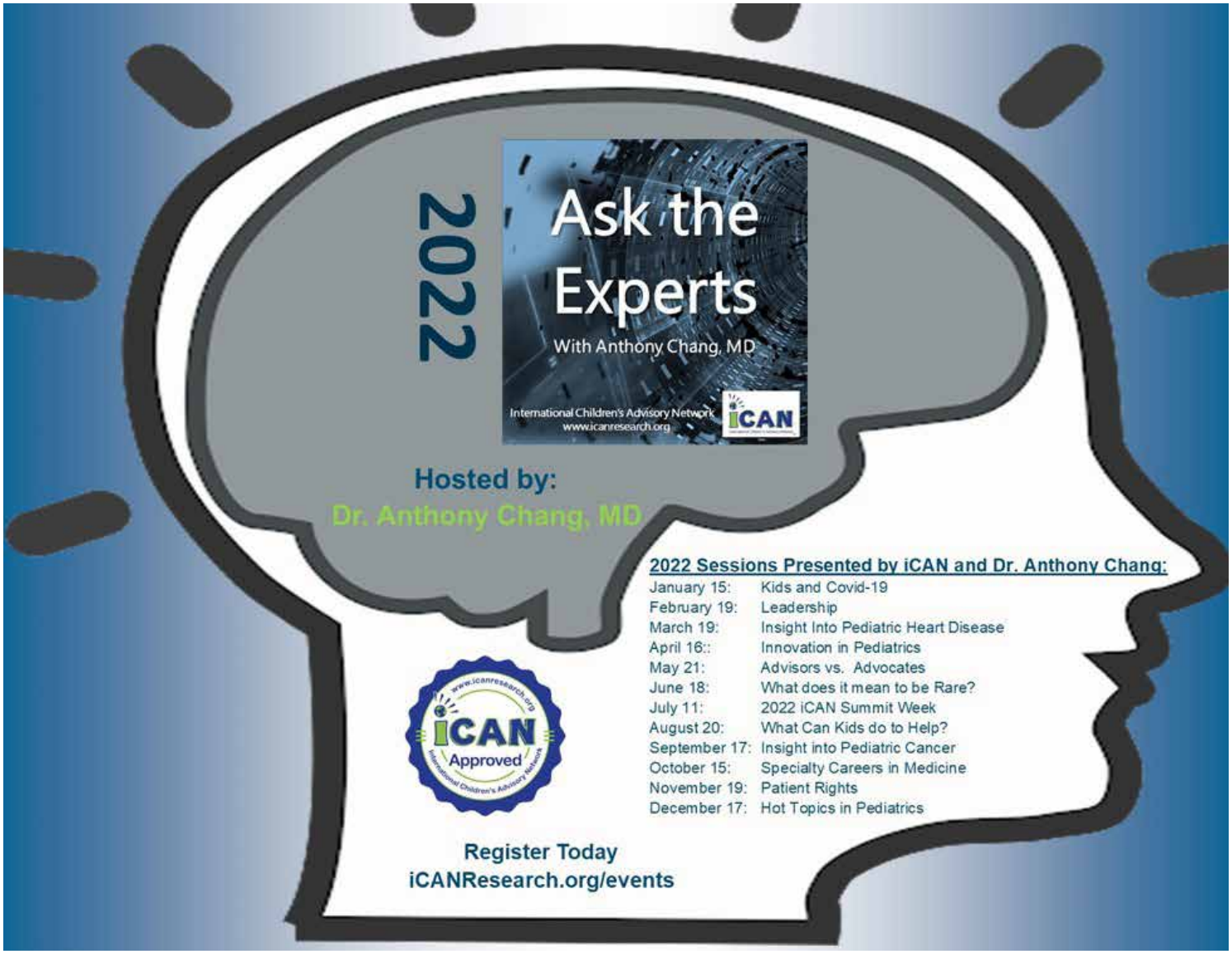
"The next leadership level provides for youth members interested in supporting iCAN in a more significant way. The iCAN Youth Council is active in creating, overseeing, executing, and disseminating pediatric issues/topics through the unique perspective of youth throughout research, science, advocacy, technology, and medicine. Interested young people can learn more at https://www.icanresearch.org/our-youth. (4)"

iCAN Youth Council: The next leadership level provides for youth members interested in supporting iCAN in a more significant way. The iCAN Youth Council is active in creating, overseeing, executing, and disseminating pediatric issues/topics through the unique perspective of youth throughout research, science, advocacy, technology, and medicine. Interested young people can learn more at https://www.icanresearch.org/our-youth. (4)

iCAN Young Adult Professionals: This dedicated group of young adults ages 18+ helps to support iCAN at a professional and higher educational level. iCAN offers internships and greater leadership roles to help retain and engage young adults as they begin their careers. To learn more about this group, head over to https://www.icanresearch.org/ican-young-adult-professionals. (5)

iCAN Parents: All parents (and family members) are welcome to join iCAN to participate as advisors for the littlest patients (0-7 years old). Joining is free and can be done through either visiting www.icanresearch.org or sending an email to iCANparent@icanresearch.org. To learn more, check out this page at https://www.icanresearch.org/parents-families. (1, 6)

The ' I CAN' Book is now available at www.icanresearch.org for USD 25.00 using our special PayPal link on the home page under



donations. (1) After payment, to receive your copy, please contact us at info@icanresearch.org with your name and mailing address - this beautiful hard-bound book is created by iCAN Youth Members from around the world and filled with positive statements about overcoming challenges to be the best you can be. Fully illustrated by our KIDS Bari chapter, this beautiful book is a treasure you and your family will treasure for years to come.

Save the Date:

- Register NOW for the iCAN Summit held on July 11th - July 15th, 2022, in Lyon, France. Discounted hotel rooms are available. Sessions include professionals, young people,

and hands-on learning to support pediatric research, rare disease innovation, and medicine worldwide.

- iCAN's unique youth series, **'Ask the Experts,'** has a new session planned for **August 20th, at 10:00 a.m.EST**. To join this fun and free event, please register at www.icanresearch.org/events. (7) All are welcome to attend, and kids of all ages are invited to join. Additional sessions are open for registration, and we welcome all doctors, researchers, and community leaders to join us. Due to the iCAN Summit, July has no 'Ask the Experts.'
- **Join iCAN and the American Academy of Pediatrics National Conference and Exhibition from October 7th - 11th, 2022,** at the Anaheim Convention Center, Anaheim, California. We cannot wait to see you at booth #2034! Look for the iCAN colors and stop by and say hello!

References:

1. http://www.icanresearch.org/
2. http://www.icanresearch.org/2022-summit
3. https://www.icanresearch.org/chapters
4. https://www.icanresearch.org/our-youth
5. https://www.icanresearch.org/ican-young-adult-professionals
6. https://www.icanresearch.org/parents-families
7. http://www.icanresearch.org/events

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Corresponding Author

Amy Ohmer
Director, International Children's Advisory Network
Website: www.icanresearch.org
Phone: (+1)734-545-2831
Email:. amyohmer@icanresearch.org

Education.
Anytime, Anywhere.

Academy of Neonatal Care

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

www.AcademyofNeonatalCare.org.

PROTECT YOUR FAMILY FROM

RESPIRATORY VIRUSES

flu coronavirus pertussis RSV

WASH YOUR HANDS
often with soap and warm water.

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

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

USE AN ALCOHOL-BASED HAND SANITIZER.

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

National Perinatal Association

www.nationalperinatal.org

FREE RESOURCES FOR YOUR NICU

Coping During COVID-19

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

BONDING WITH YOUR BABY

HELPING CHILDREN AND FAMILIES COPE

CAREGIVERS NEED CARE TOO

National Network of NICU Psychologists

nationalperinatal.org/psychologists

Respiratory Syncytial Virus:

How you can advocate for babies this RSV season

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

Identify babies at greatest risk

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

Teach families how to protect

their babies from respiratory infections

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

Use your best clinical judgement

when prescribing RSV prophylaxis

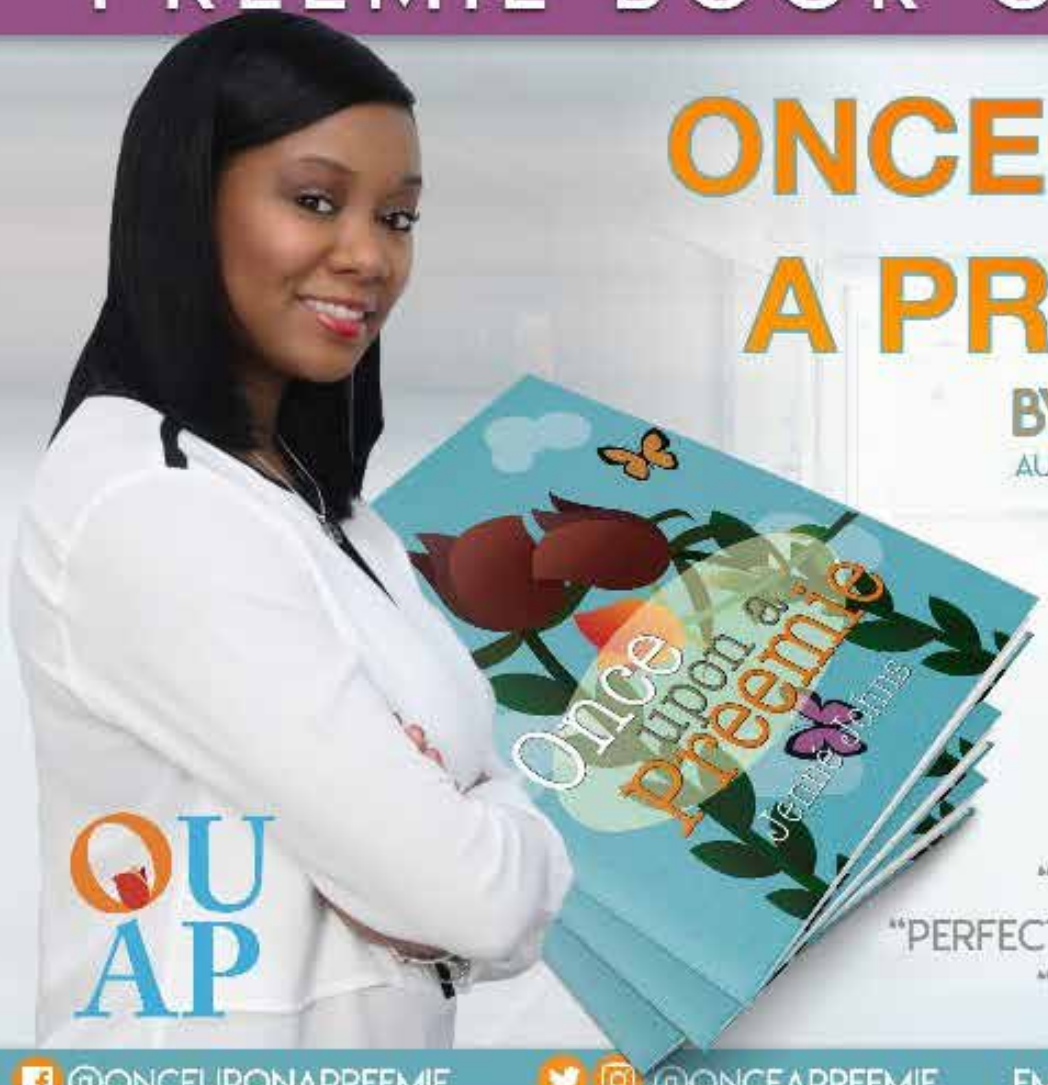
Tell insurers what families need

and provide the supporting evidence

National Perinatal Association

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

PREEMIE BOOK ON SALE



ONCE UPON A PREEMIE

BY JENNÉ JOHNS

AUTHOR | SPEAKER | ADVOCATE

QUAP

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

@ONCEUPONAPREEMIE @ONCEAPREEMIE EMAIL: HI@ONCEUPONAPREEMIE

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

SPEAKING ENGAGEMENTS

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

MEDIA APPEARANCES

Preemie Family

PEBBLES of Hope

WDAS 105.3 FM

CBS RADIO

wgts 91.9 Washington, D.C.

MAJIC 102.3 92.7 The Real Sound of the DMV

AVAILABLE FOR $12.99 ON AMAZON OR ONCEUPONAPREEMIE.COM

Still a **Preemie?**

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

But that's not every preemie's story.

Born between 34 and 36 weeks' gestation?

STILL A PREEMIE

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

Jaundice | Feeding issues | Respiratory problems

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

Born preterm at a "normal" weight?

STILL A PREEMIE

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

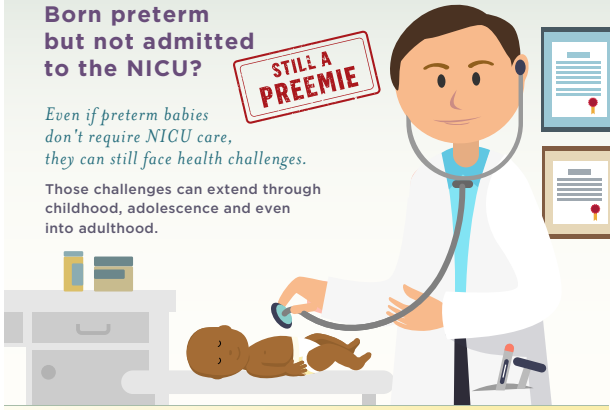
But because some health plans determine coverage based on a preemie's weight, **families of babies that weigh more may face access barriers and unmanageable medical bills.**

Born preterm but not admitted to the NICU?

STILL A PREEMIE

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

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



Some Preemies

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

All Preemies

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

NCfIH National Coalition for Infant Health

Protecting Access for Premature Infants through Age Two

www.infanthealth.org

OPIOIDS and NAS

When reporting on mothers, babies, and substance use

LANGUAGE MATTERS

I am not an addict.

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

I was exposed to opioids.

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

NAS is a temporary and treatable condition.

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

My mother may have a SUD.

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

My potential is limitless.

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

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

National Perinatal Association

FREE Online CE Activity

Nurses: parents trust you.

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

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

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

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

SAFE TO SLEEP®

Compiled and Reviewed by David Vasconcellos, MS IV

AAP experts offer advice on how pediatricians can help parents through formula shortage

May 19, 2022

Pediatricians may be getting calls from parents who are struggling to find formula for their infants. To help guide pediatricians in their conversations with patients and families, AAP experts provided answers to some common questions from parents.

Q: I found small quantities of several different formulas. What is the best way to switch among the brands?

A: It is likely that your baby will do just fine with different formulas as long as they are the same type. If your baby does not like the taste or has difficulty tolerating a new formula, you may want to try gradually introducing small amounts of it by mixing it with the usual formula. You can slowly increase the amount of the new formula. Be patient as it may take some time for the baby to get used to a new formula. Try not to give up unless it really isn't tolerated. If you have questions about whether your baby is tolerating the new formula, call our office.

Q: I have a 3-month-old infant and can't find my usual formula. What should I do?

A: This is a very difficult problem, and we're glad that you contacted us. If you can find another similar formula, it's OK to make the switch. If you use a special formula for allergies or other special health needs, you can find a list of comparable formulas at https://naspghan.org/recent-news/naspghan-tools-for-hcps-affected-by-formula-recall/.

Q: I have a 7-month-old infant and can't find any formula. What should I do?

A: If your child is older than 6 months of age and usually is on regular formula (not a specialty product for allergies or other special health needs), whole cow's milk may be a short-term option. In a pinch, you could feed your child whole cow's milk for a brief period of time (no more than one week). This is not ideal and should not be done for more than one week.

One concern about giving cow's milk to a baby who is 7-12 months old is it does not contain equivalent amounts of iron to formula. If you have to use cow's milk to feed your infant, ideally do so for as short a time as possible and for less than a week. It's also important to give the baby plenty of iron-containing solid foods, such as baby food made with meat or iron-fortified cereals.

Q: My infant needs a specialty metabolic formula, but I can't find any. What should I do?

A: Abbott is releasing limited quantities of Similac PM 60/40 and other metabolic formulas for patients in urgent need. Our office can fill out a request and if it is approved, the formula can be shipped to your home. (Pediatricians can download the form at http://www.abbottnutrition.com/metabolics and fax the completed form with a physician order to 877-293-9145.).

Q: Only one brand of formula is covered under the WIC program, but I can't find any. What should I do?

A: Most states are allowing parents who use WIC benefits to buy other brands of formula or different sizes and types like ready-to-feed formula. (To find out what their state is allowing, pediatricians and families can check a map at https://www.fns.usda.gov/wic/infant-formula-waiver-status.)

Q: What is the earliest age I can start giving my infant solid food to stretch my formula supply?

A: Solid foods should not be used to stretch formula supply. Formula contains all of the nutrients young babies need, while solid foods may not. Infants generally are ready to eat solid food when they are 6 months old, but it depends on their rate of development. You can introduce solid foods as early as 4 months of age, but infants 4-6 months of age will continue to need breastmilk or formula to supply the majority of their nutrition.

Q: Is it safe to get breastmilk from a friend or online group?

A: We can't know for sure whether breastmilk from a friend or online group is safe. It is better to obtain donor breastmilk from a local milk bank that is accredited through the Human Milk Banking Association of North America. To find an accredited milk bank, visit https://www.hmbana.org/find-a-milk-bank/.

Q: Can I make my own formula? I've seen a recipe online using evaporated milk that people say was used safely in the

1940s.

A: Homemade formulas are not recommended. Although homemade formula was used in the past, it also was associated with many risks to infants. Online recipes have significant safety concerns regarding contamination and nutrient concentration. Using homemade formula could harm your infant.

Q: Can I add extra water to formula and give my baby a multivitamin to make up the nutrients?

A: This should never be done. Adding extra water can dilute the levels of protein and minerals, and lead to low sodium levels in the blood and other electrolyte disorders, which could result in a baby needing to be hospitalized.

Q: How long can formula be used past a "best by" date?

A: Generally, formula should not be used past the "best by" date because it may not be safe or have the required levels of nutrients.

Q: I heard the government will be importing formula from other countries? Is it safe?

A: The Food and Drug Administration (FDA) is working to assure procedures are in place to verify production standards, labeling and shipping of brands that previously have not been sold in the U.S. European formulas are regulated by the European Food Safety Agency similar to how the FDA regulates formula in the U.S. and are highly reliable.

Contact information for AAP headquarters

American Academy of Pediatrics

345 Park Blvd, Itasca, IL 60143

New AAP main number: 630-626-6000

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Prolacta Bioscience Appoints David Steinberg as Chief Financial Officer

DUARTE, Calif., June 7, 2022 /PRNewswire/ -- Prolacta BioscienceProlacta®, the world›s leading hospital provider of 100% human milk-based nutritional products for critically ill, premature infants, announced today that top-ranked analyst David Steinberg has been appointed as chief financial officer. He will be responsible for overseeing Prolacta's financial operations, including financial planning, reporting, accounting, business development, and investor relations.

Steinberg brings nearly three decades of experience in biopharmaceutical equity research to Prolacta's executive team. As one of the first analysts to introduce specialty pharmaceuticals to Wall Street as a major growth opportunity about 25 years ago, Steinberg has a long list of accolades. He has been regularly voted by portfolio managers to the *Institutional Investor "*All America Research Team." Most recently, he was ranked No. 2 in the sector for 2021 and has been recognized as a top stock picker by surveys such as *The Wall Street Journal*'s "Best on the Street." Steinberg was also known for detailed "deep dive" financial reports on such topics as orphan drugs, attention deficit hyperactivity disorder, thyroid eye disease, narcolepsy,

Latam Pharma, and a multiyear series on mergers and acquisitions (M&A) titled "Who's Next?"

David Steinberg, CFO of Prolacta Bioscience

"David's extensive experience is well recognized and respected within the industry," said Scott Elster, CEO of Prolacta. "His deep knowledge of the biotechnology and pharmaceutical sectors is reflected in the tremendous success achieved by the teams he has led. David's financial leadership and foresight will be key to furthering Prolacta's mission of improving the health and lives of more critically ill, premature infants globally through human milk nutrition. We are fortunate to have such a highly respected leader on our executive team."

Prior to joining Prolacta, Steinberg served as managing director for Jefferies and Deutsche Bank. In addition to being widely recognized as a thought leader in the life sciences industry, he has deep expertise with capital fundraising and has been instrumental in launching more than 50 successful pharma and biotech initial public offerings (IPOs), and he has been involved in helping entrepreneurial biopharmaceutical companies raise more than $25 billion in equity and equity-linked securities.

"It is an honor to join Prolacta, a pioneer and leader in human milk science, especially during this period of global expansion," Steinberg said. "As evidenced by its year-over-year growth, Prolacta is poised for continued success. I'm excited to be in a position to help foster Prolacta's growth so even more premature infants can benefit from its life-saving products. As CFO, I look forward to growing the business alongside our talented management team, helping to further improve the financial outlook, and working with the research and development team to fund the development of novel pharmaceutical products that will meaningfully improve patients' lives."

Steinberg earned his Bachelor of Arts from Colby College and received his Master of Business Administration from Harvard Business School.

About Prolacta Bioscience

Prolacta Bioscience® Inc. is a privately held, global life sciences company dedicated to Advancing the Science of Human Milk® to improve the health of critically ill, premature infants. Prolacta's 100% human milk-based nutritional products have been evaluated in more than 20 clinical studies published in peer-reviewed journals. More than 80,000 premature infants have benefited from Prolacta's nutritional products worldwide to date.[1] Established in 1999, Prolacta is the world's leading provider of human milk-based nutritional products for hospital use and is also exploring the therapeutic potential of human milk across a wide spectrum of diseases. Prolacta maintains the industry's strictest quality and safety standards for screening, testing, and processing donor human milk. Operating the world's first pharmaceutical-grade human milk processing facilities, Prolacta uses vat pasteurization and a patented, FDA-reviewed manufacturing process to ensure pathogen inactivation while protecting the nutritional composition and bioactivity of its human milk-based products. Prolacta is a global company with headquarters in Duarte, California.

# # #

Media

Contact:

Loren Kosmont

310-721-9444

Reference

1. Estimated number of premature infants fed Prolacta's products from January 2007 to December 2021; data on file.

SOURCE Prolacta Bioscience

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CDC guide helps pediatricians prepare for COVID vaccination of children under 5

May 18, 2022

Editor's note: *The FDA meetings referenced below have been rescheduled for June 14-15. For the latest news on COVID-19, visit http://bit.ly/AAPNewsCOVID19.*

The Centers for Disease Control and Prevention (CDC) has released new information to help pediatricians prepare to vaccinate children under 5 years against COVID-19.

Both Moderna and Pfizer-BioNTech have adapted their COVID-19 vaccines for young children, and one or both could be available in June.

"There's a lot of data here that FDA (Food and Drug Administration) is going through. I think we all feel the sense of urgency," White House COVID-19 Response Coordinator Ashish K. Jha, M.D., M.P.H., said Wednesday. "We want to get this done as quickly as possible, but I think we also all agree we want to get it done right."

There are roughly 20 million children in the U.S. under 5 years, the only remaining age group still ineligible for vaccination. The vaccines under consideration would cover those as young as 6 months. A re-

cent Kaiser Family Foundation poll found about 18% of parents of children under 5 years plan to vaccinate their child right away, while about 38% said they would wait and see.

Those figures could change if COVID-19 cases in children continue to rise. More than 93,000 cases in children and adolescents were reported during the week ending May 12, a 76% increase over two weeks prior, according to data from the AAP and Children's Hospital Association.

Pediatrician preparation

The CDC has outlined the following steps pediatricians and other vaccinators can take to prepare:

- Enroll as a COVID-19 vaccine provider.
- Prepare scheduling systems and increase website and call center capacity.
- Update immunization information systems to allow for younger ages groups.
- Ensure staff is equipped and trained to respond to possible severe allergic reactions in young children.
- Be prepared to recommend and coadminister influenza vaccine and other childhood vaccines.
- Consider offering COVID, flu and other routine vaccines to family members.
- Educate yourself and your staff about vaccine specifications for young children, since the products for other age groups can't be used (see below).

Moderna vaccine

Moderna's vaccine for children ages 6 months through 5 years is a two-dose series. Doses are 25 micrograms (µg) each. The vaccine does not require diluent.

The vaccine ships at -20 degrees Celsius and is expected to come in 10-dose vials in cartons of 10 vials each with ancillary supplies included.

In April, Moderna released a summary of clinical trial data from 6,700 children that found vaccine efficacy of 51% in preventing infection for those ages 6 months through 1 year and 37% for children ages 2 through 5 years. Both age groups had similar immunogenicity to adults 18 to 25 years, meeting the noninferiority criteria.

Most adverse events were mild or moderate. About 17% of children 6 months through 1 year and about 15% of those 2 through 5 years experienced a fever greater than 38 degrees Celsius (100.4 degrees Fahrenheit). About 0.2% of each group experienced a fever greater than 40 degrees Celsius (104 degrees Fahrenheit). There were no cases of myocarditis or pericarditis and no deaths.

Pfizer-BioNTech vaccine

The Pfizer-BioNTech vaccine for children ages 6 months through 4 years will have a maroon cap to differentiate it from vaccines for other age groups. It is given as a three-dose series with 3 µg doses. The vaccine will require diluent, which will be provided.

The vaccine ships at -80 degrees Celsius. Packaging is expected to be 10-dose vials in cartons of 10 vials each with ancillary supplies included.

The Pfizer-BioNTech vaccine can be stored in an ultra-low temperature freezer for nine months, a refrigerator for 10 weeks and at room temperature for 12 hours before the first puncture. It must be discarded 12 hours after the first puncture.

This vaccine initially was tested as a two-dose series. In December 2021, however, the manufacturers announced it did not meet noninferiority criteria for those ages 2-4 years, leading the company to study a third dose. It then was scheduled to go before the FDA's Vaccines and Related Biological Products Committee (VRBPAC) in February, but that meeting was postponed to give the FDA more time to review the third dose data.

Vaccine authorization process

The FDA has tentatively scheduled VRBPAC meetings on June 8, 21 and 22 to discuss Moderna and Pfizer-BioNTech vaccines for children. If the FDA grants emergency use authorization (EUA) to a vaccine, it will go to the Centers for Disease Control and Prevention (CDC) for consideration.

"If the determinations are that kids should be getting these vaccines, we will make sure those vaccines are widely available as quickly as possible for kids under 5," Dr. Jha said.

The CDC is encouraging jurisdictions to preorder vaccines and coordinate with local health departments and partners on a distribution plan that balances equitable access with capacity. Shipping will begin as soon as the FDA issues an EUA, but vaccines can't be given until the CDC approves.

Resources

- CDC's Pediatric COVID-19 Operational Planning Guide
- AAP COVID vaccination resources
- CDC clinical considerations for administering COVID-19 vaccines
- Information from the CDC on COVID-19 vaccine boosters
- Information from HealthyChildren.org on preparing children for a COVID-19 vaccine

Melissa Jenco, News Content Editor

Contact information for AAP headquarters

American Academy of Pediatrics

345 Park Blvd, Itasca, IL 60143

New AAP main number: 630-626-6000

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Changes in brain's visual areas in infancy may precede autism diagnosis

Thursday, May 26, 2022

pac-lac

Perinatal Advisory Council:
Leadership, Advocacy and Consultation

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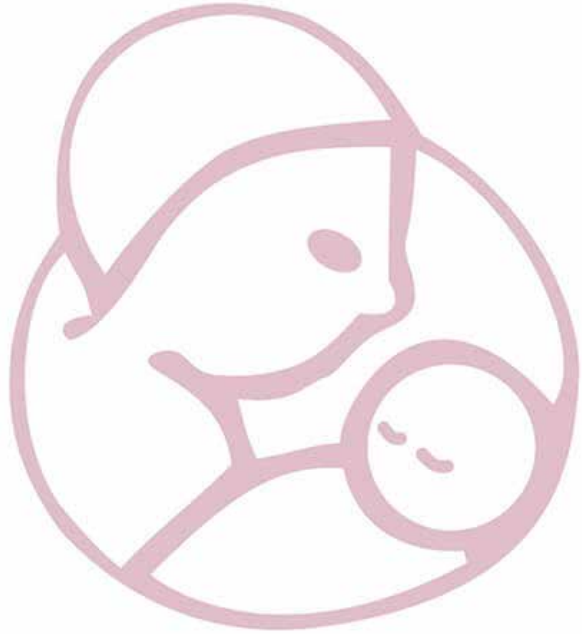

PAC/LAC's core values for improving maternal and child health have remained constant for over 30 years – a promise to lead, advocate and consult with others.

Leadership

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

Advocacy

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

Consultation

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

Changes in brain's visual areas in infancy may precede autism diagnosis

What

Infants who were diagnosed with autism spectrum disorder (ASD) at 24 months old had differences in the visual processing areas of the brain that were apparent at 6 months old, according to a study funded by the National Institutes of Health. The researchers theorized that disruption in visual processing could interfere with how infants see the world around them, changing how they interact with and learn from caregivers and their environment. These early changes could affect further brain development and play a role in ASD symptoms.

The study was conducted by Jessica Girault, Ph.D., of the University of North Carolina School of Medicine, Chapel Hill, and colleagues. It appears in the *American Journal of Psychiatry*.

The study enrolled 384 pairs of siblings, the oldest of which had been diagnosed with ASD. Previous research by the team found that younger siblings were more likely to develop ASD if their older siblings had higher levels of ASD traits. Researchers performed Magnetic Resonance Imaging scans on the brains of the younger siblings at 6, 12 and 24 months of age.

Among the 89 younger siblings who developed ASD, those whose older siblings had severe ASD traits had greater volume and surface area of the cerebrum, which controls speech, thought, emotions, reading, writing, and learning; larger surface area in the part of the visual cortex important for recognizing objects; and less mature connections in the splenium, which connects the brain's left and right visual cortices and plays a role in visual attention.

NIH funding was provided by the *Eunice Kennedy Shriver* National Institute of Child Health and Human Development, National Institute of Mental Health, and National Institute of Neurological Disorders and Stroke.

Who

Alice Kau, Ph.D., of the NICHD Intellectual and Developmental Disabilities Branch, is available for comment.

Article

Girault, JB et al. Infant Visual Brain Development and Inherited Genetic Liability in Autism. *The American Journal of Psychiatry.* 2022. doi: 10.1176/appi.ajp.21101002(link is external)

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

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Institute/Center

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

Contact

Robert Bock or Linda Huynh(link sends e-mail)

301-496-5133

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FDA panel recommends Moderna COVID vaccines for children ages 6-17 arker of SIDS Risk?

June 15, 2022

Editor's note: *For the latest news on COVID-19, visit* http://bit.ly/AAPNewsCOVID19.

A federal vaccine panel is recommending authorization of Moderna's COVID-19 vaccine for children and adolescents ages 6-17 years.

The Food and Drug Administration's (FDA's) Vaccines and Related Biological Products Advisory Committee (VRBPAC) voted 22-0, saying the benefits outweigh the risks. The recommendation will go to the FDA commissioner and then the Centers for Disease Control and Prevention (CDC) for consideration.

"I believe the vote, and I'm happy to see it was unanimous, is standing up for vulnerable populations that merit consideration in terms of protection against this virus," said VRBPAC member Ofer Levy, M.D., Ph.D., director of the Precision Vaccines Program at Boston Children's Hospital. "I believe that this will provide families an important option."

The Moderna vaccine for adolescents ages 12-17 is the same dose as for adults — 100 micrograms (µg), given as two doses 28 days apart. Children ages 6-11 years would get two 50-µg doses.

While the vaccine would be new for U.S.

children and adolescents, it is being used widely in other countries. More than 6.4 million adolescents and 300,000 children ages 6-11 have been fully vaccinated with it worldwide.

Pfizer-BioNTech COVID-19 vaccines were approved for children ages 5-17 years last year, but uptake has stalled. About 60% of adolescents and 29% of children ages 5-11 are fully vaccinated, according to CDC data.

Safety

Clinical trials evaluating safety included more than 2,000 adolescents and more than 3,000 children. For both groups, the most common systemic reactions to the Moderna vaccine were headache and fatigue. Most reactions were mild to moderate. There were no serious adverse events related to the vaccine except one case of ileus in a child with a complex medical history, which the FDA said is "possibly related" to the vaccine. About 5% of adolescents and 2% of children experienced lymphadenopathy-related events.

There were no cases of myocarditis or pericarditis after vaccination in the trials. The condition is rare but does occur above baseline rates for some age groups. Adolescent and young adult males have had the highest rates with the Pfizer-BioNTech vaccine, which is an mRNA vaccine like Moderna's. There have been 635 confirmed cases among vaccine recipients ages 5-17 reported through the Vaccine Adverse Events Reporting System out of nearly 55 million doses administered to that age group. FDA officials said they do not believe myocarditis/pericarditis risks are higher with Moderna than the Pfizer-BioNTech vaccine.

"I think we need to do whatever we can to allay parental concerns regarding myocarditis because I do think that's a major concern for the public," said Henry H. Bernstein, D.O., M.H.C.M., FAAP, professor of pediatrics at the Zucker School of Medicine at Hofstra/Northwell Health.

Myocarditis is more common and typically more severe after COVID-19 infection than after vaccination. Tom Shimabukuro, M.D., M.P.H., M.B.A., from the CDC's COVID-19 Vaccine Coordination Unit, said, "CDC and FDA are conducting the most rigorous monitoring in the history of vaccine safety for these COVID vaccines."

Immunogenicity and efficacy

Among adolescents, the geometric mean titer (GMT) ratio after Moderna's vaccine was 1.1 compared to trials in young adults, meeting FDA criteria. Vaccine effectiveness for adolescents was 93.3% against symptomatic infection.

In children, the GMT ratio compared to young adults was 1.2, again meeting FDA criteria. Vaccine effectiveness against symptomatic infection was 76.8%, according to an FDA analysis. However, confidence intervals were wide, and the FDA said efficacy was difficult to calculate due to the availability of the Pfizer-BioNTech vaccine for this age group.

The trials were conducted before the emergence of the omicron variant, leaving questions about how well it would perform now. Several VRBPAC members said they expect a third dose to be needed. The Pfizer-BioNTech vaccine has a two-dose primary series and a recommended booster dose for children and adolescents.

"The question is, will two doses of this vaccine offer adequate protection against omicron subvariants? I think the answer cer-

tainly regarding mild illness, no," said Paul Offit, M.D., FAAP, director of the Vaccine Education Center at Children's Hospital of Philadelphia. "And I think regarding severe illness yes as long as there's a third dose."

Eric J. Rubin, M.D., Ph.D., adjunct professor of immunology and infectious diseases at the Harvard T.H. Chan School of Public Health agreed a third dose probably would be necessary but said the group has to work with the available data.

"We're always going to be looking at the last variant or the variant before that because of how long it takes to produce these data," Dr. Rubin said. "And I think we have to make decisions based on the best data we have, which is going to be old … in an outbreak that is constantly moving. … I think the ability to protect against severe disease is quite compelling, so I don't think we want to pass up the opportunity to offer something to these kids."

COVID in children

VRBPAC's recommendation for a second vaccine for children and adolescents comes as there have been nearly 10.7 million COVID-19 cases in those ages 5-17 years. Seroprevalence data indicate that figure likely is even higher due to cases being undiagnosed or unreported. At least 433 adolescents and 189 children ages 5-11 years have died of COVID-19.

VRBPAC will meet again Wednesday to discuss a Moderna COVID-19 vaccine for children under 6 years and a Pfizer-BioNTech vaccine for children under 5 years. The CDC's Advisory Committee on Immunization Practices will meet Friday and Saturday to discuss pediatric COVID vaccines.

Resources

- *AAP COVID vaccination resources*
- *CDC clinical considerations for administering COVID-19 vaccines*
- *Information from HealthyChildren.org on preparing children for a COVID-19 vaccine*

Melissa Jenco, News Content Editor

Contact information for AAP headquarters

American Academy of Pediatrics

345 Park Blvd, Itasca, IL 60143

New AAP main number: 630-626-6000

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Pregnant Women with Monkeypox Advised to Have C-Section

June 08, 2022

Pregnant women with monkeypox will be advised to give birth by C-section to avoid infecting their baby during delivery, according to a new paper in *Ultrasound in Obstetrics & Gynecology*.

The risk of monkeypox infection remains low for the general public, the authors wrote, though cases continue to grow worldwide, particularly in the U.K.

"We are aware infants and children are at greater risk of becoming seriously ill if they do catch monkeypox," Edward Morris, one of the authors and president of the Royal College of Obstetricians and Gynecologists, said in a statement.

"Therefore, to minimize the risk of a baby contracting the virus, we recommend healthcare professionals discuss the benefits and risks of having a caesarean birth with a pregnant women or person who has or is suspected of having the virus," he said.

Morris and colleagues pulled together existing evidence on monkeypox diagnosis, treatment, and recommended modes of birth for mothers and babies.

"The World Health Organization states there could be adverse consequences for pregnant women and babies if they become infected, including congenital monkeypox, miscarriage, or stillbirth, which is why we have provided clear guidance for healthcare professionals in this paper," Morris said.

The monkeypox virus typically spreads through direct contact, droplets, or contaminated surfaces and objects. But some limited evidence shows that the virus can be passed from a mother to a baby via the placenta, which can lead to congenital monkeypox.

What's more, mothers may be able to transmit the virus during or after birth. Although no evidence exists around the optimal mode of birth, a pregnant woman with an active monkeypox infection may choose to avoid vaginal delivery to reduce direct contact.

"If genital lesions are identified on a pregnant woman, then a caesarean birth will be recommended," the authors wrote. "If a pregnant woman or person has suspected or confirmed monkeypox, a caesarean birth will be offered following discussion of the possible risk of neonatal infection, which may be serious."

After giving birth, close contact can spread the virus as well. To minimize the risk, the authors recommend isolating the baby from family members who have confirmed or suspected monkeypox and carefully monitoring for infection.

Mothers with an active monkeypox infection should also avoid breastfeeding to lower the risk of spreading the virus to their newborn, the authors wrote. But to support breastfeeding after infection, mothers can express and discard milk until the isolation period has passed.

Pregnant women who become infected may also consider getting vaccinated, the authors wrote. Vaccination up to 14 days after exposure doesn't prevent the disease but can reduce the severity of symptoms. In the current outbreak, public health organizations advised doctors to vaccinate contacts of confirmed cases, including pregnant people.

The data for monkeypox vaccine use in pregnant women is small, the authors wrote, including fewer than 300 women. In previous studies, no adverse outcomes were found. The vaccine is also considered safe for breastfeeding.

"The decision whether to have the vaccine in pregnancy should be a personal choice," the authors wrote. "Pregnant women and people should be encouraged to discuss the risks and benefits of vaccination, including possible side effects, with a healthcare professional before making their final decision."

Sources

Ultrasound in Obstetrics & Gynecology: "Monkeypox and pregnancy: What do obstetricians need to know?"

Royal College of Obstetricians & Gynaecologists: "New paper provides best practice for managing monkeypox in pregnancy."

Medscape, LLC
395 Hudson Street, 3rd Floor
New York, NY 10014

Carolyn Crist

By phone:
212-301-6700

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

Released: Thursday 12/13/2018 12:32 PM, updated Saturday 3/16/2019 08:38, Sunday 11/17/2019 and Friday 11/20/2020

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

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- Network with other pediatricians, pharmacists, and other health care providers to be stronger advocates for children.
- Invitation for special programming by the Section at the AAP's National Conference.
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Thank you for all that you do on behalf of children. If you have any questions, please feel free to contact:

Christopher Rizzo, MD, FAAP, Chair, crizzo624@gmail.com

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

Jackie Burke

Sections Manager

AAP Division of Pediatric Practice

Department of Primary Care and Subspecialty Pediatrics

630.626.6759

jburke@aap.org

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

Vaccines in Pregnancy Reduce Infants' COVID-19 Risk

June 03, 2022

(Reuters) - COVID-19 vaccination during pregnancy appears to lower newborns' risk of coronavirus infection, according to a study conducted in Norway.

Norwegian researchers tracked 9,739 babies whose mothers received a second or third dose of a COVID-19 vaccine from Pfizer/BioNTech or Moderna while pregnant, and 11,904 babies whose mothers were not vaccinated before or during pregnancy. Overall,

COVID infections were rare in the babies. But the risk of a positive COVID-19 PCR test during the first four months of life was 71% lower during the Delta era and 33% lower when Omicron was dominant for babies whose mothers got vaccinated during pregnancy compared with infants born to unvaccinated mothers, the researchers reported on Wednesday in JAMA Internal Medicine.

"There could still be a protective effect from antibodies past the first four months, but there are likely individual differences," said Dr. Ellen Oen Carlsen of the Norwegian Institute of Public Health.

Babies get another type of antibodies from breast milk, she noted, and the findings could partly be due to antibodies acquired from breastfeeding, or because vaccinated mothers are less likely to get COVID-19 and infect their babies.

Infants of women who received a booster shot during pregnancy had an even lower risk of COVID-19 than those of women who received just the original two-shot regimen. "This could imply that women who got vaccinated before pregnancy with two doses should consider receiving a booster dose during the last parts of pregnancy," Carlsen said.

SOURCE: https://bit.ly/3m7mX4Q JAMA Internal Medicine, online June 1, 2022.

Medscape, LLC

395 Hudson Street, 3rd Floor
New York, NY 10014

By phone:
212-301-6700

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Keeping Your Baby Safe

during the COVID-19 pandemic

How to protect your little one from germs and viruses

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

Here's what you can do...

Wash Your Hands

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

Limit Contact with Others

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

Provide Protective Immunity

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

Take Care of Yourself

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

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

WARNING

Never Put a Mask on Your Baby

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

If you are positive for COVID-19

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

We can help protect each other.
Learn more
www.nationalperinatal.org/COVID-19

National Perinatal Association

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flu · coronavirus · pertussis · RSV

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often with soap and warm water.

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

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Sneeze and cough into your elbow.

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Avoid crowds. Protect vulnerable babies and children.

www.nationalperinatal.org

National Perinatal Association

Peer Reviewed

50th Genetics Corner: A Patient with CHARGE Syndrome Illustrates the Parable of the Six Blind Men and the Elephant

Ashleigh Hansen, MSc, LCGC, CCGC, Robin D. Clark, MD

Case History:

A genetics consultation was requested for a 23-day-old term male infant with dysmorphic features and poor feeding after balloon valvulotomy for pulmonary artery stenosis.

This pregnancy was complicated by a suspected fetal cardiac anomaly on prenatal ultrasound. Maternal serum screening was normal. The mother did not gain weight during the pregnancy. At 39-week 0-day gestation, this AGA male was born by spontaneous vaginal delivery to an obese 23-year-old G1P0 mother. Apgar scores were 8^{1} and 9^{5}. The birth weight, 3470 g, and the length was 52 cm were appropriate for gestational age.

"The infant was admitted to the NICU. Asymmetric facial movement, low set, malformed pinnae of the ears, hallux varus, and micropenis were noted. An echocardiogram revealed pulmonary valve dysplasia and severe pulmonary stenosis, small muscular VSD, small PFO versus Secundum ASD, bilateral SVC without bridging vein, and a large PDA and moderate hypertrophy of the right ventricle."

The infant was admitted to the NICU. Asymmetric facial movement, low set, malformed pinnae of the ears, hallux varus, and micropenis were noted. An echocardiogram revealed pulmonary valve dysplasia and severe pulmonary stenosis, small muscular VSD, small PFO versus Secundum ASD, bilateral SVC without bridging vein, and a large PDA and moderate hypertrophy of the right ventricle. On day of life 3, a genetics consultant recommended a chromosome microarray which was normal. On day 9, "acute onset right-sided facial droop and ptosis" raised concern for an acute stroke given the presence of PFO. A brain MRI showed no evidence of a recent infarct. On day 10 of life, a comprehensive congenital heart disease gene panel was ordered, and results are pending. Poor feeding was attributed to the cardiac defect, but feeding remained a problem even after severe pulmonary stenosis was successfully treated on day 11 with balloon valvuloplasty resulting in mild stenosis.

ENT consulted on day 16 for pharyngeal dysphasia and a video swallow study that noted pooling/retention of residual thin barium in the hypopharynx. Laryngomalacia, erythematous arytenoids, prolapsing epiglottis over vocal folds, and a left vocal cord paresis were noted on flexible nasal laryngoscopy. On day 21, a brain MRI for the cranial nerve deficit and dysphagia showed abnormal dysplastic vestibule, semicircular canals, and possibly the right cochlea, as well as non-visualization of the seventh cranial nerves

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Family history:

Family history was significant for a maternal uncle with congenital heart disease but was otherwise non-contributory. Parents are both of Hispanic ancestry from Mexico. Consanguinity was denied. The patient is the only child of his parents, who are both age 23 years.

Genetics evaluation:

The genetic counselor obtained a detailed history of teratogen exposure from the mother, who reported consuming 3-4 alcoholic drinks 4-5 days/week and occasional marijuana use during the first 11 weeks of pregnancy. The mother denied other exposures, illnesses, or maternal diabetes.

On exam, he had a square forehead, right facial palsy, epicanthal

folds, low-set ears with absent helical and antihelical folds and triangular concha, high nasal bridge, asymmetry of the mandible, R<L.

Figure 1: Both ears have a simple and flat appearance without a helical fold. There is no lobule on the right ear, which is characteristic of CHARGE syndrome. Both ears have a triangular concha, also a classic feature.

The clinical diagnosis of CHARGE syndrome was based on the characteristic ear anomaly, multiple cranial nerve palsies, micropenis, and a cardiac defect. There was no evidence of coloboma on a dilated eye exam, and choanae were patent. Although the diagnosis was clear, the mother expressed her doubts because it was her experience that a new doctor had a different explanation for what was wrong with her son every day. The mother eventually accepted the diagnosis after the geneticist explained all of the features that were compatible with the diagnosis and invoked the ancient parable from India about the six blind men who encountered an elephant for the first time: each blind man felt a different part of the elephant and thought he understood the whole based on the part he had examined. One explained that he was feeling the trunk of a tree (he examined the leg), another said it was a fan (he felt the ear), the next a rope (the tail), then a snake (the trunk), then a spear (the tusk) and finally a wall (the flank).

" The mother eventually accepted the diagnosis after the geneticist explained all of the features that were compatible with the diagnosis and invoked the ancient parable from India about the six blind men who encountered an elephant for the first time: each blind man felt a different part of the elephant and thought he understood the whole based on the part he had examined."

The cardiac gene panel testing revealed a heterozygous Variant of Uncertain Significance (VUS) in *CDH7*: c.3641 A>C (p.Gln1214Pro). This variant has not been previously reported in the literature; however, a different variant affecting the same amino acid has been reported as *de novo* in two individuals with CHARGE syndrome. The variant has been reported as "pathogenic" in ClinVar and "likely pathogenic" by Franklin Genoox. The variant has not been reported in a large population database indicating its rarity. Although the variant is highly suspected as pathogenic, the interpretation remains uncertain due to the lack of conclusive functional and genetic evidence. Parental studies are in process. If this is a *de novo* variant, the laboratory confirmed that it would upgrade the classification of this variant to pathogenic.

Discussion:

CHARGE syndrome (MIM# 214800) is estimated at 1 in 15 000–17 000 newborns, which is common enough to be recognizable to astute clinicians in the NICU. However, CHARGE syndrome can present in many ways (1), which may confuse even experienced providers (even our first genetics consultant). In this case, the infant presented with multiple congenital anomalies consistent with the diagnosis but without the key components of coloboma or choanal Atresia. Medical consultants initially focused on the child's acute problems and not the clinical picture as a whole. At first, the child's heart defect was the primary issue, until the focus of attention switched to the baby's poor feeding because it did not improve as expected after the heart defect was repaired. The baby's facial paralysis raised concern for a stroke, but when a stroke was ruled out, interest in this problem declined.

Similarly, the infant's ear anomalies and micropenis, which never demanded therapeutic attention, were not given much weight in the diagnostic process. It was only when multiple cranial nerve deficits became apparent that all the individual components of the

The parable of the six blind men and the elephant can apply to examining an infant with multiple congenital anomalies. (Source https://www.adventisthealthcare.com/living-well/the-blind-men-and-the-elephant/)

diagnosis came together and pointed to the diagnosis of CHARGE syndrome. Later, brainstem auditory evoked potential was abnormal due to the absence of waves I-V in both ears.

"It was only when multiple cranial nerve deficits became apparent that all the individual components of the diagnosis came together and pointed to the diagnosis of CHARGE syndrome."

The effect of prenatal alcohol exposure in this child is a confounding factor likely to adversely affect feeding and other neurodevelopment processes that would otherwise be attributed to CHARGE syndrome. He might function at the lower end of the CHARGE syndrome phenotype because of his early alcohol exposure. Interestingly, the baby had no facial characteristics or growth retardation of fetal alcohol syndrome.

CHARGE is an acronym for **C**oloboma of the eye, **H**eart defects, **A**tresia of the choanae, **R**etardation of growth and/or development, **G**enital abnormalities, and **E**ar abnormalities (external, middle, and inner ear, including deafness). In addition to the above symptoms, other common clinical features of CHARGE syndrome are immunologic deficits (lymphopenia in 60-80% and humoral defects in 16% of patients), absent or hypoplastic semicircular canals (95%), cranial nerve dysfunction (including facial nerve palsy), cleft lip and/or palate, anosmia, feeding difficulties, and skeletal abnormalities. T-cell lymphopenia is common (80%) in patients with CHARGE syndrome. It is associated with a reduced T-cell function and hypogammaglobulinemia but normal B-cell and NK-cells numbers. Thymic aplasia or hypoplasia might be the underlying cause of T-cell lymphopenia.

In 2004, the major genetic cause of CHARGE syndrome was identified as a dominant variant in *CHD7* (MIM# 608892) that usually occurs *de novo*. Although CHARGE syndrome is a clinical diagnosis, it can also be diagnosed by molecular diagnostics. A variant in *CHD7* can be found in over 90% of all children who fulfill the clinical diagnostic criteria.

"In 2004, the major genetic cause of CHARGE syndrome was identified as a dominant variant in CHD7 (MIM# 608892) that usually occurs de novo. Although CHARGE syndrome is a clinical diagnosis, it can also be diagnosed by molecular diagnostics. A variant in CHD7 can be found in over 90% of all children who fulfill the clinical diagnostic criteria."

Clinical Criteria for CHARGE syndrome:

The diagnosis of CHARGE syndrome is based on a combination of major and minor clinical criteria proposed separately by Blake[2] and Verloes (3).

» The presence of all 4 Major criteria establishes the diagnosis of CHARGE syndrome.

» These Classic 4C's are Choanal Atresia, Coloboma, Characteristic ears, and Cranial nerve anomalies (Blake *et al.* 2006). Any of these four major criteria should suggest CHARGE syndrome as a diagnostic possibility.

~ **C**oloboma: in CHARGE, colobomas mainly affect the retina. Order an ophthalmology consult.

~ **C**hoanal Atresia: this may be membranous or bony; bilateral or unilateral. Pass a #6 French feeding tube in both nares

- Many individuals with CHARGE syndrome, such

as our patient, do not have choanal Atresia or coloboma.

~ **C**ranial nerves: multiple cranial nerve dysfunctions is common. Facial palsy is the most common cranial nerve deficit after hearing loss.

~ **C**haracteristic ear anomalies: Hypoplastic semicircular canals and Mondini malformation on CT of the petrous bones or MRI. Unusually shaped ears: the lack of a lobule and the triangular concha are classic; Hearing loss: conductive and/or nerve deafness ranges from mild to severe deafness. Order a hearing test early – do not wait for discharge.

» Minor criteria

~ Mediastinal organs (cardiac, esophagus): major and minor congenital heart defects (most common tetralogy of Fallot) in 75-80% of patients.

~ Hypothalamo-hypophyseal dysfunction (including GH and gonadotrophin deficiencies): Underdeveloped male external genitalia is common, less apparent in females.

- As a rule of thumb, you can assume that ***microphallus in a baby with facial palsy is due to CHARGE syndrome until proven otherwise***

~ Intellectual disability: IQ ranges from normal to profound intellectual disability

~ Feeding adaptation: requires early aggressive feeding therapy.

~ Characteristic face: look for a square forehead

This patient has two major (multiple cranial nerve involvement, typical ear anomalies) and four minor criteria (cardiac, genital, poor feeding, face), which is sufficient to consider the diagnosis of CHARGE according to Blake (2) and which meets the criteria proposed by Verloes (3) for atypical CHARGE syndrome. Interestingly, the four major criteria listed above do not demand intensive intervention in the NICU and, for that reason, may be overlooked as the attention focuses on anomalies that present more life-threatening concerns. The message here is that the signs that establish the diagnosis of CHARGE syndrome may not be the ones that demand therapeutic attention – a holistic approach to the baby may reward the careful practitioner with a timely diagnosis.

"The message here is that the signs that establish the diagnosis of CHARGE syndrome may not be the ones that demand therapeutic attention – a holistic approach to the baby may reward the careful practitioner with a timely diagnosis."

Practical applications:

1. In the infant with multiple congenital anomalies, pay as much attention to anomalies that do not demand therapeutic attention as the ones that do; these are often the key to the diagnosis.
2. Recognize the importance of the major and minor criteria in the diagnosis of CHARGE syndrome – especially the 4 Cs: Coloboma, Choanal atresia, Cranial nerve dysfunction, and Characteristic ear anomalies and semicircular canal dysplasia.
   a. Understand that coloboma and choanal Atresia are not always present.
3. Recognize the important association of micropenis and facial palsy as a clue to the diagnosis of CHARGE syndrome.
4. Consider the whole patient and make a diagnosis based on all the features: Do not be one of the six blind practitioners who examined the elephant!

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Ashleigh Hansen, BSc, MSc, LCGC, CCGC
Pediatric Genetic Counselor
Loma Linda University School of Medicine
Division of Genetics
Department of Pediatrics
Email: ahansen@llu.edu

Corresponding Author

Robin Clark, MD
Professor, Pediatrics
Loma Linda University School of Medicine
Division of Genetics
Department of Pediatrics
Email: rclark@llu.edu

OPIOIDS and NAS

When reporting on mothers, babies, and substance use

LANGUAGE MATTERS

I am not an addict.

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

I was exposed to opioids.

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

NAS is a temporary and treatable condition.

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

My mother may have a SUD.

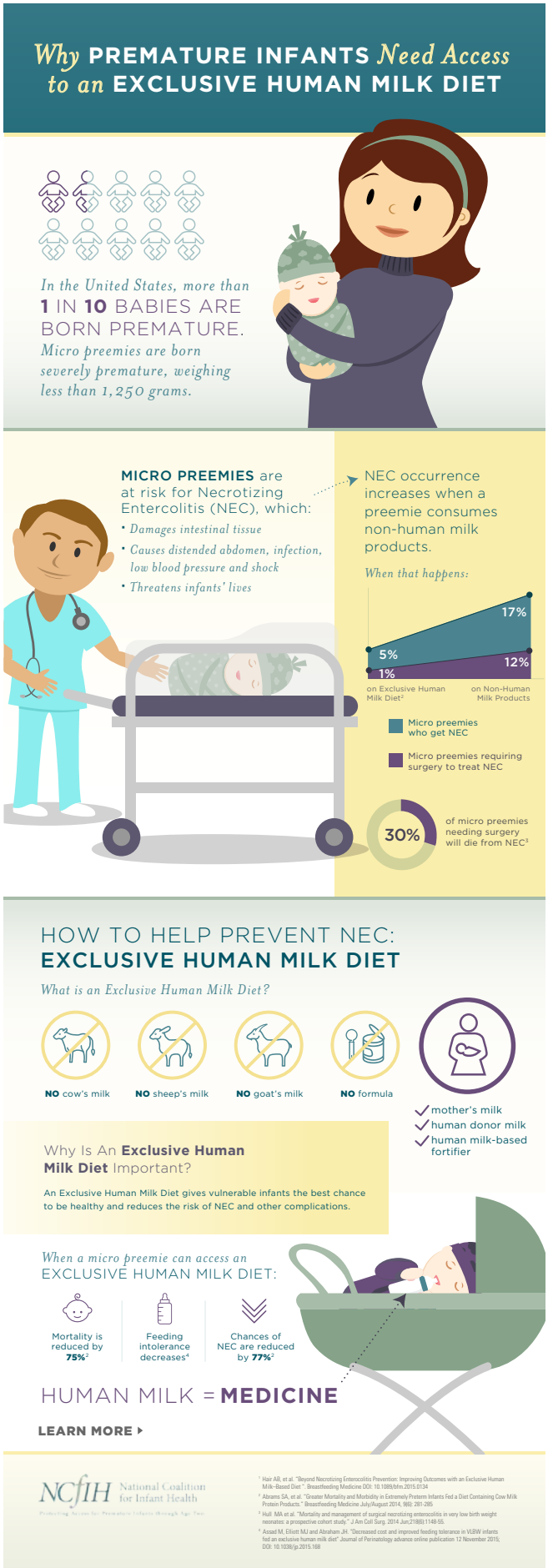
She might be receiving Medication-Assisted Treatment (MAT). My NAS may be a side effect of her appropriate medical care. It is not evidence of abuse or mistreatment.

My potential is limitless.

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

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

National Perinatal Association



Coding for Consultation

Gilbert I. Martin, MD

Families are often referred to the Neonatologist for many different reasons. There may be a previous history of a newborn with a problem or even a family history which requires guidance. The following two examples are commonly referred to the Neonatal Department.

1. A family comes to see you because their first child was born with gastroschisis. They are expecting another child, have moved to your area, and were referred to you to discuss their options. They would like to know the capabilities of your neonatal intensive care unit (NICU) if the baby they are expecting has a problem requiring intensive care. You spend 30 minutes of face-to-face time counseling the family.

The proper code is

a. 99404

b 99402

c. 99252

Answer: B

Code 99402 represents preventive medicine counseling and/or risk factor reduction interventions(s) provided to an individual (separate procedure; approximately 30 minutes).

Preventive medicine individual counseling codes (99401-99404) may be reported if the family comes to the neonatologist either self-referred or sent by another provider to discuss a risk reduction intervention (e.g., seeking advice when there is no present problem but rather to avoid a further problem or complication). These codes are reported based on the time spent face-to-face providing counseling. Because they are time-based codes, the medical record must include documentation of the total counseling time and a summary of the issues discussed. (1)

2. A couple is referred to you for an outpatient consultation because their fetus was noted to have a unilateral dysplastic kidney and complex congenital heart disease following an ultrasound by their perinatologist. You spend 60 minutes in non-face-to-face parent contact reviewing the medical records and dictating a letter to the perinatologist. You spend 60 minutes with the couple at the consultation time because they have many questions.

The proper code(s) is

a. 99358,99244

b 99245

c. 99233

Answer: A

Code 99358 represents prolonged evaluation and management (E/M) service before and/or after direct (face-to-face) patient care (e.g., review of extensive records and tests, communication with other professionals and/or the patient/family); first hour {list separately in addition to code[s] for other physician service[s] and/or inpatient or outpatient E/M service). (2)

Code 99244 represents an office consultation for a new or established patient, which requires these three key components: a comprehensive history, a comprehensive examination, and medical decision-making of moderate complexity. Usually, the presenting problem(s) is of moderate to high severity. Physicians typically spend 60 minutes face to face with the patient and/or family. Because all of the time of this consultation involves counseling, the

typical time listed for the code is used to select the level of the code. In this case, 60 minutes equates to code 99244. (3)

Code 99358 is an add-on code (never reported in isolation) for non-face-to-face services used when a physician provides prolonged service (non-face-to-face) beyond the usual service in an inpatient or outpatient setting. The code is used to report the total duration of non-face-to-face time on a given date providing prolonged service, even if the time spent by the physician is not continuous. Code 99358 is used to report the first hour of prolonged service, but prolonged service of less than 30 minutes is not separately reported. Therefore, more than 30 minutes must be used to use code 99358. This code is used for the review of extensive records and communication with other professionals and/or the patient/ family. There are no Centers for Medicare & Medicaid Services

(CMS) assigned relative value units (RVUs) for 99358. The face-to-face part of this. Consultation is only 60 minutes, and the 99244 office visit code is used in addition to code 99358. If the review of the ultrasound and the records were done face to face with parents as well, code 99245 (80 minutes) would be appropriate. This addon code can be used with any level of consultation codes.

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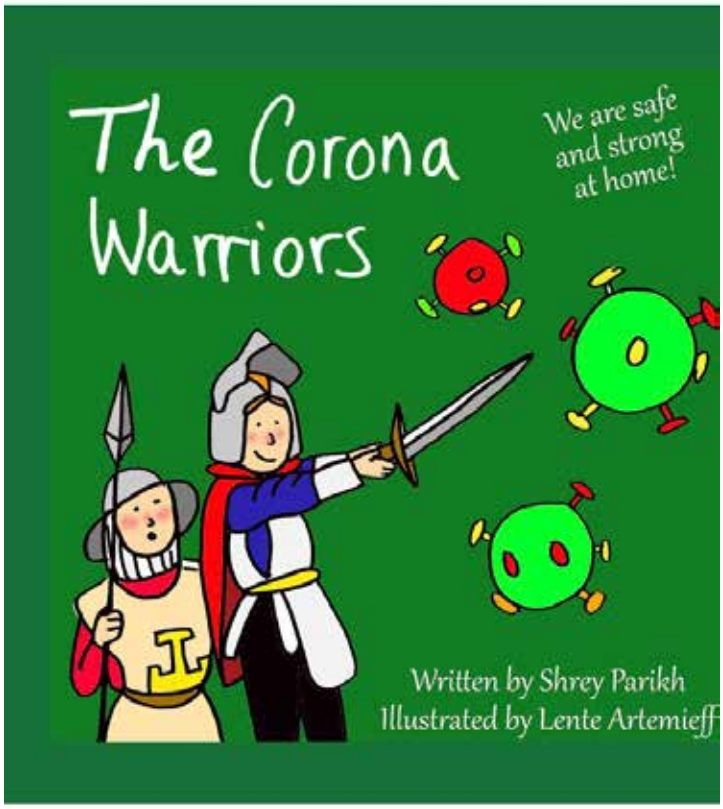
Corresponding Author

Gilbert I Martin, MD, FAAP
Division of Neonatal Medicine
Department of Pediatrics
Professor of Pediatrics
Loma Linda University School of Medicine
Email: gimartin@llu.edu
Office Phone: 909-558-7448



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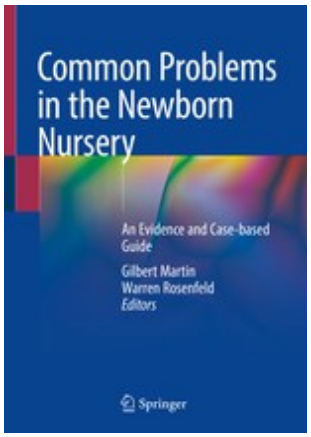

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NCfIH National Coalition for Infant Health

The Burden of RSV

Impacting All Families

JUNE 2022

Respiratory syncytial virus places a heavy burden on infants, young children, their families, and the health care system. Also known as RSV, this virus can impact children and families for months, years, or even their entire lives.

And it doesn’t discriminate.

All families need to be aware and prepared to actively protect their children from RSV.

RSV is a highly contagious seasonal virus. For some adults and older children, RSV may seem like a cold, with no major impact or lasting symptoms. But for infants and young children, especially those born prematurely or those with heart defects or compromised immune systems, RSV can take a heavy toll.[1]

RSV IS NOT RARE. BY THE TIME MOST CHILDREN ARE TWO YEARS OLD, THEY HAVE HAD AN RSV INFECTION.[2]

And while some children experience only cold-like symptoms, others face more severe consequences. RSV and its harsh symptoms are common because the virus is easily transmitted. It is spread primarily by respiratory droplets from a cough or sneeze and through contact with a contaminated surface. Infants and young children, particularly those with underlying medical conditions, are at risk of severe disease from RSV infection.

There is no cure for RSV — and no established standard of care. Providers typically treat the symptoms and do their best to support the patient. Preventive tactics like handwashing and limiting exposure to others are also options.

IN THE UNITED STATES

Nearly **58,000 infants and young children** are hospitalized because of RSV each year.[3]

For children under age 5, RSV causes **500,000 emergency room visits** each year.[4]

RSV is the **most common cause of bronchiolitis and pneumonia** in children under age 1.

RSV leads to **100-500 deaths** among children younger than 5 years old each year.[5]

Infants under age 1 are **16 times more likely to be hospitalized** for RSV than for the flu.[6]

THE BURDEN OF RSV

RSV can cause serious symptoms with long-lasting complications for infants and young children. In addition to cold-like symptoms such as a runny nose or a cough, parents may notice their child wheezing and working harder to breathe.[7] Infants and young children may become lethargic as they struggle to breathe and as their immune system tries and fails to fight the virus.

Babies, in particular, can suffer other serious symptoms that alarm parents. These symptoms may include decreased appetite, irritability, and struggling to breathe. Infants with severe RSV may experience short, shallow, and rapid breathing.

A telltale sign of RSV is when an infant's chest caves in between and under the ribs. Their nostrils may flare as they fight to breathe. In some cases, breathing problems may be so serious that their mouths, lips, and fingernails turn blue. They could also experience occasional apnea, where the baby stops breathing for 20 seconds or more.

Symptoms may worsen as the virus moves lower into the lungs. RSV may cause inflammation of the airways, which can lead to pneumonia or bronchiolitis. A barking or wheezing cough is often the first sign that the virus has begun to inflame the lungs.

PREEMIES

RSV is a serious threat for premature babies.

Preemies are often born before their lungs, and immune systems have fully developed. Premature infants born near the beginning of RSV season, traditionally October through March, face a heightened risk.

Preemies are left vulnerable to viruses and attacks on their respiratory system. Without preventive measures, these babies can suffer serious short and long-term consequences if they contract RSV.

OLDER INFANTS

Infants under 6 months are at a greater risk of a severe RSV infection.

For infants under age 1, RSV is the leading cause of hospitalization. Children in this age range are 16 times more likely to be hospitalized for RSV than for the flu.

Nearly 72% of infants hospitalized from RSV in their first year of life had no underlying or preexisting health conditions.

YOUNG CHILDREN

RSV impacts all children.

A 2020 study found that 35% of children hospitalized with acute respiratory illness were positive for RSV. Of those children, 87% were under two years old, and 67% had no underlying conditions or premature birth.[8]

Every year, RSV causes more than 500,000 emergency room visits — and nearly 58,000 hospitalizations — for children under the age of 5.

LIFELONG CONSEQUENCES

RSV can be painful and terrifying for everyone involved. Families are left to watch as their child faces unrelenting symptoms and struggles to breathe. But even after a child recovers, the family may not have escaped the burden of RSV completely. Many times, families are left to face long-term complications and costs — both emotional and financial.

Contracting RSV at a young age can lead to other health complications.[9] Infants who contract severe RSV after the age of 6 months have a higher chance of developing asthma and other breathing disorders later in life.[10] These complications often appear in later childhood and continue into adulthood. But these complications can also develop early. There is growing evidence that RSV in early childhood is associated with long-term wheezing and asthma and impaired overall lung function.

Subsequently, children who had RSV may face a diminished quality of life and place a heavy burden on families. They may also increase costs to the health care system.

CONTRACTING RSV AT A YOUNG AGE **CAN LEAD TO OTHER HEALTH COMPLICATIONS.**

IMPACT ON FAMILY

RSV-related hospitalization is distressing for infants and children, as well as their caregivers and families. As parents watch their child struggle to breathe, siblings are often separated from their parents and are confused and afraid. The physical and mental-health effects may extend for months or years.[11]

Parents and caregivers may be forced to make alternative childcare arrangements for their other children, placing an increased burden on family and friends.

The financial toll can be devastating too. For underinsured or uninsured patients and their families, a hospital stay and follow-up treatment could lead them to sacrifice jobs, savings, and financial security.

And the emotional impact of RSV on families can be long-lasting.

PREVENTION

To help prevent RSV, families with infants and young children should wash their hands frequently, avoid close contact with sick people, cover coughs and sneezes, and disinfect toys and surfaces regularly.[12]

During RSV season, families should consider taking their child out of a daycare setting or limiting visitors who come into their home. Limiting outings to the grocery store or large gatherings are other strategies to consider. While there is no vaccine for RSV, a preventive monoclonal antibody is available for some infants born preterm or with underlying health conditions. And new preventive monoclonal antibodies for preventing RSV in all infants are in development.

Ensuring timely and equitable access to these vaccine-like interventions will help prevent RSV and protect infants, young children, and their families from the long-term burden of RSV.

CONCLUSION

For infants, young children, and their families, RSV can be devastating. Preventing RSV saves lives, limits potential dangers of lifelong health complications, and protects families from the multifaceted emotional and financial burden.

RSV impacts all families, no matter their demographic, geographic location, or financial position. Prevention is key to protecting all infants and children from RSV.

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Protecting Access for Premature Infants through Age Two

The National Coalition for Infant Health educates and advocates on behalf of premature infants from birth to age two. NCfIH envisions safe, healthy infants whose families can access the information, care, and treatment their babies need.

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NCfIH National Coalition for Infant Health

Protecting Access for Premature Infants through Age Two

The National Coalition for Infant Health is a collaborative of more than 200 professional, clinical, community health, and family support organizations focused on improving the lives of premature infants through age two and their families. NCfIH's mission is to promote lifelong clinical, health, education, and supportive services needed by premature infants and their families. NCfIH prioritizes safety of this vulnerable population and access to approved therapies.

Corresponding Author

Susan Hepworth
Director
National Coalition for Infant Health
1275 Pennsylvania Ave. NW, Suite 1100A
Washington, DC 20004
Email: info@infanthealth.org

Mitchell Goldstein, MD, MBA, CML
Professor of Pediatrics
Loma Linda University School of Medicine
Division of Neonatology
Department of Pediatrics
Email: mgoldstein@llu.edu

National Coalition for Infant Health Values (SANE)

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

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

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

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

The Signs & Symptoms of RSV

RESPIRATORY SYNCYTIAL VIRUS

Know the Signs & Symptoms of RSV

- Cough
- Runny Nose
- Struggling to Breathe *(breastbone sinks inward when breathing)*
- Difficulty Eating
- Lethargy
- Wheezing

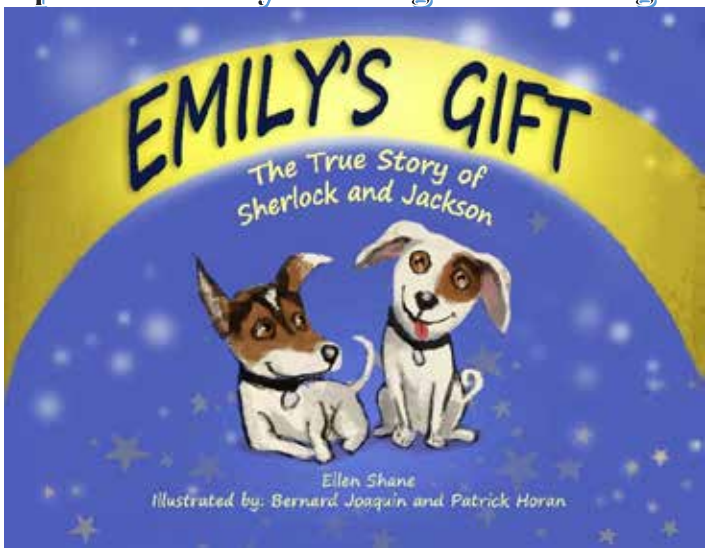
RESPIRATORY SYNCYTIAL VIRUS
is a highly contagious seasonal virus that can lead to hospitalization for some babies and young children.

Know the Signs.

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

LEARN MORE

"Emily's Gift" can be purchased by clicking on the image of the cover below.



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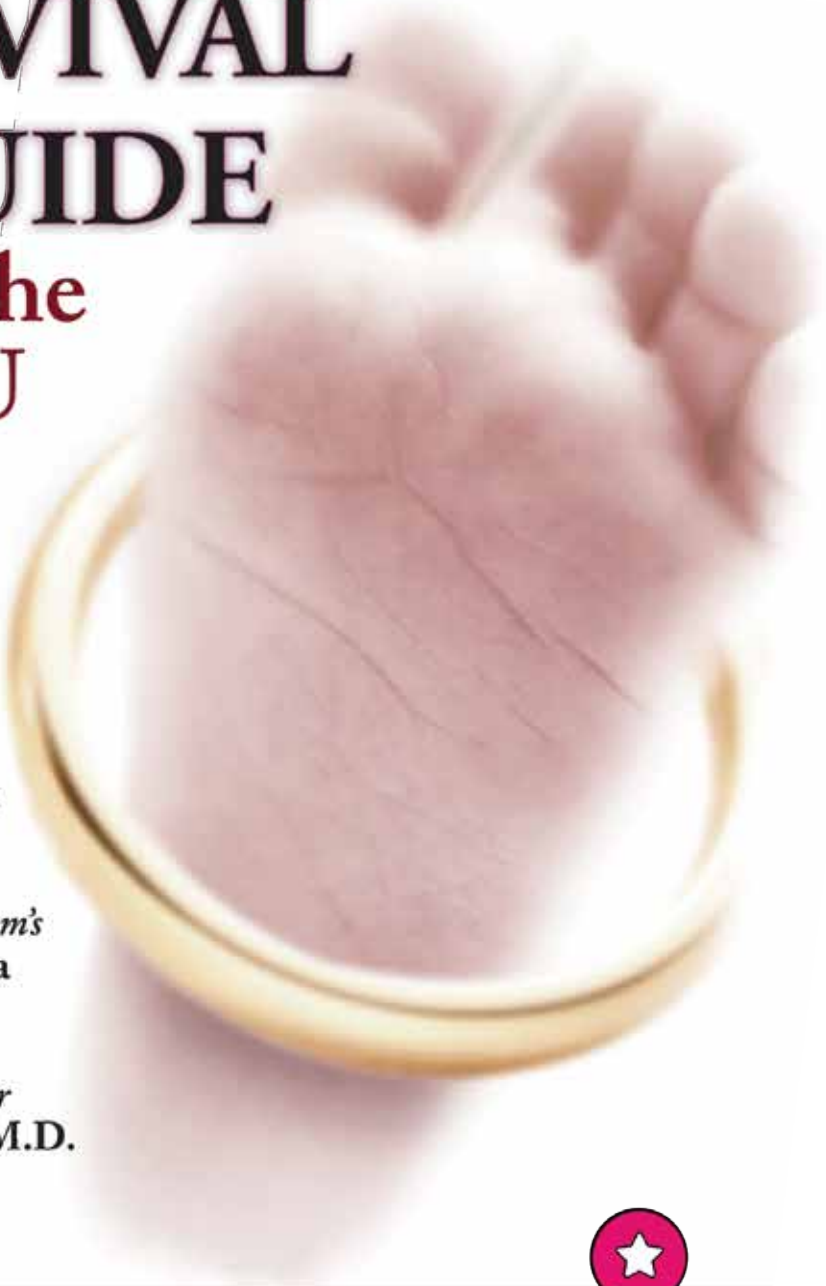
For more information, please visit emilyshane.org.

The Preemie Parent's SURVIVAL GUIDE to the NICU



By

little man's
Nicole Conn

&

PreemieWorld.com's
Deb Discenza

with

Medical Editor
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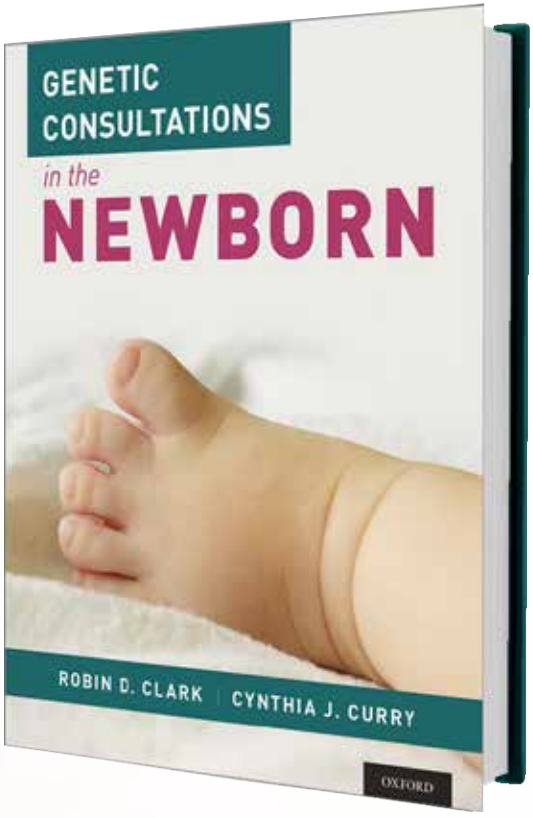

Robin D. Clark | Cynthia J. Curry

- A streamlined diagnostic manual for neonatologists, clinical geneticists, and pediatricians - any clinician who cares for newborns
- Organized by symptom and system, enriched with more than 250 photography and clinical pearls derived from authors' decades of clinical practice
- Includes "Syndromes You Should Know" appendix, distilling the most frequently encountered syndromes and chromosomal abnormalities in newborns
- OMIM numbers for each condition situate authors' practical guidance in the broader genetics literature, connecting readers to the most up-to-date references

Comprising of more than 60 chapters organized by system and symptom, *Genetic Consultations in the Newborn* facilitates fast, expert navigation from recognition to management in syndromes that manifest during the newborn period. Richly illustrated and packed with pearls of practical wisdom from the authors' decades of practice, it empowers readers to recognize the outward signs and symptoms crucial for an effective diagnosis.

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OXFORD

Clinical Pearl: Unplanned Extubation

Melanie Wielicka, MD, PhD, Kellie Barsotti, MD

Unplanned extubation, defined as the unintentional dislodgment of an endotracheal from the trachea, has become increasingly recognized as a patient safety and quality control issue in most intensive care units. This adverse event is particularly evident in neonatal intensive care units, where many premature infants require intubation and ventilation for prolonged periods. A study reviewing data from 15 NICUs across North America reported that unplanned extubation requiring reintubation was the fourth most common adverse event following nosocomial infections, catheter infiltrations, and abnormal head imaging (1). The reported unplanned extubation rates range from 49 to 69% in pediatric intensive care units and 66 to 75% in NICUs. Neonates are more prone to unplanned extubations than older children because of several unique factors, including prolonged intubations, shorter tracheas, and possibly less sedation (6).

"The few available single-center studies of unplanned extubations in the pediatric population demonstrate a significant risk associated with these events. Up to 20% of patients experience cardiovascular collapse requiring resuscitation."

The few available single-center studies of unplanned extubations in the pediatric population demonstrate a significant risk associated with these events. Up to 20% of patients experience cardiovascular collapse requiring resuscitation. Other complications include the need for reintubation and increased cost and length of hospital stay (6). One case-control study at a tertiary care pediatric hospital found that pediatric patients that underwent unplanned extubations in both the PICU and cardiac ICU had an increase in hospital stay of up to 6.5 days and a statistically significant increase in total hospital costs compared to age and diagnosis matched control patients (3). Given the significant clinical and financial consequences of unplanned extubations, many institutions have attempted to improve unplanned extubation rates within their hospitals through various quality improvement initiatives.

A large prospective quality improvement study completed at Cincinnati Children's Hospital implemented shared initiatives across their pediatric ICUs with an overarching goal to reduce the incidence of unplanned extubations and the serious harm associated with those adverse events (2). The authors found that each intensive care unit (PICU, CICU, NICU) identified different interventions contributing to risk reduction. Interestingly, all ICUs saw an initial increase in rates of unplanned extubations at the beginning of the study, reflective of the implementation of reporting systems that led to additional events being captured. In the NICU specifically, kangaroo care was identified as an inciting activity leading to unplanned extubations. As NICU providers, we appreciate kangaroo care for its many benefits - including temperature and blood glucose regulation, as well as its positive impact on growth, neurodevelopment, and sleep (5). However, it increases the risk of accidental extubation due to potential ETT manipulation associated with infant transfer and repositioning. Some of the interventions suggested by the study include standardization of transfer methods, detailed guidelines, required staff training, and family participation in stimulation (2). With the implementation of the above interventions, this study showed a sustained improvement in unplanned extubation rates within the NICU.

"Some of the interventions suggested by the study include standardization of transfer methods, detailed guidelines, required staff training, and family participation in stimulation (2). With the implementation of the above interventions, this study showed a sustained improvement in unplanned extubation rates within the NICU."

The first large, multi-institutional national quality improvement intervention included 43 volunteer hospitals with the goal of reducing the absolute rate of unplanned extubations by 40% over two years (4). The initiative assembled a group of ten national experts from 8 centers, including physicians, nurses, and respiratory therapists from PICUs, NICUs, and CICUs, to determine standardized interventions for reducing unplanned extubations in pediatric patients. These interventions involved standardized ana-

tomic reference points and securement methods and establishing protocols for high-risk situations such as repositioning associated with bedside imaging, kangaroo care, etc. The authors found a 24.1% aggregate reduction in unplanned extubation events overall as well as a reduction of episodes of cardiovascular collapse by 36.6% associated with the episodes of unplanned extubations likely secondary to increased awareness secondary to the quality improvement interventions in place. Specifically pertaining to the NICU, this quality improvement intervention led to a 17.6% absolute reduction of unplanned extubations in the NICUs.

"As demonstrated by the multi-center study above, collaboration on multidisciplinary and multi-institutional levels will be necessary to effectively identify risk factors and establish evidence-based, universal guidelines to reduce the incidence of unplanned extubations. Neonatal ICUs should continuously evaluate their institution's unplanned extubation rates and potential risk factors."

As demonstrated by the multi-center study above, collaboration on multidisciplinary and multi-institutional levels will be necessary to effectively identify risk factors and establish evidence-based, universal guidelines to reduce the incidence of unplanned extubations. Neonatal ICUs should continuously evaluate their institution's unplanned extubation rates and potential risk factors. Based on the available data, areas of improvement include achieving better control during situations associated with excessive endotracheal tube manipulation (i.e., during bedside imaging and routine repositioning). Other suggestions include multidisciplinary extubation readiness discussions and standardization of endotracheal tube securement. An opportunity to explore is how education on the significant risk of harm associated with UE for all neonatal intensive care unit providers (including physicians, nurses, and respiratory therapists) would affect event incidence. Parental involvement in education surrounding the prevention of unplanned extubations may also decrease event incidence. Parents are often involved in kangaroo care which, as noted above, has been identified as an inciting event for unplanned extubations. Involving parents in these quality improvement measures could empower them to actively participate in preventing adverse event protocols, further strengthening a culture of safety surrounding their child's care. Though institutions should identify their unique risk factors for unplanned extubations within their NICUs, it is abundantly clear that a meaningful and significant decrease in adverse events in this patient population is only achievable through strong multidisciplinary partnerships.

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1. *Sharek PJ, Horbar JD, Mason W, Bisarya H, Thurm CW, Suresh G, Gray JE, Edwards WH, Goldmann D, Classen D. Adverse events in the neonatal intensive care unit: development, testing, and findings of an NICU-focused trigger tool to identify harm in North American NICUs. Pediatrics. 2006 Oct;118(4):1332-40. doi: 10.1542/peds.2006-0565. PMID: 17015521.*
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4. *Klugman D, Melton K, Maynord PO, et al. Assessment of an Unplanned Extubation Bundle to Reduce Unplanned Extubations in Critically Ill Neonates, Infants, and Children. JAMA Pediatr. 2020;174(6):e200268. doi:10.1001/jamapediatrics.2020.0268*
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Corresponding Author

Melanie Wielicka, MD, Ph.D
Resident in Pediatrics
Comer Children's Hospital
5721 S Maryland Ave
Chicago, IL 60637
Email: melanie.wielicka@uchospitals.edu

Corresponding Author

Kellie Barsotti, MD
Resident in Pediatrics
Comer Children's Hospital
5721 S Maryland Ave
Chicago, IL 60637

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 guidlines limit their access to RSV preventative treatment, increasing these babies' risk.

AfPA
Alliance for Patient Access

Clinical Pearls are published monthly.

Submission guidelines for "Clinical Pearls":

1250 word limit not including references or title page.

May begin with a brief case summary or example.

Summarize the pearl for emphasis.

No more than 7 references.

Please send your submissions to:

jhageman@peds.bsd.uchicago.edu

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COVID-19

FREE for our NICU COMMUNITY

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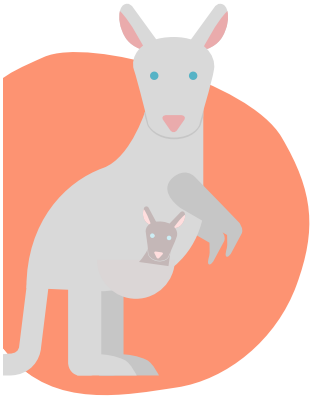
SUPPORTING KANGAROO CARE

SKIN-TO-SKIN CARE DURING COVID-19



GET INFORMED ABOUT THE RISKS + BENEFITS

work with your medical team to create a plan

GET CLEAN

WASH YOUR HANDS, ARMS, and CHEST

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

PUT ON FRESH CLOTHES

change into a clean gown or shirt.

IF COVID-19 + WEAR A MASK

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

National Perinatal Association

nicuparentnetwork.org

NPN NICU PARENT NETWORK

nationalperinatal.org/skin-to-skin

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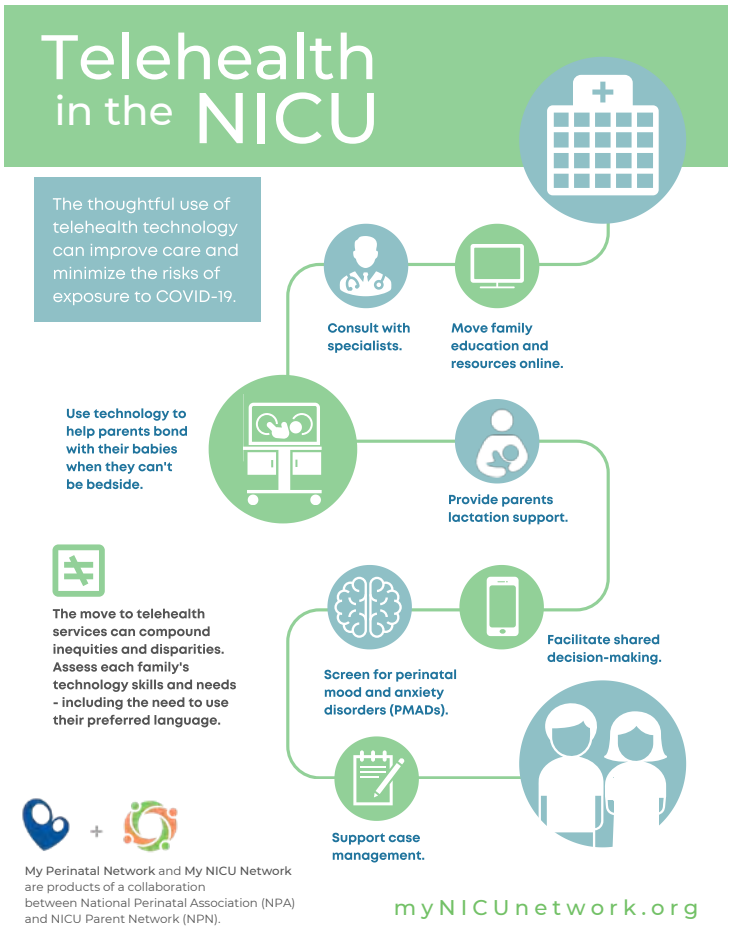

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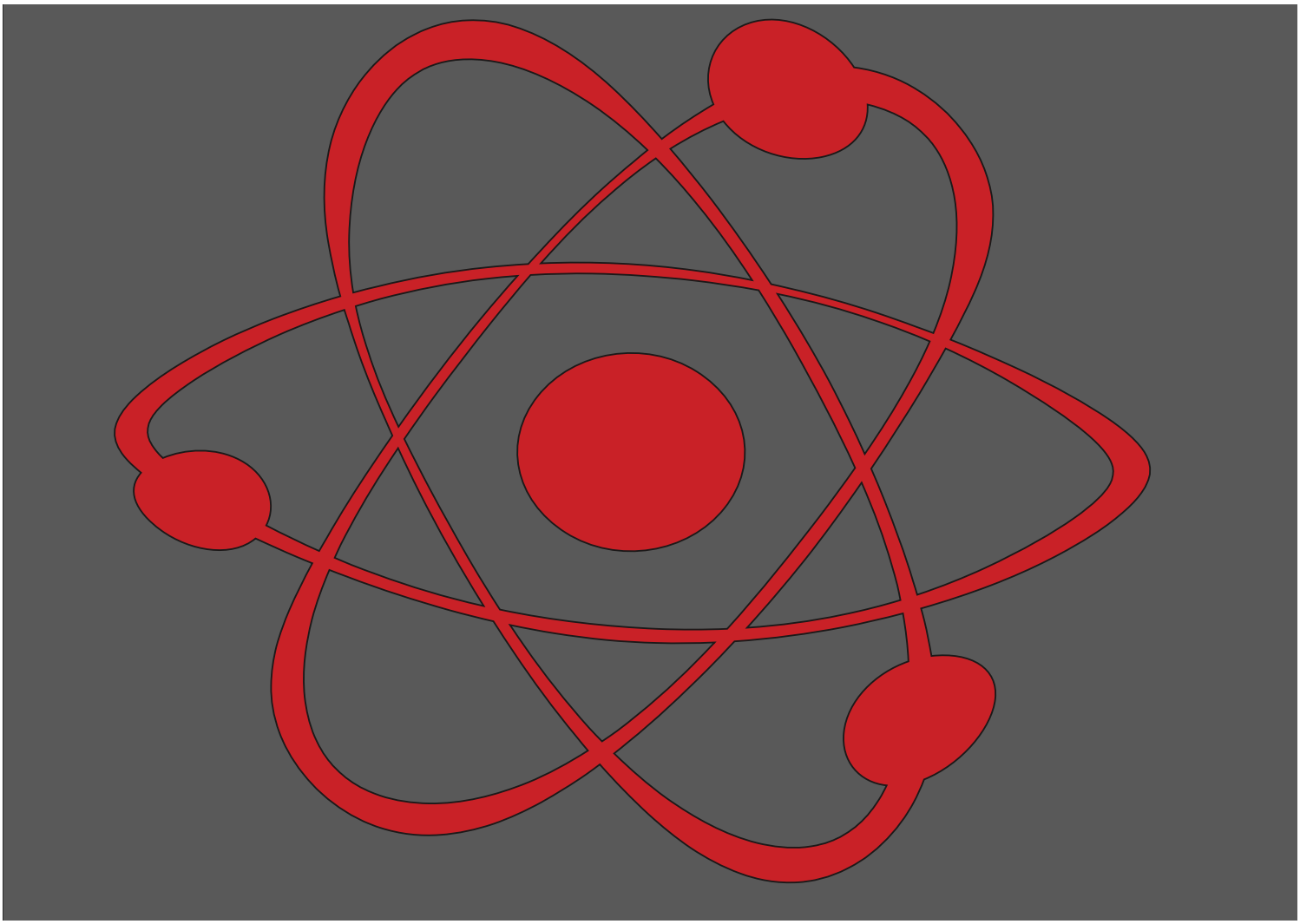

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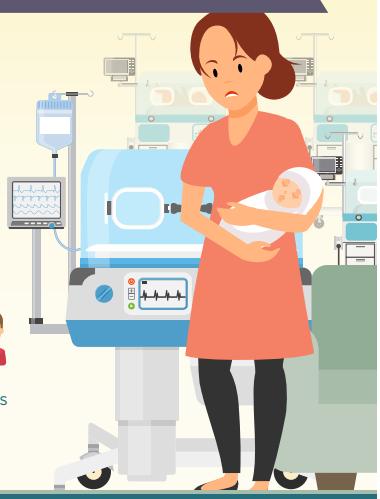
Will your PRETERM INFANT *need* EARLY INTERVENTION *services?*

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



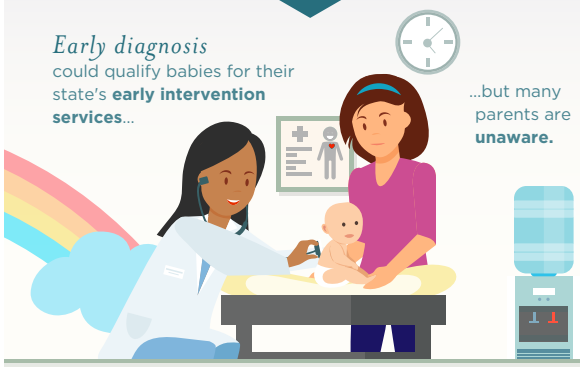
Early intervention can help preterm infants:

- 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 POSPARTO

1 DE CADA **7** MADRES AFRONTA LA DEPRESIÓN POSPARTO, *experimentando*

- Llanto incontrolable
- Sueño interrumpido
- Ansiedad
- Desplazamientos en los patrones de alimentación
- Ideas de hacerse daño a sí mismas o al bebé
- Distanciamiento de amigos y familiares

Sin embargo, sólo el 15% recibe tratamiento[1]

LA DEPRESIÓN POSTPARTO **NO TRATADA** PUEDE AFECTAR:

- *La salud de la madre*
- *El sueño, la alimentación y el comportamiento del bebé a medida que crece*[2]
- *La capacidad para cuidar de un bebé y sus hermanos*

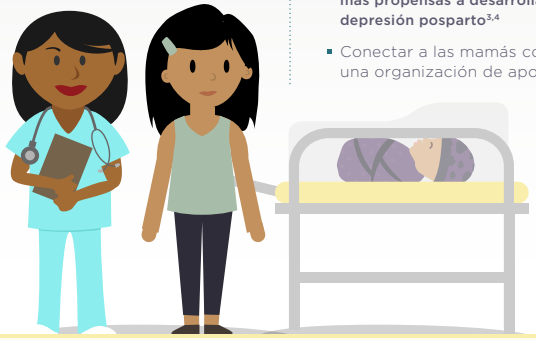
PARA AYUDAR **A LAS MADRES A ENFRENTAR LA DEPRESIÓN POSPARTO**

LOS ENCARGADOS DE FORMULAR POLÍTICAS PUEDEN:

- Financiar los esfuerzos de despistaje y diagnostico
- Proteger el acceso al tratamiento

LOS HOSPITALES PUEDEN:

- Capacitar a los profesionales de la salud para proporcionar apoyo psicosocial a las familias... **Especialmente aquellas con bebés prematuros, que son 40% más propensas a desarrollar depresión posparto**[3,4]
- Conectar a las mamás con una organización de apoyo



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[1] American Psychological Association. Accesible en: http://www.apa.org/pi/women/resources/reports/postpartum-depression.aspx
[2] National Institute of Mental Health. Accesible en: https://www.nimh.nih.gov/health/publications/postpartum-depression-facts/index.shtml
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July 13-15, 2022
https://www.eventbrite.com/e/first-fragile-infant-forum-for-integration-of-standards-hybrid-conference-tickets-337723870187

2022 American Academy of Pediatrics National Conference and Exhibition
Anaheim Convention Center
Anaheim, CA
October 7-12, 2022
https://aapexperience.org/conference-event-locations/

Once Upon a Preemie Presents
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Accelerating the Health and Racial Equity in Maternal and Neonatal Care
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Philadelphia, PA 19104
November 17th, 2022
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36th Annual Gravens Conference on the Environment of Care for High Risk Infants
The Future is Now for Babies, Families, and Systems
Sand Key, FL
March 8-11, 2023
Hold the Date

For up to date Meeting Information, visit NeonatologyToday.net and click on the events tab.

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Mitchell Goldstein, MD
Loma Linda Publishing Company
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www.NeonatologyToday.net
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LomaLindaPublishingCompany@gmail.com

Editorial and Subscription
Mitchell Goldstein, MD
Neonatology Today
11175 Campus Street
Suite #11121
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Able to read, write and speak with professional quality; use computer and software programs necessary to the position, e.g., Word, Excel, PowerPoint, Access; operate/troubleshoot basic office equipment required for the position. Able to relate and communicate positively, effectively, and professionally with others; provide leadership; be assertive and consistent in enforcing policies; work calmly and respond courteously when under pressure; lead, supervise, teach, and collaborate; accept direction. Able to communicate effectively in English in person, in writing, and on the telephone; think critically; work independently; perform basic math and statistical functions; manage multiple assignments; compose written material; work well under pressure; problem solve; organize and prioritize workload; recall information with accuracy; pay close attention to detail. Must have documented successful research administration experience focused on managing clinical trials function. Able to distinguish colors as necessary; hear sufficiently for general conversation in person and on the telephone; identify and distinguish various sounds associated with the workplace; see adequately to read computer screens and written documents necessary to the position. Active California Registered Nurse (RN) licensure preferred. Valid Driver's License required at time of hire.

The Clinical Trial Center is actively involved in many multi-center global pediatric trials, which span different Phases of research to advance health care in children. Please reach out to Jaclyn Lopez at 909-558-5830 or JANLopez@llu.edu with further interest. We would love to discuss the exciting research coordinator opportunities at our Clinical Trials Center.

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- Schedule: Full-time
- Shift: Day Job
- Days of Week: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday

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Who We Are

With over 900 beds in four hospitals, we operate some of the largest clinical programs in the nation. We also offer the only Level I Regional Trauma Center and Children's Hospital in the Inland Empire servicing the largest county in the US. We lead in many areas of excellence; pediatrics, cardiac services, cancer treatment and research, mental health, chemical dependency, and other essential clinical disciplines. All this adds up to endless possibilities for our patients and for you.

The Neonatal Intensive Care Unit (NICU) at Loma Linda University Children's Hospital is committed to providing high-quality, family-centered care with our highly skilled, multi-disciplinary neonatal team. Our unit has 84 licensed beds for the most critically ill infants and a new Tiny Baby Program focusing on improving survival and outcomes of extremely low birth weight infants (<1000g at birth). As one of the only level 3 tertiary centers in Southern California, we are equipped to provide the highest level of care for the most complex disorders. We have subspecialists in all medical and surgical areas that are available at all times and are supported by hospital staff with technical, laboratory, and service expertise.

At Loma Linda University Health, we combine the healing power of faith with the practices of modern medicine. We consist of a University, a Medical Center with four hospitals, and a Physicians Group. These resources have helped us become one of the best health systems in the nation.

Contact Us

Please visit our website **http://careers.llu.edu** or contact Jeannine Sharkey, Director of Advanced Practice Services at jsharkey@llu.edu or (909) 558-4486.

LOMA LINDA UNIVERSITY HEALTH

If you are an individual who understands and embraces the mission and purpose of Loma Linda University and its entities as premier Seventh-day Adventist Christian institutions, please visit our website or call 1-800-722-2770. EOE/AA/M/F/D/V

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Andrea Schwartz Goodman

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https://www.nc3rs.org.uk/arrive-guidelines

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Neonatology and the Arts

This section focuses on artistic work which is by those with an interest in Neonatology and Perinatology. The topics may be varied, but preference will be given to those works that focus on topics that are related to the fields of Neonatology, Pediatrics, and Perinatology. Contributions may include drawings, paintings, sketches, and other digital renderings. Photographs and video shorts may also be submitted. In order for the work to be considered, you must have the consent of any person whose photograph appears in the submission.

Works that have been published in another format are eligible for consideration as long as the contributor either owns the copyright or has secured copyright release prior to submission.

Logos and trademarks will usually not qualify for publication.

This month we continue to feature artistic works created by our readers on one page as well as photographs of birds on another. This month's original artwork features Paula Whiteman, MD who graces us with Flowers in a Vase. Our bird of the month is a Flamboyance of Flamingos by Larry Tinsley, MD.

Herbert Vasquez, MD,
Associate Neonatologist, Queen of the Valley Campus
Emanate Health, West Covina, CA
VasquezH1@gmail.com

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Manuscript Submission: Instructions to Authors

1. Manuscripts are solicited by members of the Editorial Board or may be submitted by readers or other interested parties. Neonatology Today welcomes the submission of all academic manuscripts including randomized control trials, case reports, guidelines, best practice analysis, QI/QA, conference abstracts, and other important works. All content is subject to peer review.

2. All material should be emailed to: LomaLindaPublishingCompany@gmail.com in a Microsoft Word, Open Office, or XML format for the textual material and separate files (tif, eps, jpg, gif, ai, psd, or pdf) for each figure. Preferred formats are ai, psd, or pdf. tif and jpg images should have sufficient resolution so as not to have visible pixilation for the intended dimension. In general, if acceptable for publication, submissions will be published within 3 months.

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

Please submit your manuscript to: LomaLindaPublishingCompany@gmail.com

NICU Baby's Bill of Rights

1- The Right to Advocacy
My parents know me well. They are my voice and my best advocates. They need to be knowledgeable about my progress, medical records, and prognosis, so they celebrate my achievements and support me when things get challenging.

2- The Right to My Parents' Care
In order to meet my unique needs, my parents need to learn about my developmental needs. Be patient with them and teach them well. Make sure hospital policies and protocols, including visiting hours and rounding, are as inclusive as possible.

3- The Right to Bond with My Family
Bonding is crucial for my sleep and neuroprotection. Encourage my parents to practice skin-to-skin contact as soon as and as often as possible and to read, sing, and talk to me each time they visit.

4- The Right to Neuroprotective Care
Protect me from things that startle, stress, or overwhelm me and my brain. Support things that calm me. Ensure I get as much sleep as possible. My brain is developing for the first time and faster than it ever will again. The way I am cared for today will help my brain when I grow up. Connect me with my parents for the best opportunities to help my brain develop.

5- The Right to be Nourished
Encourage my parents to feed me at the breast or by bottle, whichever way works for us both. Also, let my parents know that donor milk may be an option for me.

6- The Right to Personhood
Address me by my name when possible, communicate with me before touching me, and if I or one of my siblings pass away while in the NICU, continue referring to us as multiples (twin/triplets/quads, and more). It is important to acknowledge our lives.

7- The Right to Confident and Competent Care Giving
The NICU may be a traumatic place for my parents. Ensure that they receive tender loving care, information, education, and as many resources as possible to help educate them about my unique needs, development, diagnoses, and more.

8- The Right to Family-Centered Care
Help me feel that I am a part of my own family. Teach my parents, grandparents, and siblings how to read my cues, how to care for me, and how to meet my needs. Encourage them to participate in or perform my daily care activities, such as bathing and diaper changes.

9- The Right to Healthy and Supported Parents
My parents may be experiencing a range of new and challenging emotions. Be patient, listen to them, and lend your support. Share information with my parents about resources such as peer-to-peer support programs, support groups, and counseling, which can help reduce PMAD, PPD, PTSD, anxiety and depression, and more.

10- The Right to Inclusion and Belonging
Celebrate my family's diversity and mine; including our religion, race, and culture. Ensure that my parents, grandparents, and siblings feel accepted and welcomed in the NICU, and respected and valued in all forms of engagement and communication.

Presented by:

NPN
NICU PARENT NETWORK

NICU Parent Network

Visit nicuparentnetwork.org to identify national, state, and local NICU family support programs.

*** The information provided on the NICU Baby's Bill of Rights does not, and is not intended to, constitute legal or medical advice. Always consult with your NICU care team for all matters concerning the care of your baby.**

@drpaulawhitepad


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