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The Impact of SARS CoV-2 on Children and Adolescents

Alexandra Clark, MD

Abstract:

The impact of SARS CoV-2 on children and adolescents is frequently dismissed as less of a burden than the disease in adults. And while the percentage of severe illness in this age range is less than the percentage of severe disease in patients over 65 years old, the impact goes well beyond the physical burden of disease. Educational losses, caregiver loss, and the emotional burden of the pandemic will be elements whose full impact will not be known for likely decades to come.

"As of November 18, 2021, almost 6.8 million children and adolescents have tested positive for SARS CoV2, representing 17% of all reported cases. (1) This number is certainly lower than the number of infected children as early on, the ability to test children was limited, and many households reported that they did not test symptomatic children in the household when adult members of the home tested positive."

Physical Burden of Disease:

As of November 18, 2021, almost 6.8 million children and adolescents have tested positive for SARS CoV2, representing 17% of all reported cases. (1) This number is certainly lower than the number of infected children as early on, the ability to test children was limited, and many households reported that they did not test symptomatic children in the household when adult members of the home tested positive. Unfortunately, the Delta variant wave increased the case report to 8,641 cases per 100,000 children in the population, which is a number that has doubled since March 2021. (2)

The presenting symptoms of SARS CoV-2 in children and adolescents are broad and touch most organ systems. Respiratory and Cardiac symptoms lead to children requiring pediatric ICU care (3), while children requiring acute, non-ICU level care have had the full spectrum of symptoms from being admitted for other etiologies and incidentally covid positive to severe covid pneumonia. Children have been 1.7%-4.2% of total reported hospitalizations, and between 0.1%-2.0% of all children, COVID-19 cases resulted in hospitalization. Over time we have seen the percentage of children testing positive becoming a higher percentage of the total positive tests, and for the week ending November 18, children were 25.1% of reported weekly COVID-19 cases, yet children under age 18 make up only 22.2% of the US population. (2)

There has been much reported in the news of a small number of myocarditis cases after the mRNA vaccine, especially in men 16-29 years of age. Getting live SARS CoV2 infection/COVID-19 was associated with 11 more events of myocarditis/100,000 people compared to 1.2 - 2.7 cases/100,000 in those receiving the vaccine, still favoring the choice to vaccinate. Men in the highest age range risk should consider if a non mRNA vaccine is preferred based on their health assessment with their physician. (4, 5)

While many children are fortunate to suffer asymptomatic or mild disease, they are at risk for developing Multisystem Inflammatory Syndrome in Children (MIS-C) post-SARS CoV-2 infection. This postinfectious inflammatory process presents with serum markers of inflammation, like elevated CRP or ferritin, and clinical symptoms of fever, gastrointestinal symptoms, lymphadenopathy, rash, mucocutaneous lesions, and in more severe cases, hypotension and shock. Not all children present the same, and other clinical symptoms are possible. The majority of patients have serum lab evidence of cardiac damage, and some have fulminant cardiac dysfunction, myocarditis, or acute kidney injury. To date, 5,973 children have met the criteria for MIS-C with a median age of 8 years old. Fifty-two children have died from MIS-C, with many others requiring prolonged ICU care, IVIG, IV glucocorticoids, or Anakinra, along with outpatient follow-up. Children of Hispanic/Latino or Black, Non-Hispanic race/ethnicity were disproportionately impacted, making up 60% of the reported cases. (6-8)

" If the average age of death in America in 2020 was 77.8 years and the current estimate of years lost per child death is 68.8 years, then the death of these children accounts for 43,344 lost years of life. (9, 10) These are graduations and weddings never celebrated, new children not being brought into the world, and discoveries, inventions, and art not being found, developed, or created."

Pediatric deaths from COVID-19 are rarer than deaths in older adults, yet their impact is arguably more significant in lost potential. Six hundred thirty deaths under 18 years old have been reported due to COVID-19. If the average age of death in America in 2020 was 77.8 years and the current estimate of years lost per child death is 68.8 years, then the death of these children accounts for 43,344 lost years of life. (9, 10) These are graduations and weddings never celebrated, new children not being brought into the world, and discoveries, inventions, and art not being found, developed, or created.

Educational Burden from Disease:

There is no doubt that the best interest of public health was considered when from March 2020 thru August 2021, nineteen thousand schools closed to in-person learning affecting 12 million students in all 50 states. Yet, we cannot overlook the impact of learning

loss, and we must plan a robust intervention to overcome this loss. Learning loss is defined as knowledge or skills that students forget while they are not in school for extended periods and also encompasses the gap in knowledge or skills that students would have learned in a "normal" year but did not learn. Stanford University's Center for Research on Education Outcomes estimated learning loss in math and reading during the 2019-2020 school year for 17 states, the District of Columbia, and New York City. While estimated learning losses varied based on historical school performance and student profiles, students in Illinois lost the greatest in math, an estimated 232 days of school learning, and students in South Carolina lost 183 days in reading. (11) These losses do not consider the further losses in the 2020-2021 school year. Add to that the 9,313 schools over 916 districts that have unexpectedly closed since reopening in August 2021 due to outbreaks, staff or teacher shortages, and mental health concerns, and it is evident that this problem is not over. (12)

School shutdowns have made existing inequity of learning worse, as students of color are estimated to have lost twice as much as their white peers during the pandemic. (13) Libby Pier's group evaluated the CORE data collaborative where 18 school districts report California state MAP and STAR assessment results and found significant learning loss in both English Language Arts (ELA) and Math over the period from fall 2019 to fall 2020 compared to the three prior years. Socioeconomically disadvantaged students (SED) or English language learner (ELL) status were disproportionally impacted. For example, 5th graders classified as SED had a loss of STAR scale points in math of almost twice those not classified as SED, and 7th-grade students classified as ELL learners had approximately a four-fold loss in ELA compared to their English-speaking peers. Access to reliable wifi, home computer, or family members to assist all contributed to the widened gap for these learners. (14) In addition to these populations, children with special needs, homeless, and foster youth were farther behind than their age-matched peers with chronic absence playing a role. The impact on learning from food and housing insecurity cannot be undervalued. Children who are calorie deficient or afraid for their safety cannot learn. Black and Latino families in the US are twice as likely to face food insecurity, and women from these groups were more than twice as likely to have lost their job during Covid-19 pandemic lay-offs. (15)

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Critical milestones occur in education related to proficiency in reading and math. The reading skills of retelling stories, asking and answering questions are foundational and learned in kindergarten and first grade. Learning these skills prepares students for more in-depth reading skills to learn to read in K-3 and read to learn starting in the 4th grade. The percentage of kindergartners and first graders not on target to learn to read almost doubled from 28% to 47% and from 26% to 43% from 2019-20 to 2020-21, respectively. Again, children of color are disproportionately affected, with 54% of Black and 59% of Latino kindergartners not on track for reading in 2020-21. Without additional support, all children who are behind in reading in grade one will have a 90% chance of remaining a poor reader, and children with poor reading skills at the end of the third grade are four times less likely to graduate from high school and six times less likely if they are SED. (13, 16, 17) With respect to math skills, algebra is considered the foundational math milestone and should be mastered no later than the end of ninth grade. According to the CA State Accountability Report Card, in the 2018-19 California school year, Black and Latino eighth grade students were 12% and 24% respectively on track for math compared to 52% of their white peers. State testing for this age range did not occur in the 2020-21 school year, so the impact of learning loss is yet to be fully understood, but if the data related to elementary school learning loss is applied, we could be looking at or more than a full years' loss of math skills in this grade level.

In California, nearly 1 in 5 elementary school children missed >10% of school in the 2020-2021 school year, which is the percentage that defines chronic absence and that up to 1.5 million students are disconnected because of a lack of reliable internet or computer. Students with special needs were impacted due to poor access to assistive devices for learning and online platforms being non-conducive to students with visual or auditory loss. It is estimated that almost 3 million of the most marginalized students across the US have disengaged from school. In the Spring of 2020, nationwide, only 60% of low-income students regularly participated in their online school activities compared to 90% of high-income students. When students miss school and fall behind, they become disengaged, frustrated, and more likely to fail courses and drop out of school. Only approximately 30% of students who drop out will re-enroll in school, and of those, only 18% graduate from high school. (13) In addition, California saw its most significant drop in Spring 2021 college enrollment, which was down 5.3% and more heavily weighted towards community colleges. National fall enrollment is running 2.6% below last year with an astounding 7.8% drop overall and a 15% drop for community colleges since 2019. (18) This is alarming as community colleges serve a higher proportion of disadvantaged students and students of color, further widening income potential and job security.

Emotional Burden of Disease:

Rightfully so, attention has been given to the increased levels of emotional distress that our country and the world have endured since the pandemic's start. Unfortunately, children and teenagers have been far from protected from this impact. The psychological impact on children includes their worry about sick parents or caregivers, worry about becoming sick themselves, worry about where their next meal will come from, witnessing the anxiety of adult caregivers, and dealing with the loss of a primary caregiver. In addition, they have been separated from the protecting factors of socialization in school and extramural activities and have experienced higher levels of online bullying and the loss of monumental milestones, like prom and graduation celebrations.

With over 779,000 Covid-19 deaths in the United States, it is estimated that more than 140,000 children here have experienced the loss of a parent or primary care grandparent, with more than 1.5 million children worldwide experiencing this loss. (19, 20) This

figure represents a 20% increase in parent loss over pre-Covid-19 years. California, Texas, and New York have suffered the highest total numbers of caregiver loss, but racial and ethnic populations are suffering high numbers clustered in certain states. New Mexico, Texas, and California reported that 49-67% of caregiver loss were Hispanic, while Alabama, Louisiana, and Mississippi reported 45-57% were black. Montana, New Mexico, and South Dakota report a high percentage of Native American and Alaskan Native caregiver loss. (21) Predictability is a stabilizing force for children and adolescents, and youth are in a critical period of neurodevelopment. So significant disruption in this predictability brings a significant challenge for children. Pre-Covid work has informed us of the deep impact of caregiver loss on children. These children are at increased risk of traumatic grief, depression, poor educational outcomes, unstable housing, poverty, and suicide or unintentional death. (20, 22) Unfortunately, this increase in caregiver loss for our children during the pandemic is occurring at a time of social isolation and economic hardship that may leave many children who experience the death of a primary caregiver without the necessary bereavement support.

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The world has struggled with the unknown that the pandemic has brought rising levels of anxiety and depression. That effect has been felt deeply in the pediatric world as well. Multiple studies have been published validating the impact, but sometimes the voice of the children speaks the loudest. One online questionnaire queried 359 children and 3,254 adolescents aged 7 to 18 years and found that 22.3% of youth had scores indicative of clinical depressive symptoms with the baseline estimated prevalence pre-covid of 13.2%. (23) Another administered PHQ-9 and GAD-7 in >8,000 Jr and Sr High School students and found 43% with depressive symptoms and 37% with anxiety. Knowledge of protective measures against covid correlated with fewer symptoms and youth who had a family member or friend with COVID-19 had higher anxiety levels than those who did not. When looking at specific symptoms, the most frequently observed changes were difficulty concentrating (76.6%), boredom (52%), irritability (39%), restlessness (38.8%), nervousness (38%), loneliness (31.3%), uneasiness (30.4%), and worries (30.1%). (24) In addition, about 75% of parents reported feeling stressed about the quarantine situation, and we know that children are affected by the stress levels they observe in their home environment. Even more concerning, a study by Loades showed that social isolation and loneliness increased the risk of depression up to 9 years later and that the duration of loneliness was more strongly correlated than the intensity of the loneliness, further making us concerned about the future for our children. (22)

An additional burden felt in the pediatric world is the increased level of children and adolescents presenting with eating disorders requiring hospitalization. Pre-pandemic, the pediatric world saw an increasing number of children presenting with eating disorders, and the age was skewing younger. Eating disorders often stem from an attempt to control an area and encompass a complex relationship with food. Food insecurity and panic buying, social isolation, loss of routines, and the social media bullying about weight gain that have occurred with the pandemic are elements that have promoted the societal setup for eating disorders. The UK National Health Service has seen an almost doubling of urgent and routine referrals for eating disorders. (25) In our experience at Loma Linda University Children's Health, the six months from 3/1/21 to 8/31/21 has seen a threefold increase from the same 6-month blocks in the previous two years with frequent co-morbidities of anxiety or depression. (26) To work to stem this flood, we must normalize our children's emotions without an unhealthy focus on the loss of control and seek early support when symptoms arise. With our national shortage of pediatric therapists, the burden will fall on primary care providers to have close follow up with these children. Fortunately SAMHSA is working within their strategic plan to increase mental health support but the barriers of not enough total workforce or diversity in the mental health workforce are not factors that can be rapidly corrected.

Vaccine Hope:

Since the pandemic's start, the scientific response worldwide for collaborative vaccine solutions has been rapid and impressive. Vaccines are a safe and reliable preventative measure against deadly diseases. In comparison to covid, other vaccines recommended for routine vaccination had much lower death rates than we have seen in covid. The meningococcal vaccine was recommended after seeing eight deaths in 11-18-year-olds between 2000 and 2004, while rotavirus caused 20 deaths in children under five between 1985 and 1991. (27, 28) Currently, in the United States, Pfizer - BioNTech have approved vaccines for ages five and up, and by December 6, 4.8 million children from 5-11 years old have received one dose, and 1.2 million children have been fully vaccinated without any severe side effects reported. In the 12-17 year population, 61.5% have received at least one dose, and 51.7% are fully vaccinated. According to the CDC, using a benefit accrual assumption over six months and the recent incidence in this age range, it is estimated that for every million doses in children 5-11 years old, more than 114,000 cases, 417 hospitalizations, 260 cases of MIS-C, and 132 PICU admissions could be avoided. (29) It is important to note that vaccinating our children goes beyond protecting the child themselves to include vulnerable members of their family and the community, making a return to normal activities safer for all. Moderna has submitted data from their 12-17-year-old trial, and the FDA is likely to rule in January 2022. In addition, trials for Johnson and Johnson, Moderna, and Pfizer-BioNTech are ongoing down to 6 months of age and in pregnant women, with data expected in 2022.

"Many have discussed the pros and cons of natural immunity versus vaccine immunity. Surviving an infection with SARS CoV-2 has been shown to create variable neutralizing antibody levels with people under 30 who recovered from moderate COVID-19 having lower levels than older people, suggesting that they are at greater risk for a second infection. (30)"

Many have discussed the pros and cons of natural immunity versus vaccine immunity. Surviving an infection with SARS CoV-2 has been shown to create variable neutralizing antibody levels with people under 30 who recovered from moderate COVID-19 having lower levels than older people, suggesting that they are at greater risk for a second infection. (30) Infections with SARS CoV-2 cause the immune system to produce virus-specific antibodies as well as memory B cells to assist with protection from a second infection. While research is still ongoing to understand how antibodies wane over time in both vaccinated and in people with prior infection, data shows that vaccination in people with prior infection is a safe and vital step in decreasing the chance for future disease. In October 2021, the CDC showed that those who were unvaccinated and had a recent COVID-19 infection were five times more likely to have COVID-19 again than those who were recently fully vaccinated and had not had a prior infection. More importantly, prevention against hospitalization and death continues to be strong in vaccinated compared to unvaccinated people worldwide. In country-specific data released by the University of Oxford, Americans are 13 times more likely to die if unvaccinated, with significantly different rates between vaccinated and unvaccinated people in the UK, Chile, and Switzerland. (31) Vaccines are making a difference in severe infection rates and death. However, the data alone seems unlikely to sway the remaining vaccine-resistant population making future infection waves inevitable if we cannot find ways to make vaccine-hesitant and resistant people more accepting of vaccine science.

"The initial impact from the first 21 months of the pandemic has been devastating, but the effects and total impact are still unknown. It is upon all of us to rally around our children to lessen the future impact by encouraging vaccination, improving mental health resources, and investing in learning catch-up strategies."

Conclusion:

SARS CoV-2, as the novel coronavirus causing COVID-19, has made a significant impact on the health and well-being of our pediatric population. It has caused acute illness, postinfectious MIS-C, death, and emotional and psychological burden on our children, along with academic learning loss. The initial impact from the first 21 months of the pandemic has been devastating, but the effects and total impact are still unknown. It is upon all of us to rally around our children to lessen the future impact by encouraging vaccination, improving mental health resources, and investing in learning catch-up strategies.

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28th Annual Cool Topics in Neonatology
March 4 -6, 2022
Coronado Island Marriott Resort, Coronado, California

CAN Abstract Submission Deadline - Monday, January 24, 2022

The 28th Annual Cool Topics in Neonatology Conference will be hosting the 2022 Cool Topics in Neonatology Poster Session on Friday, March 4, 2022 at the Coronado Island Marriott Resort. The approved posters will be available for our attendees to view during the CAN Poster Session being held from 4:30 pm – 6:00 pm. Authors and presenters are expected to be available for questions during this time.

Neonatal fellows, faculty, and individuals or teams engaged in improving the quality of newborn care are welcome to submit an abstract. We encourage the submission of abstracts which are of general interest to neonatologists. In addition, abstracts which report team-based quality improvement projects are also accepted. Work may have been presented in other academic settings but should not have been published before the date of the presentation. Registration in the Cool Topics in Neonatology Conference is required to submit a poster. To register for Cool Topics 2022 or the CPQCC Improvement Palooza 2022, please click here.

Abstract Submission Instructions

To submit your CAN abstract, please email Danny Chambers, Program Manager, at DChambers@mednet.ucla.edu. Please ensure your email subject line reads "CAN Abstract Submission." Your file name should follow the following syntax "LastNameFirstName_CAN2021" (ex: DoeJohn_CAN2021).

The Abstract Submission Deadline is Monday, January 24, 2022. A review process will be completed. Acceptance decisions will be released by **Monday, February 14, 2022**. A handful of abstracts will be chosen to present during the symposium. Authors selected for this additional presentation will be notified by **Friday, February 18, 2022.**

The suggested structure of the abstract should be less than 400 words, fit a single page with the title, author information, introduction, methods, and results. The presenting author should be identified with an asterisk (*).

Quality improvement projects should follow either Standards for Quality Improvement Reporting Excellence (SQUIRE) guidelines with background, objective, design, setting, patients, intervention, measurements, results, limitations and conclusions as suggested headings. Alternatively, the Vermont Oxford Network (VON) learning fair structure with background, smart aim, setting, mechanisms, drivers of change, methods, measures, results, discussion, and team acknowledgement will also be accepted.

*Note: Submitting an abstract does not include registration for the Cool Topics in Neonatology Conference.

For more information on the Cool Topics in Neonatology Conference, please click here. To reserve your room at the Coronado Island Marriott Resort, please click here

Thank you so much and we look forward to your submission!

Best regards,

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Disaster Series: The Abrupt NICU Evacuation – Disasters without a Plan

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

Abstract:

An abrupt disaster brings the environment physically into the NICU. We describe immediate evacuation measures taken because of a ruptured water pipe, hospital fire, unexploded WWII bomb, and two earthquakes. These abrupt changes thrust the Neonatologist into an environment with new structures, rules, and threats. The intruding environment dictates actions at first as the Neonatologist addresses safety for the neonates and staff while continuing medical care for the infants. The environment has just become the pathology, a new comorbidity. Operations during abrupt change mean the Neonatologist must hand off direct minute-to-minute care for the neonates, trust staff, then begin the more demanding work of figuring out next and future steps. Personal stress and fear responses must be modulated while supporting staff during the uncertainty. While these events at first appear disparate, they share the common problem of rapid movement of neonates to safety, ensuring the safety of infants and staff while solving problems embedded in a threatening environment. Faced with an abrupt environmental threat, we must maintain awareness that disaster and medical professionals will not appreciate the unique responses of the neonate to the raw environment. We must accept and rely on our colleagues' strength, fortitude, and creativity in the NICU to resolve problems embedded in the environment.

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Introduction

An abrupt disaster brings the external environment physically into the NICU environment (1, 2). The environment acts as a pathology directly affecting the neonate and as a comorbidity complicating medical care (3). This article describes immediate evacuation measures for infants due to a ruptured water pipe, hospital fire, unexploded WWII bomb, and earthquakes.

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Abrupt change thrusts you into a physical environment with new structures, rules, and threats. You are also thrust into a system of multiple, distinct disaster infrastructures that arise from pre-existing infrastructures – emergency and disaster transport and operations while you strive for continuity of neonatal care. When misunderstood, the disaster infrastructure can quickly become your difficulty rather than enabling your success (2).

The brain responds to abrupt change immediately through the amygdala by creating and retrieving emotional memory. Not memory in the sense of recall, but memory with strength drives behavior and thought. Working in dangerous contexts, the individual comes to control the more common situations, an ability created in slack times and controlling one's temper. Those who become angry from frustration during routine operations are not fully trusted in situations with a dangerous context (4).

This place is the liminal zone, where we feel we do not belong. Cold air entering the NICU. The lack of lighting. The silence. Relying on learned behaviors or models unproven in a dangerous environment can become deadly (5-7). It is easy to assume that the stress will disrupt thinking or that protocols, lists, and leadership will move the unit through events.

On the contrary, certitude and specialized knowledge are less predictive than doubt and generalizable knowledge (8). Experts following the rules perform poorly (9-11). Discrete concepts and standardized protocols cannot align with continuous perceptions and interacting elements in flux (12), and we cannot disregard the necessary functions of stress and fear (13). Stress develops from novelty, uncertainty, and uncontrollability, while fear responds to the proximity of threat (14).

Neonatologists encountering abrupt changes will neurologically reset what they had learned, effectively starting anew, though some will resist these changes. This neurologic process appears mediated by norepinephrine (NE) and the locus coeruleus (LC) (15-17). Under severe stress, the LC impairs top-down attentional control while enhancing sensory functions, sending interrupt signals to disengage from current task sets. Quick adaptation comes about by rearranging network activity, including enhancement of the dopamine salience network. The NE-LC stress response drives a reallocation of neural resources toward attentional reorienting, vigilant perceptual intake, and autonomic-neuroendocrine control (18). The NE-LC system is how we think under severe stress.

The environment becomes the pathology that will most quickly kill the infant in the moment of change. The Neonatologist begins 'treating' the team and the NICU as the means to treat all infants in the NICU (1). From this 'outside' frame of reference, the Neonatologist surveys for the environment impinging on care while maintaining vigilance for those flurries of activity indicating disruption of that care. Decision and authority migrate to bedside staff, freeing communication for only those situations requiring the Neonatologist. *The high or mutual trust component of Lean (19), Keiretsu* connects the Neonatologist and staff for early notification of disruptions and support for decisions and actions. This component can occur within existing scopes of practice.

At the moment of abrupt change, the Neonatologist cannot select which rules apply and which do not, nor can the Neonatologist begin selecting new protocols and algorithms. The NICU becomes an open system that interacts with other, often nonmedical, systems and infrastructures such as FEMA, EMS, the fire department, and the air traffic control system. For the *Neonatology Today: Disaster Series,* we present High Reliability *Organizing* to continue operations across the gulf created by these abrupt changes to form an effective response toward High-Reliability *Operations*.

"At the moment of abrupt change, the Neonatologist cannot select which rules apply and which do not, nor can the Neonatologist begin selecting new protocols and algorithms. The NICU becomes an open system that interacts with other, often nonmedical, systems and infrastructures such as FEMA, EMS, the fire department, and the air traffic control system."

Operations at Abrupt Change

One of the first things taught for fire rescue ambulance operations is surveying the scene before physically treating patients. The rookie too quickly stops at the first seriously injured or most anguished victim without realizing worse can be just out of sight. Triage is the first of a continuous series of movements, and the most challenging step is to leave a patient alone that you had just evaluated. There is no looking back, rechecking, and re-evaluation. It is the subtle part of triage – not only deciding but acting by leaving a patient in serious need for another more seriously ill or injured patient (DvS, personal experience). In Paris, France, physicians staff EMS in the field (SAMU, *Service d'Aide Médicale Urgente* or Urgent Medical Aid Service). At a terrorist incident, physicians are taught to step over the first body they encounter. Physically step over the body. This breaks any contact with the victim. Otherwise, as a physician, they have the drive to treat each patient rather than care for the group of victims in front of them (Pierre Carli, MD, medical director, SAMU of Paris, personal communication). The firehouse saying applies here, "When the captain picks up a firehose, he's no longer a captain, he's a firefighter."

The Neonatologist continues treating the neonates through the abrupt change but in a different manner. One of the authors (DvS) experienced five children admitted to the PICU in overlapping succession over about an hour. The author assigned an objective for each RN and RCP with several ways to reach the objective. One RN could manage continuously dropping blood pressure following a prolonged operation; an RN and RCP could manage mechanically ventilated reactive airway disease with an acute CO_2 about 100 mm Hg; a nurse practitioner, RN, and RCP could manage a newly transferred infant with a diaphragmatic hernia; the pediatric resident and RN could manage inotropic and fluid support for early sepsis; plus, an RN and RCP could manage another somewhat "minor" emergency. This process allowed the author to move amongst the patients freely, observe the team performance, therapy responses, and adjust objectives.

The Neonatologist modulates personal stress and fear responses (4, 13), recognizing that showing fear reactions will weaken everyone. However, this does not mean to decontextualize, misplace abstractions as concreteness, or suppress the affective domain, a common error that shifts the person's thinking from being a participant-operator in context to a spectator relying on abstractions (1, 19, 20). No one feels alone. To feel supported at the moment is a more powerful force than we give credit. Vigilance for early heralds of stress or fear reactions allows the Neonatologist to support individuals and give meaning to their actions. This makes visible the beneficial consequences of the individual's actions. Having a positive impact develops and reinforces prosocial behaviors (21), assisting leaders in maintaining motivation and finding meaning in their experiences (22-25).

"It's not your emergency." When a fire medic or rookie firefighter became too involved with the victim, from one author's (DvS) experience, a veteran would tell them, "It's not your emergency." The rookie was not injured; the rookie did not lose anything. The rookie did not start the fire or build the swimming pool. This distancing underscores that we were there to help those who could not help themselves, the mantra the fire service held close. While they did not make the problem, their presence let the citizens know the process has stopped, that someone was there to help. For staff in the NICU, their presence represents all humanity – the family is not alone.

"While they did not make the problem, their presence let the citizens know the process has stopped, that someone was there to help. For staff in the NICU, their presence represents all humanity – the family is not alone."

The Neonatologist does not treat the team psychologically; instead, the Neonatologist reframes the situation, decomposes objectives, identifies stress and fear reactions, and gives meaning to events and actions (22, 23). There are no 'errors' in a disaster (26). An error for the HRO is transient because it reveals gaps in knowledge that serve as a sign for continual engagement. In the entropic, stochastic environment (27), a decision becomes a cycle of reciprocal decisions and actions for 'error identification and correction' that also corrects heuristic bias (28). Motor cognition emerges from error engagement as 'thinking by acting' to generate information and structure even as the activity itself reduces the maladaptive effects of stress and blunts the feeling of fear (29, 30). By becoming motor cognition, decision making reduces the maladaptive stress responses (14)

Within the turmoil, the distance gained by standing back allows the Neonatologist mental room to reframe the situation for staff, decompose objectives for decision making, and plan in real-time

toward the desired end-state (28). The Neonatologist will be the first to tell people, "You can do it."

How the individual classifies or frames and gives meaning to events and actions has serious ramifications (31). The ability to make meaning of traumatic and stressful experiences, death awareness, and 'mortality salience' promotes a positive growth state and resilience and can mitigate post-trauma stress and feelings of 'burnout' (25, 32, 33).

Leadership had occurred long before the disaster (34, 35) and has now freed the Neonatologist to care for the neonates as a group, to support staff psychologically and to develop improvisations, move to protect the NICU, organize the safe evacuation of infants and staff, and develop information for parents of the circumstances.

We reviewed published accounts containing first-person experiences (36-38). From these articles, we extracted and collated the actions and words of participants. Rather than listing models and tools that the participants stated they had used, we describe *how* they used the models and tools. This understanding follows James P. Spradley's description of culture – *how* people use social knowledge to interpret the world (39).

"Rather than listing models and tools that the participants stated they had used, we describe how they used the models and tools. This understanding follows James P. Spradley's description of culture – how people use social knowledge to interpret the world (39)."

People use social knowledge to enact future states (40), critical processes for the event that abruptly collapses our sensemaking (31). Looking at the actions described in this paper as an outsider facilitates the "I wouldn't have done that" response. This reaction is not hindsight but a thoughtful discourse to reach an effective conclusion. What that approach lacks is one of the necessary High-Reliability Organizing (HRO) values identified by two of the authors (DvS and TAM) as necessary to make HRO operational (34). "That could be me."

Internal Flooding from a Ruptured Water Pipe (41)

A water pipe break caused flooding of the floor above a NICU and Immediate Care Unit (IMC) with 26 premature and newborn babies. Eight minutes after the break, a strong water flow on the floor began dripping through the ceiling onto incubators, medical devices, and ventilators in the NICU below. Water flow alarms notified the fire department, who arrived nine minutes after the break. The hospital emergency team was alerted and reached the NICU 35 minutes after the first alarm. Five minutes after arriving, the senior Neonatologist decided to evacuate the NICU.

The Neonatologist and emergency team needed to find accommodations for the infants and a means to transport the infants as gently as possible. They discarded evacuation to external clinics because nearby centers could not quickly accept that many patients, there were only three ventilator-capable transport incubators available, and the necessary transport time would delay the evacuation of some infants.

The Neonatologist and Chief Anesthesiologist identified internal bed availability: the central operating recovery room equipped for intensive care, the PICU, and the Infant Unit on the 6th floor.

The Neonatologist changed the status of nine spontaneously breathing NICU infants to 'infant status.' Staff then moved the nine infants to the infant station on the 6th floor of the same building. While evacuation plans include methods to take infants *down* a stairway rapidly, these infants had to be carried up the stairway because water had penetrated the elevator shafts, rendering the elevators inoperable. Evacuating *upwards* required different techniques, which they developed in the moment.

Basement corridors connect buildings on the campus. The team selected foot transport for travel rather than the use of vehicles. Because the corridors are not regularly used, the fire brigade and security service investigated passageway conditions for travel. They judged that the premature babies could be moved in their mobile incubators.

For the ventilated infants, the Chief Anesthesiologist evaluated the anesthesia recovery area to ensure safe transport, sufficient staff to provide care, and 'warm packs' as a heat supply for the incubators. They would use the special transport ventilators and avoid vibrations by moving very carefully and slowly.

For the safety of the infants, the team secured catheters and endotracheal tubes, obtained sufficient reserve oxygen and compressed air, and checked battery capacity, charging the batteries where necessary. They have an existing emergency backpack containing special equipment with the capability to attend to accidental extubation. They created several more for use during parallel transports. They transitioned the infant receiving HFO ventilation to conventional ventilation.

Transport staff consisted of a direct care team of a nurse and a Neonatologist. The incubator team had five people. Two pushed the incubator, one pushed the cart with monitoring and medical devices, and two monitored the ventilator and external gas supply. They could transport a maximum of three incubators at the same time. The number of people required to move a premature infant in the incubator was more than expected, typical for emergency evacuations given the limited number of staff available in the NICU (42, 43).

"The infants were then moved through the passages, with three infants evacuated to the PICU and fourteen infants evacuated to the recovery room. Five infants went to the 'wake up' area that was also used for operations."

The infants were then moved through the passages, with three infants evacuated to the PICU and fourteen infants evacuated to the recovery room. Five infants went to the 'wake up' area that was also used for operations. Nine infants went to the recovery room for the central operating room, which had just been completed. Though pre-equipped, it had no monitors. The medical technology service installed monitors that night.

Evacuation started at 0005h, and the last incubator was situated at 0430h. For the infants evacuated through the basement corridors, the team's time from departure to return averaged 40 minutes. Following the decision to evacuate, with no plan, people interacting with others they had not previously worked with, solving problems they had not previously encountered, the team moved

twenty-six premature and newborn babies in four hours.

Internal Structure Fire (44)

A high voltage power transformer in the hospital basement exploded, igniting a high-intensity fire that burned for two hours. Smoke and soot entered the hospital ventilation system. Polychlorinated biphenyls burning in the electrical vault could produce toxic gases. The south side of the building and the NICU with twenty-nine infants were most affected by smoke.

The nursing coordinator notified the units on the north side of the hospital to prepare for patients from the hospital's south side. Twenty NICU infants were evacuated in their incubators to the north side, upstairs to the fifth floor.

The hospital across the street with a level three NICU accepted nine high-risk neonates. Normal movement between the hospitals is through a connecting underground tunnel which had filled with smoke. The outside air temperature was frigid.

Fire and police personnel created a human corridor crossing the street between the hospitals. Two or three nurses, a respiratory therapist, and a physician evacuated the neonates in their incubators through the protective human corridor.

"A construction worker discovered an unexploded "five hundredweight" (560 pounds) aerial bomb buried since World War II. An excavation crew had been excavating to expand the clinic, finding the bomb near three fuel tanks."

Unexploded WWII Bomb (45)

A construction worker discovered an unexploded "five hundredweight" (560 pounds) aerial bomb buried since World War II. An excavation crew had been excavating to expand the clinic, finding the bomb near three fuel tanks. The hospital had 626 patients, and the NICU had six neonates, all receiving mechanical ventilation. It was raining with an outside temperature of 50° F (10° C).

An Operations Center was set up in accordance with rehearsed evacuations. The anesthesia director was the clinical directing service and assigned priorities for various categories of patients. Newborns and mothers were the first priorities. The chief of operations of the fire brigade managed the technical operations with police physically present to shorten information channels. The fire chief ordered the immediate internal evacuation of patients in rooms facing the bomb.

The Operations Center informed nursing stations by phone or direct contact. Because the time of the evacuation had yet to be determined, physicians and surgeons began discharging those patients that could leave. The Chief Neonatologist reported confirmation that two NICUs had accepted all six neonates. The time was 90 minutes after initial contact. The evacuation was the responsibility of the Neonatologists. The six neonates were evacuated by neonatal ambulances the day after discovery.

The ordnance clearance service arrived and reported no acute risk of an explosion but did recognize an evacuation radius of 1,600 ft (500 m). The following Sunday, three days after discovery, they would defuse the bomb to limit exposure to schools and kindergartens and give public safety services time to evacuate residents. The bomb was defused within 15 minutes without problems.

Earthquake in Cold Weather (46)

A Level 3 NICU experienced two earthquakes of magnitude 6.5 M_J 6.2 M_w and 5.8 M_J without damage and a subsequent 6.4 M_J earthquake without damage. NICU staff reviewed the routes and priorities to evacuate the infants. Twenty-six hours after the first earthquake, an earthquake of magnitude 7.3 M_J 7.0 M_w caused extensive damage, disabled the elevators, and rendered the internal stairway impassable. Twenty minutes later, a 5.9 M_J aftershock prompted the decision to evacuate the NICU.

[The magnitude (M) of energy released in an earthquake is measured locally (the well-known Richter Scale) or by 'moment,' the total energy. The Japan Meteorological Agency (JMA) measures magnitudes in several ways. M_J ("J" for Japan) measures the magnitude of *ground shaking* as 'local magnitude,' the maximum amplitude of ground displacement for *horizontal* ground motion. M_w measures the magnitude of work ("W") of an earthquake as rocks slide past each other, the friction dissipating as heat into the earth's crust. Ground shaking results from the energy not dissipated as heat, radiating instead as seismic waves causing structural damage. Most earthquakes in western Japan are shallow strike-slip earthquakes with surface wave motion propagating long distances. M_J is larger than M_W and more accurately measures surface wave energy. The sedimentary basin of northeastern Japan attenuates ground motion, and M_J equals M_W (47).]

"Ground shaking results from the energy not dissipated as heat, radiating instead as seismic waves causing structural damage. Most earthquakes in western Japan are shallow strike-slip earthquakes with surface wave motion propagating long distances."

With the elevators disabled and internal stairs damaged, the only egress was the external emergency staircase from the third floor to the outside parking area. The outside air temperature was 14° C (57° F).

The NICU had thirty-eight infants, seven receiving mechanical ventilation and nine on nasal oxygen/ventilatory support. Another fourteen infants were receiving continuous intravenous infusions. Some nurses had finished an early night shift and stayed to assist, twenty nurses in all. Three Neonatologists were available for this primary evacuation out of the NICU. They took the infants out by way of the outside stairs. Upon reaching the parking area, they immediately transferred the infants to the ground floor rehabilitation room. Infants shared the four oxygen cylinders available.

Forty-five minutes after the decision to evacuate, the Chief Neonatologist contacted neighboring NICUs to arrange evacuation and the Japan Society for Neonatal Health and Development (JSNHD) disaster-communication secretary. JSNHD supports a network of remote NICUs through an online directory and communication tools, including internet phone and text messaging.

Coming to Their Aid

Shortly after the first earthquake, the Disaster Medical Assistance Team (DMAT) arrived with five or six members, including a doctor, a nurse, and a logistician. DMAT establishes a prefectural command post at the Kumamoto prefectural office, creating the

initial command hierarchy during the acute phase of a disaster. The DMAT operations include status checks of disaster-affected hospitals, evacuation of 1,400 hospitalized patients from eleven damaged hospitals, and utilization of doctor-staffed helicopters.

A Level III NICU 75 km (47 miles) away arranges a helicopter to evacuate several infants. DMAT intervenes, requisitioning the helicopter for other missions, and commandeers all ground ambulances that are not part of a hospital. The Chief Neonatologist requests DMAT assistance in obtaining helicopter evacuation of the sick infants. There will be no helicopter, but DMAT will arrange for five *general* ground ambulances to evacuate thirteen low-risk infants. The neonatal ambulances that did evacuate the infants were attached to their respective receiving hospitals outside the affected disaster region. The one helicopter transport that took pace was arranged outside of DMAT (46).

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Two hours after evacuation, a neonatal ambulance arrives from a local Level III NICU to transfer infants. At the same time, three outlying NICUs respond to their neonatal ambulances to transport six infants, arriving three hours later. Three and a half hours after evacuation, a neonatal ambulance from a local hospital transports three infants with congenital heart disease to an outlying NICU. Five hours after evacuation from the NICU, a helicopter arrives for transport. After seven and a half hours, one infant remains – awaiting long-distance helicopter transport to its hospital of birth.

The majority of patients are evacuated locally within eight hours. Ambulances carry 1-2 infants with intubated infants grouped with a stable infant. Thirteen infants are evacuated by general ambulance, twenty by neonatal ambulance, three by helicopters arranged outside of DMAT, and two by private vehicle. One very-low-birth-weight infant develops hypothermia, 33°C (91.4°F).

Earthquake Affecting Multiple Hospitals (48)

An earthquake of magnitude 6.7 M_w, followed one minute later by an aftershock of 6.0 M_w. Lasting 10-20 seconds, the ground motion was felt in cities 220 miles (350 km) from the epicenter.

Less than one mile from the epicenter, a NICU on the fifth floor of a damaged hospital had 22 newborn and premature babies. The day before, one neonate had been admitted following delivery by Cesarean section. The "earthquake cracked the nursery and sent some incubators toppling over, some with newborns inside." No infants were injured (48). The NICU had shattered glass, cracked flooring, damaged walls, and exposed wiring (49). NICU staff evacuated the infants to the Emergency Department. Nurses held some babies while sitting under counters for safety (48).

The hospital had lost power, disabling elevators. The hospital itself suffered major damage (48). Eight hospitals sustained significant damage from the earthquake, causing six to evacuate patients immediately. All six hospitals requested the EOC to dispatch vehicles for evacuation. The EOC reserved helicopters for patients receiving mechanical ventilation. A television-news helicopter transported a patient with potential intracranial bleeding (50).

Four of the six evacuating hospitals contacted nearby facilities directly to receive patients, while the other two sought assistance from the County Emergency Operations Center (EOC). The Neonatologists could evacuate 17 neonates to regional NICUs, leaving five without a disposition.

California hospitals are required to ha\ve contracts with area hospitals to receive patients in an emergency. Because of the earthquake, the contracted hospitals were either damaged or already receiving neonates from other damaged NICUs. The EOC was unable to help with placement. This may have been the reason for other hospitals seeking help from the EOC (personal communication during the incident, James P. Denney, EMS Captain, LAFD, retired).

One of the Neonatologists contacted a Neonatology faculty member at the university in another county where he had trained, 60 miles (100 km) away. The university hospital accepted the five neonates but had no means of transporting them (48). One Neonatologist at the damaged NICU inquired with the LAFD about using fire department rescue ambulances or helicopters to transfer the neonates. The department couldn't oblige because of earthquake-related missions (personal communication during the incident, James P. Denney, EMS Captain, LAFD, retired).

The university Neonatologist called a nearby US Marine Corps helicopter base for assistance. The base commander sent the request up the military chain of command, and it was granted. The two UH-1N Huey helicopters' flight time was 30-40 minutes each way. The helicopters landed in a nearby parking lot rather than the roof because of the disabled elevators. About 12 hours after the earthquake, the last neonate was admitted to the NICU (48).

"The university Neonatologist called a nearby US Marine Corps helicopter base for assistance. The base commander sent the request up the military chain of command, and it was granted. The two UH-1N Huey helicopters' flight time was 30-40 minutes each way. "

Not from a plan, protocol, or government agency, the evacuation of these five neonates occurred solely because of the initiative, drive, and collaboration of Neonatologists working from two NICUs with the cooperation of the US Marine Corps. In California, the county has financial responsibility for the medical care of indigent residents, even when the county resident is treated in another county. Even during emergencies or disasters, county and state agencies closely monitor "out-of-county" medical transfers. This out-of-county helicopter transfer was not included in patient evacuations tracked by the county EOC (50). The NICU had gained access to a Marine Corps helicopter unknown to the controlling government agency and unreported in the published literature.

Parents

The NICU transport teams left notes and maps for the parents.

The mother, who was delivered by C-section, was transferred to another unknown hospital. The information did not travel with her

infant. The father could not be reached by phone or through his employer (51). Other families lived in homes without electricity or heat because of power outages.

One mother learned of the evacuation the day after the earthquake when she visited. The family had stayed at an evacuation center and did not know where they would sleep that night. The infant was being treated for a blood disorder that must be controlled before being discharged home. The Neonatologists did not have experience discharging a baby with medical needs to a homeless mother (51).

Volcanic Eruption in a Tropical Storm (52)

The Mount Pinatubo eruption of June 15, 1991, in the Philippines gave little warning of the damage's severity, location, and extent. The eruption coincided with the arrival of a tropical storm. From the minor initial eruption, Ash dusted nearby Clark Air Base, and 13,000 personnel were evacuated to the US Naval Facility at Subic Bay, sixty miles distant by road. The second main eruption occurred as winds from a tropical storm blew heavy, wet ash onto Subic Bay, precluding the air evacuation of personnel.

Three days later, the mountain blew its top (1,600 feet of elevation was lost, forming a crater over a mile wide). The winds from a passing tropical storm brought ten inches of heavy wet ash to the US Naval Facility at Subic Bay, 23 miles south of Mt. Pinatubo, which had been considered a haven from the effects of the eruption for the 13,000 Clark Air Base personnel who had been evacuated to Subic Navy Base.

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The wet ash destroyed over 200 buildings, interrupted the power and water supply, and damaged the runway at Cubi Point Naval Air Station. The 20,000 Navy and Air Force dependents then had to be evacuated by Navy ship to Cebu, 300 miles south, where they could be airlifted back to the United States. Multiple trips by two aircraft carriers and a large amphibious ship completed the evacuation within a week after the eruption. One author (TAM) was the Rear Admiral who commanded the US Naval Facility at Subic Bay and these operations.

Medical Preparations for a Volcanic Eruption

The following describes a large, organized response to an abrupt disaster, comparing what is 'needed' for neonatal care during a disaster with what is available, described in this article—individuals working together and improvising care filled that gap. Planning for structure and resources comes at the risk of emphasizing what we believe we will need while under-emphasizing the development of capabilities and support of our assets. *The person operating in the flux of events becomes an asset.*

"With Mount Pinatubo becoming more active over the prior two months, several potentially complex neonatal cases were flown by weekly USAF medical evacuation flights to Japan, Hawaii, or the US mainland. After Mount Pinatubo erupted and the 20,000 evacuees were streaming into Subic Bay, it was decided that the majority of the medical personnel, their families, and all near-term pregnancies among the evacuees would depart on USS Peleliu (LHA-5)."

The US Naval Hospital at Subic Bay, fondly called "Jungle General" by the medical staff, was the designated primary care facility for all military personnel and families at both Clark AFB and Subic Bay Naval Facility. With Mount Pinatubo becoming more active over the prior two months, several potentially complex neonatal cases were flown by weekly USAF medical evacuation flights to Japan, Hawaii, or the US mainland. After Mount Pinatubo erupted and the 20,000 evacuees were streaming into Subic Bay, it was decided that the majority of the medical personnel, their families, and *all* near-term pregnancies among the evacuees would depart on USS Peleliu (LHA-5). Peleliu was selected because, as a sizeable amphibious helicopter carrier and Marine assault vessel, it was equipped with three operating rooms and could provide more extensive medical care and birthing wards than the aircraft carrier USS Abraham Lincoln (CVN-72), with only one operating room and a smaller number of assigned medical personnel. The large troop-carrying Marine helicopters (H-46s) were also more suitable for transporting non-military personnel ashore upon arriving in Cebu. Coming two months after the First Gulf War, the USNS Hospital Ship Mercy was still deployed to the Persian Gulf region. While it would have been a suitable vessel to transport the personnel potentially requiring medical care during the trip, it does not have the extensive helicopter lift capability. The medical evacuation was accomplished efficiently with no additional problems. Seven babies were born on USS Peleliu during the thirty-six-hour transit to Cebu. One baby boy was born on the USS Lincoln during its first trip south. He was appropriately named Abraham.

Immediate Response

Internal communications were maintained by armed forces radio and television and police and community meetings. Because of the diverse locations of the damage, neighborhood captains were identified. The situation also required the care and feeding of a diverse population, two-thirds of whom were from Clark Air Base forty miles from Subic Navy Base.

Evacuation and recovery plans had been developed over the previous two months that would involve airlift and sealift operations, with the sealift requiring a three-hundred-mile trip because of the lack of available port facilities. A significant contributor to the smooth response was the presence of several large US Navy ships with recent operational experience from the First Gulf War.

HRO characteristics informed the entire response of the US Navy, US Air Force, and US Government aid and support to the Philippine people.

While there is much experience with dry volcanic ash, there was little with wet ash. The trees were cut back from the above-ground power lines at Subic, surrounded by jungle in a typhoon-prone area. However, the conductivity of the ash required using lift trucks with a firehose to wash down the insulators and all wires and transformers before power could be restored.

Early in a disaster, air assets are essential for rescue and damage surveys. As soon as the skies cleared, about one day, air assets flew. These are essential missions that must be done. There was little history of flying helicopters and fixed-wing aircraft in ash-filled skies, but air search and rescue in isolated areas near Mt. Pinatubo was essential. Helicopter flights were accomplished under careful supervision and frequent inspections from day one of the recovery, followed by fixed-wing aircraft three days later after a portion of the runway was cleared. Any damage to the aircraft (minimal) was documented and became part of the bank of knowledge of the hazards of flying through a volcanic ash cloud. After volcanic eruptions in Iceland, Indonesia, and Alaska, international air control authorities subsequently utilized this information.

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Numerous individuals led the eruption response and recovery efforts, often isolated and out of touch with their normal leadership chain, with a bias for action to try something and learn what would work in these unusual circumstances.

Abrupt Change is New, Even for Veterans

We have heard the lecturer say, "I have seen everything." With more experience, we notice the rare event as something possible rather than a 'set aside' beyond imagination. We begin to distinguish between the problem, the environment, and how they interact, but we also identify the pervasiveness of how the environment influences problems – and that those you work with are part of your environment. The embedded problem is highly contextual, interacting with the environment to make every event a new event. This complexity does not mean we do not know what to do or wait for more information before engaging. It means that every problem in the environment is a new problem, and every solution is a new solution.

Even personnel with previous experience in disaster relief operations had never seen anything like this. All of nature seemed out of kilter, with the sky filled with ash, pitch-black for 24 hours, winds up to 45 knots with heavy rain and lightning, and frequent earthquakes rolling across the countryside, fortunately only to magnitude 5 on the Richter scale. Traveling around the base was impossible. Individuals used their training and previous experience to form teams and accomplish what they could in assessing the risk and managing their situation, often being the only source of support and encouragement to the refugees from the storm scattered throughout the base.

Problems Encountered

For healthcare, a disaster is an *environmental disruption* of medical care that disrupts the *ability to treat multiple patients*. This limitation is a functional, ecological definition (1). Environmental problems are not isolated but are embedded into each other – damaged structure, toxic air, cold temperatures, moving from one problem places the neonate into another.

These events abruptly and uncontrollably exposed neonates to:

- Water and contamination
- Smoke, soot, and toxic gases
- Cold air

Two abrupt disasters exposed neonates to cold outdoor temperatures or extended transportation through cold weather. One very-low-birth-weight infant developed mild hypothermia with a core temperature of 33° C (91.4° F) (46).

The physical structure of the NICU has full environmental control over temperature, humidity, lighting, and people. Neonates are susceptible to environmental stressors such as vibration and cold and are susceptible to kinetic activity or vibration affecting cerebral circulation or the security of endotracheal tubes and vascular access (41, 46). During these four events, smoke, water, vibration, and cold had abruptly entered the NICU to complicate care for all the neonates. It is a testament to the healthcare providers that only one adverse event, hypothermia, was reported.

The time course of a disaster

Healthcare providers had minutes to react during a situation in flux. They then had tens of minutes to develop a plan as the situation and the environment remained unsettled. Afterward, they had hours to wait. Achieving stability is an illusion for the spectator. Healthcare providers used continual reciprocal feedback to engage the environment while simultaneously supporting the infant, all the while keeping the neonate protected from an austere and adverse situation.

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Disaster infrastructure

A disaster brings together diverse infrastructures, but they are infrastructures of organizations and disciplines accustomed to collaborating. In viewing the relations, infrastructure builds a community. New for NICU sheltering or evacuation are the types of organizations and infrastructures they utilize. For example, air transport will be controlled by a central government agency, and air traffic control rules and procedures will become more visible. Boundary objects facilitate communication across disciplines and organizations while operating in a new boundary infrastructure.

You are not in one system or infrastructure – transport, emergency

operations, and continuity of care have distinct infrastructures. Disaster infrastructure is new to the Neonatologist but well used by disaster responders, hence the importance of boundary objects. For operations in austere or dangerous contexts, there are differences in language and lexicon, risk characterization, and medical care provision. Leaders work within the context of the disaster, monitoring stress and staff capability. Outliers as discrepancies or local disruptions are regarded as potential early heralds of new problems rather than disregarded as random events. One person's infrastructure can become another person's barrier (53).

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Government agencies

Government agencies generally coordinate activity and control out-of-area resource allocation during a disaster. Vehicles are resources controlled by these agencies except for those under the previous contract with a hospital. The two earthquake events demonstrate the control of transportation resources.

A study of disaster medical operations during the Kumamoto Earthquake included DMAT operations. DMAT evacuated patients from damaged hospitals, transported medical supplies, and coordinated 14 "doctor helicopters," helicopters with an accompanying physician to transport severely ill patients. DMAT provided medical coordination management until the local medical coordination was on track. There was no mention of the combined NICU evacuation efforts or helicopter operations supporting the evacuation (54).

In the US, a DMAT (also 'Disaster Medical Assistance Team') is part of the National Disaster Medical System (NDMS) that provides rapid response medical care for public health and medical emergencies that overwhelm local resources.

In California, no helicopter was available for hospital evacuation except a news helicopter that transported an emergency patient (50) (personal communication, James P. Denney, EMS Captain, LAFD retired). One NICU, working with colleagues in a distant county and the US Marine Corps (48), evacuated five neonates outside of, and unrecorded by, the county EOC. Until this article, the Marine Corps helicopter transport has not entered the medical literature (50).

The experience of two NICUs in two countries did not find government agencies helpful (46, 48). The other three NICU evacuations in the two countries were tightly integrated beforehand with government agencies or due to the cause of the evacuation. The two with difficulty were single hospitals amongst many needing evacuations, while the three with support were single hospital events.

There was a placement problem since the receiving hospital was also damaged, and both hospitals had to compete for the same beds. At a regional disaster meeting with state representatives, the conclusion was that the Neonatologists had figured it out, so no action was necessary. Privately, two county disaster managers recognized they had listed all ICU beds as a single value – adult ICU beds. They did not know that PICU and NICU beds differed and that both differed from adult ICU beds. An agency in another county rebuffed efforts to address the problem of multiple damaged hospitals, attempting to evacuate to the same hospitals outside the area of damage (DvS and personal communication, James P. Denney, EMS Captain, LAFD retired).

In these events, the NICU staff evacuated the infants from the NICU to a collection point for ground transportation or internal transfer. During a disaster, the larger mission of public safety agencies precludes them from evacuating hospitals. Administrators of one medical center believe the fire department would evacuate patients should the hospital structure become unsafe. The fire chief stated the department would be responding to residents and did not have the staffing to evacuate a hospital (DvS, personal communication).

"An associated problem is adult triage methods for infants and the failure to understand the necessity of helicopter transport (46). Neonatal physiology in an uncontrolled environment is deadly. What is missed is how rapidly the environment can change neonatal physiology, making it fatal, a problem not readily recognized by healthcare providers."

Adult standards

An associated problem is adult triage methods for infants and the failure to understand the necessity of helicopter transport (46). Neonatal physiology in an uncontrolled environment is deadly. What is missed is how rapidly the environment can change neonatal physiology, making it fatal, a problem not readily recognized by healthcare providers. One author (DvS) has observed environmental hypothermia in EMS and critical care with ambient temperature below an infant's thermoneutral temperature (32° C, 90° F): (air-conditioned hospital or trauma rooms, helicopter rotor wash, oxygen administration for pulmonary hypertension, methods for hand ventilation, and body temperature loss due to extended hand ventilation).

Bed availability

Most receiving NICUs accepted 2-4 neonates, while a few could accommodate more. The individual making the request was often the Neonatologist, but it appears some hospitals gave a degree of administrative assistance. In Japan, the rapid evacuation of 38 infants came about from a disaster communication team following meaningful disrupted communication in a 2011 earthquake.

The surge capacity of receiving NICUs is not predictable. It was fortunate that receiving NICUs could absorb the surge. When this was not practical, improvisations were the PICU, anesthesia recovery rooms, and the ED (41, 48).

The acuity level of the infant affects bed availability. Placement of neonates receiving HFO, mechanical ventilation, and CPAP is a problem. One solution was to change the mode of respiratory support from HFO to conventional ventilation or decrease the classifi-

cation for oxygen administration to 'infant status' (41).

Time

Seeking receiving facilities and the medical handover of complex patients can occupy significant time for the Neonatologist. Internal evacuation reduced this load (41, 44).

We can appreciate transport time in several ways – the actual transport, loss of bedside staff, and complete evacuation. Transport time within a hospital or to an adjacent building was often 40 minutes or more (41, 44). Internal, controlled evacuations occupy 3-7 people for each infant. The time away from bedside care is doubled for preparation and return to the NICU (41, 44). When evacuating infants out of the region, flight times of 40 minutes (48) or driving times of several hours (46) are expected.

Time to fully evacuate the NICU was five hours for internal evacuation (41) to 8-12 hours following an earthquake (46, 48).**Table: Evacuation Times**

Event	Infants	Receiving	Time
Water flow (41)	26	6 internal, upstairs 20 external	4 1/2h
Bomb (45)	6	6 external	n/r
Internal fire (44)	29	20 internal, upstairs 9 external	n/r
Earthquake (46) Cold weather	38	38 external	7 1/2h
Earthquake (48, 49) Multiple hospitals	22	22 external	12h

Distance

For an internal evacuation, distance creates a problem because of the smaller magnitude of response. The time for transport to an adjacent building is nearly the same as driving to a hospital in the same city. We see this in deciding whether to move neonates internally or seek receiving hospitals (41).

"For longer distances, driving three hours increases the risk of adverse events, including hypothermia in a neonate and death (46). A disaster brings together organizations and government agencies unaccustomed to the operations of the NICU."

For longer distances, driving three hours increases the risk of adverse events, including hypothermia in a neonate and death (46). A disaster brings together organizations and government agencies unaccustomed to the operations of the NICU. Translating the risks that extended travel poses to a premature infant is problematic for various reasons, but it can be reduced by understanding the various missions in a disaster and the use of 'boundary objects' (1, 55, 56). Description of the consequences, including *how* death could occur and accurately describing what is necessary to prevent death, along with private anecdotes, can facilitate collaborative action by making it a common problem (57). Government agencies focus on survivability, the reduction of death *after* the event. Survivability describes the effect of the environment on mortality as comorbidity or to impede connecting necessary medical care to the victim (3). Neonatologists focus on reducing mortality, death *due to disease*. Death, then, becomes a practical boundary object for communication.

Equipment. Availability of oxygen cylinders for one NICU during an earthquake was easily solved when the infants shared a cylinder (46).

Convergent volunteers. Volunteers and returning staff will overwhelm the physical space and the ability of healthcare providers to perform (44). This crowding can occur at public safety incidents also (3). No NICU reported this as a problem.

Communications. Commonly brought up in discussions of disaster and a problem for a hospital operating during a structure fire (44); however, no NICU reported communication problems, either internal or external. *Emergency communication* was hampered when staff members were unfamiliar with portable radios, and the hospital had no shared frequency with public safety (44).

Neonatal transport with incubator support is not readily available through EMS (41, 44). One NICU used general ambulances to evacuate some of their neonates (46).

Supplies are damaged during an internal disaster. Evacuating patients internally without accompanying supplies created shortages in the new unit. Referring to evacuations as transfers rather than an evacuation may trigger normal transfer behaviors and etiquette. Accustomed to moving the patient and not taking supplies from the originating unit, staff carry the same behavior into an evacuation.

Notification of family by the media. If an internal disaster occurs, the family may not know about the problem until they see it on the news (44). The family may not realize the hospital was evacuated (51).

"A Lesson Learned process provides realistic, actionable recommendations that cause an organization to improve from the knowledge acquired after an adverse experience. It reduces or eliminates the potential for failures and mishaps or reinforces a positive result."

The Process of Lessons Learned

A Lesson Learned process provides realistic, actionable recommendations that cause an organization to improve from the knowledge acquired after an adverse experience. It reduces or eliminates the potential for failures and mishaps or reinforces a positive result. Analytical processes discover what happened and why it happened. By identifying the root causes and remedial or corrective actions, experiences are transformed into best practices and lessons. Expert consultation from subject matter experts (SME) helps the organization understand the collected data to create informed recommendations (58).

A Lesson Learned must connect to measurable change in behavior. The organization must take deliberate corrective actions

from the Lesson Learned to enhance performance (58). Lessons learned can prepare the organization for the next disaster or improve routine operations to support operations during the next disaster.

We recommend a formal *Lessons Learned Process* with analysis of the observations, consultation with SMEs, correctional actions, and identified operations of what should be reproduced through training and simulation.

"We recommend a formal Lessons Learned Process with analysis of the observations, consultation with SMEs, correctional actions, and identified operations of what should be reproduced through training and simulation."

The Lessons Learned

Evacuating for a bomb threat went smoothly. The hospital had rehearsed evacuations, and the Neonatologist could rapidly place the six neonates who were evacuated the following day.

In the other four disaster events, healthcare providers at the bedside initiated immediate and effective action to save the babies. They did not refer to a program, follow a list, or seek outside leadership. As a leader, the Neonatologist directed activity for the whole of the NICU. As the author's group (DvS et al.) found during the After Action Review of a terrorist shooting, "Their plans were not improvised. Improvisation *was* the plan. Training can support this approach" (Sean McKay, personal communication, (3)).

Contributing to Success

The crisis management system identified authority and what instructions could be issued. Predefined structures and processes kept relevant decision-makers informed. An internal alarm system to clinical and facility administrators facilitated rapid recruitment of sufficient staff (41).

NICU and PICU staff were assisted by a group of doctors and nurses experienced with premature infants within the anesthesiology, operative intensive care medicine, and operating theater group (41).

The JSNHD disaster communication team facilitated a network with remote NICUs. The online directory and communication tools included internet phone, text messages that facilitated contact with outlying NICUs (46). Not having a program like this was identified as a significant deficit during an abrupt disaster (41). Such a system would benefit larger hospitals for internal communication where communication during an internal disaster became a problem (44).

What to Change

Working with government agencies "revealed covert but serious risks in relying on the adult-based coordination system of transportation" (46). Neonatologists can present to government disaster agencies the unique way the danger of a disaster brings threats to the neonate, such as hypothermia, vibration, and toxic air (41, 44, 46).

For sick infants on long-distance transportation, minimize the threat from transport by using helicopters or neonatal ambulances (46).

Consider recovery rooms or similar units as a temporary buffer in emergencies (41).

Envisage evacuation, emergency routes, and necessary actions you would take if the expected route becomes obstructed or dangerous (41). For internal evacuation of patients, bring care stock items and medication carts to the same unit (44).

Working with public safety, develop a unified, or unifiable, command structure with public safety. Obtain capability to communicate on a public safety radio frequency (44).

"Disaster infrastructures create friction for the Neonatologist. We can communicate across infrastructures through boundary objects. Death is a boundary object for communicating between those infrastructures working to increase survivability and reduce mortality."

Conclusion

During a disaster, the environment becomes a comorbidity. We cannot plan for a granular response to abrupt change. Although past experiences assist in response to an abrupt change, every disaster is 'ahistoric,' that is, we can never be certain about how things came about or the effect of each element involved. Support equipment, evacuation methods, and selection of receiving hospitals become part of the environment, external to what the Neonatologist can control. Disaster infrastructures create friction for the Neonatologist. We can communicate across infrastructures through boundary objects. Death is a boundary object for communicating between those infrastructures working to increase survivability and reduce mortality.

" These scenarios demonstrate that earnest attention to the problem, developmental physiology, and standard neonatal practices can support neonates during abrupt changes in the environment. However, we cannot rely on disaster authorities or other medical specialties to appreciate the lethal effects the disaster environment poses for premature or newborn infants."

While planning may focus on harm and what to fear, the actors in these events focused on protecting the babies and then moving them to a safe area or outside the hospital. They controlled fear responses and kept to contextualization to improvise safe and effective evacuations (4, 13, 19). One infant developed hypothermia

out of the 121 infants evacuated.

Immediate evacuation measures taken because of a ruptured water pipe, hospital fire, unexploded WWII bomb, and two earthquakes do not follow plans or allow for lengthy evaluation. While these at first appear disparate, they share the common problem of rapid movement of neonates to safety, ensuring the safety of infants and staff while solving problems embedded in a threatening environment. The Neonatologist must separate cognitive and affective processes from the situation and environment. These scenarios demonstrate that earnest attention to the problem, developmental physiology, and standard neonatal practices can support neonates during abrupt changes in the environment. However, we cannot rely on disaster authorities or other medical specialties to appreciate the lethal effects the disaster environment poses for premature or newborn infants. We can rely on the quality of our colleagues to carry our patients, sometimes literally, to safety.

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Fellows Column: A Gut Feeling: Antibiotic Stewardship in the Setting of Multi-Drug Resistant Enterobacteriaceae Neonatal Sepsis

Christopher Yeh, OSM-III

Abstract:

The role of enteric microbiota in both physiologic and pathologic processes of the human body remains an incompletely understood and rapidly developing field of inquiry. Enterobacter is a genus of gram-negative facultative anaerobes exhibiting widespread resistance to various antibiotic therapies. It belongs to the family Enterobacteriaceae, including such prominent members as Klebsiella, Escherichia, Shigella, and Salmonella. Here we present the case of an infant male on ventilatory support who developed hospital-acquired ventilator-associated pneumonia with cultures positive for multi-drug resistant (MDR) Enterobacter absuriae.

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Identification:

The genus of bacteria now known as *Enterobacter* initially belonged to a grouping known as Aerobacter. In the mid-twentieth century, classifying species such as Aerobacter aerogenes proved difficult as it was nearly indistinguishable from Klebsiella by microbiological techniques. Therefore in 1960, Hormochei et al. proposed that members of the genus *Aerobacter* be divided into the two genera *Enterobacter* and *Klebsiella*. By this classification, members of the genus *Enterobacter* were generally motile and expressed peritrichous flagella, whereas *Klebsiella* were typically nonmotile and non-flagellated (1). However, it should be noted that more recent categorizations based on genetic factors have revealed exceptions to these rules. *Enterobacter cloacae* is considered the nomenspecies of the genus, meaning that all newly identified members of the taxon are classified based on their similarity to *E. cloacae* (2, 3).

To this day, *Enterobacter* and *Klebsiella* often remain grouped in both clinical and phylogenetic classifications. Both genera belong to the family *Enterobacteriaceae,* so named for, including such notable disease-causing genera as *Escherichia*, *Salmonella,* and *Shigella*. Non-pathogenic members of this group include many symbiotic enteric florae. Others exist as saprophytes in the environment, which metabolizes decaying organic matter in the soil, sewage, and vegetation(4). Members of *Enterobacteriaceae* are included in the mnemonic "ESKAPE," signifying *Enterococcus faecium*, *Staphylococcus aureus*, *Klebsiella pneumoniae*, *Acinetobacter baumannii Pseudomonas aeruginosa*, and *Enterobacter cloacae* as prevalent nosocomial infections exhibiting antimicrobial resistance (2).

In recent decades, the range of microbiological characteristics used to define Enterobacteriaceae has greatly expanded. When characterized by phenotype, *Enterobacteriaceae* are unpigmented gram-negative bacilli. Metabolically, they are facultative anaerobes that are catalase positive, oxidase negative, non-spore-forming, and non-sulfate-reducing. *Enterobacter* and *Klebsiella* are lysine decarboxylase positive but are ornithine and arginine dihydrolase negative (5).

Restriction fragment length polymorphism (RFLP) with pulse-field gel electrophoresis (PFGE) is the current gold standard of classifying newly identified members of the genus (3, 6). In this technique, the bacterial genome is degraded by incubation with restriction endonucleases specific for known genetic consensus sequences. The resulting fragments are then segregated by length using gel electrophoresis. Other methods which classify bacteria by genotype include polymerase chain reaction (PCR) amplification of enterobacterial repetitive intergenic consensus (ERIC) sequences of repetitive extragenic palindromes (REP). A study compared ERIC and REP genetic sequences against RFLP electrophoresis using the heat shock protein 60 gene (*hsp60*), which is highly conserved among taxon members. The authors concluded that REP PCR was superior to ERIC PCR at identifying clinical isolates based on RFLP standards. However, ERIC PCR could more precisely differentiate between specific genovars (6). The highly conserved 16S rRNA sequences are also available to identify new strains. Commonly isolated strains in humans include *E. cloacae, E. absuriae, E. hormaechei, E. kobei, E. ludwigii,* and *E. nimipressuralis* (7, 8).

"Enterobacteriaceae are unpigmented gram-negative bacilli. Metabolically, they are facultative anaerobes that are catalase positive, oxidase negative, non-spore-forming, and non-sulfate-reducing. Enterobacter and Klebsiella are lysine decarboxylase positive but are ornithine and arginine dihydrolase negative (5)."

Clinical relevance:

The term "sepsis" is derived from a Greek root meaning "to rot." It denotes a generalized dysregulated host inflammatory response. This typically disseminates from a previously localized infectious trigger and can progress to septic shock, characterized by hypotension and reliance on vasopressors. Sepsis occurring in neonates is broadly categorized based on the timing of onset, with early-onset sepsis occurring within the first seven days of life and late-onset after seven days. While group B streptococci (GBS) is well-recognized as the most prevalent pathogen in neonatal

sepsis, many other infectious agents have been described(9). Early-onset neonatal sepsis is more often associated with GBS, coagulase-negative *staphylococci*, *Escherichia coli*. Late-onset neonatal sepsis exhibits a shift towards *Staphylococcus aureus* and members of the *Enterobacteriaceae family(10)*. Enterobacter accounts for an estimated 22.2% of nosocomial gram-negative bacteremia in one cohort study on neonatal sepsis (11). The current mainstays of empiric treatment include gentamicin, ampicillin or amoxicillin, and third or fourth-generation cephalosporins(10).

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Crucial to septic patient management is the principle of source control, as stated by international guidelines set forth with the Surviving Sepsis Campaign. Source control aims to restrict microbial dissemination from infectious foci and impede pathogenic proliferation therein. This is typically achieved by physical means, including but not limited to incision and drainage for abscess, catheter removal for urinary tract infection (UTI), suctioning for pneumonia, and debridement for soft tissue infection (12).

Neonates are particularly susceptible to nosocomial infections with opportunistic pathogens. In one retrospective cohort study of 230 neonatal intensive care unit (NICU) patients, 15% of late-onset neonatal sepsis was due to enteric gram-negative bacilli (13). Another separate study of 120 culture-confirmed neonatal sepsis patients found that *E. cloacae* accounted for 39.5% of gram-negative bacilli species isolated (14). Delayed development of a diverse intestinal microbiome was associated with sequential growth of *Staphylococcus*, *Enterococcus*, and *Enterobacter* with eventual progression to *Bifidobacterium*, a marker for healthy neonatal microbiota (15).

Pathogenicity and Antimicrobial Resistance:

Like most pathogenic gram-negative bacilli, members of this group produce endotoxin lipopolysaccharide (LPS). Therefore they are capable of inducing gram-negative sepsis and all complications thereof. In particular, the presence of a 2-hydroxymyristic acid moiety on the lipid A substituent is associated with increased neonatal mortality(16). *E. cloacae* is cytotoxic to murine macrophages and simian renal epithelial cells in the presence of 2-mercaptoethanol, a reducer of disulfide bonds. The same authors found that 27% of studied strains expressed a type III secretion system capable of introducing substances into target cells (17).

Interestingly, inoculation of the pea plant (*Pisum savitum*) with the strain *Enterobacter MN17* confers resistance to cadmium. Cadmium is a naturally occurring toxic heavy metal considered a soil pollutant(18). Additionally, human cells have been demonstrated to require divalent metal ion transporters (DMTs) for cadmium intake in vitro(19). Finally, regulation of transition metal ion concentrations via sequestration or decreased activity of DMTs is a known mechanism of the host response to microbial infection (20). Therefore, taken together, these data may represent a series of evolutionary adaptations that allow Enterobacter species to restrict local microbial competition by restricting the availability of limiting nutrients.

The decreased susceptibility to antibiotic therapy characteristic of organisms in the ESKAPE group can be broadly attributed to bacterial adaptations which alter intracellular concentrations of active antimicrobial agents. One mechanism is metabolic degradation of medications by bacterial enzymes, such as extended-spectrum β-lactamases (ESBL). The β-lactamase, AmpC, is an important factor in resistance to cephalosporins in many diverse strains of gram-negative enteric bacteria(21). The *ampC* gene can either be encoded on the bacterial chromosome or on a plasmid, which likely contributes to its far-reaching prevalence across many taxa of microbes. The AmpR repressor protein constitutively represses it(22). Mutations in AmpR and AmpD, an enzyme that recycles peptidoglycan degradation products, result in overexpression of the AmpC cephalosporinase (23). The presence of either ceftazidime or aztreonam selects for mutations in both the *ampD* and *ampR* genes, which confer overexpression and resistance (24).

"Furthermore, Klebsiella and Enterobacter are the two most prevalent producers of the plasmid-encoded carbapenemase blaKPC, and horizontal transfer of these plasmids can be traced across the eastern United States (25). A wide variety of carbapenemases have been described exhibiting serine hydrolase or zinc metalloenzyme activity against drugs such as imipenem and meropenem (26). "

Furthermore, *Klebsiella* and *Enterobacter* are the two most prevalent producers of the plasmid-encoded carbapenemase bla_{KPC}, and horizontal transfer of these plasmids can be traced across the eastern United States (25). A wide variety of carbapenemases have been described exhibiting serine hydrolase or zinc metalloenzyme activity against drugs such as imipenem and meropenem (26). Resistance to imipenem has also been observed in the *E. aerogenes* by regulating the expression of Omp35/Omp36 porin proteins. Notably, this regulation involves both increases and decreases in the presence of proteins in this group, suggesting that this resistance mechanism involved more than a simple efflux of proteins from the cell (27). Similarly, resistance to both fluoroquinolones and aminoglycosides can be conferred by the efflux by the efflux pumps coded by the *qepA* and *rmtB* genes. These were likely transferred to *Enterobacter* via plasmids traced to strains of *Escherichia coli (28)*. Fluoroquinolones differ from β-lactams in that they target the DNA replication machinery of bacteria, exerting antimicrobial effects at the level of the nucleus rather than

the cell wall. Resistance to fluoroquinolones in the *Enterobacteriaceae* family can also be found on the bacterial chromosome in the form of mutations in DNA gyrase, the mechanistic target of fluoroquinolones (29). These data reinforce the need for prudent antibiotic stewardship in the setting of rapidly developing antibiotic resistance.

Case presentation:

We present a case of a 6-week-old preterm, very low birth weight male hospitalized since birth with a history of neonatal respiratory distress and pulmonary edema requiring surfactant administration. This patient had been intubated and remained on long-term ventilatory support. A follow-up chest X-ray revealed a right-upper-lobe opacification that previous studies had not seen. Laboratory studies from the same day revealed a new neutrophilic leukocytosis with left-shift as well as thrombocytopenia. Tracheal aspirates, urine, and blood were sent for culture. In the interim, the patient was started on empiric antimicrobial therapy with intravenous gentamicin and vancomycin for nosocomial pneumonia. The patient exhibited clinical improvement in the day following empiric therapy, possibly due to the synergistic effect of aminoglycosides combined with the gram-negative activity of aminopenicillins.

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Initial cultures of the patient's tracheal aspirate isolated many gram-negative bacilli, identified as *E. cloacae* complex exhibiting multi-drug resistance. At this time, empiric therapy with vancomycin was discontinued, and pathogen-directed therapy was established with cefepime. Gentamicin was continued. Subsequently, further classification of the offending isolates revealed *E. absuriae*. Follow-up sputum cultures were negative for continuing infection.

Discussion:

Fourth-generation cephalosporins, piperacillin-tazobactam, and carbapenems are generally effective treatment for AmpC-producing strains of enteric gram-negative bacilli. However, carbapenems typically should not be considered first-line therapy. They are often considered agents of last resort for clinical use against resistant or refractory infections(26). As stated previously, mechanisms of rising resistance to carbapenems have been demonstrated worldwide. Therefore, the establishment of potential carbapenem-sparing regimens warrants further investigation. Concerning cephalosporins, third and fourth generations may be the treatments of choice for ESBL-producing *Enterobacter*. A multicenter cohort study showed improved outcomes using ceftazidime-avibactam to treat *Enterobacteriaceae* species, including *Enterobacter (30)*. However, it must be noted that widespread resistance to monotherapy with cefotaxime and ceftazidime, both third-generation cephalosporins, has been documented in pediatric populations of California and the mid-western and central United States (31). Cefepime, the only -generation cephalosporin approved in the United States, has well-reported efficacy as a carbapenem-sparing agent in treating these pathogens (32, 33). Third-generation cephalosporins may result in a greater risk of antibiotic resistance than fourth-generation agents (34). It should be noted that these studies with cephalosporins exhibited the greatest efficacy when applied in conjunction with proactive infection source control rather than with antibiotic therapy alone.

Piperacillin-tazobactam has also been shown to be effective in treating bacteria that produce extended-spectrum β-lactamases (ESBL) in vivo (35). Two multicenter, double-blind, randomized placebo-controlled clinical trials demonstrated piperacillin-tazobactam to be non-inferior to meropenem, as well as meropenem-vaborbactam, in treating UTIs and bloodstream infections, respectively, with ESBL-producing *Enterobacteriaceae (36, 37)*. β-lactams will exhibit maximum bactericidal effect when combined with β-lactamase inhibitors such as nacubactam (38). Multiple retrospective cohort studies have also demonstrated the efficacy of piperacillin-tazobactam treatment of ESBL-producing Enterobacteriaceae. These findings are partially attributed to the relatively weak induction on AmpC β-lactamase observed with piperacillin-tazobactam (22). While these data suggest piperacillin-tazobactam to be a suitable carbapenem-sparing agent, care must be taken to forestall increasing resistance to it as well(39).

"Ultimately, decisions regarding the precise antibiotic regimens combat MDR should be guided by local antibiograms reflecting local resistance patterns. Complete elimination of exposure to Enterobacteriaceae family members is not feasible due to their pervasiveness in the environment and the human microbiome."

Ultimately, decisions regarding the precise antibiotic regimens combat MDR should be guided by local antibiograms reflecting local resistance patterns. Complete elimination of exposure to Enterobacteriaceae family members is not feasible due to their pervasiveness in the environment and the human microbiome. Therefore, identifying antimicrobial agents suited to treat pathology caused by these organisms sustainably is paramount. Here we present the case of an acute onset nosocomial pneumonia with cultures positive for *E. absuriae.* In this patient, cefepime and gentamicin resulted in culture-negative repeat tracheal aspirates.

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Fellow's Column is published monthly.

- Submission guidelines for "Fellow's Column":
- 2000 word limit not including references or title page. Exceptions will be made on a case by case basis
- QI/QA work, case studies, or a poster from a scientific meeting may be submitted..
- Submission should be from a medical student, resident, fellow, or NNP in training.
- Topics may include Perinatology, Neonatology, and Younger Pediatric patients.
- No more than 20 references.
- Please send your submissions to:

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

– Christine Theard, M.D.

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Randall Bell, Ph.D.

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Neonatal Assessment - NICU Ventilator Settings - Prove yourself as a NICU Newbie - Surfactant Administration	Oscillator basics - Neonatal Chest X-Rays - Non-Invasive Ventilation Principles and Methods	HFNC in the NICU - Apneas and Bradycardias - iNO update - Jet ventilator basics - Psych-social aspects of NICU Care

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Academy of Neonatal Care

Briefly Legal: Pleural Effusion Secondary to a Malpositioned Peripherally Inserted Central Catheter

Maureen E. Sims, M.D., Barry Schifrin, M.D,

An 875-gram female infant was born at 25 weeks gestation via cesarean delivery secondary to severe maternal preeclampsia. The mother, a 28-year-old, gravida 1, para 0 with a history of preexisting hypertension, had been controlled by medications until 25 weeks gestation when she developed altered mentation, generalized edema, and severely elevated systolic and diastolic BPs (>200 />100mmHg.

"After admission to the hospital, she received magnesium sulfate and one dose of antenatal steroid shortly before the undertaking cesarean section under general anesthesia, which was complicated by difficult intubation."

After admission to the hospital, she received magnesium sulfate and one dose of antenatal steroid shortly before the undertaking cesarean section under general anesthesia, which was complicated by difficult intubation. The baby was very depressed at birth and required intubation, chest compressions, and epinephrine. Her Apgar scores were 1^{1},1^{5},1^{10}, and 2^{15}. Her initial neonatal course was complicated by respiratory distress syndrome requiring one dose of surfactant and high-frequency oscillatory ventilation on DOL 1. Early clinical findings and X-ray revealed bilateral pneumothoraces which were treated with chest tubes inserted bilaterally. The patent ductus arteriosus was treated medically. Her complete blood counts were unremarkable, and blood cultures were ultimately negative.

Umbilical catheters were placed and discontinued timely. On DOL 2, she was extubated to a high-flow nasal cannula. The baby's nutritional needs were met by trophic feeds starting on DOL 5 and by parenteral nutrition (PN) initially through an umbilical venous catheter and on DOL 3 through a central catheter (PICC) inserted in the antecubital area of her left upper extremity. The tip of the PICC was confirmed radiographically at the junction of the superior vena cava and the right atrium. However, several subsequent chest radiographs beginning on DOL 5 showed the tip of the PICC in the left subclavian vein. The baby expired on DOL 13,

In reviewing the concentrations of the intravenously delivered trophic feeds for DOL 8, with a PICC confirmed to be in a non-central position (subclavian vein) were: 16% dextrose, 3.5% protein, 10% calcium gluconate, sodium, potassium, acetate, magnesium, and 20% intralipid. This corresponded to an osmolality >900mosm/liter.

On day 13, the baby became lethargic and desaturated. A chest radiograph showed bilateral pleural effusions. Bilateral chest tubes were again placed with egress of a large volume of fluid consistent with parenteral nutrition.

Despite the chest tubes, the baby's condition deteriorated progressively, and two hours after the placement of the chest tubes, the baby required full resuscitation but could not be revived.

Postmortem examination revealed a perforation of the left subclavian vein with only small pleural effusions remaining. The PICC line was found in the subclavian vein. The pathologist and treating physicians concluded that the hyperosmotic PN had eroded through the subclavian vein and caused the pleural effusions. The hospital and neonatologist were sued for negligence.

"Postmortem examination revealed a perforation of the left subclavian vein with only small pleural effusions remaining. The PICC line was found in the subclavian vein. The pathologist and treating physicians concluded that the hyperosmotic PN had eroded through the subclavian vein and caused the pleural effusions."

Allegations

When the case was deliberated, the plaintiff neonatologist was critical of:

- The failure of the staff to appreciate the malpositioned PICC line
- The failure of the staff to monitor the depth of the PICC from outside markings and from radiographs showing the position of the PICC – notwithstanding that indication for obtaining the radiographs was unrelated to the PICC location.
- Continuing to infuse constituents with high osmolarity despite the suboptimal location of the catheter tip
- The neonatologist should have decreased the concentration of the components to ensure that the osmolarity was not excessive for the subclavian vein or removed it and reinserted another PICC

The case was settled before trial.

Discussion

Parenteral nutrition (PN) has become a standard feature of managing premature and critically ill babies in the Newborn Intensive Care Unit (NICU). The choice of providing PN via peripheral or central access depends on the anticipated duration of the nutritional therapy. Since the peripheral route only permits low concentrations of the nutritional components (osmolality 300-900mOsmol/L), the peripheral route usually is restricted to babies requiring only small supplements to their nutrition for a limited duration of time, generally less than two weeks, when it is anticipated that the large bulk of their nutrition will be met enterally generally. On the other hand, Central PN allows for high concentrations of nutrients (osmolality >900 mOsmol/L) and is reserved mainly for babies who will need parenteral nutritional support beyond two weeks and when alimentation needs cannot be met enterally or by the peripheral

route. The most popular method of providing central parenteral nutrition is by a peripherally inserted central catheter (PICC) because it is a simple procedure performed at the bedside that is considered relatively safe when inserted and monitored by skilled practitioners. PICCs provide a portal for fluids, concentrated parenteral nutrition, and sometimes medication.

"Central venous access is defined as a catheter whose distal tip lies in the distal vena cava (part of the vena cavae within the pericardial reflection). PICCs are typically placed via the antecubital vein. The location of the PICC tip is critically important."

Central venous access is defined as a catheter whose distal tip lies in the distal vena cava (part of the vena cavae within the pericardial reflection). PICCs are typically placed via the antecubital vein. The **location of the PICC tip is critically important**. PICCs inserted from the upper extremity should have their distal tips reside at the junction of the superior vena cava and right atrium (as was the case here early on), and if inserted from the lower extremity, the tip should be at the junction of the inferior vena cava and right atrial junction. Getting the catheter tip as close to the atrial-caval junction as possible and confirming its correct placement is of the utmost importance and can be done by radiograph or ultrasound. This tip position residing at these junctions takes advantage of the increased volume and turbulence in the vasculature, which helps to dilute the high osmolar PN solutions, thereby decreasing the risk of the PN causing osmotic endothelial damage to a vessel. The thick wall of the vena cava near the atrium makes the PICC less likely to perforate by erosion or tip puncture. The tip should never reside in the right atrium because of the risk of arrhythmia. The PICC tip that resides at or near the right atrial wall increases the risk of puncture or hyperosmolar transudation. Perforation or transudation of fluid into the pericardial sac can create a pericardial effusion and tamponade. Indeed, to emphasize the vulnerability of the tip in this location, the wall of the right atria has been compared to "wet paper."

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Given that the maximum osmolarity that can be delivered via a non-central route is 900mOms/L, it is usually impossible to supply all the required nutrients for many preterm or critically ill term newborns in this fashion. Although PICCs are intended to be placed centrally, occasionally, they cannot be advanced to an ideal position, perhaps because of venous tortuosity or valves. However, if this happens and the peripheral approach is undertaken, ensuring that the catheter tip is in the prescribed location becomes critical. If the decision is made to leave the PICC in a non-optimal position, the osmolarity must be adjusted to ≤900 mOmol/L.

"This development demands prompt recognition and a change in osmolarity to avoid complications of the malpositioned catheter. Understandably, the potential for adverse events is increased if the PICC migration/malposition is not appreciated and appropriately managed. "

When dealing with a centrally placed PICC, it is also important to recognize the potential causes and consequences of the tip that has migrated to a non-central location, often to the brachiocephalic or subclavian vein. This development demands prompt recognition and a change in osmolarity to avoid complications of the malpositioned catheter. Understandably, the potential for adverse events is increased if the PICC migration/malposition is not appreciated and appropriately managed. In cases when the tip has migrated distally, the tip could impinge on the vessel wall, disrupting the endothelium, and triggering the coagulation cascade. As pointed out, an influx of hyperosmolar fluid might be caustic to the vessel's endothelium, eventually resulting in perforation of the vessel and damage to the surrounding tissues. In addition, the tip could perforate the vessel wall and move into the various tissues, including the pleural space. Whether by transudation or outright perforation, the extravasation of hyperosmolar fluid is caustic. Such a complication also potentiates the damage with the extravasation of caustic drugs given via the PICC line, including calcium gluconate and calcium chloride. Pharmacists determine the osmolarity of a PN solution, or one can approximate the osmolarity from Table 1 or use one of several equations:

1. mOsm/L= (grams amino acids/L x10) + (grams dextrose/L x 5) + ({mEq Na + mEqK} x2)/L + (mEq Ca x1.4)/L.

2. Another method is a) multiply grams of dextrose per liter by 5 b) multiply grams of protein per liter by 10. c) 300-400 for vitamins and mineral contribution. Then add a +b+c to give a close approximation of the osmolarity of PN.

The Osmolarity of Components in Parenteral Nutrition	
Component	**Osmolarity (mOsm/L)**
5% Dextrose	252
10% Dextrose	505
15% Dextrose	631
20% Dextrose	1010
25% Dextrose	1263
30% Dextrose	1515
10% Dextrose, 1% amino acids	800
10% Dextrose, 2% amino acids	900
12.5% Dextrose, 1% amino acids	925
12.5% Dextrose, 2 % amino acids	1025
20% Dextrose, 2% Amino Acids	1400
10% Calcium gluconate	680

In addition to the above, a malpositioned PICC may cause a **pleural effusion related to one of several** mechanisms including: 1) disruption or obstruction of lymphatic drainage around the site of PN extravasation which can cause increased hydrostatic pressure and transudation of fluid into the pleural space 2) mechanical perforation of the tip of the PICC into the pleural space 3) hyperosmotic endothelial damage and increased vascular permeability causing the PN to into the pleural space 4) proximal migration of the PICC into the a) pulmonary artery (from the right atrium to the right ventricle to the pulmonary artery, to become wedged in one of the branches) or b) into the pulmonary vein (from the right atrium, through the foramen ovale, to the left atrium and thence into a pulmonary vein) 5) extension of ascites fluid into the pleural space if the PICC was placed below the diaphragm With the appearance of pleural effusion, the infant presents signs of respiratory distress which may arise within a few hours or even several days after placement of the catheter. Tachycardia, hypotension, and hypoglycemia can be expected to occur when increasing amounts of PNare delivered outside of the intravascular space.

"With the appearance of pleural effusion, the infant presents signs of respiratory distress which may arise within a few hours or even several days after placement of the catheter. Tachycardia, hypotension, and hypoglycemia can be expected to occur when increasing amounts of PNare delivered outside of the intravascular space."

Catheter-related bloodstream infection with PICC is another risk for NICU patients in addition to malpositioned PICCs. The incidence of infection is highest with prolonged use, and it is common in the most premature infants. Risks of infection with PICCs are also proportional to the degree of manipulation of the catheter and breaks in the line for administration of products (e.g., medications, blood components). The most common organism colonizing catheters is a coagulase-negative staphylococcus (CONS), followed by gram-negative bacilli and fungi. The onset of catheter-related CONS infection usually is insidious with low-grade clinical features, such as apnea, feeding intolerance, temperature instability, increased oxygen requirement, and lethargy. The prognosis for catheter-related CONS infection is good, with greater than 90% survival.

Arm movements have been shown to affect the position of the tip of PICCs. Catheters placed in the basilic or cephalic veins below the level of the elbow are likely to move toward the heart when the elbow is flexed. Catheters placed in the basilic or axillary veins migrate toward the heart with adduction of the arm, and catheters placed in the cephalic vein move away from the heart with adduction of the arm. An awareness of this is important when images are evaluated for migration. Obstruction of the PICC, characterized by an inability to infuse fluids or withdraw blood or by increased infusion pump pressures, is often caused by thrombosis, malposition, or chemical precipitates from minerals, drugs, or lipids infused. The catheter position should be evaluated. If malposition is ruled out, dissolving the clot or precipitate may be attempted if salvaging the catheter is vital. Heparin (0.5 to 1.0 mL per mL of intravenous fluid) should be added to infused fluids.

"Complications of PICCs can be minimized with proper insertion with aseptic technique, good skin fixation, proper positioning of the tip at the caval-right atrial junction, monitoring the position for possible migration issues, making osmolar changes in PN if it becomes non-central, and keeping manipulations and entries into the line minimal. Prompt recognition and timely intervention for a non-central position of the tip are critical."

Complications of PICCs can be minimized with proper insertion with aseptic technique, good skin fixation, proper positioning of the tip at the caval-right atrial junction, monitoring the position for possible migration issues, making osmolar changes in PN if it becomes non-central, and keeping manipulations and entries into the line minimal. Prompt recognition and timely intervention for a non-central position of the tip are critical. Weekly follow-up imaging often begins one week after insertion, and observation of the tip position, whenever images are taken, decreases the risk of complications. Inspecting the site daily with transparent dressings and minimal manipulation and invasion of the line for administration of medications helps reduce infection risk. Nosocomial infection and perforation or vascular erosions from a possible malpositioned PICC should always be high on the differential when adverse clinical signs develop on a baby receiving PN from a central line.

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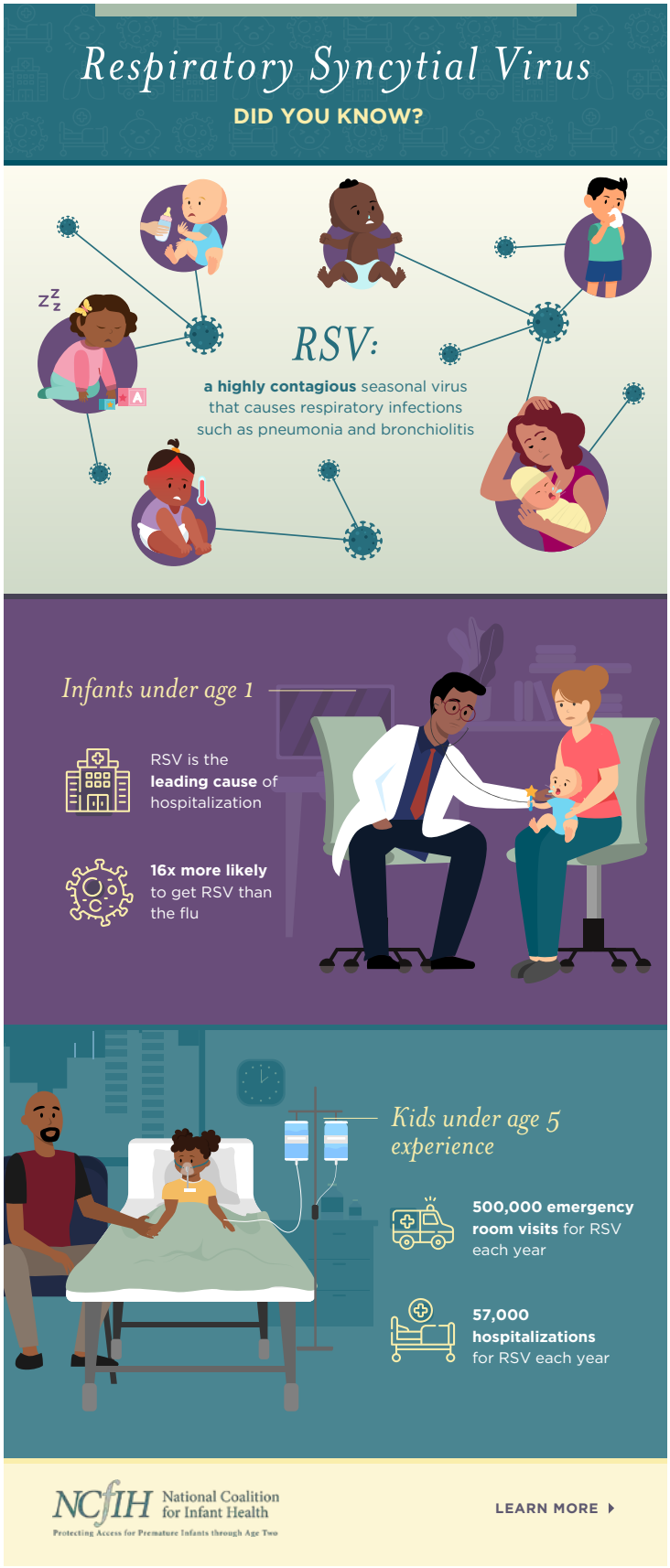

SHARED DECISION-MAKING PROTECTS MOTHERS + INFANTS DURING COVID-19

KEEPING MOTHERS + INFANTS TOGETHER

Means balancing the risks of...

- HORIZONTAL INFECTION
- SEPARATION AND TRAUMA

EVIDENCE

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

PARTNERSHIP

What is the best for this unique dyad?

SHARED DECISION-MAKING

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

TRAUMA-INFORMED

Both parents and providers are confronting significant...

- FEAR
- GRIEF
- UNCERTAINTY

LONGITUDINAL DATA

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

- MENTAL HEALTH
- POSTPARTUM CARE DELIVERY

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

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National Perinatal Association

Gravens By Design: Infant and Family-Centered Developmental Care Standards, Competencies and Best Practices—What is the Evidence?

Joy V. Browne, Ph.D., IMH-E, Kathleen J. S. Kolberg Ph.D

"In considering how implementation of EBP has evolved over time, the integration of a more targeted and organized approach to the best research, clinical expertise and the family's individual values and circumstances, as well as the clinical practices where the health professional works are considerations in setting evidence based standards for care (3)."

Developmental and family-centered care has emerged over the past several decades and is now seen as essential for the clinical care of babies and families. As in any emerging clinical approach, evidence accumulates with varying degrees of scientific rigor. The Infant and Family-Centered Developmental Care (IFCDC) interprofessional consensus panel has, over the past five years, been committed to providing the best evidence regarding developmental care practices for intensive care (1). As a result, the panel has reviewed, evaluated, and documented evidence leading to developing standards and competencies for babies and their families in intensive care.

A recognized definition of evidence-based practice (EBP) by Sackett is "the conscientious, explicit and judicious use of current best evidence in making decisions about the care of the individual patient. It means integrating individual clinical expertise with the best available external clinical evidence from systematic research (2). In considering how the implementation of EBP has evolved, the integration of a more targeted and organized approach to the best research, clinical expertise, and the family's individual values and circumstances, as well as the clinical practices where the health professional works are considerations in setting evidence-based standards for care (3). Traditional medical models, emphasizing experience, clinical judgment, and rationale from pathophysiology, utilized research but in a less organized and systematic fashion (4). Evidence is examined in an organized fashion for the level of evidence leading to a strength of recommendation when combined with clinical judgment. Evidence should be reviewed regularly to update treatment recommendations regardless of the strength of recommendation.

Several structured approaches to evaluating available evidence exist, but for application to the population of preterm and/or medically fragile babies and their families in intensive care, the Interprofessional panel chose Melnyk's Scale (5), which scores intervention studies by the level of evidence according to study design and provides a Critical Appraisal Guide to understand the quality of the studies further. Evidence in Melnyk's Scale was then used to grade the strength of recommendation ranging on an A to D continuum consistent with the Oxford Centre for Evidence-Based Medicine. The committee continues to examine evidence and schedule regular updates.

The first level of evidence possible in Melnyk's model demonstrates a reduction in bias for selection of participants, observer expectations, procedural changes between groups, measurement bias, and recall bias. Additionally, these studies have a large enough sample size to increase the confidence that the result is accurate and not due to chance or innate variability in outcomes. The first level involves proper randomizing participants with care providers and observers blinded to the intervention. Strong representative measures are planned and collected prospectively. Many studies in intensive care that examine pharmacological effects fall into the randomized, double-blinded category. In this type of study, preparatory research also estimates the number of participants needed to achieve significance through power analysis. Treatments based on these studies are labeled as having Grade A strength of recommendation(6).

At the other end of the evidence are studies of rare diseases for which the best evidence may be a few descriptive case studies that are the best evidence available to us. This evidence is combined with clinical judgment inside a clinical setting and working with family/patient preference to produce a care plan. A limitation of this research is the low number of patients and a lack of randomization. However, reviewing a few cases and how care decisions are made in those instances provide insight into how to care for the infant in front of the provider. Treatments based on this research have a Level C strength of recommendation.

Most clinical intervention research falls in between those two approaches. The evidence in many of the "in between" studies comes from cohort studies, crossover studies, case-control studies, and cross-sectional studies. We have accepted observational studies that are compelling, such as loud noise causing physiologic instability in preterm infants (7, 8). Higher-level cohort studies have deepened our understanding of the details of the effect of the acoustic environment. Action-based interventions are challenging to assure "masked" observers and difficult to randomize in a truly clinical environment. The family and the nurse are usually not blind to the intervention, which may change how they assess the infant. Parents and staff in a non-intervention group may also be influenced by observing the interventions and change their behavior, causing a drift in the comparison group. Proper randomization may be flawed if, for example, a developmental intervention is performed on one wing of a unit and standard care is on the other wing. If the intervention changes the length of stay, beds may be available in one condition and not the other, and the participant may not be randomly assigned. Additionally, many available developmental care research study designs include a number of "individualized" and multimodal approaches. Even with these limitations, good quality studies from these levels allow us to have Level B strength of recommendation.

EBP requires a methodical examination of the best evidence available to support the development of recommendations for best practice. Research and clinical experience in developmental care are emerging, so is whether there is sufficient quality in the available studies to inform clinical decision-making and setting standards. Documenting what constitutes evidence-based practice (EBP) in IFCDC is important as it provides the most effective and appropriate clinical care available and does so in the context of the patient's/family's preferences, cultural values, and traditions.

The IFCDC consensus panel, recognizing the need for standardization of practices yet sensitivity to baby and family needs, explored the currently available evidence using a stringent model

that incorporates scientific studies and documented clinical judgment. The consensus panel took on the challenge of critically appraising evidence long before developing the standards and best practices. The panel first established "pillars" consisting of assumptions that take into consideration the baby as a communicator and interactor with their primary caregivers, the baby's and family's individualized developmental needs, neuroprotection of the developing brain, relationship-based infant mental health, and the family contexts all provide the context for evidence-based developmental care in intensive care units. Six domains of current care practices attributed to developmental and family-centered care exhibited enough research and clinical experience to demonstrate merit for inclusion in the standards. Those justifiable domains of evidence include Systems Thinking, Positioning and Touch, Sleep and Arousal, Skin to Skin Contact with Intimate Family Members, Managing Pain and Stress for Newborns and Intimate Family Members and Feeding, Eating and Nutrition Delivery. Three aspects of appraisal of each domain included whether the studies were trustworthy or valid, whether the results were clinically useful and applicable in the clinical setting.

"Six domains of current care practices that are attributed to developmental and family centered care exhibited enough research and clinical experience to demonstrate merit for inclusion in the standards. Those justifiable domains of evidence include Systems Thinking, Positioning and Touch, Sleep and Arousal, Skin to Skin Contact with Intimate Family Members, Managing Pain and Stress for Newborns and Intimate Family Members and Feeding, Eating and Nutrition Delivery."

The interprofessional panel carefully evaluated the evidence for each domain and assigned a level of evidence, resulting in the recommended standards, competencies, and best practice guidelines for IFCDC. The levels of evidence, practical application, and appropriate references are found for each domain at https://nicudesign.nd.edu/nicu-care-standards/. As more studies on the current domain areas are published and reviewed by the panel, revisions will be added. As evidence for other areas attributable to IFCDC become available, they will also be added to the current standards.

All clinical decision-making should be based on available evidence and clinical judgment, including those regarding developmental care. Based on the IFCDC consensus panel's structured review of available research and published clinical practice articles, they developed standards for practice. As the body of research studies evolves and expands, and as clinical experience informs practice, expanding the standards and best practices will ultimately benefit babies and families in intensive care.

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COVID-19

STOP THE SPREAD AT HOME

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

HYGIENE TIPS

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

EYES
Wear protective eye gear (glasses)

HANDS
ALWAYS wash your hands

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

BATHROOM

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

PROTECT

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

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

SELF ISOLATION

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

6 FT

Practice social distancing

KITCHEN

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

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COVID-19

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Qué hacer cuando usted o un ser querido está infectado.

CONSEJOS DE HIGIENE

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

OJOS
Use equipo de protección para los ojos (lentes)

MANOS
SIEMPRE lávate las manos

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

BAÑO

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

PROTEGER

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

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

AISLAMIENTO

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

6 FT

Practica el distanciamiento social

COCINA

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

SIGUIR COVID-19 VISTAR COVIDNEARYOU.ORG

#STOPTHESPREAD

MIORA

Visitar Miora.org

Traído por Miora en asociación con United2Care

Ways to Manage Covid 19 @ Home

Household

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

Stop the Spread at HOME

MIORA

Sick

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

Maneras de manajer COVID-19 en casa

Hogar

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

Detén la propagacion en casa

MIORA

Enfermo

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

PROTECT YOUR FAMILY FROM

RESPIRATORY VIRUSES

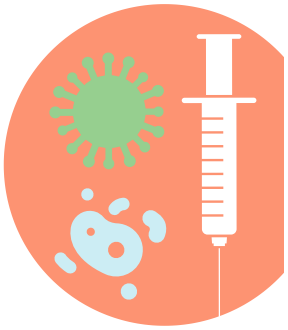
flu coronavirus pertussis RSV

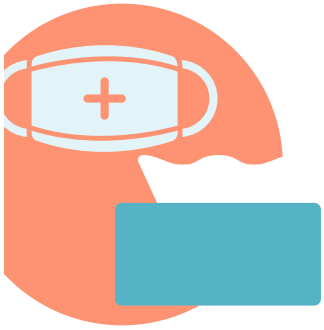
WASH YOUR HANDS

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

GET VACCINATED

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





COVER COUGHS AND SNEEZES.

Sneeze and cough into your elbow.

USE A HAND SANITIZER THAT IS 60%+ ALCOHOL.

STAY AWAY FROM SICK PEOPLE

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

National Perinatal Association

nicuparentnetwork.org

nationalperinatal.org

NPN NICU PARENT NETWORK

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

KEEPING MOTHERS + INFANTS TOGETHER

Means balancing...

Risk of horizontal infection

Risks of separation and trauma

EVIDENCE

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

PARTNERSHIP

SHARED DECISION-MAKING

What is the best for this unique dyad?

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

TRAUMA-INFORMED

Both parents and providers are confronting significant...

- FEAR
- GRIEF
- UNCERTAINTY

LONGITUDINAL DATA

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

- MENTAL HEALTH
- POSTPARTUM CARE DELIVERY

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

Partnering for patient-centered care when it matters most.

National Association of Neonatal Nurses

nann.org

National Perinatal Association

nationalperinatal.org

NT Behind the Scenes: Welcome to Neonatology Today Media

Kimberly Hillyer, DNP, NNP-BC

Neonatology Today is strengthening its social media platform. We have now branched out to YouTube. In November of this year, we created a subdivision called Neonatology Today Media. Please use the link to subscribe today, **"Neonatology Today Media."**

Neonatology Today Media will provide a visual presence to expand the knowledge of our subscribers with a comprehensive look surrounding the healthcare of today and the future.

"Neonatology Today Media will provide a visual presence to expand the knowledge of our subscribers with a comprehensive look surrounding the healthcare of today and the future."

This channel will feature a diverse group of voices that will promote the health and care of newborns. Like Neonatology Today, the channel will incorporate information surrounding the diagnosis, treatment of the premature and sick infants in the Neonatal Intensive Care Unit and post-discharge. We believe that we can provide a system that will allow individuals to make a difference in newborns' world, a place where voices are heard. We hope to collaborate with organizations and individuals that will help us provide a place where Neonatologist, Perinatologist, Nurses, Respiratory Care Specialists, Parents, and anyone interested in Neonatal-Perinatology have the possibility in making reform at all levels of the healthcare system.

We will interview individuals with expertise in a wide range of topics affecting healthcare and our society today. With the belief that we can eliminate inequities in healthcare, we will discuss the diverse communities we serve. We will bring awareness with stories that address human rights, access to care, and patient stories. We will spotlight individuals who offer solutions or have made a difference in addressing health disparities and overcoming the barriers to human suffering and unfair disadvantages.

Come back monthly to the YouTube channel "**Neonatology Today Media**" or click on the article link or NT media image to go directly to the channel to see what we have added. Please subscribe, hit the notification bell, and comment on the videos.

"Interested in being featured on Neonatology Today Media, please email LomaLindaPublishingCompany@gmail.com. Include your name and a Press or Authors kit describing the project or book that you would like featured on our channel."

Interested in being featured on Neonatology Today Media, please email LomaLindaPublishingCompany@gmail.com. Include your name and a Press or Authors kit describing the project or book that you would like featured on our channel.

Click this link to enjoy the direct viewing of the interviews.

Disclosure: *The author has no disclosures.*

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

Neonatology Today in partnership with Loma Linda University Publishing Company.

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.

Readers can also follow

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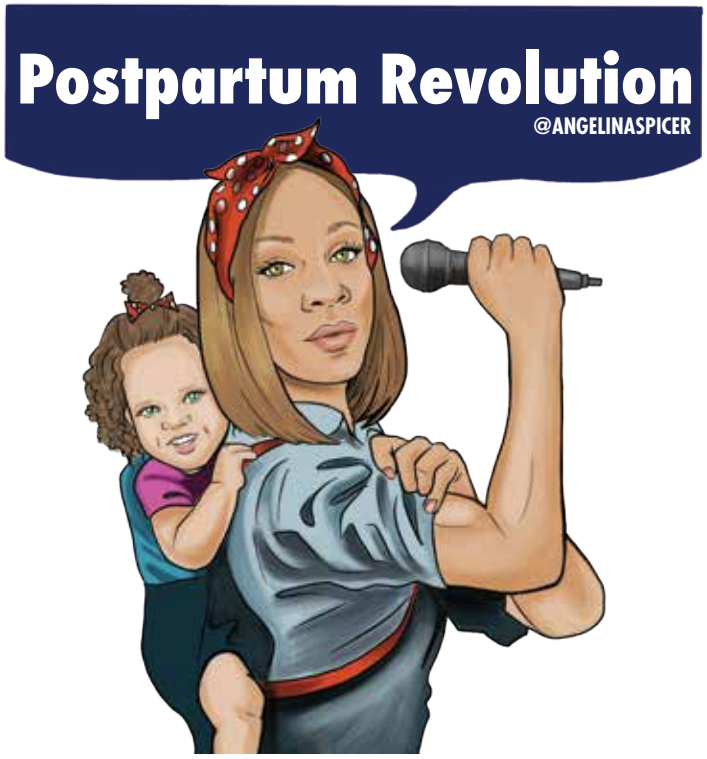

ONCE UPON A PREEMIE ACADEMY

eLearning Courses

Health and Racial Equity Continuing Education Courses

+ An Intro to Health and Racial Equity and Implicit Bias
+ Solutions for Addressing Inequities and Implicit Bias In the NICU
+ Black NICU Mother's Mental and Emotional Health
+ Black Preemie Parents as Partners in Preemie Care

Register at OnceUponAPreemieAcademy.com

$150
physicians
$175

equity-focused solutions for healthcare professionals

The first and only virtual training academy focused on delivering health and racial equity educational programs for perinatal and neonatal healthcare professionals. Our purpose is to raise awareness and offer real-time solutions for addressing health and racial equity.

+ Earn Continuing Education Credits
+ Learn from nationally recognized perinatal and neonatal professionals and preemie parents
+ Gain actionable tools to drive health and racial equity solutions in your organization!

pac-lac Continuing Education Partner, paclac.org/continuing-education

NICU-NET

NICU-NET is a private and moderated forum for neonatology professionals. Membership is available to physicians, nurses, and other caregivers in neonatal and perinatal medicine. Conference announcements and other news of interest to members may be posted here. Please do not post messages with identifiable patient information of any kind. Vendor posts and messages of a commercial nature will be deleted.

To post to the list, send email to

nicu-net@nicu-net.org

To subscribe or unsubscribe, send an email to nicu-net-request@nicu-net.org with one of the following commands in the subject line:

join - Join this mailing list.

leave - Leave this mailing list.

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Rather than joining by email, if you would like more granular control over your subscription (frequency of digests, vacation holds, etc.), you can navigate to https://nicu-net.org/mailman3/lists/nicu-net.nicu-net.org/, create a username and password, and set, view, or modify your subscription settings.

Message archives from the U. of Washington NICU-NET (1994-2003) and Yahoo Groups NICU-NET (2003-2019) are available on Google Drive. You can download them using this link: https://drive.google.com/drive/folders/1MoPTrDjzmGbsZlKqY9MczihApWaFbREK?usp=sharing

To contact the list owners, use the following email address:

nicu-net-owner@nicu-net.org

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

In Loving Memory

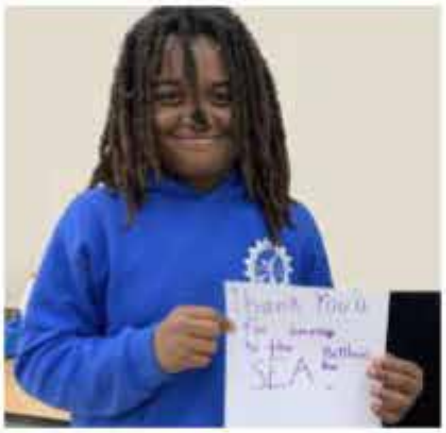
August 9, 1996 - April 3, 2010

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

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

Sponsor a Child in the SEA Program

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



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

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

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2022

Perinatology at the Intersection of Health Equity and Social Justice

NPA's 42nd ANNUAL INTERDISCIPLINARY CONFERENCE

DATES May 2 - 4

SEEKING POSTER ABSTRACTS

- Innovative Models of Care
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STUDENT RESEARCHERS ARE ENCOURAGED TO SUBMIT.

VENUE Hyatt Regency Aurora-Denver

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National Perinatal Association

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

The Teaching and Supervising Physician: Why Do We Need (Have) Rules?

Gilbert I. Martin, MD

In today's world, it is the physician's responsibility to decide on the correct code for services rendered. We as neonatologists embrace taking care of newborns, but the business of neonatology remains a tedious chore. Since the daily rounding requirements of the physicians and associated ancillary groups continue to increase, most neonatal groups employ a business office with coding specialists to assist in assigning both CPT (Current Procedural Terminology) and ICD (International Classification of Diseases) codes. I have often pleaded "not to kill the messenger."

"In today's world, it is the physician's responsibility to decide on the correct code for services rendered. We as neonatologists embrace taking care of newborns, but the business of neonatology remains a tedious chore."

The teaching and supervising physician includes residents, fellows, neonatal nurse practitioners, and other healthcare providers. The global concepts deal with improper coding (coding for services and procedures that the documentation in the medical record cannot substantiate); coding for the level of service which cannot be substantiated; sloppy reporting, or finally, intentional improper coding now considered "fraud and abuse."

The teaching supervising physician should document their presence, especially their care involvement. When quoted, participation times are called "typical times," and the "typical time" is derived from CPT or RUC surveys. The involved individuals also must match ICD-10-CM diagnoses to the level of service.

The business office must understand the contractual relationships which establish the documentation of services. General evaluation and management principles (E&M) must be followed. The physician must provide timely information, and if there is an addendum added to the note, it needs to be dated and timed.

The PATH Guidelines (Physicians at Teaching Hospitals) are an initiative by the Inspector General (OIG) of the Justice Department to investigate coding and documentation practices. These include presumed abuses, including upcoding and especially the "non-presence" of the teaching physician.

Unfortunately, investigations at all levels are increasing, and they utilize the same audit tools that Federal Medicare employs. Is the term "whistleblower" all too familiar? The justification of the costs of audits is justified by the large amounts of payoffs that are offered. The awards include $3,000 - $10,000 per claim in addition to treble the damages. The whistleblower can receive 10-15 percent of this amount.

"The justification of the costs of audits is justified by the large amounts of payoffs that are offered. The awards include $3,000 - $10,000 per claim in addition to treble the damages. The whistleblower can receive 10-15 percent of this amount."

Some definitions guide the use of the term "direct services." By definition, this describes a service to a patient furnished by a physician or by a resident supervised by a physician in the teaching hospital. The service furnished and the teaching physician's participation are required to place a code. If the neonatologist is just "on the floor" and not in the area dealing with the patient directly, the code cannot be placed. Remuneration by Medicare will be provided if the teaching attending was present for the critical/key portions of the service. Documentation should include information regarding the performance of the service by the physician and participation in the management decision.

The level of E/M service based upon CPT can be a combination of the resident, fellow, and teaching physician notes which can determine the level of documentation. If audited, the reviewer will consider these notes and decide upon the correct level of code or service.

Several scenarios should be presented. First, the admission and follow-up note must be capable of "standing alone." Second, the resident or fellow performs the key elements in the presence of the attending physician. In that case, as an attestation, the attending physician would state, "I was present with the resident/fellow during the admission or follow-up examination. I discussed and agreed with the findings and plan.

"In addition to all of the above, I recommend that one member of the neonatal team provides input to the billing office. Oftentimes when a code is denied, there needs to be appropriate claims filings, timely follow-through, and an aggressive appeal process that is ongoing. "

In addition to all of the above, I recommend that one member of the neonatal team provides input to the billing office. Oftentimes when a code is denied, there needs to be appropriate claims filings, timely follow-through, and an aggressive appeal process that is ongoing. Neonatologists want to care for babies and families and often find these coding guidelines onerous. We often incorrectly believe that reduced payment can be offset by increasing volume. Does this sound familiar?

Certain comments never should be professed to an auditor or claims representative when you are asked to substantiate a CPT or ICD code. These include:

1. You underpaid us, and we want that money right away
2. You people did it again
3. You're completely useless. Let me talk to your supervisor
4. Do you know who I am?

Someone on the neonatal team and in the billing office needs to be aware of the appeal process, the designation of a "clean claim," and the ability to evaluate the explanation of benefits (EOB) where processing errors or inappropriate codes are provided. The teaching physician (us) is ultimately responsible for CPT codes selected and billed. Fraud and abuse will not look good on your curriculum vitae.

The "proactive teaching physician" should have input in the negotiation process on contracts, frequently meets with billing staff to assess denials, claims for additional information, and non-payment. Like the "clotting mechanism," a billing and reimbursement cascade is often repetitive but not always consistent. When we pay our monthly bills, there is often an "interest charge" for delayed payments if late. Why is it that neonatologists and billing offices do not consider this approach? If we don't pay the plumber, the water will be turned off. If we don't pay the electric bill, we sit in darkness. If we don't pay our mortgage, we will be snoring under the stars. Where is the justice?

A Coding Limerick for Today

We disdain the term whistleblower,

In dealing with a feeder or grower.

Our language must not be terse,

When we consider the term "reimburse,."

We don't want our payments to be lower.

Thank you to Dr. Stephen Pearlman, who provided the verbiage for the title of this "MISSIVE".

Disclosure: There are no reported conflicts.

NT

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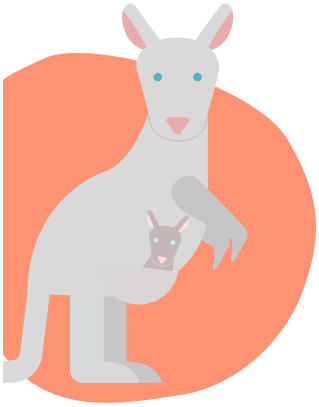
SUPPORTING KANGAROO CARE

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

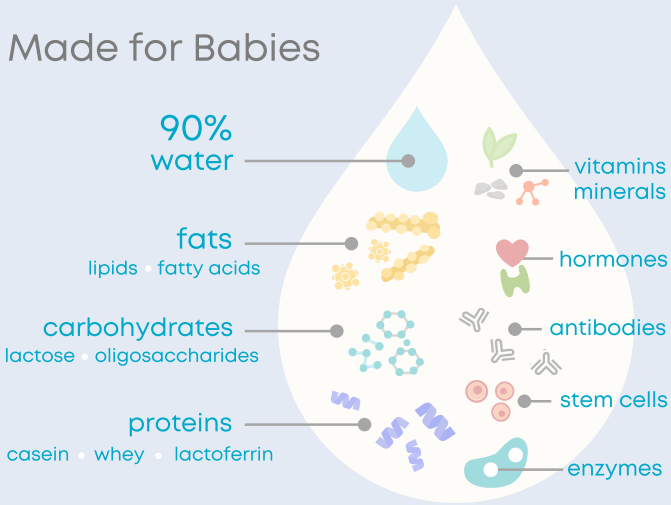
nationalperinatal.org/skin-to-skin

NPN NICU PARENT NETWORK

The Composition of BREAST MILK

200+ components

Made for Babies



Breast Milk is Living Tissue

National Perinatal Association

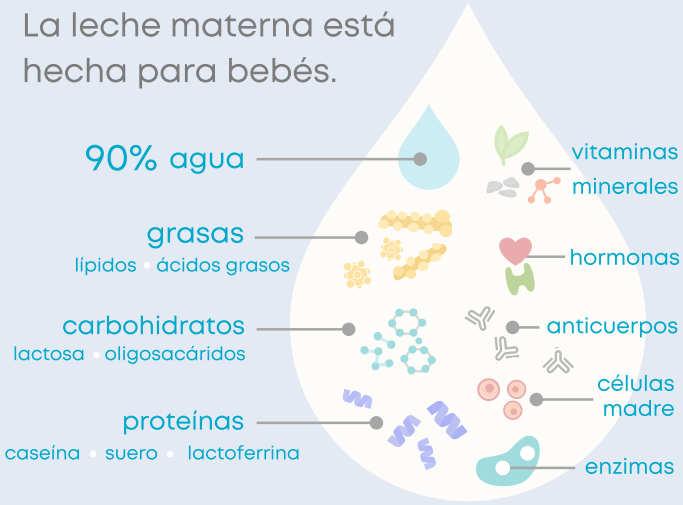
Educate. Advocate. Integrate.

nationalperinatal.org/feeding_our_babies

La composición de la LECHE MATERNA

200+ componentes

La leche materna está hecha para bebés.



La leche materna es tejido vivo.

National Perinatal Association

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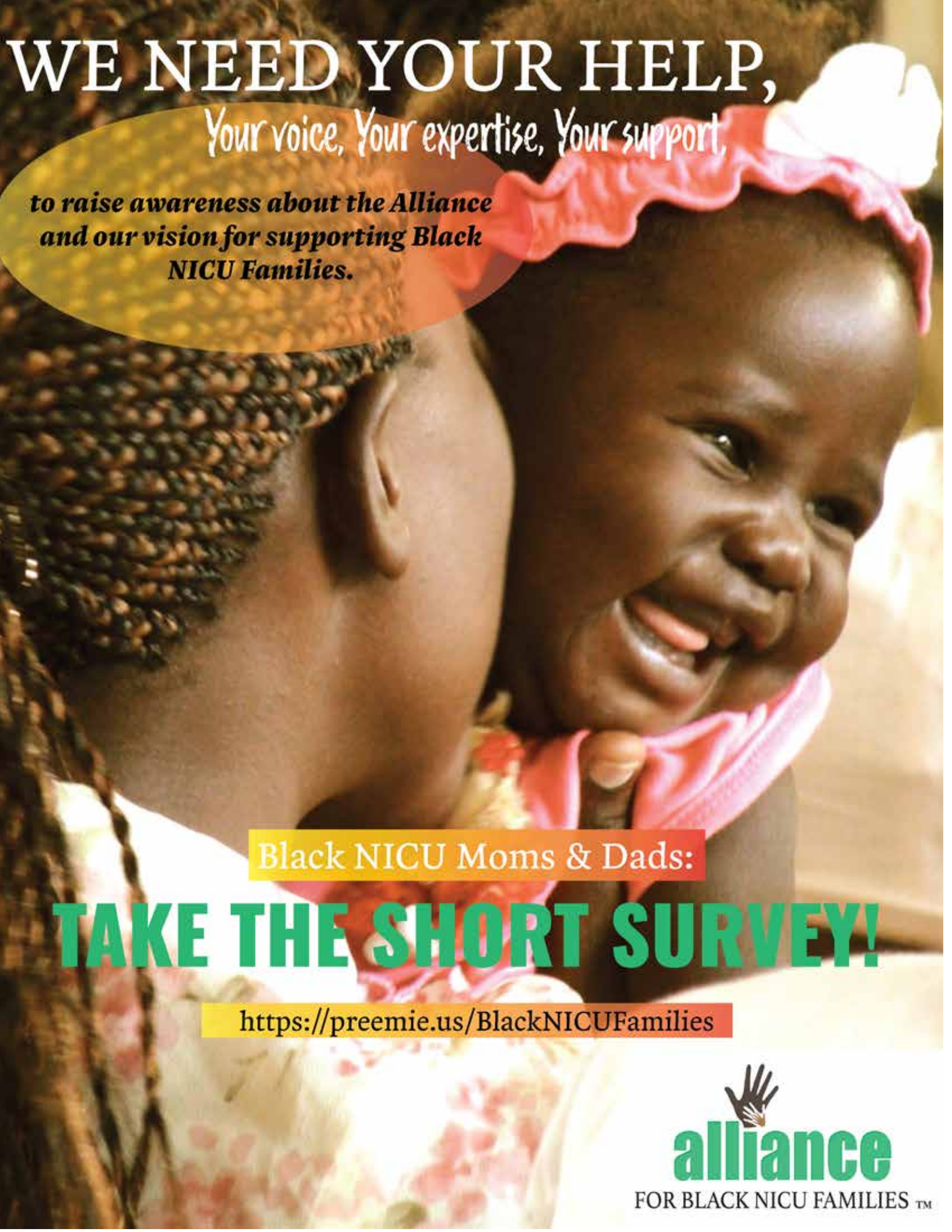
The Village Son

A Life's Journey

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

Houchang D. Modanlou


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 ™

Medicaid, Doulas and Reducing Maternal and Infant Mortality Rates in the United States

Barb Himes, IBCLC, CD

first candle

Saving babies. Supporting families.

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

"However, many factors interfere with maternal access to health care before, during, and after pregnancy, including racial/ethnic disparities and socioeconomics. Mortality rates due to pregnancy and birth complications are more than three times higher in Black than white women, and Black infants are more than twice as likely to be born prematurely or die within their first year of life than non-Latinx white infants."

First Candle's mission is to reduce the rates of sleep-related infant mortality, which involves taking a hard look at maternal health - a critical gateway to infant health, and a reason why the American Academy of Pediatrics (AAP) includes in its infant safe sleep guidelines the recommendation that pregnant women seek out and obtain regular prenatal care.

However, many factors interfere with maternal access to health care before, during, and after pregnancy, including racial/ethnic disparities and socioeconomics. Mortality rates due to pregnancy and birth complications are more than three times higher in Black than white women, and Black infants are more than twice as likely to be born prematurely or die within their first year of life than non-Latinx white infants. Further complicating this is that women have also reported feeling they experience diminished autonomy or indifference in the provider-patient relationship, which could affect their outcomes and attitudes toward accessing care. (1)

On the economic side, according to the Centers for Medicare and Medicaid Services (CMS), nearly two out of three adult women enrolled in Medicaid are of childbearing age, and Medicaid covers around 42% of births in the United States. Of those, whites make up 41.8% of women covered by Medicaid or the Children's Health Insurance Program (CHIP), Hispanic women 28.1%, Black women 21.0%, and the rest Asian or native ethnicities.

In addition, only 21% of women in 2018 had a family income of 250% of the Federal Poverty Level (FPL) compared to 56.7% for women overall, and 20% had a family income of only 50 to 99% of the FPL. (2) The lack of financial resources can get in the way of access to health care to the degree needed throughout the birthing process and add to the risk of compromised health for infants.

But there is something that can address this combination of financial and social strain and help pregnant women get adequate care: make doulas part of the maternal health support network covered by Medicaid.

This approach advanced by the National Health Law Program's Doula Medicaid Project monitors the status of Medicaid efforts regarding doula reimbursement in the United States, state by state. The ongoing-updated chart can be found at https://healthlaw.org/doulamedicaidproject/. The program's goal is to ensure that all pregnant enrollees in Medicaid who want access to a doula will have one.

According to the latest standings, there are currently four states

(Oregon, New Jersey, Minnesota, Florida) where Medicaid is actively reimbursing for doula services, and eight states are putting Medicaid doula benefits in place. Ten states report action has been proposed but has made no progress, and those remaining have been taking steps related to care, such as setting up doula registries and certification programs.

"This initiative matters because it contributes to maternal health care support, directly affecting maternal outcomes in at-risk populations and providing a method of care that fosters a level of trust that can enhance health care compliance to the benefit of mother and baby."

This initiative matters because it contributes to maternal health care support, directly affecting maternal outcomes in at-risk populations and providing a method of care that fosters a level of trust that can enhance health care compliance to the benefit of mother and baby.

Doulas are a trained personal support system for expectant mothers and, depending upon the care plan, can be with the mother for prenatal and postpartum visits and the birth. Research studies indicate that doula support has contributed to better birth outcomes, reduced caesarian sections, advanced breastfeeding, and bolstered maternal emotional wellbeing. (3) They also serve mothers and their partners in their homes, literally meeting families where they live.

The Doula Medicaid Project is taking place as Medicaid itself continues its Maternal and Infant Health Initiative, working with states to increase the use and quality of postpartum care visits and decrease rates of caesarian sections in low-risk pregnancies, as well as increase well-child visits.

In 2018, there were 17 maternal deaths for every 100,000 live births in the United States, a rate that is more than double that of most other developed countries, which have a more integrated system of physician and midwife support than the U.S. (4) Unlike midwives, doulas do not deliver babies. However, in this country, they share with midwives a history of providing maternal support decreased by regulations in the 20th century with the advent of physician-centric health systems.

There is room for both, and the expansion of Medicaid to cover doulas is a positive step toward improving maternal and infant health.

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***Disclosure**: The author is the Director of Education and Bereavement Services for First Candle, a 501c (3) non-profit organization.*

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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.

Academic Physician – Neonatal Section Chief
The University of Chicago: Biological Sciences Division: Department of PediatricsPosition

Description

The University of Chicago's Department of Pediatrics is searching for a full-time faculty member at the associate or full professor rank to serve as the Chief of the Section of Neonatology. The appointee will be a nationally recognized scholar focused on making fundamental discoveries of high impact in one or more aspects of neonatology. The appointee will also serve as the inaugural Stephen Family Chair in Pediatrics. We are particularly interested in individuals with expertise in genomics, metabolomics, neonatal pharmacology, and/or neurodevelopmental disorders. Other duties will include teaching and supervision of trainees and students. Academic rank and compensation (including a generous package offringe benefits) are dependent upon qualifications.

The Chief of the Section of Neonatology has responsibility for supervising the 71 bed Level IV NICU at UChicago Medicine Comer Children's Hospital and for oversight of the UChicago Medicine perinatal network that stretches across the region. In addition, the successful individual will assume a leadershiprole in our evolving partnership with the Chicagoland Children's Health Alliance, the largest pediatrics program in the state of Illinois. Together, we care for over 25,000 deliveries per year across metropolitan Chicago, adjacent counties in Illinois, and Northwest Indiana.

We anticipate a leader who will grow the clinical program, enhance the training of our fellows and residents, have a commitment to outstanding quality and efficiency, lead an outstanding group of clinical and translational neonatology investigators, and develop programs of fundamental impact. We are particularly interested in individuals who will exploit the enriching environment of the Biological Sciences Division, The Pritzker School of Molecular Engineering, and the other Divisions of the Universityto advance neonatal medicine.

Prior to the start of employment, qualified applicants must: (1) have an MD or MD/PhD or equivalent, (2) hold or be eligible for medical licensure in the state of Illinois, and (3) be board certified or board eligiblein Neonatology.

To be considered, those interested must apply through The University of Chicago, Academic Recruitment job board, which uses Interfolio to accept applications: http://apply.interfolio.com/87879.Applicants must upload: a CV, including bibliography and cover letter. Review of applications ends when the position is filled.

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Job seekers in need of a reasonable accommodation to complete the application process should call 773-702-1032 or email equalopportunity@uchicago.edu with their request.

Another Sad Goodbye

Kelly Welton, BA, RRT-NPS

"A seasoned NICU/PICU RT has left us for a Covid contract job. She will make $5K a week, about three times what she makes at her home hospital. "

A seasoned NICU/PICU RT has left us for a Covid contract job. She will make $5K a week, about three times what she makes at her home hospital. She is taking a giant leap: change in benefits, no 401K contributions, and a 13-week commitment to leave home life comforts and sleep in a strange place, learn a new EMR system, and try a new menu of hospital food (which could be an improvement).

The surge in demand for hospital beds and RT's during the pandemic hit some hospitals and areas harder than others. Perhaps her home hospital was not that affected, and this was her chance to branch out and learn more about ICU or ER care. Alternatively, maybe it was affected, but the call to go was stronger than the pull to stay. Was it the money? The opportunity to play bigger in the healthcare arena? The call to expand her role in a big way?

What did her home hospital manager say? Come back anytime? Or bye-bye forever if you leave us now? And what did her manager say to the Administration? At the destination hospital,

It turns out she was replacing 4 RT's that left for Covid Bucks. It is one thing to need staff for a pop-up field hospital, another for a manager to try to keep their head above water when staff is leaving in droves.

It seems this whole Covid surge staffing looks like one big square dance.

Everyone took one step to the right, to another hospital. Some traveler stories sound more like speed dating. Take six 13 week contracts in a row in different hospitals and see what else is out there.

When she left, she left a vacancy that took administrators a minute to realize would need to be filled. The options were: fill with a new grad (there were none, the graduating class of 2020 got cheated out of their last clinical rotations) or pay lots of overtime to current staff. Or start hiring contract RT's of their own. However, this NICU/PICU RT was also an experienced outside transport RT.

Many people think the NICUs were not that affected by CoVid. But CoVid landed so fast, and managers did not see the shift coming -- neither did Administration. The notion of pop-up hospitals conjured up images of them being staffed by FEMA or military RT's and RN's. Compared with Ebola, which was contained, as a nation, we prepared. Moreover, there was no need for pop-up hospitals. CoVid landed like an asteroid causing wildfires, and the damage was done and continued to destroy. But back to my original thought:

Why not just recognize the demand for RT's and pay the $$ so they will stay?

There is more than one reason a "SoCal" RT would leave this weather to go to places where blizzards happen -- more recognition, more respect, certainly more pay. Respiratory Therapy finally got its name on the minds of the public. But, at what price? (1)

"There is more than one reason a "SoCal" RT would leave this weather to go to places where blizzards happen -- more recognition, more respect, certainly more pay. Respiratory Therapy finally got its name on the minds of the public. But, at what price? (1)"

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

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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."

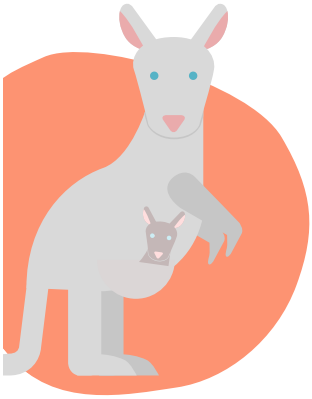
10 HELP US HEAL

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

ONCE UPON A PREEMIE ACADEMY

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+ Deidre McDaniel, MSW, LCSW
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+ Dalia Feltman, MD, MA, FAAP
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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

Peer Reviewed

Pediatricians Increase Knowledge of Neonatal Circumcision Using www.neocirc.org

Chloe Salzmann, MD, Max Maizels, MD, Emily S. Blum, MD, Edwin A. Smith, MD, Paola Fliman, MD, Elizabeth Goetz, MD, and Walid A. Farhat, MD

Abstract:

Objectives: *Neonatal circumcision is a common practice. We believe that adverse neonatal circumcision outcomes (ANCOs) may occur owing to a lack of standardized knowledge of circumcision. The goal of this study was to determine if a single tool could provide multiple specialties with increased knowledge of neonatal circumcision.*

Methods: *The authors used insight from multidisciplinary circumcision providers to build the educational model. It was made available online, and a user survey assessed its usefulness. Knowledge of pediatricians in a teaching hospital was assessed before and after using www.neocirc.org, and the scores were compared using a paired t-test.*

Results: *www.neocirc.org was found to be 95% useful by multidisciplinary users. Pediatricians significantly increased knowledge after using www.neocirc.org from intake correct answers (18/30, 60%) to exit (23/30, 77%), respectively (p<0.0001).*

Conclusion: *www.neocirc.org provides a tool to increase pediatrician knowledge about neonatal circumcision. Future research is indicated to assess if the use of www.neocirc.org may reduce the incidence of ANCOs.*

"Neonatal circumcision is one of the most common procedures in pediatric patients. It is routinely performed by pediatricians, family physicians, obstetricians, and urologists. Adverse neonatal circumcision outcomes (ANCOs) may follow and affect approximately 52000 newborn males each year in the US. (1,5)"

Introduction:

Neonatal circumcision is one of the most common procedures in pediatric patients. It is routinely performed by pediatricians, family physicians, obstetricians, and urologists. Adverse neonatal circumcision outcomes (ANCOs) may follow and affect approximately 52000 newborn males each year in the US. (1,5) The American Academy of Pediatrics Task Force on Circumcision charged key organizations (such as the American Academy of Pediatrics, American College of Obstetrics and Gynecology, American Academy of Family Physicians) to collaboratively develop standards of training proficiency in performing circumcision and provide education for the care of circumcised newborn males. (2) However, there has not yet been a systematic effort to standardize the procedure training for providers or home-care for parents resulting in reduced ANCO incidence. The responsibilities of primary care physicians and obstetricians in the newborn nursery often include judging suitability for circumcision, performing circumcision, and providing education on care after circumcision to parents. However, it is unusual that primary care residency programs have standardized instruction for these domains. (3) The majority of home-care instruction is frequently provided to families by nursing staff, which varies significantly among providers and hospitals. Because we believe ANCOs largely result from conflicting knowledge regarding newborn circumcision across multiple specialties, we created an online tool to promote consistency in knowledge across specialties. Herein we present the model creation process and the results.

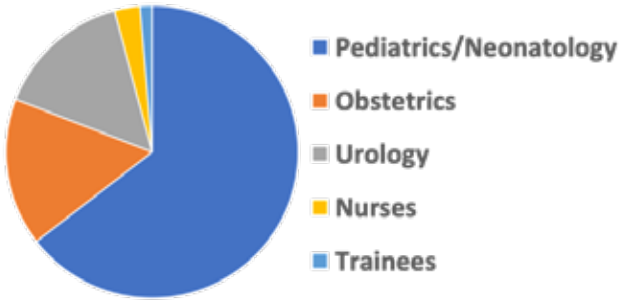

Figure 1. Logins after launch by specialty (n=332).

"The model presents knowledge interactively as a single method that is applicable to diverse clamp types and circumcision experiences. The model encompasses three domains: before, at, and after circumcision."

Methods:

The model was built based upon insights from circumcision providers (n=46): Pediatrics/Neonatology (24), Obstetrics (14), and Pediatric Urology (8) that were collected during real-time focus groups and by survey data. These insights were then compiled along with the authors' opinions to provide the framework for the content build of the model. The model presents knowledge interactively as a single method that is applicable to diverse clamp types and circumcision experiences. The model encompasses three domains: before, at, and after circumcision. Before circumcision, the model provides a standardized assessment for medical and anatomical clearance for circumcision, referenced as picture match (Figure 4a). At the circumcision table, the model demonstrates a standardized procedure, referenced as NeoCircles (Figure 4b). After circumcision, it provides consistent home-care instructions, referenced as penis skin shaft physical therapy (PSSPT) (Figure 4c). The model was made available online at www.neocirc.org. The model's usefulness was assessed using an embedded survey tool (Likert scale).

The circumcision knowledge gained among pediatric hospitalists and trainees was tested at one author's (CS) hospital, Advocate Children's Hospital in Park Ridge, IL. The subjects included pe-

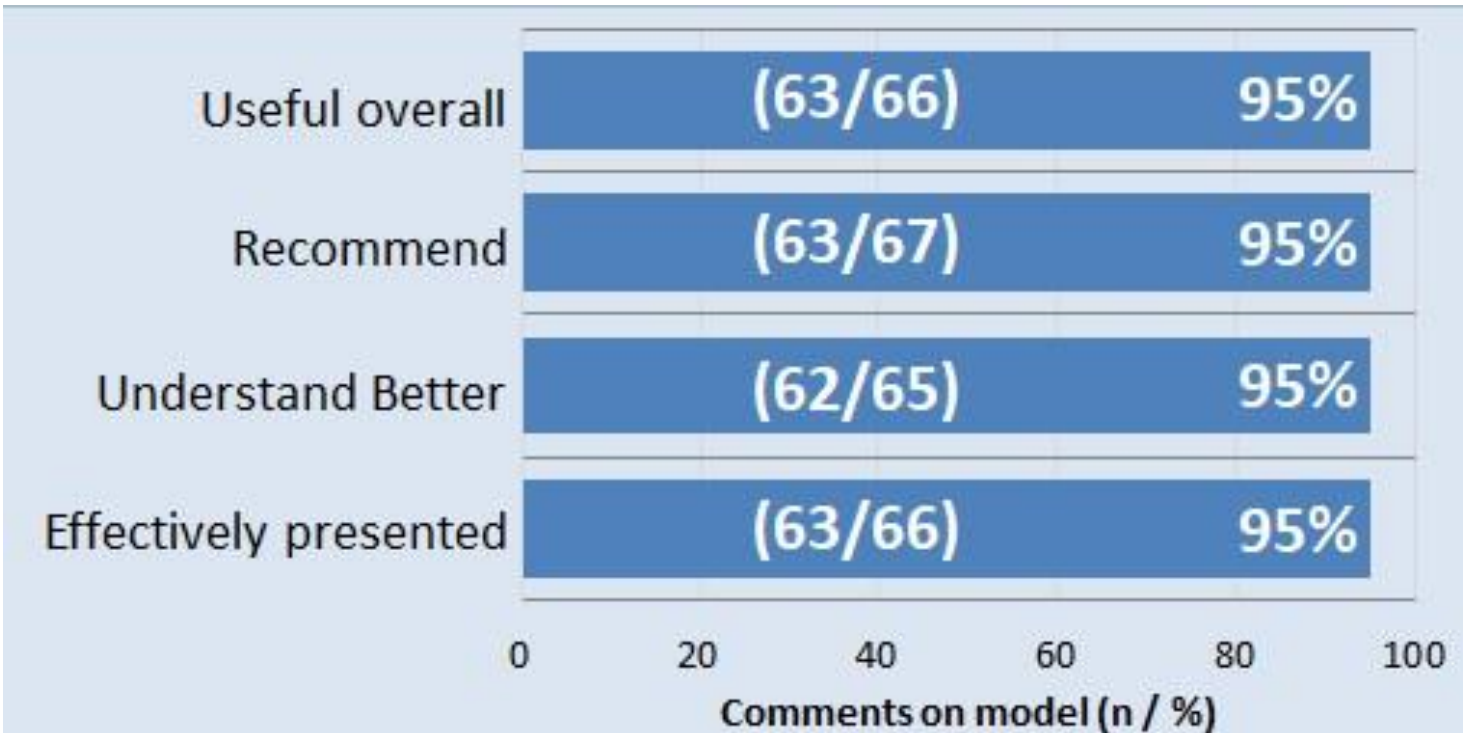

Figure 2. Survey data shows the model is useful at 95% of comments.

diatric physicians and trainees in a teaching hospital, and knowledge of circumcision was tested before and after access to the model. The intake and exit test scores were then compared using a paired t-test.

Results:

Focus groups reviews of www.neocirc.org indicated the model content as "very valuable" for the three domains: before (19/19), at (22/31), and after circumcision (21/27). For example, before circumcision, there were 19/19 comments which indicated the picture match method to assess suitability was "very valuable." A total of 19/27 (70%) comments showed that at circumcision, "how to mark the circumcision site," using the standardized method of NeoCircles was "very useful." Furthermore, the model content on home care provided as PSSPT was "very useful" in 21/27 (78%) comments.

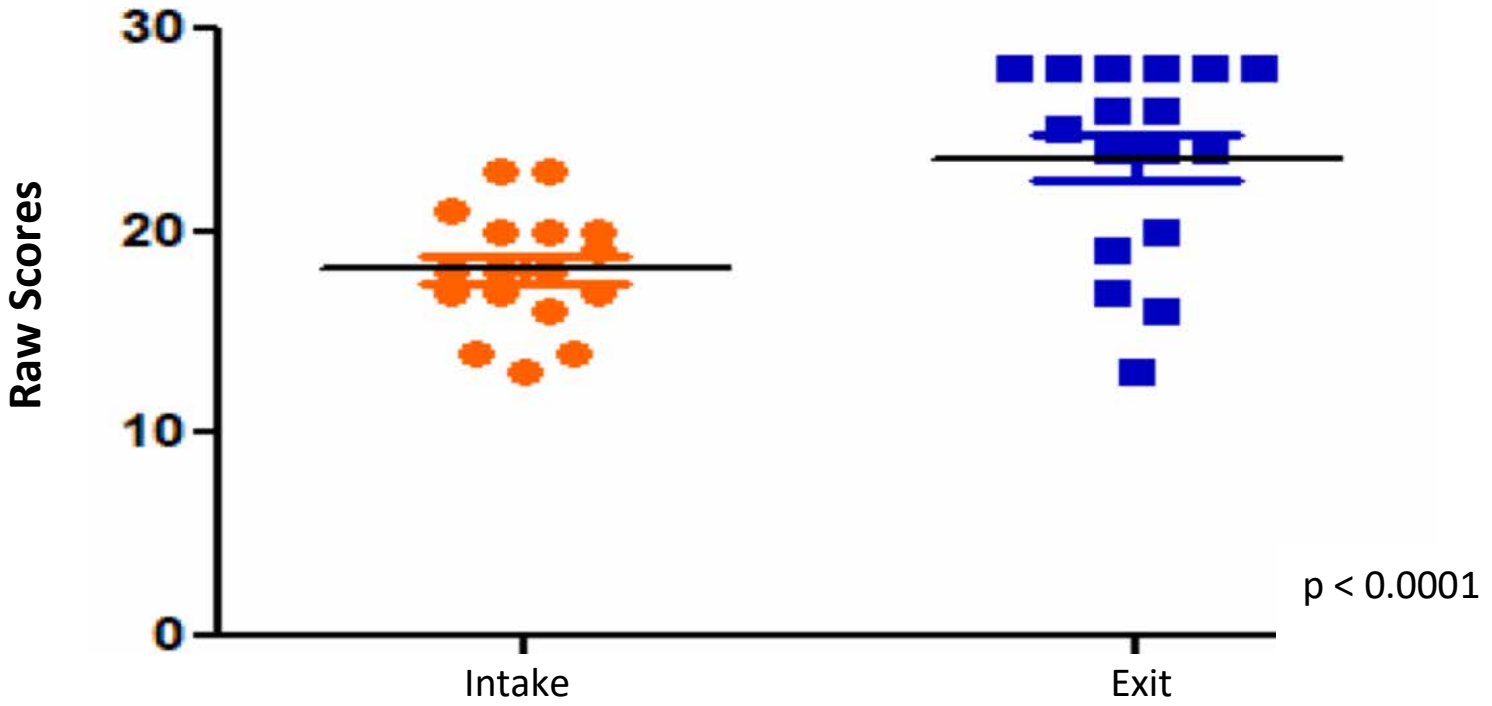

Figure 3. Physician staff knowledge to correctly answer 30 questions increased significantly after access to the www.neocirc.org model (p<0.0001).

Figure 4A. NeoCirc.org presents innovative methods for the process of circumcision. Method of "Picture Match" to judging suitability for circumcision. All views require a "yes" for circumcision planned to be suitable.

The focus group comments were assimilated into content creation and the authors' personal views. We used word of mouth to launch the model. This resulted in 332 users who logged in from diverse specialties (Figure 1). The majority of users (65%) were pediatricians/neonatologists, followed by (16%) obstetricians, (15%) urologists, (3%) nurses, and (1%) trainees from several different practices and hospitals.

The time intervals that subjects accessed the learning before completing the exit survey were: less than 30 minutes (n=27), 30 min to 1 hour (n=67), 1-2 hours (n=15), greater than or equal to 2 hours (n=2). This data shows the majority (94/111, 85%) of subjects completed learning sufficient enough for them to access the exit survey within 1 hour of learning.

"This data shows the majority (94/111, 85%) of subjects completed learning sufficient enough for them to access the exit survey within 1 hour of learning."

The www.neocirc.org model was found to be 95% useful by the 66 users who completed the survey (Figure 2). The survey data demonstrated that users gained a "better understanding of neonatal circumcision," that the model provided "effective presentation of knowledge," and that users" would recommend www.neocirg.org to a colleague." A sample user comment on suitability was, "Thanks to your valuable advice, I [learned] that mild [glanular] hypospadias as long as it is located distal to corona, is not contradicted for circumcision…."

There was strong overall subjective agreement on the model's usefulness for the 111 responses as follows. The survey responses showed the model was effective: strongly agree (n=54), agree (n=50), neutral (n=5), and disagree (n=2); and survey responses showed the model provided significantly better knowledge: strongly agree (n=54), agree (n=48), neutral (n=8), and disagree (n=1). For this research, we define effective as "useful and increases circumcision knowledge."

Effectiveness in increasing knowledge was tested prospectively at

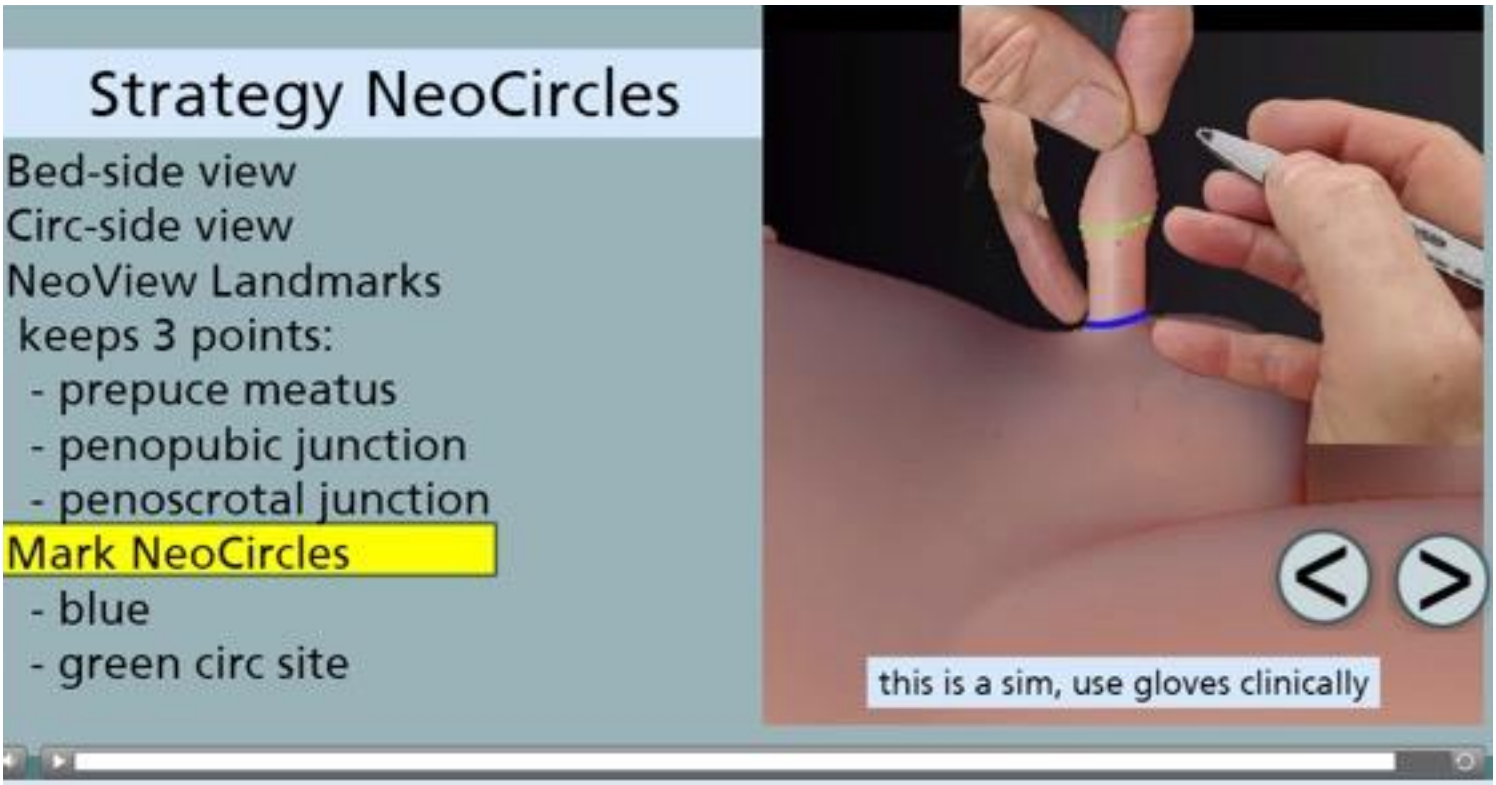

Figure 4B. NeoCircles (blue and green lines) are the markings of a standardized method for circumcision incision. The blue line identifies the penopubic crease at the base of the penis and guides marking the skin just distal to the glans corona in parallel orientation. The green line marks the circumcision incision site.

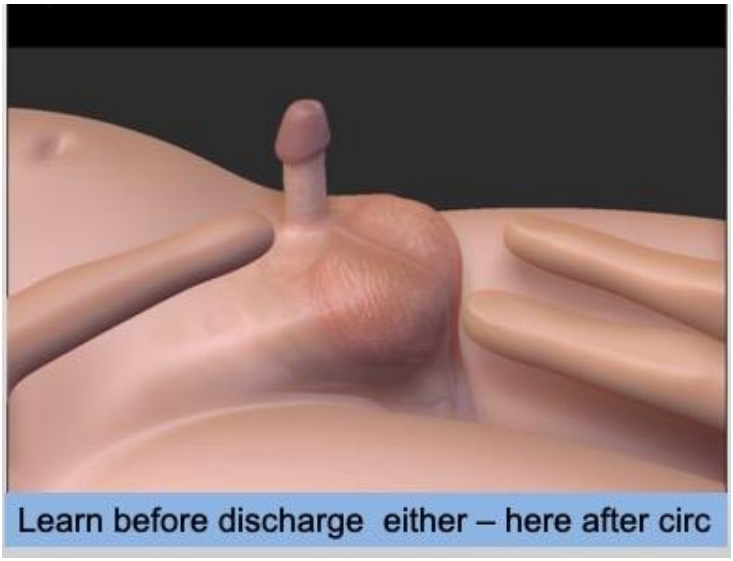

Figure 4C. Penis Shaft Skin Physical Therapy (PSSPT) is taught to parents before discharge, preferably before circumcision. This method works to keep shaft skin below the glans and promote healing.

an academic hospital among pediatric hospitalist attendings and trainees (Figure 3). A total of 30 pediatricians completed an intake knowledge test (30 questions) and then accessed the www.neocirc.org model for online education. A total of 15 (50%) also completed the same test on exit. Comparison of intake and exit test scores showed a significant increase in knowledge after access to www.neocirc.org from intake correct answers (18/30, 60%) to exit (23/30, 77%), respectively ($p<0.0001$).

"We have shown that the online tool created significantly improves newborn circumcision practices among pediatricians, and survey data shows it was effective and valuable (95%) across multiple specialties."

Discussion:

We have shown that the online tool created significantly improves newborn circumcision practices among pediatricians, and survey data shows it was effective and valuable (95%) across multiple specialties. Insights from focus groups revealed that about 70% of circumcision providers desire more information on objective landmarks to place the circumcision incision planned; www.neocirc.org content on such placement, presented as NeoCircles, was regarded as very valuable (70%).

In our opinion, determining suitability for circumcision and defining medical clearance is currently not clearly defined or standardized and varies greatly among primary care physicians and obstetricians, preventing clamp circumcision from being the safe and consistently performed procedure that it can and should be. As we have shown that all 19 responses on judging suitability using the picture match method as being "very valuable," we believe such an objective method will reduce the likelihood of misjudging suitability for circumcision and subsequent performance of clamp circumcision when it is contraindicated (i.e., in cases of hypospadias, penile torsion, or chordee). This selection process is expected to reduce ANCOs that require surgical repair. (4)

Furthermore, while practices on home care were not explicitly tested, focus group data showed about 80% of subjects regarded the home care of PSSPT as "very useful." From such results, we believe that the provision of consistent home care education will lead to a reduction in ANCOs as penile adhesions and skin bands. Similarly, as the www.neocirc.org method to mark the circumcision site is objective, we believe the application of this method will promote consistency in placement of incision at circumcision and that an ample amount of foreskin is excised as to provide a satisfying cosmetic result.

We showed a significant gain in knowledge among pediatric hospitalists and trainees using www.neocirc.org (i.e., average intake score of 60% vs. average exit score of 77%). A total of 30 study subjects completed the intake test, and 50% completed the exit testing is likely the result of the voluntary nature of the subjects' participation. Feedback from the surveys supports the view that the model was an appropriate duration and useful, and participants did not see it as a significant time burden.

During the launch of the educational model at the academic hospital, other aspects of multidisciplinary neonatal care related to circumcision were improved. At this institution, neonatal providers are asked to provide medical and/or anatomical clearance for surgical colleagues who perform the circumcision, but medical clearance has been poorly defined. Using a standardized model for medical and anatomical clearance during this study contributed to developing better-defined guidelines for clearance for circumcision among obstetricians, neonatologists, and pediatricians at the hospital. This demonstrates the potential for www.neocirc.org to also improve hospital-based patient care with standardized newborn nursery guidelines and policies regarding neonatal circumcision.

"While the study captured a large majority of providers who perform circumcision, it did not capture users from all groups involved in providing newborn circumcision care, including family medicine physicians and mid-level providers."

While the study captured a large majority of providers who perform circumcision, it did not capture users from all groups involved in providing newborn circumcision care, including family medicine physicians and mid-level providers. This was likely due to the hospital staffing models, with hospital-based pediatricians providing the majority of newborn care at the sites involved. This is not believed to impact the 95% usefulness rating among multiple specialty providers.

Conclusion:

In conclusion, www.neocirc.org is an effective and useful learning tool that provides a model to increase knowledge about neonatal circumcision in pediatrics. We believe this tool will also benefit other specialties. This research does not probe the arena of circumcision success or if using www.neocirc.org may reduce the incidence of ANCOs, but we expect to do so in future research.

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Author Contributions

Drs. Max Maizels, Walid A. Farhat, Edwin A. Smith, and Emily S. Blum were responsible for designing the learning module, designing the study, analyzing the data, interpreting results, and writing the manuscript.

Dr. Chloe Salzmann was responsible for designing the study, data collection, interpretation of results, and writing the manuscript.

Dr. Paola Fliman and Dr. Elizabeth Goetz provided a critical review of the online content and reviewed and revised the manuscript.

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

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The Survey says RSV

COVID and KIDS
Omicron's Curve Ball is a Whole New Ballgame

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

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

"I had hoped that by 2021's end, we would be looking at this virus through the rear-view mirror with our collective feet to the floor. Unfortunately, it is the windshield we are looking through, and the scenery is anything but pleasant."

I derive no pleasure covering COVID-19 (C-19) a second time since my first submission to NT. Like everyone else, I had hoped that by 2021's end, we would be looking at this virus through the rear-view mirror with our collective feet to the floor. Unfortunately, it is the windshield we are looking through, and the scenery is anything but pleasant.

It has been almost two years since the C-19 hit the world stage and its fondness for centre stage shows no signs of abating; indeed, the virus has all the makings of a "ham" with each performance (mutation) seemingly worse than the last.

While children, for the most part, seem to have been spared the devastating illness afflicting adults, and particularly the elderly, the more recent Delta variant (DV) and the newest Omicron variant (OV) seem to have their sights set on younger age brackets. Data from Arkansas show a marked increase in more severe illness from Delta with a significantly increased number of children hospitalized, in PICU, and mechanically ventilated (1). (This column's references may be from sources I would not typically use since data on new variants is lacking or are still in the proverbial pipeline). Of more concern are the reports on the OV out of South Africa (SA) (which has a very good public health system), indicating children under 5 (and particularly those under 2) are the second-largest cohort of C-19 patients in the hospital next to those over 60 (2,3). SA also has relatively low vaccination numbers, with just over 30% having at least one dose and 25% full vaccination at the time of writing (4). (The reference gives numbers in real-time).

The severity of OV disease in young children and infants is unclear and why so many young children are ending up in hospital; reasons for hospital admission are multifactorial and may reflect an overabundance of caution (5). A recent analysis shows the least risk at ages 3 to 10 years and states children are "better protected" from C-19 than adults and that C-19 mortality among children is lower than most other infectious diseases (6). Since this study was published in August 2021, it could not consider OV, and the Delta variant is also likely underrepresented. We know that C-19 can trigger multisystem inflammatory syndrome in children (MIS-C) in rare cases; whether or not OV is more or less likely to do so is unknown. Given the rarity in which MIS-C strikes children infected with C-19, it may be some time before we know this.

"We do know that evidence to date from the U.S. indicates that when it comes to C-19, not all children are created equal. Black and Latino children seem more at risk, although confounding factors may be at play here (7)."

We do know that evidence to date from the U.S. indicates that when it comes to C-19, not all children are created equal. Black and Latino children seem more at risk, although confounding factors may be at play here (7). Risk factors for severity of disease in children such as asthma, obesity, immune system compromise and chronic lung disease mirror those for adults. Those born prematurely are also at higher risk, as well as those under age 2 (8). It is too early to say with any certainty that OV poses the same or worse threat, although the number of young children being hospitalized is concerning. Children under age 5 are currently not eligible for available C-19 vaccines, and this is one possible reason for their disproportionate hospitalization numbers.

What about babies? We know that respiratory infections pose a potentially serious threat to babies (especially premature babies) because their smaller airways are more prone to obstruction from inflammation and secretions. We also know that C-19 can be contracted *in-utero*, although rarely (estimated at 1.1%), and early evidence indicates they do well and do not typically have respira-

tory problems related to C-19 (9). Again, this data is from 2020 and does not reflect either DV or OV.

Fortunately, babies are very inefficient aerosol generators. That aside, filters on the expiratory limb of the ventilator and care in an incubator, the likelihood of them transmitting the C-19 to caregivers is exceptionally low.

"The good news is that breast milk is protective and results in babies developing mucosal immunity when born to mothers exposed to C-19 (10) and those born to vaccinated mothers (11). Expressed breast milk should be given to babies if breastfeeding is not possible (12)."

The good news is that breast milk is protective and results in babies developing mucosal immunity when born to mothers exposed to C-19 (10) and those born to vaccinated mothers (11). Expressed breast milk should be given to babies if breastfeeding is not possible (12). The benefits of both kangaroo care and breastfeeding outweigh any risks when proper precautions are in place; C-19 should not be a factor in the decision to do either. (In the author's opinion, C-19 positive breastmilk banks should be investigated as a way to immunize shortly post-partum. Imagine that; breastmilk **is** the vaccine!).

In stating C-19 is transmitted via aerosol, particularly indoors, there are too many references to list. Had this been acknowledged much earlier, there might not need to be this much carnage. This fact mandates N-95s on mothers to protect both their babies and staff.

"A recent analysis by the Centres for Disease Control (CDC) showed an increased risk of stillbirth among C-19 positive women, particularly with DV (13). Evidence also shows that C-19 increases risks of morbidity and mortality in pregnant women, particularly DV (14). Again, whether or not OV mirrors this is not known."

A recent analysis by the Centres for Disease Control (CDC) showed an increased risk of stillbirth among C-19 positive women, particularly with DV (13). Evidence also shows that C-19 increases risks of morbidity and mortality in pregnant women, particularly DV (14). Again, whether or not OV mirrors this is not known.

The precautionary principle would have us act according to the worst-case scenario until the risks thereof are established. While we have learned a great deal about C-19 in record time, we have barely scratched the surface regarding long-term effects and sequelae. "Long covid" (LC) threatens to become a public health nightmare. Because children may not be able to describe symptoms of LC such as "brain fog" or fatigue, the already significant number of children diagnosed with it may be underreported (15,16). (An interview with one of the authors of reference 15 is listed as reference 17. It is frightening food for thought and a good read). We already know that C-19 crosses into the brain in humans (17). Rhesus macaque monkeys are genetically close enough to humans that a pathogen's effects on them should be of note. If that finding is Lewy bodies in the brains of those C-19 infected (17), that note should be in red block capital letters, followed by a string of exclamation marks. (!).

LC and evidence suggesting C-19 may remain in the body long after acute infection (15) should have us proceeding with extreme caution. We have no idea how C-19 affects the developing brain, and LC appearing in children with very mild symptoms of C-19 infection should raise a flag. Children should be vaccinated as rapidly as possible, and preventing infection in those who are ineligible for vaccination should be a top priority. As Dr. Anthony Leonardi states, "we are setting these children up to have a chronic illness." Think post-polio syndrome, shingles; in my opinion, the statement is not so far-fetched.

On the brighter side, researchers at McMaster University are set to start human trials on an inhaled C-19 that promises to achieve mucosal and hence a sterilizing immunity (18).

As 2021 comes to a close, so does the second year of my column submissions to NT. I hope, dear readers, that you have enjoyed them as much as I have enjoyed writing them. I've learned a lot. May you all enjoy the festivities that come with the darkness of winter, C-19 notwithstanding. Just get vaccinated, get boosted, and enjoy them safely!

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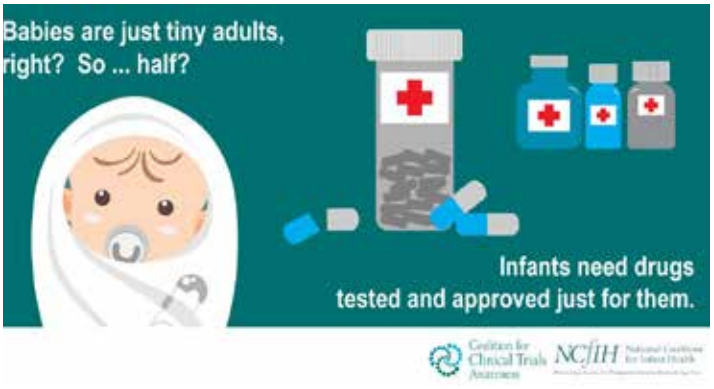


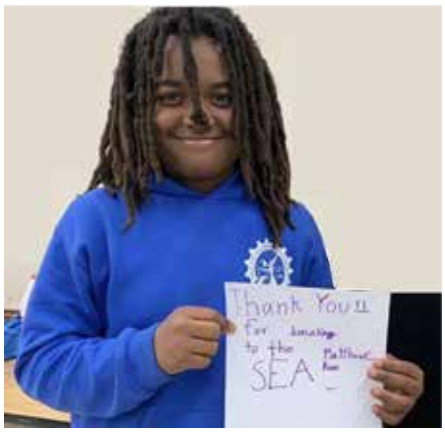
Thirteen-year-old Emily Rose Shane was tragically murdered on April 3, 2010 on Pacific Coast Highway in Malibu, CA. Our foundation exists to honor her memory.

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.

Standard of Care to Incorporate Mental Health Care for NICU Families: TECaN Embarks on National Advocacy Campaign

Katie Hoge, MD, Ali Slone, MD, Ann Blake, MD, MPH

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

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

National Perinatal Association

Educate. Advocate. Integrate.

We are thrilled to announce the official launch of the Carousel Care Advocacy Campaign. This effort is led by the group TECaN (Training and Early Career Neonatologists), a subspecialty group of the American Academy of Pediatrics. This campaign focuses on the need for mental health care for NICU families throughout the NICU journey. We know that a need for mental health support for NICU families is a long-standing need preceding the COVID-19 pandemic; however, the advent of the pandemic has exacerbated these needs and brought the mental health concerns of families into sharper focus. We know from pre-pandemic research that about half of NICU parents at any given time suffer from anxiety or depression during a NICU stay and that a third of parents go on to develop PTSD after a NICU admission. We believe that the need is even higher with the onset of the pandemic and its numerous added challenges and burdens on families. Despite the high needs and impact on child and family outcomes, there is no universal NICU standard to address familial mental health. Due to this, TECaN has ambitiously resolved to take on the task of altering the standard of care within the NICU to include mental health care through all-around support and well-being for NICU families via the national advocacy campaign, *Carousel Care (#CarouselCare)*.

"We are thrilled to announce the official launch of the Carousel Care Advocacy Campaign. This effort is led by the group TECaN (Training and Early Career Neonatologists), a subspecialty group of the American Academy of Pediatrics."

"TECaN is partnering with multidisciplinary experts from across the country to educate and empower NICU providers on addressing mental health needs for NICU families adequately."

TECaN is partnering with multidisciplinary experts from across the country to educate and empower NICU providers on addressing mental health needs for NICU families adequately. TECaN is teaming up with experts in Neonatology, Psychiatry, Psychology, Maternal, and Fetal Medicine, Palliative Care, Social Work, Child Life, Nursing, and NICU parents to create content and resources delivered throughout the campaign. The campaign, launched in October 2021, will continue to deliver content through live webinars (also viewable post live date) and supplemental materials, which can all be found on the campaign's website through October 2022 (https://www.aap.org/en/community/aap-sections/sonpm/tecan/advocacy/).

The content over the course of the year will be organized into four main phases.

Phase one focuses on the prenatal period for parents who learn that they may require a future NICU admission for their child's survival and the general need for mental health resources from the start of the NICU journey. Webinars and supplemental materials found on our website will include topics on managing parental expectations and addressing emotional needs in the prenatal consult, understanding the scope of mental health challenges of NICU families, and special consideration populations of diversity, equity, and inclusion relating to NICU mental health. Live webinars will take place monthly from October 2021 through December 2021, and all webinars will be available for viewing on our website after their original air date.

Phase two of the campaign will focus on the time during a NICU admission. Topics will include mental health impacts upon the interrupted bonding of the parent-infant dyad, screening for parental mental health concerns throughout the NICU admission, and potential mental health interventions during the NICU stay. This content will be delivered beginning in January 2022 through March 2022.

Phase three will focus on the NICU discharge process and continuity of care after NICU admission. Topics will include establishing mental health resources for families post-discharge, comforting families during bereavement, and helping families thrive after the NICU. This content will be delivered beginning in April 2022 through June 2022.

The fourth and final phase of the campaign

will focus on incorporating these new standards of care into NICUs across the country in a wide range of clinical settings with variable resources. Topics will include webinars on including NICU family mental health within your NICU and caring for the caregiver. In recognition of each unit's unique challenges, we strive to provide means for all NICUs to consider adopting these changes into clinical practice. We also recognize that it is vital to support our team members' mental health to care for families effectively. One cannot pour from an empty cup, so we will also address caring for ourselves as providers. This content will be delivered beginning in July 2022 through October 2022.

"TECaN, the campaign's content experts and our parent experts are ambitiously working towards the goal of creating a universal standard of care that systematically addresses familial mental health in the NICU. We strongly believe in the promise of this campaign, and we encourage you to join us in creating this paradigm shift."

TECaN, the campaign's content experts and our parent experts are ambitiously working towards the goal of creating a universal standard of care that systematically addresses familial mental health in the NICU. We strongly believe in the promise of this campaign, and we encourage you to join us in creating this paradigm shift. To join in our efforts of this campaign, please visit our AAP TECaN website, where you can find the links to our webinars and the content delivered over the course of the year. Together, let us turn a roller coaster of uncertainty for our NICU families into a ride of all-around support through Carousel Care.

(https://www.aap.org/en/community/aap-sections/sonpm/tecan/advocacy/.)

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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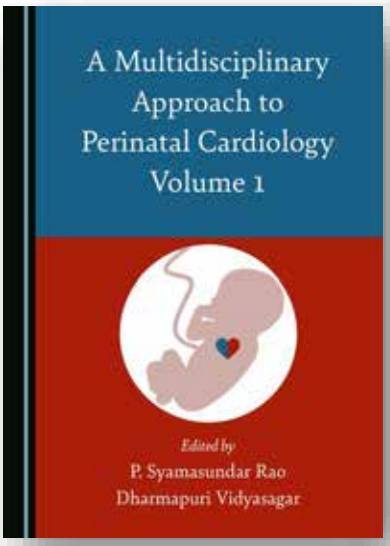
A Multidisciplinary Approach to Perinatal Cardiology *Volume 1*

Edited by P. Syamasundar Rao and Dharmapuri Vidyasagar



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Book Description

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

About the Editors

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

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

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

My NICU Network
My Perinatal Network

National Perinatal Association + NICU Parent Network

Online L&D Staff Education Program

Caring for Pregnant Patients & Their Families:

Providing Psychosocial Support During Pregnancy, Labor and Delivery

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Continuing education credits provided by

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

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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.

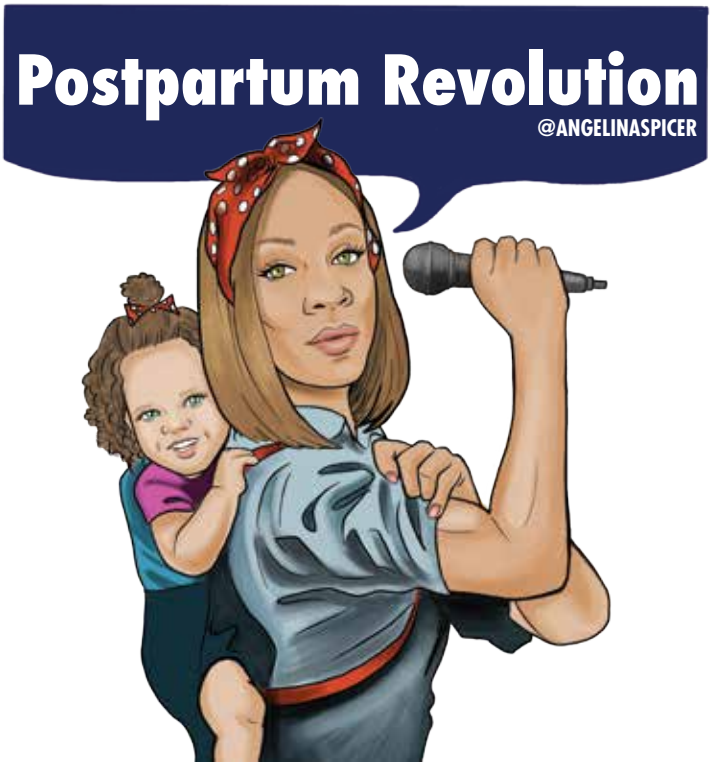
CANCELLATIONS AND REFUNDS

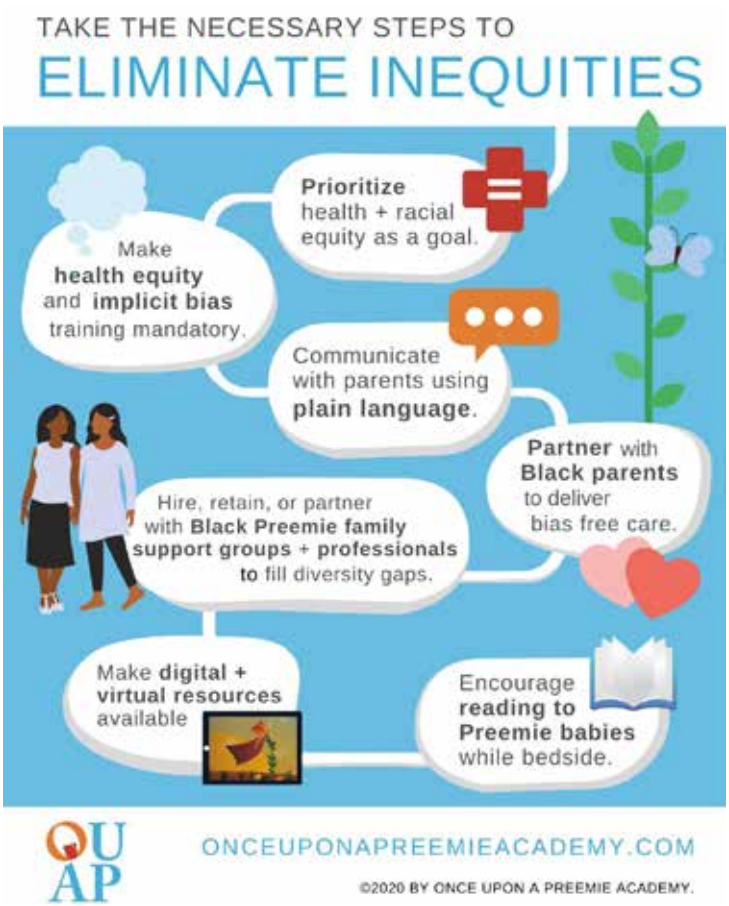
- For Individual Subscribers:
  - If you elect to take only one course, there will be no cancellations or refunds after you have started the course.
  - If you elect to take more than one course and pay in advance, there will be no cancellations or refunds after payment has been made unless a written 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.

COVID-19

National Network of NICU Psychologists

FREE for our NICU COMMUNITY

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

Download at www.nationalperinatal.org/psychologists

newly validated

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

7- Module Online Course in NICU Staff Education

and

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Federal Officials Weigh in on Infant Tubing Saga

Michelle Winokur, DrPH, and the AfPA Governmental Affairs Team, Alliance for Patient Access (AfPA)

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.

"More than four years after concerns were raised about certain hospital tubing devices, the Food and Drug Administration finally acknowledged their potential danger to infants. (1,2)"

More than four years after concerns were raised about certain hospital tubing devices, the Food and Drug Administration finally acknowledged their potential danger to infants. (1,2)

The Potential for Overdose

The "ENFit" tubing connector was developed to minimize dangerous tubing misconnections. But in the years since the device was released, it has become clear ENFit connectors introduce a different danger.

The ENFit design features a moat around the tip. If the moat area is not cleared before medication is administered, there is a potential for tiny babies to get an incorrect amount of medication. ENFit adaptors "significantly increase" the possibility of inaccurate dosing, according to one study. (3)

Recommendations for Safe Use

The FDA provided recommendations for optimizing dose accuracy with the ENFit device in its safety message. Among its guidance, the FDA suggests users should:

- Tap the tip of the syringe to ensure it is free of air bubbles and that the moat is free from fluids
- Use a filling adapter to prevent fluid and medications from entering the moat area of the syringe tip
- Flush the medication or fluid after administration to prevent overdose.

"The FDA also requested manufacturers update relevant labeling and training materials to include information about accurately dose medication, reducing the risk of overdose."

The FDA also requested manufacturers update relevant labeling and training materials to include information about accurately dose medication, reducing the risk of overdose.

Alerting Providers

Health care providers need this information to use ENFit tubing devices safely. Moreover, individual hospitals should have the autonomy to decide what is in the best interest of their tiniest patients – whether that is using ENFit or another safe, FDA-approved tubing option.

There is no margin of error when dosing medication for babies. Safety and precision must be a priority – even federal officials agree.

References:

1. https://www.youtube.com/watch?v=pu8H-5nCkwo
2. https://www.fda.gov/medical-devices/safety-communications/potential-medication-overdose-enfit-low-dose-tip-syringe-fda-safety-communication
3. https://onlinelibrary.wiley.com/doi/full/10.1111/jcpt.12810
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Disclosures: Michelle Winokur, DrPH, is the Policy Communications Director for the Alliance for Patient Access.

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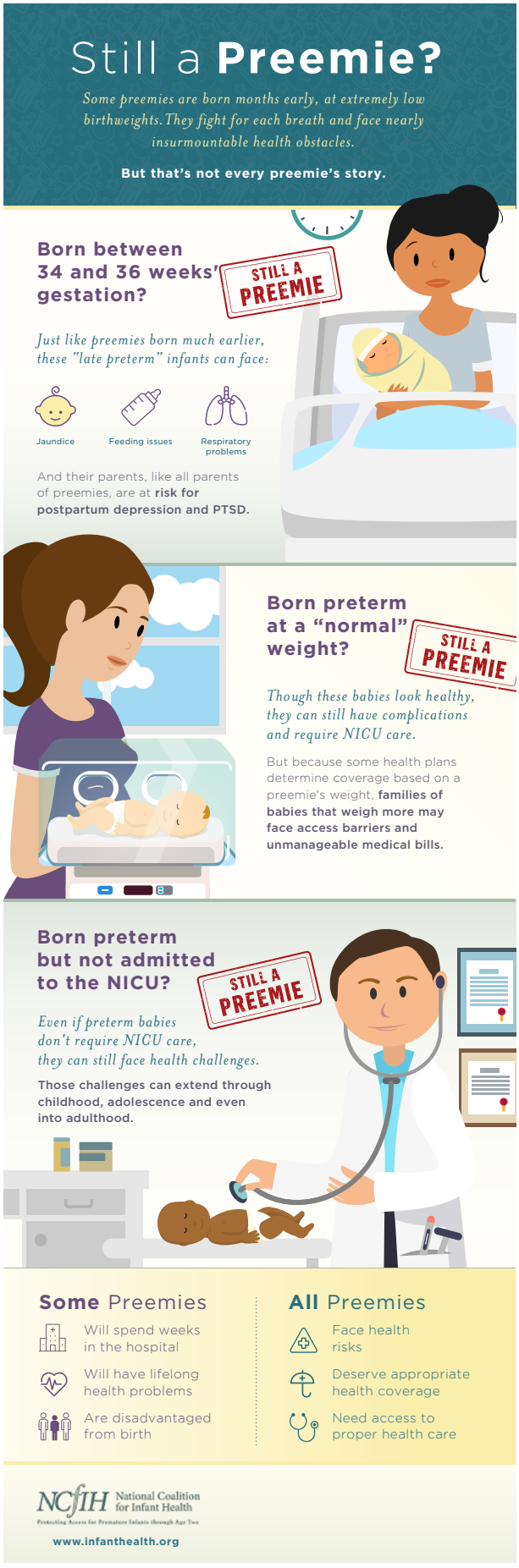

Keeping Your Baby Safe

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

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): Committed to Serving All Children

Amy Ohmer

iCAN
International Children's Advisory Network

" In November, the International Children's Advisory Network, Inc. (iCAN) focused on GIVING TUESDAY, a day of charitable acts of service to reflect the gratitude for organizations that support our world. As we wrap up 2021, we wanted to take a moment to reflect on our journey. iCAN has been fully committed to serving all children, many of whom live with rare, chronic, and complicated medical conditions."

First and foremost, we would like to thank our community for celebrating the spirit of giving during this holiday season. In November, the International Children's Advisory Network, Inc. (iCAN) focused on GIVING TUESDAY, a day of charitable acts of service to reflect the gratitude for organizations that support our world. As we wrap up 2021, we wanted to take a moment to reflect on our journey. iCAN has been fully committed to serving all children, many of whom live with rare, chronic, and complicated medical conditions. Since our inception in 2014, iCAN has been intentional with ensuring that children could share their voices to help create the best path within pediatric clinical trials, research, medicine, science, and innovation.

Closing out the year, iCAN is pleased to share the completed and published two-part series of **Social Media Terms and How to Create Social Media to Reach Kids and Families.** Thanks to our iCAN Chapters worldwide for sharing their youth member voices and helping iCAN understand more about social media.

At iCAN, our goal is to help everyone in the community better understand what kids need to create the best possible pediatric healthcare, clinical research, innovation, and science. We hope to inspire the best possible content on social media to help our kids and our pediatric healthcare community for this project.

Everyone may share both video links as we hope it helps increase awareness of social media terms and definitions and reduce confusion or misinformation within social media postings/platforms. Video 2 includes a wonderful "Do and Don't" resource to help make your next social media post clear and helpful.

The YouTube link for Video 1 is:

https://youtu.be/J-siTzECNcI

The YouTube Link for Video 2 is:

https://www.youtube.com/watch?v=2DEyZGV23PQ

Check out the Video on iCAN's website:

https://www.icanresearch.org/videos

Where will the Videos be Shared?

iCAN's website links to social media for iCAN and direct email to our large network of followers: including groups like the American Academy of Pediatrics, Pharmaceutical Organizations, Regulators, and other community partners.

Why Did We Make these Videos?

iCAN was asked to create awareness of how to better direct medical news and information (including clinical research, technology, medicine, and medical device development) to our community. The goal is to ensure that kids know ways to better help their own healthcare.

Which Chapters are Featured in these Videos?

iCAN met with two chapters for this video content. One chapter is KIDS Kansas City, and the other is KIDS Illinois - Walter Payton. Kids received a list of questions, and all answers were shared directly by the kids in their own words.

Can I Share the Links?

Video 1 and Video 2 ***may be shared by everyone and everywhere as we hope it helps*** increase awareness of social media terms and definitions and reduce confusion or misinformation.

"Video 1 and Video 2 may be shared by everyone and everywhere as we hope it helps increase awareness of social media terms and definitions and reduce confusion or misinformation."

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

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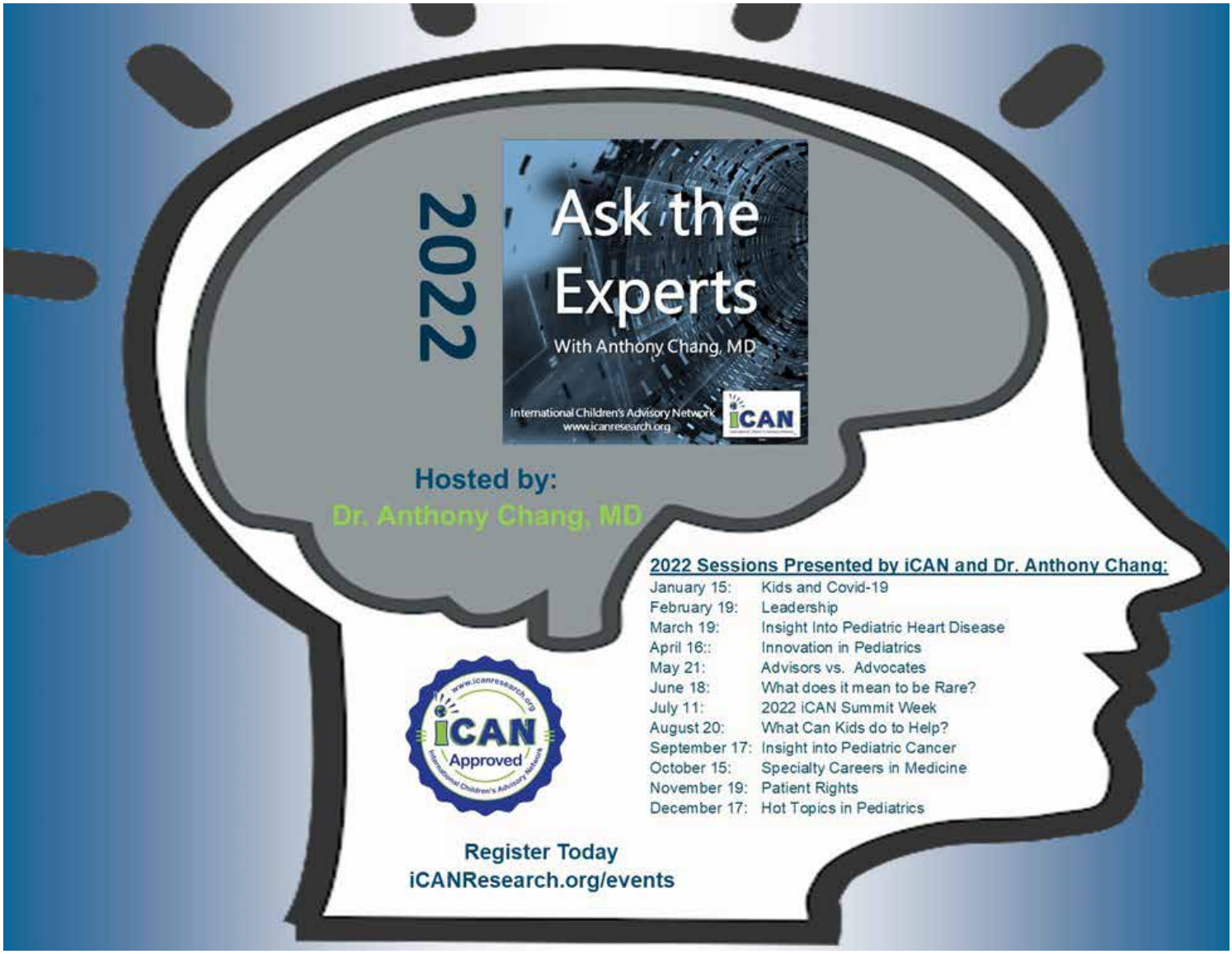
www.iCANResearch.org



Save the Dates:

Looking ahead… iCAN and KIDS France Chapter will be hosting the 8th Annual iCAN Summit, June 11th - June 15th, 2022, in Lyon, France. Check out our BRAND NEW 2022 Summit video to better understand what iCAN is all about. Get ready for the iCAN 2022 Summit Lyon, France!

To keep track of all of the new content added for the Summit, be sure to check out https://www.icanresearch.org/2022-summit and add a bookmark to connect easily. Registration opens on March 15th, 2022, at www.icanresearch.org.

"Registration is open for all sessions at www.icanresearch.org/events. Check out the schedule, and we hope to see you there."

January launches the new roster of 'Ask the Experts' sessions - moving to the third Saturday of each month, iCAN has a brand-new lineup of topics chosen by our youth members. Registration is open for all sessions at www.icanresearch.org/events. Check out the schedule, and we hope to see you there.

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

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Respiratory Syncytial Virus is a

Really Serious Virus

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

Coughing that gets worse and worse

Breathing that causes their ribcage to "cave-in"

Rapid breathing and wheezing

Bluish skin, lips, or fingertips

RSV can be deadly. If your baby has these symptoms, don't wait.

Call your doctor and meet them at the hospital.

If you baby isn't breathing call 911.

Thick yellow, green, or grey mucus

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

Fever that is higher than 101° Fahrenheit

101°

which is especially dangerous for babies younger that 3 months

National Perinatal Association

www.nationalperinatal.org/rsv

PROTECT YOUR FAMILY FROM

RESPIRATORY VIRUSES

flu coronavirus pertussis RSV

WASH YOUR HANDS
often with soap and warm water.

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

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

USE AN ALCOHOL-BASED HAND SANITIZER.

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

www.nationalperinatal.org

National Perinatal Association

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.

Peer Reviewed

Disaster Series: High Reliability Organizing for (HRO) Disasters – Disaster Ecology and the Color of Noise

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

Abstract:

The frequencies of stochastic noise inherent to the environment can be described as colors. The various colors of noise refer to the disruptive potential of stochastic energy within the environment and its characteristics. The meaning of the type of noise lies in the unpredictability of events and the 'forcing functions' of energy. That is the strength of the environment to force a system or population to respond. For human activity, the color types correlate to problem characteristics such as leadership-line authority coupling, well-structured, ill-structured, and embedded problems. When the noise color changes, forcing functions and the types of problems also change, increasing characteristics necessary for adaptation or altering characteristics in unexpected ways through relaxed selection. The noise process applies equally to nursing homes, NICUs,and public safety and is independent of timescale or magnitude. We need not characterize normal environmental variation differently from catastrophes.

> ***"The noise process applies equally to nursing homes, NICUs,and public safety and is independent of timescale or magnitude. We need not characterize normal environmental variation differently from catastrophes."***

Introduction:

A disaster is an environmental disruption of the larger community that affects multiple community systems and government services. In medical care, a disaster is an environmental disruption of the healthcare system. This is not only from the location of the disaster but also through its effects as they radiate throughout the local healthcare system (1).

The environment has always intruded into healthcare in some form, often becoming a part of healthcare, such as public health. Aerospace medicine provides medical care when the patient is healthy, but the environment has the pathology, a valuable analogy for medical care during a disaster. The strength of the intrusion is increasingly entropic, something we have no control over. Energy dissipation can intrude slowly or abruptly, recede quickly, or have an extended resolution. We discuss the effects of these patterns and the response by NICUs in the Neonatology Today Disaster Series for abrupt disasters (2), approaching disasters (3), prolonged disasters (4), and epidemics [scheduled article]. We can protect healthcare systems by blocking or distancing ourselves from the environment or by increasing the capabilities of the system and individuals.

> ***"We can protect healthcare systems by blocking or distancing ourselves from the environment or by increasing the capabilities of the system and individuals."***

Preparations for a disaster often focus on logistics and some form of hierarchy. Embedded in this planning are linear thinking, scientific deduction, and classical logic, none of which were developed for the disaster environment (5). Deprecated is stress-induced impairment of cognitive processes and operational performance, a problem recognized by HROs (6, 7). Rather than describing disasters as singular events, we draw upon physics to demonstrate how disasters and routine exigencies emerge from environmental noise, differing only in scale (8). We can then use routine operations to respond, but with an increased level of response.

The dissipation of energy from the disaster injures people and impairs necessary system functions and human activities. The structure of these abrupt environmental fluctuations can be described as '1/*f*-noise' that follows a power-law distribution rather than the normal, or gaussian, distribution [**Table 1**]. The increased stochastic noise of a disaster becomes a forcing function causing change to organizations and people. Perhaps the true force of nature is entropy and the resulting stochastic processes.

Table 1. Pink Noise and Power Laws

Spectral density. 1/*f*-noise is a measure of power per frequency interval where *f* is frequency.
Power spectral density. It measures the signal's energy when it concentrates around a finite time interval.
Power laws. Describe relationships between two quantities where the change in one gives a proportional change in the other independent of the initial size.
1/f-noise and power laws. The graphed relation of power density versus frequency forms a power law (9).

Viewed in this manner, we can discuss a disaster as stochastic noise in a stochastically noisy system. This background noise comes from everyday stochastic processes that corrupt the ac-

tual-world application of scientific studies. Fluctuating entropy in our open environment amplifies this natural noise. We routinely operate with environmental stochastic noise, which fluctuates, at times exceeding our ability to respond readily.

"The unpredictable time and force of entropic, stochastic noise cause a disaster to impair effective planning and logistic preparation. Because the behaviors and actions for a disaster are used for routine operations, we may better prepare by increasing our capabilities."

The unpredictable time and force of entropic, stochastic noise cause a disaster to impair effective planning and logistic preparation. Because the behaviors and actions for a disaster are used for routine operations, we may better prepare by increasing our capabilities. "You do in a disaster what you do in everyday life," James P. Denney, EMS Captain, LAFD, and veteran of multiple disasters and multiple casualty incidents.

Healthcare operates in a relatively closed system separated from the open public domain. In the closed healthcare environment, participants adopt specific roles such as a physician, nurse, patient, and parent, and the information generated is privileged, that is, legally confidential. Some healthcare domains, such as intensive care units and operating theaters, are even more sequestered, severely restricting those who can enter, what clothing they can wear, and the procedures they must follow. These environments are more highly sequestered to manage expected severe, abrupt changes in the patient's medical condition.

This restriction does not mean the healthcare system is completely sequestered. Energy and resources from the external environment enter but are filtered and dampened, not fully controlled but limited in their effect on medical care. In this manner, the external environment becomes a dampened forcing function on medical care, mainly by changing the probabilities of variables, generating stochastic processes.

We can describe a disaster as an abrupt, severe 'forcing function' onto a system already buffeted by environmental stochastic processes. ("External forcing by environmental noise alters the qualitative nature of the dynamics" (10)) Stated in this simplistic way, one might presume healthcare systems need only to expand operations to extend medical care into the disaster environment while at the same time the outside environment temporarily intrudes into healthcare. This idea misses the difference between a normal environment consisting of multiple *independent* stochastic processes and an environment of intermittent *correlated* stochastic processes. Correlation amplifies stochastic processes. The first has some degree of predictability while the latter does not. The difference profoundly affects how systems adapt to each environment. 'Environmental stochasticity' reflects the unpredictability of the environment (11).

Within our environment, we experience and must differentiate between signals and noise. Noise is unwanted, apparently disorganized stimuli that do not carry information. Signals carry objective information from the environment. Cues are *unintentional* byproducts of activity, such as a chemical's heavy scent indicating its presence. Novices preparing to operate in dangerous contexts learn to discern the salience of a signal so they will not disregard subtle or nuanced yet vital information. The authors have had routine experience with novices or outsiders who mistake subtle, nuanced signals as noise.

An observer on a fire rescue ambulance asked one author (DvS) about an experience responding to a home with an agitated crowd outside. Why did the team respond to a person who fell and bring in resuscitation equipment for a cardiac arrest? The author asked whom the crowd was looking at as the rescue ambulance arrived. They looked toward the front door of the house, meaning a serious event had occurred to a neighbor inside. In a benign event, many of the crowd would be looking at each other. A hostile crowd would stare at the crew of two as they arrived.

> *The PICU of the same author worked closely with the regional poison center, reporting all ingestions admitted to the unit. Over months, the unit experienced an increase in admissions of toddlers with toxic ingestions of iron from prenatal vitamins. The poison center reported this to the national network and identified an early epidemic of toxic iron ingestions. This led to communications from the poison center with physicians regarding prescription practices of prenatal vitamins. Data' noise' to the PICU team was an early herald of a potentially deadly epidemic to the poison center.*

Entropic and stochastic energy inherent to the environment profoundly affects people and organizations within that environment. The light spectrum provides a helpful analogy for understanding stochastic environmental noise's effects as 'forcing functions,' which is the environment's strength to force a system or population to respond. Stochastic noise, viewed as various colors, has characteristics for statistical evaluation, predictability, problem types, and human response. The noise process is independent of timescale or magnitude. We need not characterize normal environmental variation differently from catastrophes (8).

"The light spectrum provides a helpful analogy for understanding stochastic environmental noise's effects as 'forcing functions,' which is the environment's strength to force a system or population to respond. Stochastic noise, viewed as various colors, has characteristics for statistical evaluation, predictability, problem types, and human response."

Stochastic Noise in the Environment:

The concept that noise in the environment is entropic and stochastic can help us understand the response by healthcare systems to various types of environmental noise, from the emergency of a cardiac arrest to widespread disruption from a regional disaster. These types of noise define spectrum with spectral densities lending to the colors white, brown, red, and pink [**Table 2**]. Blue and black noise are included in the spectrum but beyond discussion in this paper.

Table 2. Spectral densities of noise

White noise $1/f^0$
Brown noise $1/f^2$
Red noise $1/f^\alpha$
value of α between 0.5 and 1.5
Pink noise $1/f^1$

If we separate and remove signals (cycles with predictability that have meaning) from noise (the residual variability that causes unpredictability), we can distinguish patterns of environmental stochastic noise. This noise can fluctuate over time or through space as serial correlations of flux (autocorrelation), or noise can exist as dominant frequencies in a power spectrum (8, 12). In the analogy with visible light, these fluctuations are termed 'color' to describe the pattern of predominant frequencies in a certain range of fluctuation (10) [**Table 3**].

"Environmental noise with constant variance per unit frequency (an equal and independent representation of all frequencies without autocorrelation) is 'white noise.' Events in white noise environments are random, without temporal correlation, because no frequency dominates (8, 13)."

Environmental noise with constant variance per unit frequency (an equal and independent representation of all frequencies *without* autocorrelation) is 'white noise.' Events in white noise environments are random, without temporal correlation, because no frequency dominates (8, 13). The environmental pressure of white environments favors the generalization of a population with *evolutionary* changes over periods longer than the life of individuals (14). White noise gives tractability for the descriptions of the operating environment for healthcare that can incorporate constant variance. It is this variance that places unexpected demands on the organization. Opposite of the relative predictability of white noise is 'brown noise,' a measure of randomness named for Brownian motion.

Following the light analogy for variance frequency, stochastic processes with slow fluctuations or low frequencies (long periods) have a 'red' spectrum. Low-frequency events are rare and have a greater spectral density. They are said to have increased redness in the spectrum. These low frequency, rare events significantly influence the system more than more common, high-frequency events with less spectral density (8). Their influence comes from their spectral density.

This appears counterintuitive because our undergraduate science studies focus on the normal or gaussian distribution where the greatest probability density is in the center norm, rare events are in the tails. The emphasis on normal distributions creates the misconception that outliers, events far from the mean, are random and independent events that can be readily disregarded. HROs maintain vigilance for these outliers, considering such discrepancies as early heralds of failure or the initial presentation of disruptive processes (15). Rare events and outliers are treated differently between power distributions with increased redness of the spectrum (noise) and normal distributions. Red noise environments describe an outlier possibility, while normally distributed environments describe the *probability* of an outlier.

Red noise events, or residuals, are autocorrelated, meaning there is an increased chance the event can continue, producing above or below average conditions that cause environmental disruption (10, 16). Red noise explains the lasting correlation of effects from a single event (8, 11). The environmental pressure of noise in red environments favors the specialization of a population. *Ecological* change and responses occur within the lifetime of individuals (14). Special environments in healthcare, such as the ICU, Emergency Department, and operating theater, operate in a red noise spectrum environment.

Pink, 1/f, noise

'Pink' noise lies between the predictability of white noise (no correlation in time) and the randomness of brown noise (no correlation between increments). The variance of pink, or 1/*f*-noise, differs from other red-spectrum noises in that variance continues increasing regardless of the length of the measured time series. Pink noise power decays as the inverse of frequency, causing common and rare environmental events to gain equivalent weight in a pink environment (8). Midway between white and red noise, environmental pressure from pink noise equally favors a balance of generalization and specialization (14).

"Pink noise power decays as the inverse of frequency, causing common and rare environmental events to gain equivalent weight in a pink environment (8). Midway between white and red noise, environmental pressure from pink noise equally favors a balance of generalization and specialization (14)."

The stochastic noise fluctuations of white noise have equal power in every unit of bandwidth, while brown noise fluctuations demonstrate randomness. Astronomers studying quasars considered stochastic noise to be signals and found quasar signals fell exactly between white and brown noise, called' flicker noise' at a factor of 1/f (17). The name flicker noise came from John B. Johnson's initial measurements of the white noise spectrum. He measured an unexplained flicker at low frequencies halfway between white and brown noise (18).

Pink noise behavior (17) has been reported in:

- Quasar signals
- Deep undersea ocean current velocities at a depth of 3100m
- The radio audio output of Scott Joplin piano rags and news-and-talk programs

Pink noise characteristics (19) have been identified in:

- EEG alpha wave
- Heartbeat period time interval between the R peaks
- Body sway, when standing upright, the body sways later-

Table 3. Patterns and Characteristics of Noise

Color	Analogy Light spectrum	Variance	Characteristics
White	White light No frequencies dominate Flat spectrum Spectral density has equal amounts of all frequencies	Gaussian distribution - elements fully independent - no autocorrelation Mean converges over long periods - converges at low frequencies - diverges at high frequencies More data - narrows variance - forms Gaussian curve	Values of a random signal at two instants in time are entirely independent of each other
Brown	Brownian motion Spectrum generated by a signal in a random walk "Drunkard's" or "random" walk	Random distribution Over long periods: - no defined mean - value at a single point	Random The random variable drifts Brown processes are 'non-stationary.' A particle in Brownian motion: - *position* – brown noise process - *velocity* – white noise process
Red	Dominated by low-frequency or long-period cycles (hence, red) Optical spectra with surplus lower frequency light appear redder.	Power law distribution Not independent - mutual/reciprocal relations Variance increases with the length of the series - more data over more extended periods increase variance Autocorrelation of residuals Correlation events decline exponentially with separation in time	Time-domain – increased probability of long runs of above / below average effects Slow changes - low frequencies dominate - slow variations have greater 'strength' than rapid ones - (only 'revealed' in longer time series) If low frequencies have spectral density > high frequencies - *effect of low frequency (rare) events have more significant influence than high frequency (common) events*
Pink	Lies *exactly* midway between white noise and brown noise on a scale of redness "Flicker noise"	Power law distribution - no well-defined long term mean - no well-defined value at a single point Variance increases regardless of time series length - distinguishes pink noise from other reddened spectra More data continuously increases variance	Slower decline in correlation - correlation of fluctuations falls off as a power law

ally and back and forth

- Music, the spectral density of fluctuations in the loudness of (especially classic) music
- Pain-relieving stimuli, transcutaneous electrical nerve stimulation (TENS), the impulse repetition frequency generated by 1/*f* fluctuations
- Traffic flow

"Each color noise creates a distinct operating environment. When unrecognized, adaptive traits are mistranslated for use by others or misapplied when one is unwittingly present in a changing environment."

White, Red, Pink Noise:

Each color noise creates a distinct operating environment. When unrecognized, adaptive traits are mistranslated for use by others or misapplied when one is unwittingly present in a changing environment.

White Noise

The Gaussian distribution brings a normative value as error measure measurement in this information-dependent system. Error in the white noise environment comes from acting and is visible and correctable. The stability of the environment conceals 'error from not acting,' enabling such errors to become incorporated into organizational knowledge (20). Unfortunately, from the Gaussian distribution, we develop statistics for descriptions and probabilities for prediction. The Euclidean space has measurable hierarchies fitting the environment and forming the organization.

"I don't know": the Hedgehog, and the Fox

Hearing "I don't know" engendered confidence in the fire rescue ambulance and fire service. The phrase marked the initiation of an investigation. In medicine, hearing "I don't know" loses confidence in the person. The person *should* know. One of the authors (DvS) has personally experienced both reactions in each setting – the conflict between doubt and certitude.

We digress here because white noise environments are susceptible to certitude. Subordinates and novices often find security following an individual who demonstrates certitude, whereas veterans of live-or-die circumstances prefer doubt. This conflict is more profound than one's preferences.

"The fox knows many things, the hedgehog one great thing."

Archilochus, Greek poet

Studying the success rates of forecasters in politics, intelligence, and journalist commentary, Philip E. Tetlock (21) found the worst success rate from those with the greatest certitude and higher rates from those who entertained the most doubt. He turned to Isaiah Berlin's essay *The Hedgehog and the Fox* for the explanation.

Hedgehogs will extend their one theory to many domains with great confidence. When they are wrong, they focus on justifying their decision

The 'super forecasters,' Foxes know many things to a far lesser degree. They use a point-counterpoint style of thinking to sustain doubt and understand how opposing, and contradictory forces yield stability, a feature that confounds prediction. Superforecasters pursue and update information, revising conclusions as information becomes available.

Prediction and explanation are not tightly coupled. An explanation is possible without prediction. Prediction is possible without explanation.

Tightly coupled concepts support expert formation and mastery but at the risk of creating "hedgehog" experts who know one thing well that they apply to all situations (21). The linear structure allows matching resources to disturbances and solving problems much like a puzzle – find the pieces for their proper space (22). Problems match the well-structured problem amenable to algorithmic solutions described by Herbert Simon (23).

The stability of a white noise environment permits context-free concepts and problem solving, placing greater significance on classifications (24) and abstractions (25). System change occurs over generations in an evolutionary manner rather than context-dependent ecological processes. Leadership is less critical than executive, administrative, and managerial skills (26), where 'categorical work' creates classifications and rules to work by (24) [see below].

"The stability of a white noise environment permits context-free concepts and problem solving, placing greater significance on classifications (24) and abstractions (25). System change occurs over generations in an evolutionary manner rather than context-dependent ecological processes."

Red Noise

The non-Gaussian distribution supports a more topological space influenced by relations rather than the metrics of points and distances. Rather than probabilities, possibilities, and the ease of an event influences predictions (27). Environmental' forcing functions' drive environmental influences into the organization, destabilizing the internal environment. Problems become contextual with pragmatic solutions. Changes occur within the experience of the individual. Contextualization in short periods makes a red noise environment ecological and amenable to pragmatism.

Loosely coupled, overlapping, and gapping concepts create a confusing environment where the problems are ill-defined (15). Simon (28) described how we naturally use heuristics to solve these ill-structured problems. Heuristics, however, create a bias (29) that can be corrected by error (30) and motor cognition (31) – 'error by acting' is visible and correctable (20). In a dynamic environment, the ill-structured problem is more of a mystery that we solve by finding clues (22).

Doubt as a problem-solving method, combined with rigorous evaluations of failure, breeds super forecasting 'foxes' who know a little about a lot, a strategy that further drives learning and develops a different type of mastery (21). Doubt, broad knowledge,

and concern for consequences are practical common sense problem solving (32). Leadership is an integral part of the executive, administrative, and managerial skills (33), bringing together categorical work with 'articulation work,' the way things worked out in practice (24) [see below].

The long periods without change mimic a white noise environment. Individuals who enter a red-noise environment during such a period may believe they are operating in a stable environment, much like a shifting baseline (34) [see below]. The result is tolerance of 'hedgehog forecasting' but the greater value in 'fox super forecasting.'

Pink Noise

Environmental forcing functions are more severe and sudden in the pink noise environment, pushing the ill-structured problem into the environment as the environment is forced into the organization. Problem-solving differs with greater reliance on heuristics and early error identification (30). Characteristics such as certitude and rigid central authority cause less visible damage to the organization in white noise to become deadly in the pink noise environment, even during slack periods. As a 'leader-leader,' leadership integrates fully into the organization (35). The greatest difficulty in communicating across the gap between white and red noise environments is avoiding jargon and cliché (15). The *Neonatology Today Disaster Series* is one effort to translate pink noise organizational characteristics for those who work in the red and white noise environments.

"We sacrifice accuracy for conceptual tractability when separating the organization from the environment. The Gaussian distribution of white noise environments supports discrete concepts, hierarchical systems, and linear thinking independent of context or the environment."

The Meaning of Color:

We sacrifice accuracy for conceptual tractability when separating the organization from the environment. The Gaussian distribution of white noise environments supports discrete concepts, hierarchical systems, and linear thinking independent of context or the environment. The observer's frame of reference moves outside the flow of events and becomes fixed as Eulerian specificities (27). Authorities use this external reference frame to create models for the reddened environment. However, the reddening of the environment increases variance, dissolving Gaussian distributions and creating unpredictability (8).

We also cannot discuss the colors of noise without discussing the relation between internal changes of individuals, populations, and organizations against environmental forcing at different frequencies (13). The variance of red noise ensures that the energy in the environment will, at some interval, force the organization into a response. In ecology, these forces drive a population into extinction or adaptive change.

The resistance of human systems against such change creates two self-organizing systems – social and environmental. Social systems self-organize against stochastic noise. Self-organizing occurs within the environment from the interplay of social self-organizing and self-organizing from stochastic noise. Social self-organizing creates scale-free growth from small social units into society. Bringing structure to the reddened environment becomes less amenable to outside direction. "Many natural systems become structured by their internal processes: these are self-organizing systems, and the emergence of order within them is a complex phenomenon," E. Eugene Yates (36)

Unpredictability

White noise has a Gaussian distribution while colored noises deviate from the normal distribution, which can confound research results relying on a normal distribution (12). Reddened noise and pink noise (pink noise is specifically 1/*f*-noise) have a power-law distribution rather than a Gaussian distribution. Pink noise behaves in a fractal, power-law manner similar to snowflakes, coastlines, earthquake magnitudes, city size, Zipf's law (8), and explains the presentation of abrupt environmental disturbances.

Unpredictability, whether routine stochastic unpredictability or that of a disaster, demonstrates a striking difference between organizations operating with pink and red noise compared to white noise. High-Reliability Organizations (HRO) in the pink environment engage unpredictability through leadership, the purpose of safety, their use of error, and how they train novices. We must remember that High-Reliability Organizations (HRO) amalgamate safety into leadership and consider safety as integral to operations.

The amalgamation of leadership and safety ensures reliability through the development of the "leader-leader" rather than creating "leader-followers (26, 35). Organizational leadership in white noise environments follows the conventional line authority of executives, administrators, and managers. Authority derives from the organization's owners (or the head of one of the three branches of government for governmental organizations). Authority for decision-making as *line authority* derives from the need to control an organization's operations. *Functional authority* is employed to control local events, a type of authority more closely associated with high-reliability operations in pink noise (33, 37).

"Functional authority to control local events is significant for an HRO operating in the extreme stochastic randomness of pink noise. White noise organizations encounter stochastic randomness but with less frequency density than red noise organizations. With the greatest red frequency density, Pink noise organizations experience the most significant demands and disruptions."

Functional authority to control local events is significant for an HRO operating in the extreme stochastic randomness of pink noise. White noise organizations encounter stochastic randomness but with less frequency density than red noise organizations. With the greatest red frequency density, Pink noise organizations experience the most significant demands and disruptions.

In pink noise organizations, leadership and line authority are tightly coupled, creating a singular identity. 'Leadership-line authority' coupling can loosen in red noise organizations following extended periods without environmental forcing. The coupling becomes quite loose in white noise organizations, yet the leadership-line authority identity remains to muddle their distinct functions. This muddling compromises the necessary obedience to authority in pink noise environments and can motivate unaligned 'work-arounds.'

"Extending an organization into pink noise environments utilizes different characteristics, dynamics, and social interactions than in a white noise environment (6, 31). Safety as an organizational response is the distance between stochastic environmental frequencies and the organization's stochastic operational frequencies. "

Extending an organization into pink noise environments utilizes different characteristics, dynamics, and social interactions than in a white noise environment (6, 31). Safety as an organizational response is the distance between stochastic *environmental* frequencies and the organization's stochastic *operational* frequencies. The operators' concerns are the density values of lower frequencies causing infrequent clustering that can presage systemic operational deficits or the stochastic downward fluctuations of operational performance. In either case, the forcing functions in a reddened environment may exceed stochastically lowered performance, or an abrupt stochastic peak in a pink noise environment may rapidly exceed the performance capabilities of the organization.

Separation of the stochastic flux of organizational processes from the stochastic fluctuations of a reddened environment gives tractability for management and planning but will lead to rare, costly failures. White noise administrators can operate much closer to their white noise environment by utilizing *proactive defenses*. When risks are predictable and controllable, proactive defenses have the greatest effectiveness. When risks are consistently high or defensive costs are low, fixed constitutive defenses become effective (38, 39). White noise environments are amenable to static defenses such as a centralized authority hierarchy having steep authority gradients and relying on algorithms, rules, and protocols. Following management science, principles for risk management are also prudent.

Increasingly unpredictable or uncontrollable risks in the reddened environment will vary by location or over time. *Reactive defenses* then become more effective and reliable. Inducible responses allow the selection of behaviors with variable expression, increasing behaviors for elevated risks and decreasing their expression as the risk abates (39). These organizations focus on capability and decision migration with increased information flow, the basic characteristics of HROs. Responsive, adaptive organizations will naturally develop into an HRO.

HROs incorporate safety as integral to operations through the mantra, "safety through operations and operations through safety" (26). Safe behaviors during operations create effectiveness and efficiency. Because threats, particularly at their initial presentation, are unpredictable, uncontrollable, and variable, any breach in safety is amplified as the incident consumes resources necessary for the operation. Safety as an individual response is part of leadership using the leader-leader model to extend safety into operations.

Error in a white environment derives from models and the Gaussian distribution. These errors are information-dependent and measure the distance from the desired mean or model (40). In the stochastic noise of the pink environment, error marks the boundary of knowledge and the border of capabilities (30). Error for the HRO becomes a safety border.

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A more predictable environment with white noise also reduces demands on less experienced personnel, with less supervision necessary compared to the variability of a reddened environment (13). Organizations operating in red environments, especially with pink noise, focus on training their novices with a particular focus on early fieldwork (6).

Forcing Functions

White and reddened environments have different onsets and strengths of environmental forcing functions that can affect organizational performance. White noise has longer forcing periods acting over more extended periods, somewhat equivalent to evolutionary processes. In systems dominated by lower frequencies, that is, increased redness, ecological processes predominate. In these situations, variation maintains equilibrium (13).

In a white environment, the organization may consider resilience as the goal for recovery. This resiliency makes sense because white environments are relatively stable, and the return to operations as before is likely a wiser use of resources. The organization may conclude that the environment has changed in a reddened environment. Prudence then dictates a change to increase capabilities. Persistence becomes the goal rather than resilience (13).

Forcing functions experienced by the individual illuminate the stress response functions and reveal weaknesses in leadership and the social fabric of the organization or culture. Novelty, uncertainty, and uncontrollability cause stress (41, 42), elements that are inherent to red noise.

- *The novelty* comes from the emergence of new properties during the nonlinear interactions of self-organization.
- *Uncertainty* is an inherent principle of linear, time-variant systems, a product of the stochastic frequencies in red noise. (Heisenberg's Uncertainty Principle is an example from quantum mechanics.)

- *Unpredictability* develops from stochastic frequencies and the rate of change in the logistic equation that can develop into deterministic chaos (43).

These elements of stress are within the domain of the brain's executive functions. Temporal organization of behavior is essential for sequencing novel and complex behavior responding to red noise and stress elements. The executive functions integrate between prefrontal cortex *representational* neurons and posterior parietal cortex *operant motor* neurons to accomplish this (44-46). Adaptive stress responses, mediated by cortisol, limit cognition to bring behavioral focus to the threat, support protective actions by inhibiting memory recall in select systems, and enhance memory recall for habits and learned behaviors. The individual will quickly use learned behaviors without losing time thinking and developing plans or actions (7, 47). Because of their essential survival function, behavioral stress responses remain little changed across mammalian species, though conserved within phylogenetic constraints (48).

Problem Characteristics

It is too easy to reduce the fire service to firefighting and EMS today. William J. Corr, Captain, LAFD, and WWII US Navy veteran, South Pacific, viewed the fire service uniquely as a way of thinking and acting. In effect, he modeled motor cognition (thinking *by* acting) in his career from the late 1940s through the 1970s. To expand the frame of reference of firefighters from specialists to specialist-generalists, he often counseled, "We don't fight fires. We solve problems the public cannot or will not solve themselves." These were not simple problems but ill-structured that might be embedded in a dangerous situation. When trite problems arose, he modeled as a learnable skill how to solve a 'simple' problem during a 'live-or-die' situation, keeping those around you living while you gave yourself space to think. Today, we might say he took the white noise environment into the pink noise space, giving all equal weight.

"In the beginning, we do not know if the problem is white, red, pink, or brown noise. The trite or straightforward problem could be the appearance of a covert, compensated state that may self-resolve, be straightforward to address, or challenge us on the way to overwhelming us."

In the beginning, we do not know if the problem is white, red, pink, or brown noise. The trite or straightforward problem could be the appearance of a covert, compensated state that may self-resolve, be straightforward to address, or challenge us on the way to overwhelming us. Like Captain Corr's approach, we treat all problems as ones that cannot be solved. We know that environmental forcing functions alter the qualitative nature of the system's dynamics (10), making every problem a new problem.

There is an ecological hierarchy of problems, however. Problems in a white noise environment tend to be well-structured. In a red noise environment, we can encounter ill-structured problems, and in the pink noise, environment problems embed in the stochastic activity of the environment.

The white noise environment contains Herbert Simon's well-structured problem that is amenable to the algorithm (23, 28), solved much like a puzzle with a set number of pieces fitting into a pattern (22). Abstractions and concepts provide the basis for understanding and prediction. With the Gaussian distribution, problems tend to be information-dependent, and error measures the distance from the model or concept. Classical logic and scientific reasoning are used (5).

The red noise environment is ecological, therefore contextual and pragmatic (15). It contains Simon's ill-structured problem solved with heuristics corrected by error (23, 27, 28, 30). These problems are information-independent. We cannot easily differentiate information from noise. We search instead for clues as in a mystery rather than pieces of the puzzle (22). We will be generating structure as we generate information. Red noise has a power-law distribution.

The pink noise environment is also ecological, but the problem is embedded into the environment, making these problems contextual and pragmatic (49). Problem-solving tends toward practical common sense, focusing on consequences and a broad knowledge base (32). Reciprocal feedback decision-making methods provide flexibility, such as Boyd's OODA Loop (49). Actions through motor cognition (31) generate information by converting uncertainty to certainty (50).

Data collected to understand a reddened environment better quickly becomes difficult to interpret. Variance in the presence of red noise does not form a Gaussian curve. Instead, the variance increases with the period. In pink noise, the variance increases no matter how long the time series (8).

"Data collected to understand a reddened environment better quickly becomes difficult to interpret. Variance in the presence of red noise does not form a Gaussian curve. Instead, the variance increases with the period. In pink noise, the variance increases no matter how long the time series (8)."

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Classification in Colors

The environmental disorder can become spontaneously ordered through self-organization as a dissipative system. That is, dissipating energy to the more extreme degree can achieve chaos. Social systems direct self-organization through the behaviors of each member. Therefore the self-organization does not become dissipative. Alternatives to self-organization can include a well-informed leader directing the group's activity. Having a leader means the system is not self-organized. The group may follow a blueprint, a representation of the pattern, a recipe, or sequential instructions for each member. Blueprints guide *what* is done but not *how* and do not synchronize workers. Recipes guide *how* it is done but do not coordinate workers' activity or adjust for temporal events (51).

To use an alternative to self-organization, we would need to classify elements of the event. Classifications act as objects for cooperation and create boundary objects for communication across infrastructure during a disaster (40, 52). Classifications build from data, which is not a problem in the gaussian white noise environment where more data narrows the variance to form a norm. Variance in a reddened environment increases with data, and we lose

the norm. One solution is to disregard environmental noise (8), but the noise is the disaster.

Classifying the elements gives us an understanding and perception of control. Once we obtain a diagnosis, we know how to manage the disease. Classifying a disease can be for the clinical purposes of prediction, treatment, or data collection through the ICD-10 codes. In his first year (1972) on an ambulance, one of the authors (DvS) stood at the head of a patient with a head injury next to a harried emergency physician. The physician intently looked

at the scalp above the ear. When asked what he was waiting for, the physician said he thought the patient had intracranial bleeding and he should drill a burr hole through the skull to let blood out and relieve the pressure. "Why don't you drill?" the author asked. "Because if I drill and there is no bleeding, then the physicians in a meeting across the hall will take away my job." "If you don't drill and it's bleeding?" the author asked. "He dies."

That was the author's introduction to medicine – the diagnostician in a meeting is revered; the doctor at the bedside sweating over what action to take is the one at risk.

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The forcing function of the medical environment within a white noise environment was to find a classification. The physician was operating in a pink noise environment with imminent death possible for the patient. His stress came from what Susan Leigh Star termed "tacking back-and-forth between the expectation for a well-structured problem" and diagnosis and the demand of the ill-structured problem to prevent death (24). Star described how administrators or regulatory agencies would try to control the tacking back-and-forth by making equivalent the ill-structured and well-structured aspects of boundary objects through classification and standardization.

The dichotomy is 'articulation work,' the way things worked out in practice versus

'categorical work,' creating the rules. Articulation work is real-time managing and anticipating contingencies in the face of the unexpected, directing efforts to keep the program running. As its name implies, categorical work classifies for communication, juggling meanings, and seeking conforming actions and compliance (24).

Assumptions of time as the only dependent variable and that space is constant allow for structural web and energy flow diagrams. However, they fail to allow or explain the switching between varying structures. For example, Simon's ill-defined/well-defined problem or Star's dichotomy of operators doing articulation work and administrators doing categorical work. The embedded problem confounds these divisions amidst the qualitative changes from system dynamics.

Evolutionary and Ecological Progression:

In biological systems, external stochastic forcing at different frequencies affects the internal biological rates of change in populations and organisms. Slower or gradual evolutionary processes at the population level dominate in white noise environments, while contextual ecological processes at the individual level dominate in red noise environments. However, the ability of organisms to respond to change has a profound influence over adaptations and population strategies.

"Though the terrestrial environment has greater short-term variability than the marine environment, it is relatively stable over the long term. The marine environment has greater change over long periods but with greater stability in the short term. Terrestrial noise, then, is white and marine noise is red."

Though the terrestrial environment has greater short-term variability than the marine environment, it is relatively stable over the long term. The marine environment has greater change over long periods but with greater stability in the short term. Terrestrial noise, then, is white and marine noise is red. However, the terrestrial environment exposes organisms to reddened noise, driving internal adaptations for short-term variability, which can minimize the effects of long-term variation (13).

In the marine environment, poikilotherms dominate even at higher trophic levels without the need to control their internal environment. Larval and adult phases in fish populations also became decoupled with less supervision and feeding of the young (13). This circumstance illustrates the difficulty of comparing population responses to environmental stochastic forcing. Short-term variability on land creates responsive, robust populations that are better able to withstand long-term change. The marine environment's greater short-term stability creates ill-adapted populations to withstand long-term change.

We can see these differences in healthcare cultures. Medical care exists in a white noise environment, while red noise environments include critical care units and emergency departments. Though rehabilitation medicine and long-term care would be expected to operate in a white noise environment, some programs operate in red noise or have the constitutional ability to adapt despite a white noise environment.

One author (DvS) has extended EMS and critical care into nursing homes to create subacute care facilities capable of 'red-noise' operations (53-55) and has worked with a county public health agency supporting families with disabled children. These groups did not "accept" their operating area as a white noise environment. Instead, they sought out and responded to stochastic variances, even acting into pink noise variances. We must not view these groups as outsiders to reddened environments.

Extension of Nursing Home Care

The extension of a pediatric subacute care facility (San Bernardino, CA, Community Medical Center) into active management of mechanical ventilation reddened the nursing home's white noise environment. Before the change, the response to a medical emergency was 911 notification. One of the authors (DvS), unfamiliar with the concept of white, red, and pink noise, encouraged vigilance for the *loss of a smile* in a child. (Loss of smile as a sign of hypoactive delirium is a sensitive interoceptive marker for physiological dysfunction.) Visual evaluation for covert compensated physiological dysfunction rather than focus on lab studies,

x-rays, causes, errors, or mistakes became the norm. The author educated staff to think of consequences rather than diagnoses or risks and encouraged identification and correction of physiological dysfunction.

The way of thinking changed and became appropriate for a reddened environment. What did not change was staff, administration, or infrastructure. This approach moved the facility from a white noise environment to the red noise of management of acute respiratory failure, initiation of mechanical ventilation, and treatment of hypovolemia. As a result, patient mortality and transfers to the PICU decreased. Creating critical and long-term care for what can now be understood as a red noise environment produced new ventilator strategies. Ventilators now enhance the child's life by using *smiling* as the goal of mechanical ventilation (56).

Home Care Support – Children with Severe, Complex Disabilities

A children's service with the Riverside County (CA) Public Health Agency reviews medical support for children with limited ability to ambulate. Physicians order treatments, but exigencies impair care delivery, complicated by all participants' limitations in health, social, and cultural literacies. Healthcare professionals have limited exposure to the unique exigencies of home environments. Problems emerge from local, nonlinear interactions between impaired physiological systems, medical conditions, treatments, and home circumstances.

"The whole situation develops into an embedded problem. What appears to be a white noise environment has become one of red noise and, easily, a pink noise environment. Children miss appointments due to emergency department visits or hospital admissions, while the occasional child arrives with a medical or emotional crisis."

The whole situation develops into an embedded problem. What appears to be a white noise environment has become one of red noise and, easily, a pink noise environment. Children miss appointments due to emergency department visits or hospital admissions, while the occasional child arrives with a medical or emotional crisis. It is challenging to characterize the problem, identify a responding medical specialty, and develop effective treatments. Consequently, unrecognized stochastic forcing functions are not resolved. With no knowledge of the effect of reddened noise or these principles, the review team views the problem within an ecological system of reddened noise and forcing functions. By recognizing the consequences of failure by not acting (20), the review team increases adherence by families to continuous, prolonged treatments and finds direct interventions the families can manage. Irreversible consequences and medical costs are then avoided.

NICU staff having no experience in disasters have demonstrated the ability to extend neonatal care into pink noise despite minimal ability to prepare (2-4). The development of response plans will become more robust and pragmatic with the inclusion of bedside caregivers.

Growth from Pink to White:

A domain grows and develops by gaining control and finding predictability in the environment. Problems become well-structured with fewer ill-structured problems. Algorithms and protocols are developed. The novice entering this domain will not learn the reason behind specific attitudes or rules. The inability to support these attitudes while mentoring and teaching new novices shifts the baseline of attitudes and knowledge.

A Shifting Baseline

Daniel Pauly (34) first identified such a baseline shift in fisheries science, where he noticed that new researchers used their initial observations of the fish catch as a baseline of fisheries productivity and change. Over time, the change in fisheries appeared smaller than when measured over the span of several careers. High-Reliability attitudes and characteristics are lost during this period of shifting baseline.

We can see that as the environment of a domain becomes more controlled, less influenced by entropy, a healthcare system and medical discipline will move from pink to red, then toward a white environment. We see this with the domains of emergency and critical care, operating theaters, and emergency medical services as they move to a more rule-based, algorithmic approach. Neonatology differs in that some NICUs operate in white and red noise while university research NICUs remain within pink noise environments.

Relaxed Selection

A domain shifting toward a white noise environment can also shift from reactive to proactive defenses. The shift to a white noise environment weakens or removes a source of selection that had been important in maintaining behavioral traits. This situation of 'relaxed selection' leads to the disappearance of traits that once were necessary for survival. These traits eventually disappear, but some break down quickly while others linger (57).

"The behaviors necessary for reactive defense come in suites of behaviors and do not simply disappear. The resulting relaxed selection causes slow disintegration of the suites of reactive defense behaviors, leaving some behaviors as remnant behaviors out of place while other behaviors will be needed but lack their suite of supporting behaviors (7)."

The behaviors necessary for reactive defense come in suites of behaviors and do not simply disappear. The resulting relaxed selection causes slow disintegration of the suites of reactive defense behaviors, leaving some behaviors as remnant behaviors out of place while other behaviors will be needed but lack their suite of supporting behaviors (7).

Loss of selection pressure not only occurs from a change in environmental adversity but also because of a change in the nature of the selection pressure. For example, the demands of a supervisor who has not operated in an adverse environment will create an arbitrary selection. In such situations, the supervisor may not obtain the wished-for behaviors; subordinates develop protective be-

haviors rather than productive behaviors, distinguishing between natural and artificial environments (58). This development is like animal domestication, introducing domesticated traits that, while attractive and productive in a protected space, are unsuitable for survival in the wild condition (59).

Different Levels of Analysis:

The color analysis of environments is confused by the dynamic mixing of the environment with the organization, intertwined through common forcing functions, viewed from different frames of reference and various points of view. The magnitude of change, power of environmental forcing functions, geographic spread, et-cetera drive the necessity for voices 'requisite diversity'. Accuracy of the situation supersedes closely held beliefs. "Failure to identify levels of analysis … can create false debates," Scott A. MacDougall-Shackleton (60).

Points of view along the vertical organizational hierarchy are necessary to maintain close contact with contextual changes for logistic support. This support underscores the benefit of common terminology and the development of lexical elements for accurate rendering of the changing circumstances.

Reference frames from within the flow of events and outside fixed points can combine for accurate understanding and preparation of evolving events. Recognizing the ecological nature of pink noise environments will bring attention to effects in smaller, even adjacent areas.

"Reference frames from within the flow of events and outside fixed points can combine for accurate understanding and preparation of evolving events. Recognizing the ecological nature of pink noise environments will bring attention to effects in smaller, even adjacent areas."

Conclusion:

Environmental noise from entropy and stochastic processes disrupts routine operations and corrupts planning. Though the most significant degree of disruption from stochastic environmental noise occurs during a disaster, this dynamic continuously operates at various scales in the environment around us. The pervasiveness of stochastic environmental noise confounds our best efforts to prevent errors and failures through *proactive defenses*.

Inducible *reactive defenses* allow the selection of behaviors with variable expression, increasing behaviors for elevated risks and decreasing their expression as the risk abates (39). The necessary judgment becomes available through a tight coupling of leadership-line authority and fostering leader-leader members. The focus on capability and decision migration result in increased information flow and effective, rapid responsiveness.

The medical conditions of premature infants can also be described with stochastic noise. Rather than focus on an expected physiological weakness or failure, NICU staff remain vigilant for any discrepancy or disruption. This focus is not to characterize error or assign blame but to make the statement, "I don't know." The acknowledgment of doubt is the beginning of inquiry and engagement.

Low-frequency events will always occur. Their strength as forcing functions, though, will vary. We cannot protect ourselves from low-frequency events in our patients or environment. Then, it may not be worthwhile to seek *where* failure will occur. Instead, we may be better served to identify covert, compensated states and engage outliers as if they were signals in the red noise environment rather than random and independent noise in the white noise environment.

> *"Pink noise shows no preference for short or long-timescale disturbances. From seconds to millennia, natural disturbances of various sizes can be seen as part of a seamless l/f-noise process. In this picture, we need not make any special distinction between normal environmental variation and ecological 'catastrophes': it is the same thing seen at different scales."*
>
> *John M. Halley (8)*

An infant in a reddened environment will always have the unexpected. There will always be an unexpected. The unexpected can be managed (61).

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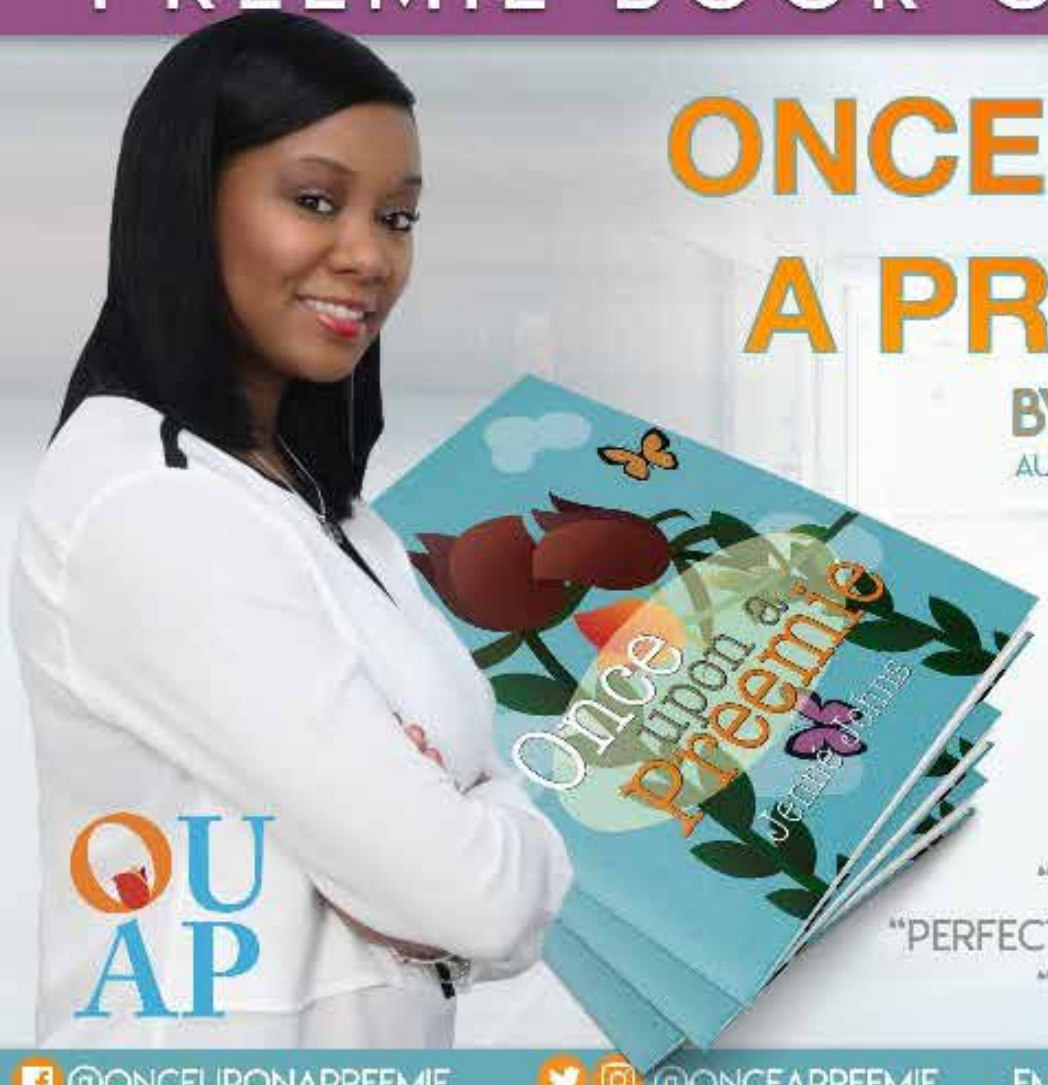

ONCE UPON A PREEMIE

BY JENNÉ JOHNS

AUTHOR | SPEAKER | ADVOCATE

QUAP

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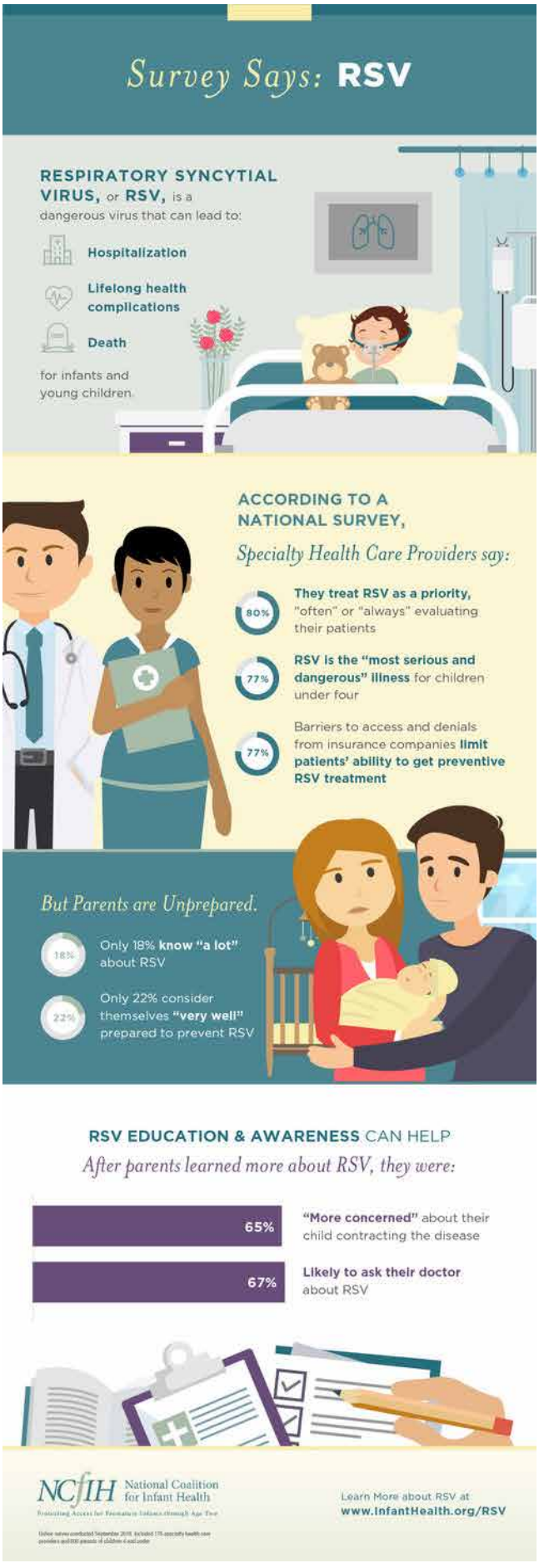

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Compiled and Reviewed by David Vasconcellos, MS IV

Autism Rate Rises to 1 in 44, Early Identification Improves

December 2, 2021

Melissa Jenco, News Content Editor

One in 44 8-year-old children has been identified as having autism spectrum disorder, a rate that continues to rise and indicates a need to make sure supports are in place for them, experts said.

The rate reported Thursday in the *Morbidity and Mortality Weekly Report* is up from one in 54 children two years prior. Experts said they can't rule out environmental factors contributing to the increase but also pointed to improvements in screening and diagnosing children.

"There's a ton of added initiatives and effort around screening and identification in large part due to the AAP's advocacy efforts as well as leadership in the autism space," said Kristin Sohl, M.D., FAAP, chair of the AAP Council on Children with Disabilities Autism Subcommittee. "That's obviously going to lead to more kids who are being evaluated, so that leads to more diagnoses."

The AAP recommends developmental screenings at 9, 18 and 30 months and screening for autism at ages 18 and 24 months.

About 47% of 8-year-olds with autism were evaluated by 36 months, up from 44% two years prior, according to the report from the Centers for Disease Control and Prevention (CDC). An accompanying report also found children born in 2014 were 50% more likely to have an autism diagnosis by 4 years compared to children born in 2010.

"The substantial progress in early identification is good news because the earlier that children are identified with autism, the sooner they can be connected to services and support," National Center on Birth Defects and Developmental Disabilities Director Karen Remley, M.D., M.P.H., M.B.A., FAAP, said in a press release. "Accessing these services at younger ages can help children do better in school and have a better quality of life."

The CDC's findings are based on 2018 data from its Autism and Developmental Disabilities Monitoring Network, which spans 11 sites — Arizona, Arkansas, California, Georgia, Maryland, Minnesota, Missouri, New Jersey, Tennessee, Utah and Wisconsin. While reports from the network may not be nationally representative, they are commonly used as an indicator of autism prevalence. The 2018 analysis used a new case definition, but applying that definition to the 2016 data still showed an increase.

The prevalence rates among 8-year-olds at the 11 sites ranged from one in 61 in Missouri to one in 26 in California. The rate for boys was four times higher than the rate for girls, consistent with previous years. While that trend may be starting to shift, many girls with autism likely are still being missed because their expected behavior is different than that of boys and they may be better at camouflaging their symptoms, said Dr. Sohl, executive director of ECHO Autism and professor of clinical child health at the University of Missouri.

"The bottom line is we as clinicians, as experts, have to get very good at recognizing this autism spectrum looks different in girls," she said. "We cannot keep missing it."

Autism rates for Hispanic children were lower than those of White and Black children at some sites, indicating a potential disparity in screening. In addition, Black children identified as having autism were more likely to have an intellectual disability than children who are Hispanic or White. This may indicate some aren't being diagnosed unless the severity of their condition makes it obvious, according to Dr. Sohl.

Overall, about 35% of the children with autism had an intellectual disability and tended to be diagnosed earlier than children without an intellectual disability.

Dr. Sohl said the data should be used to ensure supports are in place for this growing number of children diagnosed with autism. She called for state and federal advocacy to make sure Medicaid and private insurance cover medically necessary services. She also called on pediatricians to know the signs of autism and act on them.

"General pediatricians are very critical to addressing this need," she said. "With more children being diagnosed, that tells me pediatricians are doing more and more to screen and identify these kiddos. And I think the more that pediatricians engage in understanding autism, the more that pediatricians can play a role in community-based diagnosis."

Resources

- AAP clinical report *Identification, Evaluation, and Management of Children with Autism Spectrum Disorder*
- AAP Autism Initiatives
- AAP toolkit on caring for children with autism
- HealthyChildren.org article "What are the Early Signs of Autism?"
- CDC program: Learn the Signs. Act Early.

Contact information for AAP headquarters

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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

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

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NT

COVID During Pregnancy: Studies Underscore Urgency of Prevention Strategies

November 23, 2021

Alyson Sulaski Wyckoff, Associate Editor

Pregnant individuals infected with COVID-19 are more likely to become severely ill, die or have a stillbirth compared with those who are not pregnant, according to three new reports.

The predominance of the delta variant in the U.S. (after June 27, 2021), exacerbated these risks, highlighting the urgency of prevention strategies including vaccination for this population. There were 145,791 COVID-19 cases in pregnant women between Jan. 22, 2020, and Nov. 15, 2021, with 229 deaths, according to the Centers for Disease Control and Prevention (CDC) COVID Data Tracker. In September, the CDC issued an urgent health advisory calling for vaccination as soon as possible for those who are pregnant, recently pregnant, or trying to or are likely to become pregnant. Pregnant people also are included in the CDC's clinical considerations for use of COVID-19 vaccines.

The new reports analyzed maternal or perinatal outcomes in three similar time periods. Factors such as mothers' underlying health conditions and demographic variables also were considered. One study also looked at vaccination status.

Risk factors in Mississippi deaths

A study aimed to assess characteristics of 15 pregnant Mississippi women who died after contracting COVID-19, with consideration of the timing of infection before and during the rise of the delta variant.

There was an increase in the ratio of deaths associated with COVID-19 per 1,000 cases among pregnant women as the delta variant spread. The study described the characteristics of the women who were either pregnant — or within 90 days of the end of their pregnancy — from March 1, 2020, to Oct. 6, 2021.

None of the women were fully vaccinated. Nine were unvaccinated; five women died before vaccinations became available and one was partially vaccinated.

The median age was 30; 14 of 15 women had underlying conditions; and all had been admitted to the intensive care unit (ICU), with 14 requiring invasive mechanical ventilation. Nine of these patients were Black, three were non-Hispanic Whites and three were Hispanic women.

Seven of the women had emergency Cesarean delivery; 3 died during pregnancy and 12 died after a live birth.

The findings are published in "COVID-19–Associated Deaths After SARS-CoV-2 Infection During Pregnancy — Mississippi, March 1, 2020–October 6, 2021" (Kasehagen L, et al. MMWR. Nov. 19, 2021).

Risk for stillbirths

Another study sought to assess whether a maternal COVID-19 diagnosis at delivery hospitalization was associated with stillbirth between March 2020 and September 2021, as well as before and during the period of the delta variant's predominance.

Previous studies looking at whether COVID-19 during pregnancy was associated with an increased risk for stillbirths have reported mixed results.

Analysis of 1.25 million deliveries at 736 hospitals found that compared with women without COVID-19, those infected with the virus were four times as likely to have a stillbirth when delta was the predominant variant.

Vaccination status was not assessed.

The study identified the following conditions that were associated with a higher prevalence of stillbirths in women with COVID-19: chronic hypertension, multiple-gestation pregnancy, adverse cardiac event/outcome, placental abruption, sepsis, shock, acute respiratory distress syndrome, mechanical ventilation and ICU admission.

"Implementing evidence-based COVID-19 prevention strategies, including vaccination before or during pregnancy, is critical to reducing the impact of COVID-19 on stillbirths," the authors wrote in "Risk for

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Stillbirth Among Women With and Without COVID-19 at Delivery Hospitalization — United States, March 2020–September 2021" (De Sisto CL, et al, MMWR. Nov. 19, 2021).

Impact of delta variant, pregnancy status

Using a large sample size, a third study, posted as a preprint, aimed to assess risk for severe COVID-19 among women aged 15 to 44 years by pregnancy status and timing relative to the delta variant.

While noting that the overall risk for severe COVID-19 among women of reproductive age remains low; symptomatic pregnant women are at increased risk for severe outcomes compared with nonpregnant individuals. The risk increased when the delta variable became predominant, according to the report.

Delta also increased the risk for severe illness among the nonpregnant women of reproductive age.

For pregnant women with COVID-19 during the delta period, the report found the following:

- The risk of ICU admission was 66% higher.
- The risk of needing a ventilator or special equipment to breathe was 63% higher.
- The risk of death was more than two times higher than in the pre-delta period.

Researchers were unable to assess the role of vaccination status in the study, "COVID-19 Severity among Women of Reproductive Age with Symptomatic Laboratory-Confirmed SARS-CoV-2 by Pregnancy Status – United States, Jan 1, 2020 – Sep 30, 2021."

The report concludes that the greatest risk for COVID-19 is currently among the unvaccinated, noting that the CDC, American College of Obstetricians and Gynecologists and Society for Maternal-Fetal Medicine recommend COVID-19 vaccination.

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New AAP main number: 630-626-6000

NT

COVID-19 Vaccine Booster Authorized for 16–17-Year-Olds

COVID-19 Vaccine Booster Authorized for 16–17-Year-Olds

December 9, 2021

Melissa Jenco, News Content Editor

Editor's note: *For the latest news on COVID-19, visit http://bit.ly/AAPNewsCOVID19.*

Federal health officials have authorized a COVID-19 vaccine booster in 16- and 17-year-olds as the omicron variant spreads to more states.

The Pfizer-BioNTech vaccine can be used as a booster for this age group at least six months after a primary series, under an expanded emergency use authorization (EUA) granted by the Food and Drug Administration (FDA) Thursday. The Centers for Disease Control and Prevention (CDC) also signed off on the boosters.

"Since we first authorized the vaccine, new evidence indicates that vaccine effectiveness against COVID-19 is waning after the second dose of the vaccine for all adults and for those in the 16- and 17-year-old age group," Peter Marks, M.D., Ph.D., di-

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

rector of the FDA's Center for Biologics Evaluation and Research, said in a news release. "A single booster dose of the vaccine for those vaccinated at least six months prior will help provide continued protection against COVID-19 in this and older age groups."

Last month, the FDA and CDC authorized boosters for all adults. The FDA said in its announcement Thursday it believes the benefits of a booster to protect against SARS-CoV-2 outweigh the small risk of myocarditis in those under 18 years.

Health officials have been urging people to get boosters as soon as they're eligible to protect them against the omicron variant that is being reported in a growing number of states. The variant contains about 50 mutations, and its molecular characteristics suggest it may be able to spread more easily than the original pandemic virus. Experts are racing to study transmissibility, disease severity and vaccine effectiveness relative to omicron.

Earlier this week, Pfizer released preliminary data from a laboratory study showing a booster dose increases neutralizing antibody titers against the omicron variant by 25-fold compared to two doses.

"Although we don't have all the answers on the Omicron variant, initial data suggests that COVID-19 boosters help broaden and strengthen the protection against Omicron and other variants," CDC Director Rochelle P. Walensky, M.D., M.P.H., said in a statement. "We know that COVID-19 vaccines are safe and effective, and I strongly encourage adolescents ages 16 and 17 to get their booster if they are at least 6 months post their initial Pfizer vaccination series."

Pfizer-BioNTech first received an EUA in December 2020 for its COVID-19 vaccine those ages 16 years and older. It is the only vaccine authorized for use in teens.

"As people gather indoors with family and friends for the holidays, we can't let up on all the preventive public health measures that we have been taking during the pandemic," Acting FDA Commissioner Janet Woodcock, M.D., said in a press release. "With both the delta and omicron variants continuing to spread, vaccination remains the best protection against COVID-19."

Resources

- AAP resources on becoming a vaccinator, preparing a pediatric practice for COVID-19 vaccination and getting paid
- CDC clinical considerations for administering COVID-19 vaccines
- Information from the FDA about the Pfizer-BioNTech COVID-19 vaccine

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New AAP main number: 630-626-6000

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FDA expands EUA for monoclonal antibodies to include young children

December 3, 2021

Editor's note: *For the latest news on COVID-19, visit http://bit.ly/AAPNewsCOVID19.*

A combination of two monoclonal antibodies has been authorized to prevent and treat COVID-19 in young children.

The Food and Drug Administration (FDA) announced Friday it has expanded emergency use authorization (EUA) for bamlanivimab and etesevimab in children under 12 years.

The investigational medicines from Eli Lilly and Co. must be administered together via intravenous infusion. They can be used for children of all ages at high risk for severe COVID-19 as post-exposure prophylaxis to prevent COVID or as treatment for those who have contracted SARS-CoV-2. The monoclonal antibodies previously were authorized for people 12 years and older.

"Children under one year of age who are exposed to the virus that causes COVID-19 may be at particularly high risk for severe COVID-19 and this authorization addresses the medical needs of this vulnerable population," FDA Center for Drug Evaluation and Research Director Patrizia Cavazzoni, M.D., said in a press release. "While today's authorization includes post-exposure prevention of COVID-19 in children, this therapeutic option is not a substitute for vaccination. Vaccines remain our best tool in the fight against the virus and there is a COVID-19 vaccine authorized for children 5 years of age and above."

Conditions that may put children at increased risk for severe disease include obesity or overweight, chronic kidney disease, diabetes, immunosuppressive disease/treatment, cardiovascular disease, chronic lung diseases, sickle cell disease, neurodevelopmental disorders and having a medically related technological dependence.

Bamlanivimab and etesevimab block the SARS-CoV-2 virus' attachment and entry into human cells, according to the FDA. The monoclonal antibodies were studied in a clinical trial that included 125 children at risk for severe COVID-19. Hypersensitivity, anaphylaxis and infusion-related reactions have been reported after use. Possible side effects include nausea, dizziness, itchy skin and rash.

Resources

- Fact sheet for health care providers
- Fact sheet for patients, parents and caregivers
- Frequently asked questions on the emergency use authorization for bamlanivimab and etesevimab

Contact information for AAP headquarters

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New AAP main number: 630-626-6000

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FDA Expands Authorization of Two Monoclonal Antibodies for Treatment and Post-Exposure Prevention of COVID-19 to Younger Pediatric Patients, Including Newborns

FDA NEWS RELEASE

For Immediate Release:

December 03, 2021

Today, the U.S. Food and Drug Administration revised the emergency use authorization (EUA) of bamlanivimab and etesevimab (previously authorized for pediatric patients 12 years of age and older weighing at least 40 kilograms, or about 88 pounds), to additionally authorize bamlanivimab and etesivimab administered together for the treatment of mild to moderate COVID-19 in all younger pediatric patients, including newborns, who have a positive COVID-19 test and are at high risk for progression to severe COVID-19, including hospitalization or death. This revision also authorizes bamlanivimab and etesevimab, to be administered together, for post-exposure prophylaxis for prevention of COVID-19 in all pediatric patients, including newborns, at high risk of progression to severe COVID-19, including hospitalization or death.

"Now all patients at high risk of severe COVID-19, including children and newborn babies, have an option for treatment and post-exposure prevention. Children under one year of age who are exposed to the virus that causes COVID-19 may be at particularly high risk for severe COVID-19 and this authorization addresses the medical needs of this vulnerable population," said Patrizia Cavazzoni, M.D., director of the FDA's Center for Drug Evaluation and Research. "While today's authorization includes post-exposure prevention of COVID-19 in children, this therapeutic option is not a substitute for vaccination. Vaccines remain our best tool in the fight against the virus and there is a COVID-19 vaccine authorized for children 5 years of age and above."

Monoclonal antibodies are laboratory-made proteins that mimic the immune system's ability to fight off harmful pathogens, such as viruses. Bamlanivimab and etesevimab are monoclonal antibodies that are specifically directed against the spike protein of SARS-CoV-2, designed to block the virus' attachment and entry into human cells. Bamlanivimab and etesevimab bind to different but overlapping sites on the spike protein of the virus.

In February, the FDA originally autho-

rized bamlanivimab and etesevimab administered together to treat mild-to moderate COVID-19 in adults and pediatric patients (12 years of age or older weighing at least 40 kg) with positive results of direct SARS-CoV-2 viral testing, and who are at high-risk for progressing to severe COVID-19 and/or hospitalization. In September, the agency authorized its use for post-exposure prevention of COVID-19 in certain adults and pediatric individuals (12 years of age and older weighing at least 40 kg) who are at high-risk for progression to severe COVID-19, including hospitalization or death.

To support today's action, bamlanivimab and etesevimab, administered together, were studied in a clinical trial of 125 pediatric patients (14 adolescent patients received placebo), all with at least one risk factor for severe COVID-19, to evaluate the safety and pharmacokinetics of treatment in pediatric patients. Patients weighing less than 40 kg (88 pounds) received doses of bamlanivimab and etesevimab adjusted for their body weight, to achieve comparable exposures to adults and adolescents receiving the authorized dose. Given the similar course of COVID-19 disease, the authorization of bamlanivimab and etesevimab in younger pediatric patients, including neonates, is supported by safety and efficacy data in adolescents and adults, together with additional pharmacokinetic and safety data from the clinical trial in pediatric patients.

Serious adverse events including hypersensitivity, anaphylaxis, and infusion-related reactions have been observed with bamlanivimab with and without coadministration of etesevimab. Possible side effects of bamlanivimab and etesevimab administered together include nausea, dizziness, pruritus, and rash.

The FDA is working with sponsors of all currently authorized therapeutics to assess the activity against any global SARS-CoV-2 variant(s) of interest and is committed to communicating with the public as we learn more.

Under the EUA, fact sheets that provide important information about the emergency use of bamlanivimab and etesevimab, to be administered together, must be made available to health care providers and to patients, parents and caregivers. These fact sheets include dosing instructions, potential side effects and drug interactions.

The EUA was issued to Eli Lilly and Co.

Related Information

- Letter of Authorization
- Fact Sheet for Providers
- Fact Sheet for Patients, Parents and Caregivers
- Frequently Asked Questions on the Emergency Use Authorization for Bamlanivimab and Etesevimab

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

NT

Long-term study of children with COVID-19 begins

Monday, November 15, 2021

NIH-supported research will track effects of COVID-19 infection on children over three years.

A large, long-term study of the impacts of COVID-19 on children has enrolled its first participant at the National Institutes of Health's Clinical Center in Bethesda, Maryland. The study, which is supported by the National Institute of Allergy and Infectious Diseases (NIAID), part of the National Institutes of Health, will track up to 1,000 children and young adults who previously tested positive for COVID-19 and evaluate the impact of COVID-19 on their physical and mental health over three years. The study is expected to yield a detailed picture of COVID-19's effects on the overall health of children, their development and immune responses to infection, and their overall quality of life in the years following infection. This work is part of NIH's Researching COVID to Enhance Recovery (RECOVER) Initiative(link is external), to better understand the long-term consequences of SARS-CoV-2 infection.

In the early days of the COVID-19 pandemic, initial data suggested that children were less likely to suffer from severe cases of COVID-19 than older people. However, among the 6 million reported pediatric COVID-19 cases the United States, many children have experienced significant acute and long-term effects of the disease. Although increasing numbers of children are becoming eligible to receive a COVID-19 vaccine, the lack of vaccine-derived protection for most children has made this age group especially vulnerable to infection. In addition, children can suffer from a suite of inflammatory symptoms, collectively called Multisystem Inflammatory Syndrome in Children (MIS-C), that can affect multiple organs and lead to severe illness. MIS-C can arise even when the child initially appeared to be asymptomatic for COVID.

"Although we know that children are vulnerable to COVID-19, we still do not have a clear picture of how COVID-19 affects them in the long term," said NIAID Director Anthony S. Fauci, M.D. "In adult patients, the long-term sequelae of COVID, including post-acute COVID-19, can significantly

affect quality of life. Our investigations into the pediatric population will deepen our understanding of the public health impact that the pandemic has had and will continue to have in the months and years to come."

Study participants will be enrolled with the consent of their parents or guardians. The NIH Clinical Center will recruit children ranging from 3 to 21 years of age, and Children's National Hospital in Washington, DC, will recruit children ranging in age from birth to 21 years. In addition to tracking the long-term health effects of COVID-19 and attempting to determine risk factors for complications, the study also will evaluate the long-term immune responses to the disease, screen for genetic factors that may affect how children respond to COVID-19 infection, and determine whether immunological factors influence long-term outcomes.

Children may be eligible to be enrolled if they have tested positive for COVID-19 in the past, even if they were asymptomatic. Participants will receive a full physical examination and undergo a complete medical history. Study physicians will collect a variety of baseline samples, including blood, nasal swabs, stool and urine. An optional genetic analysis may be performed to identify potential genetic risk factors for severe COVID-19 outcomes. Participants also will undergo scans of their hearts and other organs. Members of their households without a history of COVID infection also will be asked to enroll as part of a control cohort. In all, the study may enroll up to 2,000 people, the participants who have tested positive for COVID-19 and their household contacts.

Children and young adults who enroll within 12 weeks of a COVID-19 infection or a positive COVID-19 test will visit a clinic for follow-up at three and six months and then every six months for a total of three years. Those who enroll more than 12 weeks after a positive COVID-19 test will have clinic visits scheduled every six months for three years. At these follow-up visits, participants will undergo additional scans, sample analyses, questionnaires, and other means of tracking their health, development, and overall quality of life, including their mental and social well-being. Any reinfections or adverse events that may be linked to a prior COVID-19 infection will be documented. The researchers anticipate that the study will take approximately six years to complete.

For more information about the study, please visit ClinicalTrials.gov using the study identifier NCT04830852.

NIAID conducts and supports research — at NIH, throughout the United States, and worldwide — to study the causes of infectious and immune-mediated diseases, and to develop better means of preventing, diagnosing and treating these illnesses. News releases, fact sheets and other NIAID-related materials are available on the NIAID website.

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

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NT

Repurposed ALS drug shows promise in mouse model of rare childhood genetic disorder

Friday, November 19, 2021

Repurposed ALS drug shows promise in mouse model of rare childhood genetic disorder

NPC1 leads to difficulty controlling movements, liver and lung disease, impaired swallowing, intellectual decline and death.

What

Riluzole, a drug approved to treat amyotrophic lateral sclerosis (ALS), a disease affecting nerve cells controlling movement, could slow the gradual loss of a particular brain cell that occurs in Niemann-Pick disease type C1 (NPC1), a rare genetic disorder affecting children and adolescents, suggests a study in mice by scientists at the National Institutes of Health.

The study was conducted by Forbes D. Porter, M.D., Ph.D., of NIH's *Eunice Kennedy Shriver* National Institute of Child Health and Human Development (NICHD), and colleagues in the National Human Genome Research Institute and National Institute of Arthritis and Musculoskeletal and Skin Disease. It appears in *Molecular Genetics and Metabolism*. The study was supported in part by a grant from the Ara Parseghian Medical Research Foundation.

NPC1 results from an impaired ability to move cholesterol through cells, leading to difficulty controlling movements, liver and lung disease, impaired swallowing, intellectual decline and death. Much of the movement difficulties in NPC1 result from gradual loss of brain cells known as Purkinje neurons. The researchers found that mice with a form of NPC1 have a diminished ability to lower levels of glutamate — a brain chemical that stimulates neurons — after it has bound to a neuron's surface. High levels of glutamate can be toxic to cells. The researchers believe the buildup of glutamate contributes to the brain cell loss seen in the disease. Riluzole blocks the release of glutamate and hence delays the progression of ALS in people.

In the current study, mice with NPC1 survived 12% longer when treated with riluzole, compared to untreated mice. The researchers believe that riluzole or similar drugs may provide a way to slow disease progression in patients with NPC1.

Who

Forbes D. Porter, M.D., Ph.D., NICHD Clinical Director, is available for comment.

Article

Cougnoux, A., et al Reduction of glutamate toxicity: a novel therapeutic approach for Niemann-Pick disease, type C1(link is external). *Molecular Genetics and Metabo-*

lism. 2021.

This media availability describes a basic research finding. Basic research increases our understanding of human behavior and biology, which is foundational to advancing new and better ways to prevent, diagnose, and treat disease. Science is an unpredictable and incremental process—each research advance builds on past discoveries, often in unexpected ways. Most clinical advances would not be possible without the knowledge of fundamental basic research. To learn more about basic research, visit https://www.nih.gov/news-events/basic-research-digital-media-kit.

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

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

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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

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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.

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

USE AN ALCOHOL-BASED HAND SANITIZER.

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

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Peer Reviewed

Genetics Corner: Cat-Eye-Syndrome and Genetic Syndromes Associated with Ear Anomalies

Subhadra Ramanathan MSc, MS, CGC, Robin Dawn Clark, MD

"A 5-week-old female infant was referred for an initial evaluation in the Craniofacial Team clinic for bilateral microtia and external auditory canal atresia."

Clinical Summary:

A 5-week-old female infant was referred for an initial evaluation in the Craniofacial Team clinic for bilateral microtia and external auditory canal atresia.

The prenatal history was non-contributory. Fetal movements were normal. Second-trimester fetal ultrasound detected polyhydramnios and a 2-vessel umbilical cord. Maternal serum screening tests were negative; the mother declined an amniocentesis for advanced maternal age.

A 36-week gestation was delivered by repeat C-section to a 36-year old G4P3 mother. Birth weight was 4 lb 11oz (2521 g). She was admitted to the NICU of an outside hospital for respiratory distress and transient tachypnea of the newborn and discharged at two weeks of age.

The family history was non-contributory for ear anomalies, hearing loss, or other congenital anomalies. Parental consanguinity was denied. The patient has three healthy siblings. A maternal aunt had recurrent miscarriages and infertility. Parents are of Hispanic ancestry from Mexico.

On exam, the infant had dysplastic ears, a skin tag on the right cheek, an inferior coloboma of the right iris, and an asymmetric crying face. She had failure to thrive, and all growth parameters were significantly below the 3rd %ile: weight Z-score = -4.17, length Z-score = -3.63, and head circumference Z-score = -3.63.

A chromosome microarray analysis was ordered because of multiple congenital anomalies and failure to thrive. The results showed mosaicism for a 2.0 megabase triplication of chromosome 22q11.21. Additional studies demonstrated a small supernumerary marker chromosome, consistent with Cat-Eye syndrome (CES).

"A chromosome microarray analysis was ordered because of multiple congenital anomalies and failure to thrive. The results showed mosaicism for a 2.0 megabase triplication of chromosome 22q11.21. Additional studies demonstrated a small supernumerary marker chromosome, consistent with Cat-Eye syndrome (CES)."

Assessment:

Cat-Eye syndrome (1) is characterized by the presence of ocular colobomas, including those of the iris and retina in about 50% of affected individuals, anal atresia with fistula, renal and heart malformations, as well as ear anomalies with preauricular pits and tags (Figures 1 a, b,c, d). The clinical symptoms can be highly variable. There is an increased risk for growth problems, developmental delay, and intellectual disability. The chromosome abnormality is an accessory small supernumerary chromosome resulting from an inverted duplication of proximal 22q11: inv dup dup(22)(q11). The derivative chromosome is small (smaller than chromosome 21), and it frequently has two centromeres and is bisatellited.

"The principal reason for her referral to the Craniofacial Team Clinic was bilateral microtia. Microtia is a broad term that encompasses a spectrum of ear anomalies."

The principal reason for her referral to the Craniofacial Team Clinic was bilateral microtia. Microtia is a broad term that encompasses

a spectrum of ear anomalies. Although the name microtia implies a small ear, the term usually describes a dysplastic auricle or pinna of the ear. Ectopic structures such as preauricular or even cheek tags are frequently seen. Microtia is usually associated with conductive hearing loss. Sometimes the unique shape of the pina is enough to suggest the diagnosis, but more often, it is the associated pattern of anomalies that points to the underlying diagnosis in a child with microtia.

Microtia is an etiologically and pathogenically heterogeneous anomaly (2), and it provides a clue to an underlying diagnosis that can be appreciated in the newborn period. To help you in your efforts to care for your newborn patients, we have compiled a summary of syndromes that feature microtia. You can test your knowledge by taking the quiz at the end. Good luck and see you in the New Year.

"Microtia, especially unilateral and isolated, is often a sporadic abnormality. Oculoauriculovertebral syndrome (OAVS) is a relatively common cause of microtia caused by abnormal morphogenesis of the first and second branchial arches. It is usually a sporadic, nongenetic condition, more often seen in infants of poorly controlled diabetic mothers. Facial asymmetry and cervical vertebral anomalies are common in OAVS, including cerebral, renal, and ocular anomalies."

Syndromes Associated with Microtia

Microtia, especially unilateral and isolated, is often a sporadic abnormality. Oculoauriculovertebral syndrome (OAVS) is a relatively common cause of microtia caused by abnormal morphogenesis of the first and second branchial arches. It is usually a sporadic, nongenetic condition, more often seen in infants of poorly controlled diabetic mothers. Facial asymmetry and cervical vertebral anomalies are common in OAVS, including cerebral, renal, and ocular anomalies. When an epibulbar dermoid is present, which can be deep in a far corner of the eye, the condition is often referred to as Goldenhar syndrome, but many use OAVS and Goldenhar interchangeably.

About a third of patients with microtia have a genetic syndrome. This is especially true when the ear anomalies are bilateral, and other anomalies are present. Table 1 provides causative genes for some common syndromes that include microtia.

Syndrome	Causative gene(s)
Auriculo-condylar syndrome	*PLCB4,GNAI3*
Branchio-oculo-facial (BOF)	*TFAP2A*
Branchio-oto-renal/Branchiootic (BOR/BO)	*EYA1,SIX1,SIX5*
CHARGE	*CHD7,(SEMA3E)*
Fraser	*FRAS1,FREM2,GRIP1*
Kabuki	*MLL2, KDM6A*
Klippel-Feil	*GDF6*
Labyrinthine aplasia, microtia and microdontia (LAMM)	*FGF3*
Lacrimo-auriculo-dento-digital (LADD)	*FGFR2,FGFR3,FGF10*
Mandibulofacial dysostosis	*HOXD*
Mandibulofacial dysostosis with microcephaly	*EFTUD2*
MeiereGorlin (Ear-patella-short stature)	*ORC1,ORC4,ORC6,CDT1,CDC6*
Microtia, hearing impairment, and cleft palate	*HOXA2*
Miller	*DHODH*
Nager	*SF3B4*
Oculo-auricular (OA)	*HMX1*
Townes-Brocks	*SALL1*
Treacher-Collins	*TCOF1,POL1RC,POL1RDT*

Table1: Modified from T.C. Cox et al. European Journal of Medical Genetics 57 (2014) 394e401397

Practical applications:

1. When an ear anomaly is present, examine the infant for other anomalies
2. Pay special attention when the ear anomaly is bilateral and when other anomalies are present. Consider a chromosome microarray or genetic consultation.
3. Learn to recognize a few characteristic auricular anomalies that are distinctive and help point to a genetic diagnosis.

Syndrome	Ear manifestations		Other
	External ear	Additional anomalies	
Auriculo-condylar dysplasia	**Question-mark ear (interruption between the helix and antihelix and the lobule)**, posteriorly rotated cup-shaped ears	Middle ear malformations, CHL	Micrognathia, temporomandibular joint dysfunction, prominent cheeks, microstomia, facial asymmetry, cleft palate
Beckwith Weidemann	**Linear creases, indentations, or pits in anterior or posterior helix or lobule**		Macroglossia, large size at birth, lateralized overgrowth hypoglycemia (hemihypertrophy), umbilical hernia or omphalocele, visceromegaly
Branchio-oto-renal/ Branchio-otic (BOR/ BO)	Minor anomalies to severe microtia with external auditory canal atresia, uni- or bilateral. (prominent, cup, flap, lop, flattened, underdeveloped), preauricular pits. tags	Ossicle malformations, inner ear malformations (bulbous IAC, hypoplastic cochlea, Mondini, widened vestibular aqueduct and sac); HL-variable	Usually **bilateral branchial fistulas or cysts (50–60%), renal abnormalities** ranging from mild hypoplasia to complete absence/no renal malformations; risk for end-stage renal disease
CHARGE (coloboma, heart defects, choanal atresia, retarded growth and development, genital abnormalities, ear anomalies)	**The lower part of the ear is more severely affected, the lobule and lower helix absent, as if clipped-off**. Antihelix and antitragus are discontinuous, hypoplastic/absent lobe, **triangular concha,** protruding, usually asymmetric	Ossicular fixations/ malformations, **Mondini defect of the cochlea**, absent/**hypoplastic semicircular canals** (>90%), hypoplasia of auditory nerve; mild to profound SNHL	Unilateral/bilateral **coloboma of the iris, retina, choroid, and/or disc with/ without microphthalmos** (80–90%), unilateral/bilateral **choanal atresia/ stenosis (50–60%), cranial nerve dysfunction** (hyposmia/anosmia, unilateral/bilateral facial palsy (40%), swallowing problems (70–90%), **small genitalia in males,** hypogonadotropic hypogonadism in both males/ females, developmental delay, cardiovascular malformations (75–85%), growth deficiency (70–80%), orofacial clefts (15–20%), tracheoesophageal fistula (15–20%)
Kabuki	**Large, protruding, cup ear**, prominent lobules, hypoplastic anthelix; preauricular pits	Malformed ossicles; recurrent otitis media, CHL; Mondini defect of the cochlea, rarely an absence of cochlea/ malformed vestibule, sensorineural hearing loss	**Long palpebral fissures, eversion of the lower lateral eyelid, broad arched eyebrows with lateral sparseness,** depressed nasal tip; cleft lip/palate, skeletal anomalies (brachydactyly V, spine deformity); dermatoglyphics (including fetal fingertip pads); intellectual disability/ short stature. Dental/heart anomalies
Townes-Brocks	Overfolded superior helices (“satyr form” of cup ear: 25–35%), small ears, preauricular tags/ pits	Progressive SNHL; middle ear malformations (ossicle defects); mixed HL	**Imperforate anus, thumb malformations** (triphalangeal thumbs, preaxial polydactyly, rarely hypoplasia), renal dysfunction (+/- structural abnormalities), cardiac anomalies, **genitourinary malformations**
Treacher-Collins	Any degree of microtia, ear tags/fistulas; **preauricular hair displacement: a tongue-like extension of hair extends toward the cheek**	Any degree of middle ear malformations; in some cases inner ear malformation (malformed cochlea/vestibular apparatus); CHL (at least 55%)	**Downward-slanting palpebral fissures, hypoplasia of zygomatic complex/mandible, lower eyelid coloboma, micrognathia, macrostomia, cleft palate**

Table 2: A characteristic auricular shape or other associated findings can be the key to a particular genetic diagnosis. The distinctive features are in bold in Table 2:

Modified from Cox TC et al., 2014 (3)

HL: hearing loss; CHL: conductive hearing loss; SNHL: sensorineural hearing loss

Figure 1 a, b, c, d: This child with Cat-Eye syndrome has bilateral microtia (a, b) with a preauricular fistula on the upper right ear (b). There is a skin tag on the right cheek (c) and coloboma of the left iris (d).

QUIZ

Match the lettered photos of ear anomalies with the numbered syndromes. Use hints provided in Table 2. The answer key is below the author boxes.

A:

B:

C:

D:

1. Treacher-Collins syndrome
2. Auriculocondular dysplasia
3. Beckwith-Wiedemann syndrome
4. CHARGE syndrome

Reference:

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ANSWER KEY FOR THE MICROTIA QUIZ:

A-2 Auriculocondylar dysplasia

B-3 Beckwith-Wiedemann syndrome

C-4 CHARGE syndrome

D-1 Treacher-Collins syndrome

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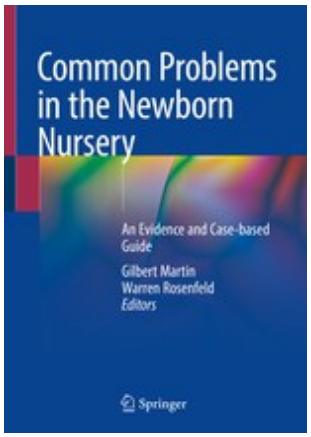

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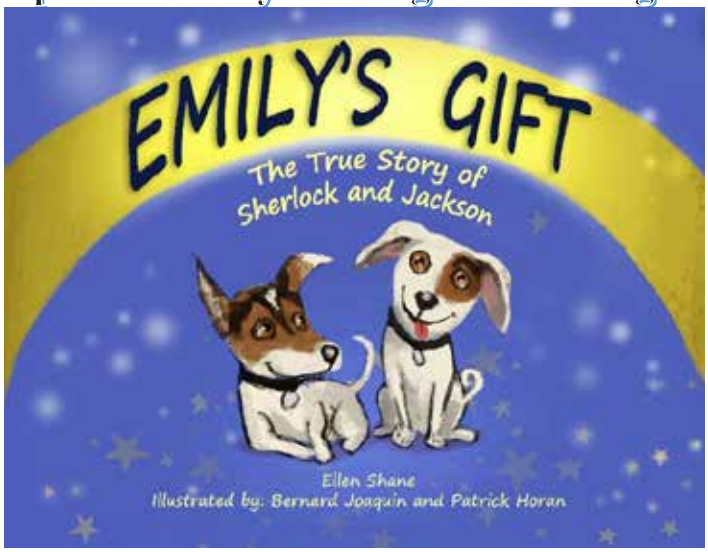

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Infant Health Matters: When a Baby Receives Harmful Antibodies, What Happens

Kenneth Moise, Jr., MD

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.

Q: How do antibodies work?

All of us have immune systems that can create antibodies, a specialized type of protein. They are the first line of defense against any foreign invaders to the human body. Think of the body's response to an infection, for example. But sometimes pregnant women can develop antibodies that actually work against the baby growing inside their body. While the placenta usually stops harmful substances, cells can traffic in and out of the placenta, allowing antibodies to harm the developing baby.

"All of us have immune systems that can create antibodies, a specialized type of protein. They are the first line of defense against any foreign invaders to the human body."

Q: When a baby receives harmful antibodies, what happens?

A number of different diseases can develop.

There's what's known as hemolytic disease of the fetus and newborn. This is where there is a blood incompatibility between the mom and the developing baby. It can cause the baby to be extremely anemic and can also lead to fetal or infant death.

Another condition that can develop is fetal and neonatal alloimmune thrombocytopenia. With this disease, antibodies can cause the infant's fetal platelet count to drop and lead to bleeding problems.

"And then there's congenital heart block. Here, the harmful antibodies attack a specific node in the developing baby's heart, creating a blockage that can cause the baby to have a dangerously slow heart rate."

And then there's congenital heart block. Here, the harmful antibodies attack a specific node in the developing baby's heart, creating a blockage that can cause the baby to have a dangerously slow heart rate.

When antibodies do cause harm, it's usually in a second or subsequent pregnancy.

Q: How do you treat these diseases?

It's a long process, usually beginning at about ten weeks gestation and continuing even after birth.

We do lots of ultrasounds to monitor the developing baby. In some cases, it can mean blood transfusions, where we insert a needle into the umbilical cord. Sometimes we use an IV medication that's called immunoglobulin to increase the developing baby's platelet count.

It's a lot for a pregnant woman to go through. Many decide not to have another baby or to adopt if they want to expand their family. Over my 35 years in practice, I've had only two patients come back with a subsequent pregnancy.

Q: What advice do you have for expectant mothers?

This is really a conversation that should begin before conception. Women should talk to their doctors about previous pregnancies, genetics, cell counts, and risk factors for future pregnancies. Then they should work together to sketch out a plan for what the next months would look like.

Some women may decide to consider adoption or in-vitro fertilization, which can negate the risk of a mother transferring harmful antibodies to her developing baby.

Q: How can policymakers, health care providers, and advocates help?

Within the health care system, we should probably be checking the patient's platelet type, much like we check the patient's blood type. We don't do it often because it's expensive, and fetal and neonatal thrombocytopenia affects only a small percentage of the population. Some other countries take more action on checking platelet type.

"Within the health care system, we should probably be checking the patient's platelet type, much like we check the patient's blood type. We don't do it often because it's expensive, and fetal and neonatal thrombocytopenia affects only a small percentage of the population."

More broadly speaking, we need more education on these conditions. It amazes me that even some health care providers are unaware.

And patients need to step up and become their own advocates, especially in taking charge of their health and the health of their unborn baby. Don't be afraid to ask questions.

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National Coalition for Infant Health Values (SANE)

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

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

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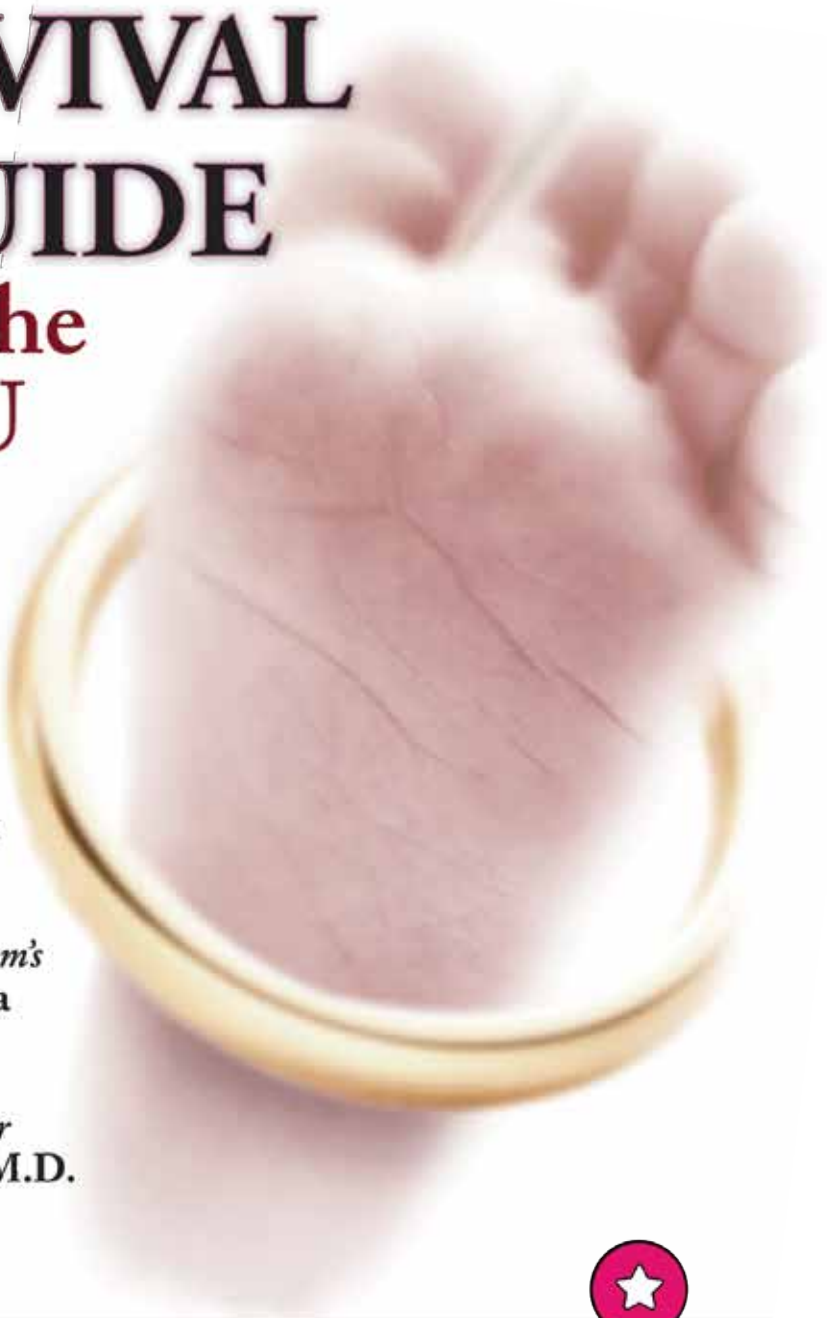

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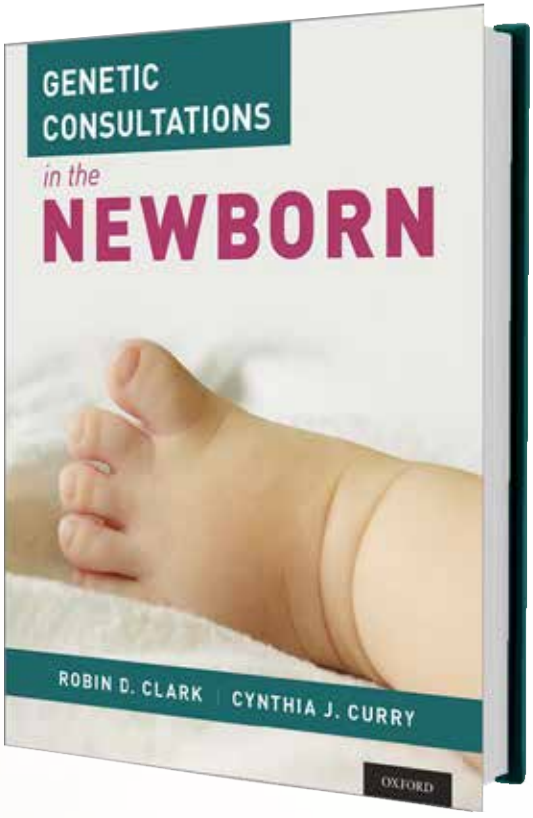

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From the National Perinatal Information Center: Impact of COVID-19 on Prematurity: Exploration of Premature Birth and COVID Status within the NPIC Perinatal Database

Elizabeth Rochin, PhD, RN, NE-BC

The National Perinatal Information Center (NPIC) is driven by data, collaboration and research to strengthen, connect and empower our shared purpose of improving patient care.

For over 30 years, NPIC has worked with hospitals, public and private entities, patient safety organizations, insurers and researchers to collect and interpret the data that drives better outcomes for mothers and newborns.

"On February 11, 2020, the World Health Organization (WHO) officially named the novel coronavirus COVID-19, and one month later, on March 11, 2020, the WHO declared COVID-19 a global pandemic (3). Infectious disease outbreaks and pregnancy create unique and significant challenges to public health strategies."

SARS-CoV-2 is the seventh coronavirus known to infect humans and cause a significant disease burden (1). The first case of COVID-19 in the United States was reported on January 20, 2020, in Snohomish County, Washington (2). On February 11, 2020, the World Health Organization (WHO) officially named the novel coronavirus COVID-19, and one month later, on March 11, 2020, the WHO declared COVID-19 a global pandemic (3). Infectious disease outbreaks and pregnancy create unique and significant challenges to public health strategies.

This NPIC Perinatal Database exploration reviewed deliveries during the reporting period April 1, 2020 – March 31, 2021, for COVID-19 infection impact. Beginning in April 2020, The Centers for Disease Control (CDC) had issued several iterations of coding and diagnostic criteria for COVID documentation (https://www.cdc.gov/nchs/data/icd/COVID-19-guidelines-final.pdf) that NPIC has been utilizing for determination of inclusion for documented cases.

"Early in the pandemic, case reports and state surveillance described increasing preterm birth rates among patients with confirmed COVID-19 diagnosis in 2020(4-7). Reports have described both unchanged as well as increased preterm birth rates; however, these reports do continue to describe disparities in outcomes related to race and ethnicity."

Early in the pandemic, case reports and state surveillance described increasing preterm birth rates among patients with confirmed COVID-19 diagnosis in 2020(4-7). Reports have described both unchanged as well as increased preterm birth rates; however, these reports do continue to describe disparities in outcomes related to race and ethnicity. This exploration utilizes the gestational age included in the mother's chart at the time of delivery. Table 1 provides an overview of maternal gestational age by race and ethnicity by COVID status within the NPIC Perinatal Database. The NPIC COVID Database included 308,977 deliveries, of which 7,105 were coded with a positive COVID-19 diagnosis (2.3%), and 301,872 with no positive COVID-19 diagnosis code (97.7%).

Notable observations:

American Indian/Alaska Native:

- Extremely preterm: 4.4% COVID-19 vs 1.0% non-COVID-19
- Very preterm: 6.7% COVID-19 vs 1.1% non-COVID-19

National Perinatal Information Center
04/01/2020 – 03/31/2021
n = 308,977

Gestational Age by Race/Ethnicity and COVID Status
Deliveries

	Race							Ethnicity		
	AI/AN	Asian	Black	Other	PI	Unknown	White	Hispanic	Non-Hispanic	Other Ethnicity
COVID (*n* = 7,105)										
Extremely Preterm	4.4%	1.2%	0.9%	0.8%	0.0%	0.9%	0.4%	0.6%	0.8%	0.0%
Very Preterm	6.7%	1.2%	2.5%	0.9%	0.0%	0.9%	1.6%	1.0%	1.9%	2.6%
Moderate or Late Preterm	11.1%	10.9%	15.6%	11.1%	5.7%	11.4%	9.2%	10.8%	11.6%	10.4%
Term	77.8%	86.7%	81.0%	87.2%	94.3%	86.7%	88.8%	87.7%	85.7%	87.0%
Non-COVID (*n* = 301,872)										
Extremely Preterm	1.0%	0.3%	1.3%	0.5%	0.2%	0.5%	0.4%	0.4%	0.7%	0.6%
Very Preterm	1.1%	0.5%	1.6%	0.8%	0.7%	0.8%	0.7%	0.7%	1.0%	0.7%
Moderate or Late Preterm	11.5%	6.3%	11.1%	7.8%	6.5%	8.3%	7.9%	7.7%	8.8%	6.4%
Term	86.5%	92.9%	86.0%	90.8%	92.6%	90.4%	91.0%	91.2%	89.6%	92.3%

AI/AN: American Indian/Alaska Native
PI: Pacific Islander

Table 1. Maternal Gestational Age by Race/Ethnicity and COVID Status

Asian:

- Extremely preterm: 1.2% COVID-19 vs 0.3% non-COVID-19
- Very preterm: 1.2% COVID-19 vs 0.5% non-COVID-19

Discussion:

"Outcome disparities in maternal and neonatal health continue to resonate within the literature and data analyses; however, there is still evolving information and research surrounding SARS-CoV-2, COVID-19, and its impact on preterm birth."

Outcome disparities in maternal and neonatal health continue to resonate within the literature and data analyses; however, there is still evolving information and research surrounding SARS-CoV-2, COVID-19, and its impact on preterm birth. Janevic, Glazer & Vieira (8) found no evidence for increased racial/ethnic disparities in preterm birth in New York City among women who tested positive or tested negative for SARS-CoV-2. A large cohort study in California found similar outcomes to the NPIC Perinatal Database, including the highest rates of prematurity in American Indian/Alaska Native women (9), which provides additional support to highlight disparities among indigenous populations in the United States within COVID-19. Several publications describe a potentially "protective" element of quarantine due to job loss and reduced stressors associated with job and social responsibilities, which may have reduced the overall preterm birth rate (10-11).

While studies and data continue to be inconsistent within the sphere of preterm birth and COVID-19, providers and clinicians need to understand the rates and impacts of preterm birth within the communities they serve. While regional reports may highlight minimal differences in disparities or reductions in preterm birth during the pandemic, recognizing local impacts and trends continue to drive conversations surrounding the need for education, prevention, and treatment of those communities most impacted by preterm birth. Identification, recognition, and mitigation of social determinants of health (SDOH) is an essential element of care during and after hospitalization for mothers, babies, and families.

The National Perinatal Information Center was invited by the Department of Health and Human Services to participate in the inaugural White House Maternal Health Day of Action on December 7, 2021. NPIC has committed to partnering with organizations across the United States to amplify the urgency for accurate race and ethnicity reporting and to promote stratification of critical maternal and neonatal outcome metrics by race and ethnicity to support health equity initiatives. COVID-19 is one of many strategic initiatives connecting healthcare organizations and communities to their collective purpose.

"The National Perinatal Information Center was invited by the Department of Health and Human Services to participate in the inaugural White House Maternal Health Day of Action on December 7, 2021. NPIC has committed to partnering with organizations across the United States to amplify the urgency for accurate race and ethnicity reporting and to promote stratification of critical maternal and neonatal outcome metrics by race and ethnicity to support health equity initiatives. "

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RSV AWARENESS:
A National Poll of Parents & Health Care Providers

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

Yet a national poll of parents and specialty health care providers reveals a startling divide in attitudes toward the virus. While both groups acknowledge RSV as a significant concern, the two populations vary widely in their reported ability to meet RSV's threat head-on. Health care providers vigilantly monitor for the virus, which they report seeing regularly in their practices. Parents, however, feel unequipped to protect their young children.

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

KEY FINDINGS

Preparedness

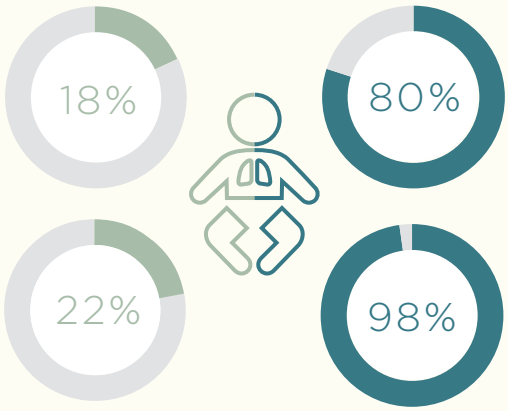
Parents of children age four and under report that understanding of RSV is lacking. That leaves them less than fully prepared to prevent their young children from catching the virus.

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

PARENTS

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

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



SPECIALTY HEALTH CARE PROVIDERS

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

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

Peer Reviewed

Clinical Pearl: The Promotion of Human Milk and Breastfeeding for the Very Low Birthweight Infant in the Neonatal Intensive Care Unit

Saajidha Rijvydeen, DO, Amy Meyer, RN, BSN, CL, Joseph R, Hageman, MD

The American Academy of Pediatrics (AAP) has long endorsed breastfeeding in infants for at least six months and continued breastfeeding with the addition of complementary feeds thereafter for at least a year (1). The use of human milk in preterm infants has been shown to have significant advantages that include lower rates of necrotizing enterocolitis (NEC), late-onset sepsis, chronic lung disease, neurodevelopmental impairment, and retinopathy of prematurity. The awareness of these benefits has led to a slow but steady increase in breastfeeding rates among preterm infants in the last decade.

"The use of human milk in preterm infants has been shown to have significant advantages that include lower rates of necrotizing enterocolitis (NEC), late-onset sepsis, chronic lung disease, neurodevelopmental impairment, and retinopathy of prematurity."

Pasteurized donor milk is becoming increasingly routine in its use in preterm infants, most often when there is limited or insufficient maternal milk to support nutritional needs at neonatal ICUs (NICUs) around the country. Advances in optimizing nutrition for very low birth weight (VLBW) infants has also been at the forefront of the field of neonatology, and this has been highlighted with the recent publication of a clinical report by the AAP aimed at promoting human milk and breastfeeding for very low birth weight infants (2).

The report recognizes that though pasteurized donor breast milk, when provided exclusively or supplemented, is protective against NEC, it "does not appear to confer the additional health benefits that have been reported with mother's own milk (MOM) such as reduction in late-onset sepsis or improvements in neurodevelopment" (2). It recommends that "pasteurized donor milk may be considered as a bridge until a full supply of mother's own milk is available" (2).

The report highlights several challenges experienced by mothers of VLBW infants that impede breastfeeding. These include prolonged mother-infant separation, pumping to maintain milk production rather than direct breastfeeding, and caring for other children or family members (2). Engaging in family-centered care models where various members of a multidisciplinary NICU care team are educated on skills that support lactation and breastfeeding is recommended in the report.

Given barriers such as delayed oromotor coordination, prolonged mother-infant separation, and the need for fortification feeds in VLBW infants, breastfeeding is often delayed, and these delays have been associated with a shorter duration of breastfeeding post-discharge (2). The report highlights the importance of assessing infant readiness beginning in weeks 31-33 postmenstrual age and encouraging the opportunity for non-nutritive suckling and breastfeeding when appropriate (2).

Importantly, the report identifies racial disparities with lower rates of human milk use in non-Hispanic Black mothers than non-Hispanic white mothers, as we have experienced in our NICU at the University of Chicago (2,3). It advocates for NICUs to consider approaches such as establishing peer counselor programs and support groups, assisting with acquiring a breast pump, and minimizing transportation barriers that limit mothers' visits to the NICU. Furthermore, it recommends that "technical assistance in early milk expression should be available to mothers within 6 to 8 hours of the birth of any VLBW infant, and mothers should be encouraged to express their milk as often as needed to maintain a milk supply for their infant, ideally every three to four hours" (2).

"When VLBW infants prepare for discharge home, the AAP recommends open conversation with mothers about their breastfeeding goals, challenges that may be experienced, and any needs for fortification (2,3.). Resources in the community and support from outpatient pediatricians may lead to more successful breastfeeding (2,3)."

When VLBW infants prepare for discharge home, the AAP recommends open conversation with mothers about their breastfeeding goals, challenges that may be experienced, and any needs for fortification (2,3.). Resources in the community and support from outpatient pediatricians may lead to more successful breastfeeding (2,3). Despite these initiatives in the NICU prior to discharge,

our discharge rates on maternal human milk still range around 50% (3). One of the biggest challenges has been the Coronavirus-19 pandemic (COVID-19) (3).

"The publication of this AAP clinical report comes shortly after the recent publication of a prospective cohort study that showed that for every 1% increase in MOM fed to preterm infants during the first 14 days of life, there was a sevenfold increase in odds of being discharged home on an exclusive diet of MOM."

The publication of this AAP clinical report comes shortly after the recent publication of a prospective cohort study that showed that for every 1% increase in MOM fed to preterm infants during the first 14 days of life, there was a sevenfold increase in odds of being discharged home on an exclusive diet of MOM. This finding was more pronounced when there was MOM consumption for the first 28 days of life, which correlated with a 17-fold increase of odds of being discharged on an exclusive MOM diet. These results support the increasing body of knowledge on the crucial need to provide a multidisciplinary approach that helps mothers of VLBW infants successfully establish lactation soon after birth and provide breastmilk (4).

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Disclosures: The authors have no disclosures

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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.

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OPIOIDS and NAS

When reporting on mothers, babies, and substance use

LANGUAGE MATTERS

I am not an addict.

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

I was exposed to opioids.

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

NAS is a temporary and treatable condition.

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

My mother may have a SUD.

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

My potential is limitless.

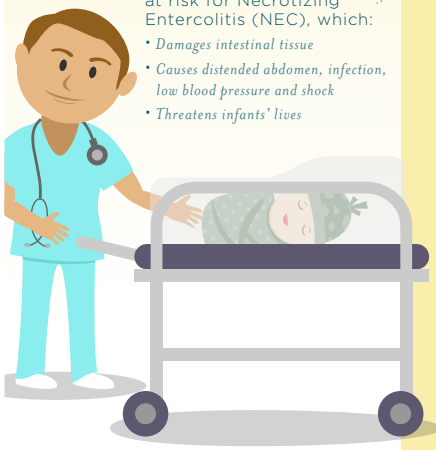
I am so much more than my NAS diagnosis. My drug exposure will not determine my long-term outcomes. But how you treat me will. When you invest in my family's health and wellbeing by supporting Medicaid and Early Childhood Education you can expect that I will do as well as any of my peers!

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

National Perinatal Association

Why PREMATURE INFANTS *Need Access to an* EXCLUSIVE HUMAN MILK DIET

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



MICRO PREEMIES are at risk for Necrotizing Entercolitis (NEC), which:

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

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

When that happens:

Micro preemies who get NEC

Micro preemies requiring surgery to treat NEC

30% of micro preemies needing surgery will die from NEC³

HOW TO HELP PREVENT NEC: EXCLUSIVE HUMAN MILK DIET

What is an Exclusive Human Milk Diet?

NO cow's milk · **NO** sheep's milk · **NO** goat's milk · **NO** formula

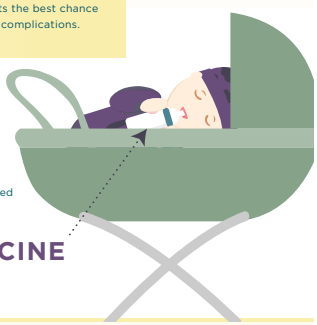
- ✓ mother's milk
- ✓ human donor milk
- ✓ human milk-based fortifier

Why Is An **Exclusive Human Milk Diet** Important?

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

When a micro preemie can access an EXCLUSIVE HUMAN MILK DIET:

- Mortality is reduced by **75%**²
- Feeding intolerance decreases⁴
- Chances of NEC are reduced by **77%**²



HUMAN MILK = **MEDICINE**

LEARN MORE ▸

NCfIH National Coalition for Infant Health

¹ Hair AB, et al. "Beyond Necrotizing Enterocolitis Prevention: Improving Outcomes with an Exclusive Human Milk–Based Diet." Breastfeeding Medicine DOI: 10.1089/bfm.2015.0134

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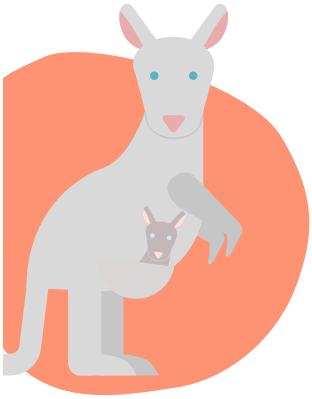
⁴ Assad M, Elliott MJ and Abraham JH. "Decreased cost and improved feeding tolerance in VLBW infants fed an exclusive human milk diet" Journal of Perinatology advance online publication 12 November 2015; DOI: 10.1038/jp.2015.168

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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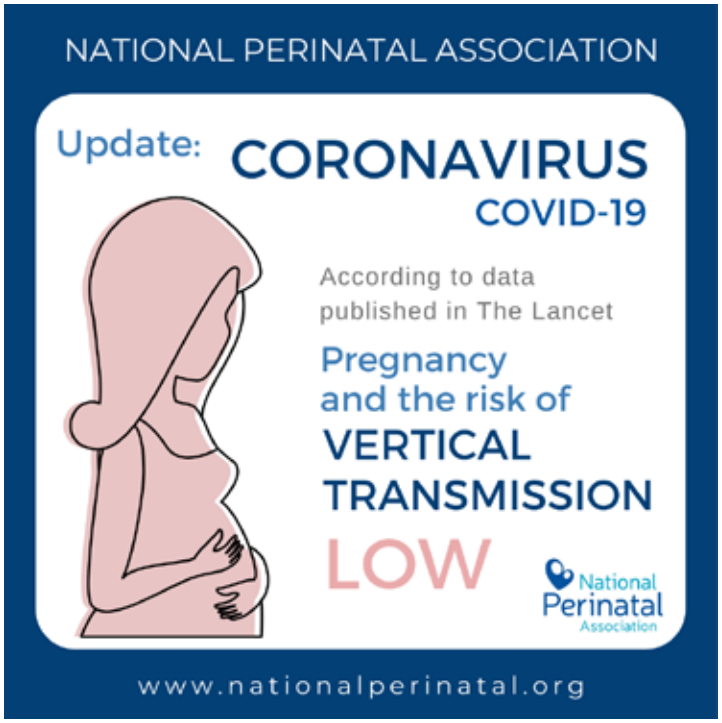


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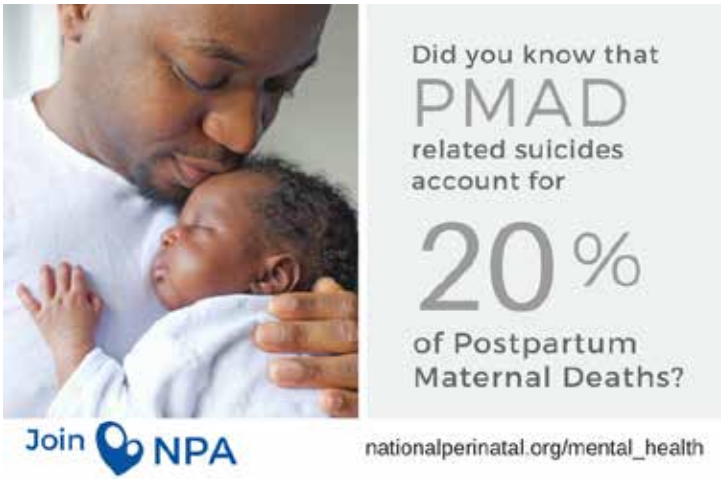
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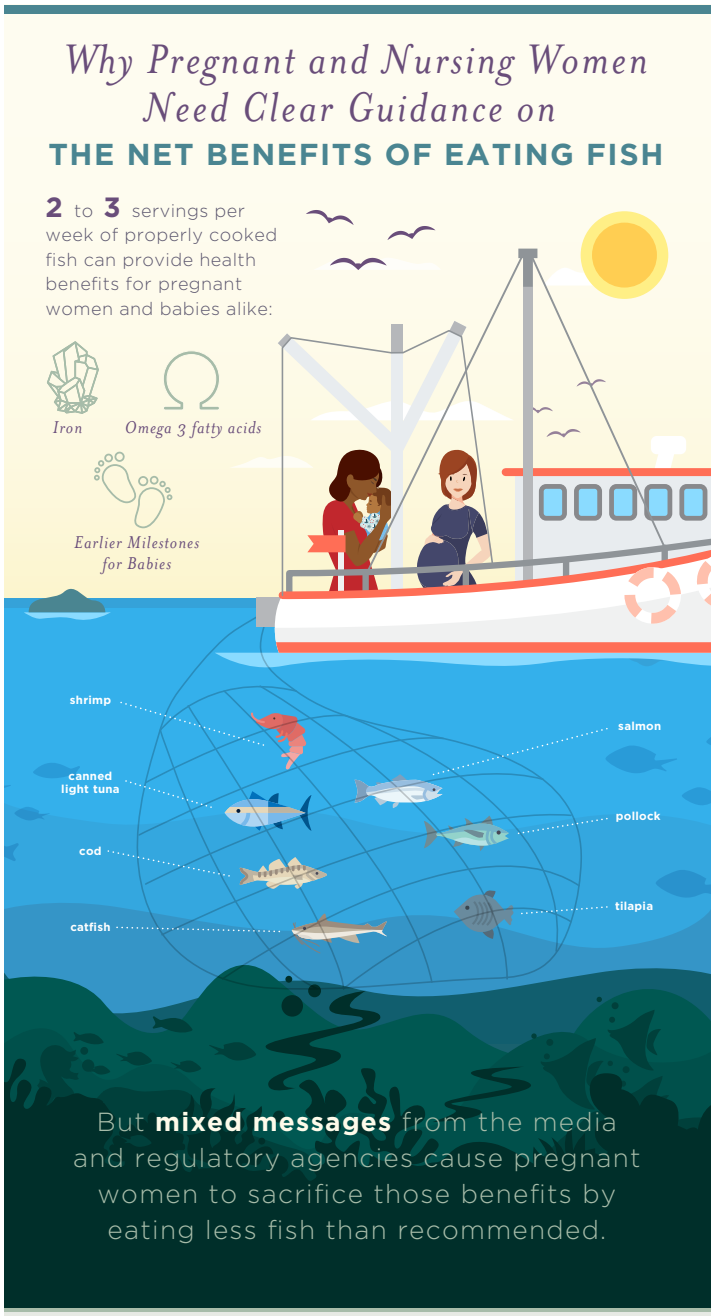
PMAD
related suicides
account for
20%
of Postpartum
Maternal Deaths?
Join NPA
nationalperinatal.org/mental_health


Support the
Open Letter
Breastfeeding
Innovations
Team


Why Pregnant and Nursing Women
Need Clear Guidance on
THE NET BENEFITS OF EATING FISH
2 to 3 servings per
week of properly cooked
fish can provide health
benefits for pregnant
women and babies alike:
Iron
Omega 3 fatty acids
Earlier Milestones
for Babies
shrimp
salmon
canned
light tuna
pollock
cod
tilapia
catfish
But mixed messages from the media
and regulatory agencies cause pregnant
women to sacrifice those benefits by
eating less fish than recommended.


GET THE FACTS
ON FISH CONSUMPTION
FOR PREGNANT
WOMEN, INFANTS,
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Letters to the Editor

Improving COVID-19 Immunization Rates to Better Protect the Higher Vulnerability of Pregnant Women to Severe COVID Infection

Letter to the Editor

Although the CDC and Neonatology Today, via published articles, have advocated for pregnant women to be vaccinated against COVID-19 with mRNA derived vaccines, there has been considerable misinformation about adverse events following vaccination using either the Pfizer or the Moderna vaccines in regards to an increased incidence of miscarriages within a week of immunization, especially during the first trimester. Please provide our readers with the latest information regarding miscarriage rates among pregnant women who have been immunized compared to those who chose to forego being immunized.

Although the rate of immunization against COVID-19 during pregnancy is far below that of the general public, what efforts by Obstetricians and others providing prenatal care and counseling should be done to improve these rates to better protect the higher vulnerability of pregnant women to severe COVID infections?

Please see Magnus M, Gjessing H, Haberg S. Covid-19 Vaccination during Pregnancy and First-Trimester Miscarriage. N Eng J Med 2021,385:22, 2008-2009.

T. Allen Merritt, MD

Professor of Pediatrics

Loma Linda University School of Medicine

Division of Neonatology, Department of Pediatrics

Loma Linda University Children's Hospital

Dear Dr. Merritt,

Thank you for bringing this topic to NT. The vulnerability of pregnant women to COVID-based disease cannot be overemphasized. From the first anecdotal reports of severe illness in pregnant moms to early reports of fetal loss and several centers reporting fewer premature infants being born, this pandemic has disproportionately targeted pregnant moms. (1, 2) Worse still, the risk is compounded in those moms at risk for disparity. (3, 4) Although the initial pandemic strain was very concerning, Delta was worse. With Omicron brewing and confirmed reports of increased transmission over an already weaponized Delta, pregnant women remain at high risk. Preliminary reports suggest that the mRNA-derived vaccines retain activity against Omicron despite extensive mutation, especially in the spike protein. (5-7)

Of particular concern have been the vaccine deniers and, more recently, the allegations made by Joseph Mercola, DO, regarding the troubling side effects of mRNA, including miscarriage. To support his claim, he refers to the 3,071 miscarriages that have been reported to the United States Vaccine Adverse Events Reporting System (VAERS) as of November 19, 2021. (8) According to his analysis, upwards of 80% of all pregnant women with a gestation less than 20 weeks had a miscarriage, which is not evidenced by ongoing research. The CDC V-safe pregnancy registry reports a miscarriage rate of just under 13% with immunization which is not different from that reported prior to the pandemic. In fact, "normal" miscarriage rates of 11-16% have been reported, with some suggesting that the current rate may provide significant protection to some, especially high-risk individuals. (4, 5, 7, 9)

The CDC, the American College of Obstetricians and Gynecologists, the Society for Maternal-Fetal Medicine, and the National Perinatal Association have all supported vaccination of pregnant women. Although the effectiveness of the vaccines may change with the evolution of the virus, vaccination with an mRNA-based product should be a routine and significant part of prenatal care. (2, 6, 9, 10)

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Mitchell Goldstein, MD, MBA, CML

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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 November 2021

Neonatology Today is not aware of any erratum affecting the November, 2021 edition.

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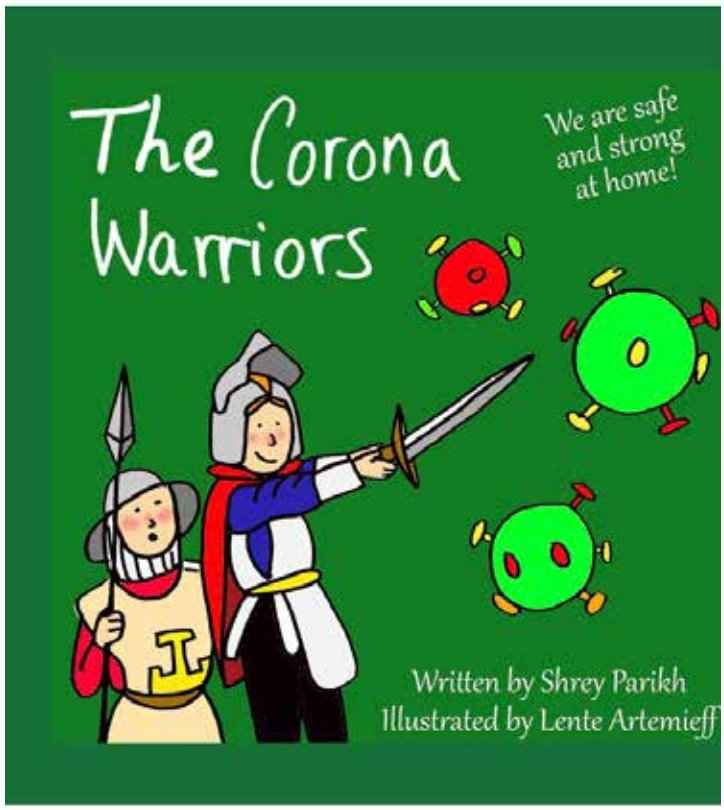

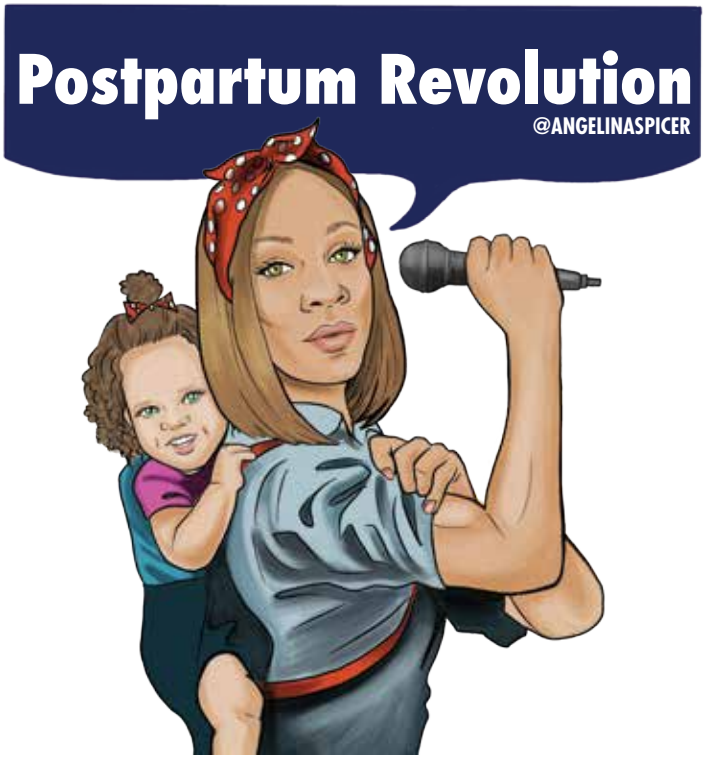

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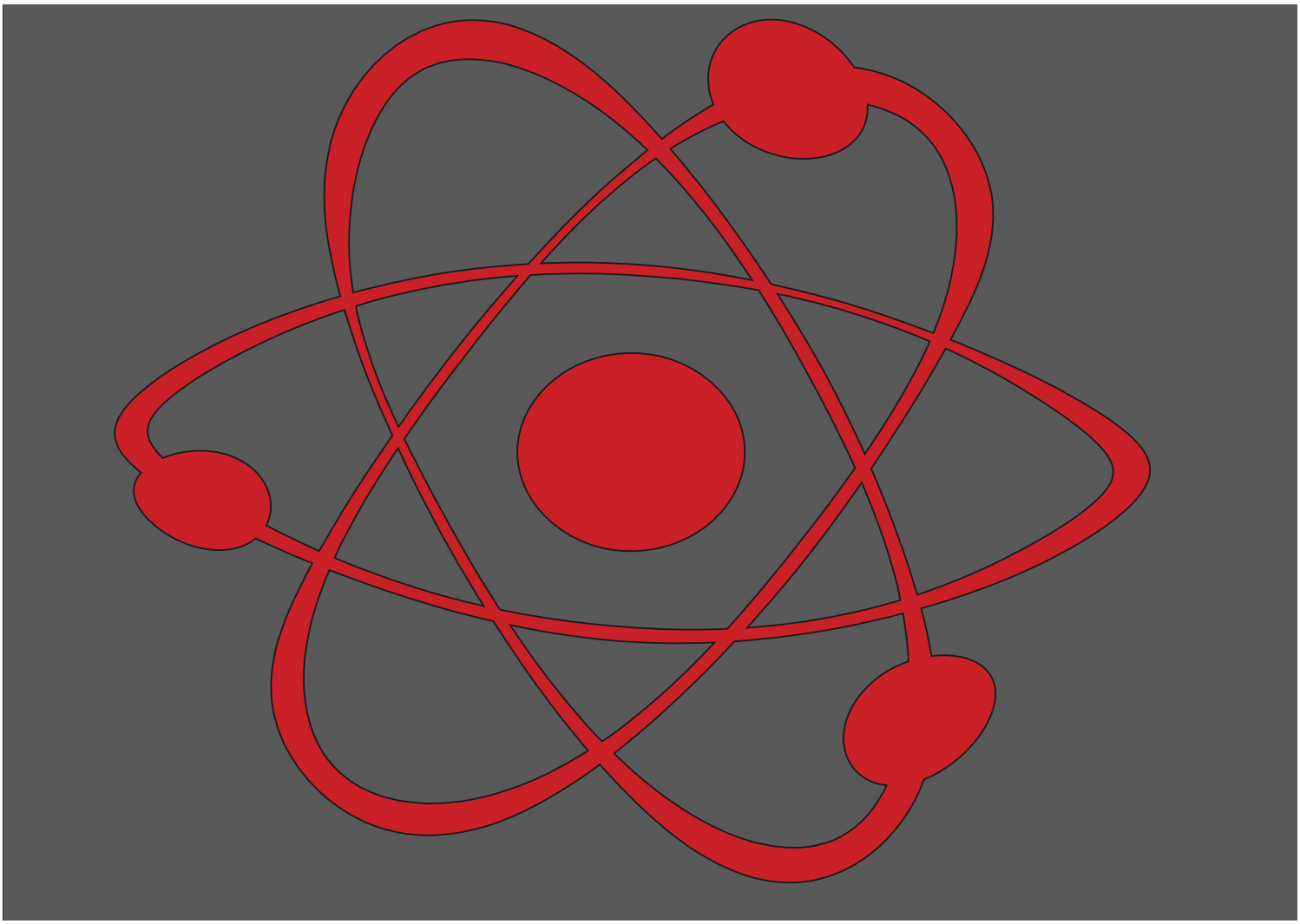

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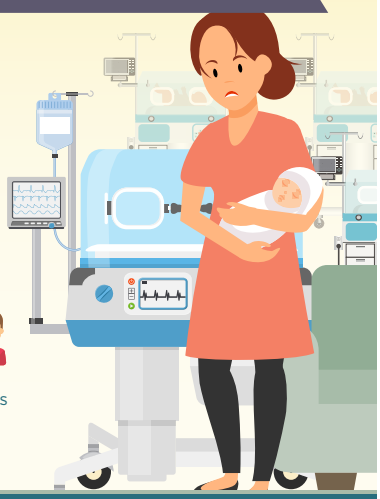
Will your PRETERM INFANT *need* EARLY INTERVENTION *services?*

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

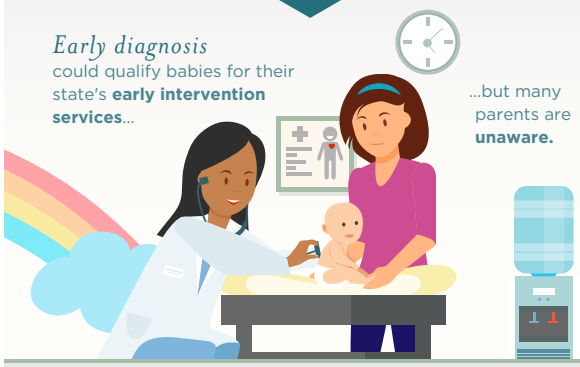


Early intervention can help preterm infants:

- 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*

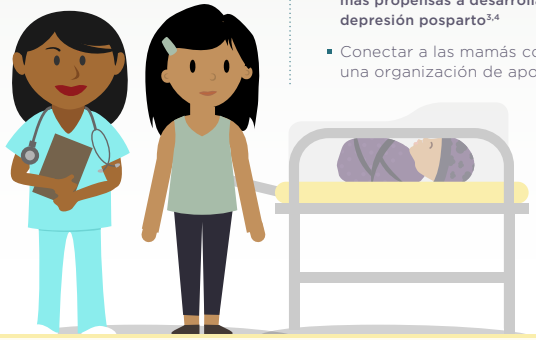
PARA AYUDAR **A LAS MADRES A ENFRENTAR LA DEPRESIÓN POSPARTO**

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



NCfIH National Coalition for Infant Health

Protecting Access for Premature Infants through Age Two

www.infanthealth.org

[1] American Psychological Association. Accessible on: http://www.apa.org/pi/women/resources/reports/postpartum-depression.aspx

[2] National Institute of Mental Health. Accessible on: https://www.nimh.nih.gov/health/publications/postpartum-depression-facts/index.shtml

[3] Journal of Perinatology (2015) 35, 529–536; doi:10.1038/jp.2015.147.

[4] Prevalence and risk factors for postpartum depression among women with preterm and low-birth-weight infants: a systematic review. Vigod SN, Villegas L, Dennis CL, Ross LE BJOG. 2010 Apr; 117(5):540-50.

CALL FOR
POSTER SUBMISSIONS

2022

Perinatology at the Intersection of Health Equity and Social Justice

NPA's 42nd ANNUAL INTERDISCIPLINARY CONFERENCE

DATES May 2 - 4

SEEKING POSTER ABSTRACTS

- Innovative Models of Care
- Applied or Basic Research
- Public Policies or Local Initiatives

STUDENT RESEARCHERS ARE ENCOURAGED TO SUBMIT.

VENUE Hyatt Regency Aurora-Denver

www.NPAconference.org

National Perinatal Association

Upcoming Medical Meetings

2022 NeoPREP®
An Intensive Review and Update of Neonatal-Perinatal Medicine
January 22-26, 2022
San Antonio, Texas
https://shop.aap.org/live-activities/

35th Annual Gravens Conference on the Environment of Care for High Risk Infants
Transformational Change: Making if Happen in the NICU
March 9-12, 2022
Sheraton Sand Key
Clearwater Beach, Fl
Abstract call:
https://neonatologytoday.org/Gravens/Abstract/

38th Annual Advances in Therapeutics and Technology: Critical Care of Neonates, Children, and Adults
March 29-April 2, 2022
Snowbird, UT
https://paclac.org/advances-in-care-conference/

42nd Conference on Pediatric Health Care.
Phase 1:
March 10-13 (Orlando, Fl)
Phase 2:
March 24-27 (Virtual)
NAPNAP
https://www.napnap.org/national-conference/

NEO: The Conference for Neonatology
March 2-4, 2022
San Diego, CA
www.neoconference.com

Specialty Review in Neonatology
March 1-6, 2022
San Diego, CA
www.specialtyreview.com

2022 National Perinatal Association Perinatology at the Intersection of Health Equity and Social Justice
Hyatt Regency Aurora-Denver
Denver, CO
May 2-4, 2022
www.NPAconference.org

For up to date Meeting Information, visit NeonatologyToday.net and click on the events tab.

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I want to learn to work in NICU... but how?

Academy of Neonatal Care Winter Course and Workshop

Thursday, Friday, and Saturday January 27, 28, 29

Valley Presbyterian Hospital

15107 Vanowen Street, Van Nuys 91405

~~7 CEU's Per Day Available~~ 0900-1700 Daily

SESSION 1

Maternal Complications and High -Risk Pregnancies - Fetal Lung Development - Fetal Circulation - CBG'S, Cord Gases, and TCOM'S - Neonatal Assessment - NICU Ventilator Settings - HFNC in NICU - Surfactants - Infection Control- Hands-on workshop

SESSION 2

Neonatal Pneumonia and Sepsis - Oscillator basics - Neonatal Chest X-Rays - HFNC vs. CPAP - Apneas and Bradycardias - Intraventricular Hemorrhage - Neonatal Respiratory Distress Syndrome- Non-Invasive Ventilation - Prove yourself as a NICU Newbie -and Hands on workshop

SESSION 3

Ventilator waveforms - ECMO - iNO update - Jet ventilators - Infection Control in the NICU - Psych-social aspect of NICU Care - Transports - and Hands-on Workshop -And MORE!

Academy of Neonatal Care

AcademyofNeonatalCare.org/register

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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.

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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.

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https://www.nc3rs.org.uk/arrive-guidelines

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https://olaw.nih.gov/policies-laws/phs-policy.htm

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Neonatology and the Arts

This section focuses on artistic work which is by those with an interest in Neonatology and Perinatology. The topics may be varied, but preference will be given to those works that focus on topics that are related to the fields of Neonatology, Pediatrics, and Perinatology. Contributions may include drawings, paintings, sketches, and other digital renderings. Photographs and video shorts may also be submitted. In order for the work to be considered, you must have the consent of any person whose photograph appears in the submission.

Works that have been published in another format are eligible for consideration as long as the contributor either owns the copyright or has secured copyright release prior to submission.

Logos and trademarks will usually not qualify for publication.

This month we continue to feature artistic works created by our readers on one page as well as photographs of birds on another. This month's original artwork is "A Moment in Time" provided by Paula Whiteman, MD. Our bird of the month is "A Pelican in Flight" contributed by Cynthia 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.

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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.**


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