NEONATOLOGY TODAY

Peer Reviewed Research, News and Information in Neonatal and Perinatal Medicine

Volume 17 / Issue 1 | January 2022

NEONATOLOGY TODAY

ISSN: 1932-7137 (Online), 1932-7129 (Print)
All editions of the Journal and associated manuscripts are available on-line:
www.NeonatologyToday.net
www.Twitter.com/NeoToday

Loma Linda Publishing Company
A Delaware "not for profit" 501(c) 3 Corporation.
c/o Mitchell Goldstein, MD
11175 Campus Street, Suite #11121
Loma Linda, CA 92354
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Anti-Intellectualism and Covid19 Vaccine Hesitancy

Benjamin Shlomo, MD, JD, Ernest Flores, MD

Introduction:

Vaccine hesitancy relies on the same universal arguments everyone uses when the evidence challenges their deeply held beliefs. We present some discussion points that may help address these arguments and some proposed ways to talk to their proponents.

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Discussion:

Every clinician has encountered a patient who cannot be swayed towards accepting medical advice regardless of the evidence and whose explanations for why they reject expert opinion sound absurd to our ears. In recent times, this has manifested as Covid Vaccine hesitancy that threatens to prolong the pandemic. (1) In a post-facts world, such discussions very much involve the nature of reality from a philosophical perspective.

Please be aware that convincing people that their strongly-held beliefs are false is very difficult and may likely require multiple, repeated conversations with no guarantee of eventual success. Anyone would have difficulty facing the possibility of having caused or contributed to the deaths of close family members by remaining unvaccinated, so instead, reframe the discussion as a question of interpreting new data that was not previously available or understood until recently.

"Please do not debate individual rights vs. social responsibilities to protect each other; instead, focus on the fact that the Covid vaccine is selfishly the best way to protect the patient and his or her immediate family. Discussions that emphasize personal health benefits--rather than the health of others, economic recovery, or vaccine safety--are more likely to convince listeners. (2)"

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Below follow some concepts to raise with vaccine-hesitant patients. The following are not exact scripts but should be tailored to an individual's specific concerns and level of understanding.

"The initial hurdle in Covid vaccine discussions will be the patient's reluctance to discuss the issue. By now, many of the vaccine-hesitant will have been through repeated arguments with friends, family, and likely other physicians and may be unwilling to engage further."

Opening the Mind

The initial hurdle in Covid vaccine discussions will be the patient's reluctance to discuss the issue. By now, many of the vaccine-hesitant will have been through repeated arguments with friends, family, and likely other physicians and may be unwilling to engage further. Begin with an appeal to the patient's idealized sense of self: "Do you think of yourself as an open-minded person? Are you able to learn new things and change your mind?" Most individuals' sense of self includes the trait of open-mindedness, and this should make them more receptive to further discussion.

Step 2 involves asking the patient what worries them about the vaccine. Not only will this help you tailor the discussion to address the patient's concerns, but anyone with strong beliefs will likely feel the need to express their opinions before they can focus on processing new information.

How Do You Know What Is True?

One option is whatever feels right, makes sense, and seems obvious, but that is not very helpful in talking to each other because what is obvious to you might be obviously wrong to me.

The Scientific Method is a systematic way of studying reality by identifying a problem, stating a hypothesis, performing a reproducible procedure, gathering data, analyzing it, forming conclusions, and then repeating the whole process over and over to refine our knowledge. (3) The philosopher Hume pointed out that trusting past performance to predict future behavior only because that process worked in the past (in other words: if it works, it works) is circular reasoning. However, even Hume believed that Science was the best way to describe reality, because otherwise *"we would be entirely ignorant of every matter of fact beyond what is immediately present to the memory and senses. We should never know how to adjust means to ends or to employ our natural powers in the production of any effect. There would be an end at once of all*

action, as well as of the chief part of speculation." (4)

Modern medicine is now based almost entirely on the Scientific Method: *"Evidence-based medicine is a set of principles and methods intended to ensure that to the greatest extent possible, medical decisions, guidelines, and other types of policies are based on and consistent with good evidence of effectiveness and benefit."* (5) Any *"practitioner who claims not to need any statistical or experimental studies but relies solely on clinical experience as adequate justification, by that very claim is shown to be a nonscientifically minded person whose professional judgments are not to be trusted."* (6)

"Falsifiability is the logical possibility that some evidence might disprove any scientific theory. (7) All scientific theories are falsifiable. (8) If hypothetically you were to find an appropriately conducted research study (published in a peer-reviewed journal) with enough subjects that showed the Covid 19 vaccination did not work--even though every other earlier study had different results--an honest scientist would then have to admit they were wrong about the vaccine."

Falsifiability

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Imagine you are right that the Covid19 vaccination kills more people than it saves. But one night, while you are sleeping, a wizard teleports you to a bizarre alternate world. This parallel world is very much like our own: everyone and everything looks the same. The one difference is that the Covid19 vaccine did work in this parallel universe and saved lives. How would you know which world you were living in? Would you ever find out? In other words, if you did not already know in advance that I was wrong and you were right, how would you find out? Don't you think you should have a good answer for why you are so sure?

To continue to believe something after knowing there is proof it is wrong is a "Delusion" (*"fixed beliefs that are not amenable to change in light of conflicting evidence"*), (9) a key component of the "Psychotic" category of mental illnesses. (10) The question is, what is the proof?

"Anecdotal Evidence" vs. "Statistically Significant"

Most people trust the stories they hear from friends and family or rely on past personal experiences. Stories about events that happen to one person (even yourself) or a few are called "Anecdotal Evidence." But how do you know if what happened to just a few people is a pattern or random coincidence? If my brother had a heart attack while wearing a seatbelt, does that prove seatbelts cause heart attacks? If you know someone who had bad side effects from a vaccine, how do you know if that is more reliable than my stories about people who had no reaction and stopped getting the diseases the vaccine protects them from?

Scientists rely on "Randomized Controlled Studies," where large numbers (the more subjects, the more powerful the conclusions) (11) of subjects are given an exposure (such as the vaccine) and then evaluated to see whether outcomes (such as Covid infections or side effects) are significantly more likely with or without the exposure.

A finding is considered meaningful if it is "statistically significant," meaning that the probability that the experiment's results were obtained through random chance instead of because the theory is right is very low. Typically this probability is required to be less than 5 to 0.1%, (12) on the assumption that random chance would result in a "normal distribution" of information. (13)

"You should trust doctors' medical recommendations to take the vaccine more than the opinion of people who are not experts, the same way we would trust engineers to design a bridge or pilots to fly a plane. No one is perfect, and of course, doctors can and have made mistakes. But your doctor's recommendation that you get vaccinated is based on genuine concern for your well-being and health."

Trust the Experts

You should trust doctors' medical recommendations to take the vaccine more than the opinion of people who are not experts, the same way we would trust engineers to design a bridge or pilots to fly a plane. No one is perfect, and of course, doctors can and have made mistakes. But your doctor's recommendation that you get vaccinated is based on genuine concern for your well-being and health. If you did not trust your doctor's medical opinion, why did you come to the clinic at all?

The "Dunning-Kruger Effect" describes the well-studied tendency of untrained people to be more confident about their skills than experts despite being worse at those skills. The same studies showed that competence improved when people learned more about the subjects they were tested on, so please read as much reliable information as you can. (14) If you would like to "do your own research," then please understand that to a Scientist, "research" means a valid scientific study published in a peer-reviewed journal where the results are reported in terms of statistical significance, not the anecdotal evidence of a story told by someone who is not an expert.

Make the Right Choice for You

It is your choice whether to vaccinate, but your body and your family take the risk when you make the wrong choice. Your doctor's job is to provide you with the information you need to make the best choice for yourself.

Herd Immunity will not protect you because a) antibodies from Covid19 infections wear off after six months, and b) not enough people have been vaccinated. (15)

Probability, Not Guarantees

There are no guarantees in life or medicine. Just because your doctor cannot promise results with absolute certainty does not make you a "guinea pig." Every treatment or vaccine is its own experiment, just like every decision not to vaccinate. Vaccinations are like seatbelts: they reduce but cannot eliminate risk.

"*A common anti-actuarial argument, or misconception, is that group statistics do not apply to single individuals or events. The argument abuses basic principles of probability. Although individuals and events may exhibit unique features, they typically share common features with other persons or events that permit tallied observations or generalizations to achieve predictive power*". (16) You are not a statistic, but statistics can help us predict what will happen and which vaccination schedule will most likely keep you healthy.

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God will protect you...by vaccinating you

When people refuse medical advice out of faith, I am reminded of the famous parable of the flood. "Once a man of faith was trapped in his house by a hurricane, so neighbors drove by to rescue him, then the police sailed by in a boat as the waters rose, then finally the coast guard showed up in a helicopter with a rope ladder, and each time the man refused to leave, saying 'Don't worry, God will protect me!' Instead, he drowns, and as he meets his Maker in Heaven, he asks, 'Why didn't you save me after I was so faithful?' God responds, 'I sent you a car, a boat, and a helicopter, why wouldn't you accept My help?'"

"When it is my time, it is my time," but why not take medicine, or a vaccination, when it will protect you and prolong your life?

Balancing the Benefits against the Side Effects

All vaccines, like all medications, have side effects. Common side effects of the Covid19 vaccinations include Swelling, redness, pain at the injection site, Fever, Headache, Tiredness, Muscle pain, Chills, and Nausea.

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Other side effects are rare. Approximately 2-5 people out of every million vaccinated can experience an allergic anaphylactic event, although this is immediately treatable (such as with Epinephrine).

In just 47 of the 14.7 million doses of the Johnson and Johnson Covid19 vaccine, and 2 of the more than 367 million Moderna Covid 19 vaccinations reported a clotting reaction called "Thrombosis with Thrombocytopenia Syndrome." Out of the more than 386 million doses of COVID-19 vaccines administered in the U.S., there were 7,899 (or only 0.0020%) reports of death from 12/14/2020 - 09/20/2021. The VAERS (Vaccine Adverse Event Reporting System at https://vaers.hhs.gov/) has received 890 confirmed reports of myocarditis and pericarditis. These reports of adverse events to VAERS following vaccination, including deaths, do not necessarily mean a vaccine caused the health problem, just like the anecdotal evidence of wearing a seatbelt and then having a heart attack would not prove (with statistical significance) that seatbelts caused heart attacks. Just because one event happened after the other does not mean the first event caused the second. A review of available clinical information has not established a causal link to COVID-19 vaccines. (17)

Covid is so bad that you need the vaccine

Compare the side effect numbers above to the total 686,000 U.S. deaths from Covid 19 (18) out of a total U.S. population of 328 million (19), which does not even include illnesses, costly hospitalizations, and long-term complications from Covid-associated clotting issues. The evidence shows that not getting vaccinated is a much bigger risk than taking the vaccine.

Imagine, for example, that you were offered a bowl of 100 jellybeans, but one of those jellybeans was randomly poisoned; surely you would not take even a single jellybean, even though the probability of eating the poisoned one was low, because it would be an unnecessary risk. Remaining unvaccinated is a similarly unnecessary risk. Although most people who get Covid will recover, the risk of death or disability is so high, and the vaccines are so effective that you should get vaccinated as soon as possible.

"Remaining unvaccinated is a similarly unnecessary risk. Although most people who get Covid will recover, the risk of death or disability is so high, and the vaccines are so effective that you should get vaccinated as soon as possible."

Make the Best Choice with Limited Information

Science cannot know everything, and there is more to the Covid 19 vaccination than what we can measure today, but that does not mean the things we do not know will prove us wrong. It could just as quickly be that the Covid infection is worse than we think, and the vaccination is even safer than we think. Everyone on Earth makes the best decision possible with the limited information they have available to them at the time, including your doctor. Every few months, there are new research studies out there, which is why recommendations change.

"*Antistatistical clinicians persist in making what Dawes* (20) *called the 'vacuum argument,' in which (imagined, hoped for) supportive evidence is simply hypothesized, whereas negative evidence that has actually been collected is ignored. ... One observes a series of tactical retreats, reformulations, and ad hoc explanations, coupled with a complacent assurance that if the 'right sort' of the study were done, things would turn out differently. ...One must classify continued rejection (or disregard) of the proactuarial generalization as clear instances of resistance to scientific discovery, (21) or,*

more generally, as exemplifying H. L. Mencken's dictum that most people believe what they want to believe". (22)

We have to use the best data we have, not what we wish. The vaccines are new because Covid19 is new, but the background research adapted to the new 2019 coronavirus variant existed for years prior to 2019, and enough scientifically valid data exists to recommend vaccination. (23) Current research shows the Covid vaccine makes you eight times less likely to catch Covid and 11 times less likely to be hospitalized if you do get it. (24) Every day you wait to get vaccinated is an added risk that you might get Covid and develop a severe illness or might expose a family member.

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Acknowledgment:

The authors would like to thank Dr. Grace Nam in the Department of Pediatrics at Loma Linda University School of Medicine for his assistance in developing this topic and constructive feedback on this article's content.

Disclosures: The author has no disclosures or conflicts of interest

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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: Prolonged Improvisation during Hurricanes – High Reliability Organizing in the NICU

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

Abstract

NICU preparation for a hurricane includes evacuating or sheltering neonates, agreements to transfer neonates, communication, and emergency transport systems to move neonates to safer ground. Under-represented are identifying the skills and capabilities to support a neonate for hours, if not days, in an austere and adverse environment. The successful operations that sheltered and evacuated 235 neonates with only two deaths and no adverse events recorded are under-recognized. Such accomplishments came about from the actions and improvisations of local Neonatologists and NICU staff who extended an ordinary workday into the consequences of major hurricanes.

"NICU preparation for a hurricane includes evacuating or sheltering neonates, agreements to transfer neonates, communication, and emergency transport systems to move neonates to safer ground. Under-represented are identifying the skills and capabilities to support a neonate for hours, if not days, in an austere and adverse environment. "

Introduction

Hurricanes have a measurable intensity with a predicted path that produces a reasonably reliable place and time for landfall. The winds of hurricanes cause severe damage, and the storm surge floods low-lying areas, damaging structures and disrupting road travel. Power is lost. It would seem prudent for us to evacuate the NICU early when transporting infants is safer. However, we do not.

Hurricanes are extreme environmental forcing events that bring severe, abrupt change to the NICU and regional healthcare system. Disasters as external ''forcing functions'' alter the qualitative nature of the dynamics of a system (1). At the same time, disasters expose deep weaknesses in the system and reveal latent, under-recognized resilience, adaptability, and strengths. These forcing functions destabilize the internal environment of the NICU and the regional healthcare system. Each everyday problem thus becomes a new problem.

We can more accurately describe hurricanes as developing from ambient, continuous stochastic noise. Hurricanes as entropic, stochastic forcing functions drive unpredictable external environmental influences *into* the organization. The resulting destabilization challenges the reliability and safety programs we have in place -- even as profoundly embedded problems initiated by the hurricane begin to form. Problems become contextual, resolved more effectively through local actions and pragmatic solutions. During the hurricane responses described in this article, neonatal staff self-organized to engage and contain problems while ensuring care for their neonates.

"Problems become contextual, resolved more effectively through local actions and pragmatic solutions. During the hurricane responses described in this article, neonatal staff self-organized to engage and contain problems while ensuring care for their neonates."

Routine, adaptive operations can suffice for disaster responses. We do not need to make any special distinction between normal environmental variation and catastrophes; they are the same thing experienced at different scales (2, 3). Operators in dangerous contexts seek the necessary capabilities for likely threats, particularly capabilities they can generalize to unforeseen threats or that will extend operations into novel situations (4). Disaster response, like routine operations, is about accuracy and responsiveness rather than belief in concepts (5-8). We observed how operations segued without transition during the hurricane responses described in this article.

Context occurs within a topological space. The strength of *connections* derives from the strength of the *relations* between elements rather than physical proximity or externally developed rankings. Topological elements maintain their connectedness despite deformations (9). An administrative approach will more likely assume a Euclidean space comprised of metrics between elements that act as points, then builds from academic models based on logical categories, scientific theories, and compartmentalized knowledge (10, 11). Euclidean structure provides the necessary structure and operations for plans and planning. However, the resulting rigidity displays fragility within environmental forcing functions (2). The genius of these effective neonatal operators during hurricanes was their use of topological relations for adaptation to hurricane forcing functions.

The convergent problems solved, the different frames of reference used, and the points of view each person held that contrib-

uted to the decision are absent from public exposure. These contributors are unaware of the effects of thinking *while* acting, the topological nature of decision-making in context, and the influence of contextual thought and actions (6, 12, 13). When removed from the intimate context where these decisions are made, deciding whether to evacuate or shelter becomes an abstraction; we can discuss and evaluate such decision abstractions from a distance, using what ''we'' personally would have done as our standard for judgment.

> "During a crisis, there is no time to think about each specific bit of knowledge or experience that we depend on to make sense of imperfect information and ambiguity. But having those resources immediately accessible in our minds, we use them in a conceptual decision-making process to frame the decision. We essentially quickly come up with a paradigm of how to solve the problem. It is after the fact that we retrospectively begin to attribute specific reasons for the decisions that we made. "
> Capt. Chesley "Sully" Sullenberger (personal communication)

The last sentence of CaptainSullenberger's quote bears repeating, "*It is after the fact that we retrospectively begin to attribute specific reasons for the decisions that we made*. "

"Rather than discuss the elements and processes of evacuation decisions versus sheltering decisions, the pros, and cons, or the risks and benefits, we have extracted the experiences and actions taken by operators during various hurricanes that have been published in the medical literature."

Rather than discuss the elements and processes of evacuation decisions versus sheltering decisions, the pros, and cons, or the risks and benefits, we have extracted the experiences and actions taken by operators during various hurricanes that have been published in the medical literature. We then collated the material, grouping experiences into the hurricane environment, initial emergency engagement, the sensory environment experienced by participants, rapidly improvised hurricane operations, neonatal care during the hurricane, the decision to evacuate and the evacuation itself staffing, and problems encountered.

We will interpret these behaviors and activities through the lens of High-Reliability Organizing, our discussions and interviews conducted over decades, diverse academic concepts, and personal experiences. Participants dealing with an emergency will not know the reason they acted how they did with accuracy or precision. They do know what they did and the results of their actions.

We reviewed published accounts containing first-person experiences (14-20). 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 follows James P.Spradley's description of culture – *how* people use social knowledge to interpret the world (21).

People use social knowledge to enact future states (22), critical processes for an event that abruptly collapses our sensemaking (23). An outsider looking at the actions described in this paper could easily arrive at an "I would not have done that" response. This is not hindsight but a thoughtful discourse to reach an effective conclusion. What that approach lacks, though, is one of the necessary High-Reliability Organizing (HRO) values identified by two of the authors (DvS, TAM) as necessary to make HRO operational (24). "That could be me. "

Despite their unpredictability, hurricanes present similar challenges as other disasters: the decision to evacuate or shelter, the evacuation itself, and providing medical care during and after the hurricane. As long as an obstetric patient remains in the hospital, the NICU cannot close and must retain staff for possible admission to the NICU.

Evacuation and Sheltering

Timing for evacuation currently rests on opinion. Not evacuating early enough has led to criticisms. However, there are no published accounts of a NICU evacuated before a hurricane and later receiving consequential structural damage to that empty NICU. Such an occurrence could help with a cost-benefit analysis of preventative evacuation. There are also no published reports of neonatal death during or after an evacuation. We have reports of two neonatal deaths in the NICU during a hurricane (14, 20). Hypothermia contributed to one death in a NICU that could not be evacuated. The other death cannot be attributed strictly to environmental effects or if the infant survived evacuation. We do not know if the paucity of NICU deaths due to a hurricane is from the capabilities of healthcare providers or the low number of such events. The timing of evacuation in a dangerous situation of continuous change is deeply contextually dependent. Consequently, the organization becomes exposed to criticism from spectators and outside reviewers.

"The timing of evacuation in a dangerous situation of continuous change is deeply contextually dependent. Consequently, the organization becomes exposed to criticism from spectators and outside reviewers."

Criticism, to some degree, addresses deviations from a norm or standard. As part of classification systems, standards reflect agreed-upon rules, serve more than one community, and are used to make things work together. We create classification systems by removing contextual characteristics from the situation. Such abstraction then allows comparisons and standardization (25). Slowly changing environments with slight variance provide stable contexts which make ''abstractionalization'' possible (26). These stable contexts, through these abstractions, are then amenable to the creation of a proper conceptual order (26, 27) from which we create standards by which others must abide.

What makes these environments stable is the minimal effect of external forcing from stochastic environmental noise. ''Noise'' in this context refers to random or stochastic variation in the environment (3, 28). In this sense, noise is graphed as the *inverse of its frequency* against the *power of that frequency* to form a power law (29).

- White noise environments, like the white noise used to cancel background sound, occur from an equal and independent representation of all noise frequencies. Events in white noise environments are purely random, without temporal correlation, because no frequency dominates (3, 28).
- Brown noise represents randomness, named after Brownian motion.
- Red noise, named after the low frequency, longer wave lengths of the visible spectrum, describes rare, low-frequency events. However, red events have a more significant influence on the system because they also have a greater spectral density (3).
- Pink noise is a particular frequency (*1/f*) that lies precisely midway between the predictability of ''organized'' white noise and the randomness of brown noise. 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. That is, pink noise events are sudden and extreme (3).

"Collecting more information reduces uncertainty and measured variance, much like creating pieces for a puzzle that can be completed (31). The characteristic of limited variance creates white noise environments that are stable over decades (2, 28)."

Fixed standardizations and classifications function most effectively in environments with limited variance, where increased information (data) will decrease the variance of the data and reduce uncertainty. Information in these environments acts to reduce model-parameter uncertainties, which are ''information sensitive'' uncertainties from imperfections of the model (Bob Bea, Professor Emeritus, Civil Engineering, University of California, Berkeley, 8/8/2007, personal communication, (30)). Collecting more information reduces uncertainty and measured variance, much like creating pieces for a puzzle that can be completed (31). The characteristic of limited variance creates white noise environments that are stable over decades (2, 28).

Reddened or pink-noise environments are information *insensitive*. In fact, more information (or data) makes the data messier or reveals covert, unexpected influences. We operate more in a mystery, searching for and testing clues using a full spectrum analysis (31).

If viewed as powerful forcing functions in a ''pink noise'' environment, hurricanes are abrupt, uncommon systems in flux – rapid, continuous change that we must make sense of (see below). This means abstracting continuous change into fixed, discontinuous concepts (26) that we can use for standardization and comparison. Nevertheless, continuous abstract change into fixed discontinuous concepts creates conflict between theory and practice, the concrete and abstract, imagination and reality, belief, and action (6, 26, 27, 32, 33).

Extracting environmental cues to fit our abstractions makes conflicting interpretations possible (26). Cues in a stochastic environment are ambiguous and in flux. We risk selecting evidence and interpretations for their plausibility, constructing a world that, while supported by evidence, is not true. This is the danger of ambiguity and abstractionism – later events show we were wrong (34).

Drawing out the extraction of cues to support action, often to be right or at minimum to not be wrong, moves individuals outside the details of the situation, transforming them into spectators (27). "When an abstraction is compounded in the direction of formalization, updating and reconstitution become secondary, and the system becomes vulnerable" (26). We have achieved logical classifications and created standards for the normative stance. We have lost context and the pragmatic stance, increasing vulnerability (6, 26, 27).

Forcing functions appear during routine operations. It is through routine operations that we first engage.

"For those who do not live where hurricanes are common, an appendix explains hurricane terminology for the events and threats during a hurricane."

The Hurricane Environment

For those who do not live where hurricanes are common, an appendix explains hurricane terminology for the events and threats during a hurricane. Below is an abbreviated glossary.

Hurricanes, generically ''tropical cyclones,'' are symmetrical, rotating weather systems with a warm core that gain energy from warm ocean waters. Hurricanes, typhoons, and cyclones are regional names for the same type of storm:

- Hurricanes – North Atlantic; central and eastern North Pacific
- Typhoons – western North Pacific
- Cyclones – South Pacific and the Indian Ocean

Extratropical Cyclones develop when a warm-core, symmetrical hurricane moves to higher latitudes (lower latitudes in the southern hemisphere) and encounters a *frontal* weather system (air masses differentiated by temperature or pressure). The cold air mass surrounds and distorts the hurricane, altering its direction and dangerously increasing its variability.

Hurricane Damage

Storm damage. From the speed and intensity of the hurricane and the rising water level. For coastal margins, the primary threat is wind, waves, and swell; while away from the flood zones, the major threat is wind.

Water, rain, flooding. Water, not wind, is the biggest threat. Total Water Level = Storm Surge + Astronomical Tides (natural or lunar tides) + Waves + Freshwater Input.

Storm surge is the water level rise above the predicted astronomical tide level. Storm surge is caused by strong storm winds pushing water toward shore. The low pressure of the storm has minimal contribution to storm surge.

Storm tide is the water level rise due to the storm surge *and* the astronomical tide. While storm surge has no reference level, the astronomical tide does as the height above mean sea level.

Hurricane Sandy, Extratropical Transition (35)

The frontal systems Sandy encountered changed the direction and varied the hurricane's intensity. The strongest winds spread over a much larger area during its expansion.

October 26. Sandy moved slowly north as a tropical cyclone, en-

countering strong wind shear, causing slightly decreasing intensity.

October 27. Traveling northeast, Sandy briefly weakened to a tropical storm, then merged with a cold front from the eastern U.S. to re-intensify as a minimal hurricane while over the Gulf Stream, warm water (81° F).

October 28. By continuing in a northeast direction, wind shear decreased, and, drawing energy from the cold front, Sandy began robust intensification as a Category 1 tropical cyclone, developing an eyewall.

October 29. Turning to the northwest and New Jersey, Sandy encountered a cold front on its western periphery with a warm front over the Canadian Atlantic on its eastern edge. The warm-core remained intact as the surrounding environment became cold. Energy from the storms on either side intensified Sandy's energy, beginning the transition to an extratropical cyclone having a larger-scale cyclonic circulation. By 0630 EDT, cold continental air began wrapping around its warm core. By 1600 EDT, the warm core was entirely encircled by cooler continental air, and sea level pressure decreased. 1930 EDT, Sandy reached landfall along the New Jersey shoreline.

October 30. Hurricane Sandy continued west.

"Rather than identifying, developing, and adhering to decontextualized standards, perhaps we can borrow from disaster infrastructures and view NICU preparation and response to a hurricane as the extension of neonatal care into the disaster environment (8)."

Extension and Engagement

Rather than identifying, developing, and adhering to decontextualized standards, perhaps we can borrow from disaster infrastructures and view NICU preparation and response to a hurricane as the extension of neonatal care into the disaster environment (8). An extension is an enactment into an uncertain environment without knowing an outcome. The individual operates on the environment, just as the environment operates on the individual—the outcome for both changes.

Disruption from the hurricane creates a liminal zone, a temporary space in which a person does not seem to belong, a space for transition but without movement (36). We lose any contextual orientation, unable to rely on learned concepts, policies, or rules (7). Liminal zones are not continuous with routine operations or with each other. Karl Weick describes this repeated presentation of abrupt changes as "punctuated sensemaking" (personal communication). "HRO is a trajectory of engagement that fuses *now* with the experience of *then* into simultaneous inquiry and redescription, " Karl Weick (personal communication). Responding as fire rescue in the gang and drug neighborhoods, one author (DvS) did not know what would help or hurt friends and families – what helped bring calm during the previous response could incite a fight at the next response. What incited a fight during the previous response could calm the next encounter. ("What helped before will hurt now, what hurt before will help now.") To learn what worked, fire rescue medics held the assumption that each action was a failure until they learned what worked.

Disaster infrastructure

As in any system, hospitals and NICUs operate in a relatively closed environment with established infrastructure. A disaster brings in other infrastructures (emergency operations) accustomed to collaborating in hazardous, austere environments. Sheltering or evacuation procedures and disaster infrastructures are outside the NICU's usual organization and 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.

"Operations in disasters have a distinct language and lexicon. They match capability to risk in dangerous contexts and support medical care and public health in austere environments. Leadership for disasters is vigilant for signs of stress and impaired capability in members and considers the outlier as an early herald of processes rather than to be disregarded as a random event."

Operations in disasters have a distinct language and lexicon. They match capability to risk in dangerous contexts and support medical care and public health in austere environments. Leadership for disasters is vigilant for signs of stress and impaired capability in members and considers the outlier as an early herald of processes rather than to be disregarded as a random event. However, one person's infrastructure can become another person's barrier (37).

How Neonatologists and the NICU staff respond to the damage from the hurricane and their demonstrated capability to continue medical care reflects the power of engagement and the ability to extend neonatal care into an austere and hostile environment.

The Sensory Environment

The sensory effect of a hurricane can become overpowering. This reflects our lack of experience in a hurricane and how our subcortical brain interprets environmental stimuli – as noise or as signals. Public safety and military veterans are more likely to have experienced the effects of the sensory environment on performance (personal experience of the authors).

> "The first officers quickly formed a contact team and… entered an extremely difficult operating environment with the fire alarm sounding, water gushing from a broken fire suppression line, smoke, the smell of gunpowder, and seriously injured victims begging for help. " Some responders described the slipperiness of bodies wet from blood and water. The room was quiet, except for the alarms.
>
> "Law enforcement, fire, and EMS personnel emphasized the need for realistic physically and mentally challenging training" (38).

The officers involved in the terrorist shooting described above had extensive, years if not decades, of experience in a criminally violent area of the city. Nevertheless, they had limited experience with the simultaneous stimulation of all their senses. Few emer-

gency responders do. This is an unrecognized and undiscussed topic that led to the following Lessons Learned:

> "The ability to understand and apply response strategies in a high-stress environment improves performance. Training should attempt to create as much *sensory deprivation or stimulus as possible to simulate real-world scenarios"* (38), emphasis from the authors.

"These physical sensations are more than distractions. The penetration by a hurricane of the outdoor environment into the well-controlled NICU environment degrades the security and comfort the hospital had provided. The sensations do enter the mind, interfering with thought."

These physical sensations are more than distractions. The penetration by a hurricane of the outdoor environment into the well-controlled NICU environment degrades the security and comfort the hospital had provided. The sensations do enter the mind, interfering with thought. This is not to say a professional cannot function, but that prolonged sensory stimulation contributes to subcortical stress responses and possibly late mental sequelae. Awareness of these effects and the ability to articulate their liminal experience without the need for interpretation or judgment will support staff to continue operations (39).

Prolonged intensive care becomes exhausting. With the added pressure of concern for the safety of family members, one hospital learned from experience to limit shifts to six hours during a storm (16). Over a week, during an extended hurricane response, the work shift was reduced to 2-hour intervals, similar to the work intervals on the fire line for wildland firefighters.

> "The noise is deafening. On the hospital's east side, we can't replace saturated towels fast enough to soak up rainwater forced through the window seams, so we move the patients into hallways. Most of the building is intact, but the sound of smashing windows and papers, furniture, and files blowing around on the upper levels is frightening. Suction from a blown-out window prevents opening doors in one area…The lights flicker, the air conditioning cuts out, and generator power kicks in. The elevators stop working most of the time. Temperatures in some areas fluctuate between 100° F and *cold* as mechanics work on the cooling system. The heat on the upper floors is intolerable."
>
> Hurricane Katrina (40)
>
> "I knew the power had gone out. An alarm sounded, but I couldn't understand the announcement over the sound of rushing water. I was worried but not in panic. I sang every Sunday school song I'd learned as a kid to drown out the noise."
>
> "Unbearable noise spewed from the warning alarms on ventilators and other life-support devices. Two cardiopulmonary monitors and two computer screens gave us some light."
>
> Hurricane Allison (14)

Even in silence, the experience creates a liminal state where we do not seem to belong:

> Two R.N.s arrived and "climbed the seven flights of stairs to the NICU in the dark. [They] were immediately hit by hot, humid air and pitch-black darkness. The usual noises were strikingly silent: none of the cardiopulmonary monitors, ventilators, radiant warmers, or incubators worked. "
>
> Hurricane Allison (14)

Continuing to work in these environments becomes a relentless assault on the senses and the body. The variability and uncertainty conflict with the belief that "OK, I can deal with this" because "this" is soon different.

> "Without water pressure, toilets could not refill, and because most new toilets in institutions do not have tanks, there was a major problem developing. A few hours later, there was discolored water [from an onsite well] flowing from the taps, and toilets once again could be flushed. "
>
> "Because of the heat, a cold well-water shower was a luxury item (but you needed your flashlight close by, because most bathrooms were not on the generator circuit). "
>
> "By early evening, the temperature in the NICU was above 95 degrees. Because of the humidity, any item that was stuck to the wall with tape soon found its way to the floor. Although other areas of the hospital were slightly air-conditioned, the general activity of all the health care workers and equipment kept our area from ever feeling any flow of air, not even warm, humid outside air. The building was designed, like many others, for air conditioning, so windows do not open. "
>
> Hurricane Katrina (41)
>
> "Because running water and sewerage were not available, personal hygiene was limited. Alcohol-based hand sanitizers were used in abundance. The various smells—floodwaters, generator exhaust, body odors, and wastes—were persistent. Thankfully, the NICU area smelled considerably better than the parts of the hospital in which adult patients were cared for. "
>
> Hurricane Katrina (15)

"Hurricanes disrupt medical care for multiple patients, the definition of disaster used for this set of articles (42). Not only does the delivery of care, but our patients experience the same disaster environment we do."

Hurricanes disrupt medical care for multiple patients, the definition of disaster used for this set of articles (42). Not only does the delivery of care, but our patients experience the same disaster environment we do.

> "Sponge baths [for the infants] were not feasible because of the unknown elements in the well water. The baseline body temperatures of the infants began to rise despite being clothed only in diapers. Many of the infants became increasingly irritable and then feeding-intolerant. Shortly thereafter, we were informed that because of the

heat and lack of freshwater, the analyzers in the laboratory were shutting down. We then were limited to bedside point-of-care testing only. "

"I met with our NICU staff and made the difficult decision to begin evacuation proceedings. "

Hurricane Katrina (41)

"The area in L&D where our babies were located was becoming extremely hot because of lack of ventilation. Some of our babies experienced elevated temperatures and were growing lethargic. One baby began to have symptoms indicating a surgical emergency. "

Hurricane Katrina (16)

"The same decision conundrum of evacuation versus shelter presents itself for approaching hurricanes or wildland fire (43). Evacuation in itself places the neonate into a physiologically hostile environment. Unexpected structural failure does the same. The result is to prepare to evacuate while sheltering simultaneously."

Hurricane Operations

The same decision conundrum of evacuation versus shelter presents itself for approaching hurricanes or wildland fire (43). Evacuation in itself places the neonate into a physiologically hostile environment. Unexpected structural failure does the same. The result is to prepare to evacuate while sheltering simultaneously.

Evacuation, whether before, during, or after, the storm presents problems specific to neonatology: vehicle availability, capable personnel, and equipment. A NICU with a census of fifteen neonates could use 8-15 ambulances. Having fewer ambulances available is more likely, and the time for round trips extends the evacuation period. This may not pose a problem, except for personnel. EMS systems do not mandate knowledge for, nor do they experience, the transportation of premature babies. The limited ability to call in staff means the NICU may or may not provide personnel while simultaneously maintaining an adequately staffed NICU. Difficulties could arise regarding the administration of drugs during transport if early evacuation does not meet the rules for disaster management. We will discuss in this article evacuations that occurred due to a hurricane rather than hurricane-related policies, procedures, laws, etc.

The medical needs of the neonate are based on the disease, not the level and experience of the caregiver or the environment. An orthopedic surgery resident received a one-minute in-service on hand-ventilating a premature infant to enable transport by canoe (15). Several premature neonates received improvised CPAP, and others developed hypothermia during a tropical cyclone. The capability to improvise care attests to the quality of neonatal personnel (and orthopedic surgery residents).

From the literature available for this paper (see below), we could document that NICUs evacuated over 235 neonates. There were no adverse events during evacuation. Two deaths occurred during sheltering, one neonate in an under-developed country and one in the U.S. We could not determine if the U.S. death was due to the storm.

NICUs are unique hospital units in that they must take admissions even when the hospital is closed to admissions and during or after NICU evacuation. An evacuated NICU with one ECMO infant who could not be transported had admitted a 683g infant from labor and delivery (41). The NICU may receive admissions as long as the hospital census includes pregnant patients. Several NICUs admitted premature newborn infants who received intubation, umbilical catheterization, and surfactant administration. *NICUs never close*.

Care during Hurricanes

During a hurricane, nurses and the Neonatologist treated their neonates for an extended period without power. One infant deteriorated, they resuscitated, the infant died. During the resuscitation, they continued to keep other infants breathing and living. The nurses understood that the infant died from a combination of disease and environment, not from their efforts or performance. They quickly looked to the infants they were actively saving. Could the infant have survived if they used the full resources available? Triage is to choose to treat the many, continue to work to save all and realize some may die from the situation. There are the limits placed on the infant by the environment. It is the turning away and not the treatment that is triage.

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Initial Intensive Care

The NICU in one hospital actively maintained communication to support Labor and Delivery. The NICU clinical commander had a cellular phone for the Labor and Delivery Unit and used a handheld radio to maintain contact with the Hospital Incident Command System. Off-duty Neonatologists, fellows, and nurses reported to the NICU to support continuous care in the NICU (44). Three infants were born in the U.S. and two in an under-developed country in the available records regarding births during hurricanes.

One preterm neonate arrived in the NICU with umbilical catheters in place. While preparing for intubation and surfactant administration, the lights flickered, then went out. "I grabbed my penlight and flashed it so that a nurse could see to position a baby's Ambu bag, " reported a nurse. The nurses and Respiratory Care Practitioners (RCPs) began hand ventilating infants with the power out. The nurse improvised CPAP for the infant without intubation with tubing and forced air. Her system supported the infant for the next ten hours and through evacuation to the other hospital. This is how she started her twenty-one-hour shift in a hurricane (14).

Three days after landfall in another hurricane, a mother in labor for 24 hours with a possible cesarean-section delivery of an infant delivered a healthy boy with forceps assistance (15). Five days after landfall at another hospital, an infant was delivered weighing 683g (1 lb, 8 oz) (41).

Following Super Typhoon Haiyan's landfall in the Philippines, the Israeli Defense Forces (State of Israel) Field Hospital (IDFFH) (19) improvised neonatal care for two newborn infants, a premature newborn of 31 weeks gestation, 1,520 grams, and a term infant by a cesarean section due to lack of progression, birth weight 2,000 grams. The term infant was lethargic but responded to a dilution of 50% concentrated glucose solution brought by the IDFFH.

Initially cold but vigorous, the preterm infant deteriorated to apnea with bradycardia. The IDFFH team improvised a CPAP device for respiratory stability. They chose CPAP over intubation because the infant would be transported by ground ambulance for three hours. A further concern was the danger of intraventricular hemorrhage, for which they prepared a padded transfer incubator from a cardboard box, head elevated at 30° angle, and heating pads for heat and humidity. The improvisations led to the survival of these infants.

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Births

Six births, three premature, were recorded in the available published articles during Hurricanes Allison, Katrina, and Typhoon Haiyan (Yolanda) (14, 15, 19). Of the three premature births (~700g, 1,520g, unknown), one was intubated and received surfactant. The other two responded to improvised CPAP. One was not intubated because of a three-hour ambulance evacuation, and the other because staff had other duties, including hand ventilation when an electric power outage disabled the mechanical ventilators. All newborns did well.

Clinical Care

"Don't treat the monitor" is an often-cited maxim, yet electronic monitoring has supported the development of today's intensive care and currently informs our therapies. The experiences described in this paper of neonatal intensive care as prolonged improvisation relying on sensory monitoring demonstrate the duality of human and electronic monitoring. NICU staff relied on experience and senses developed by responding to monitors. "Don't treat the monitor, but do treat the senses."

Loss of power, staging, travel outside the NICU, constraints during the evacuation, unanticipated delays, and infants not attached to monitors all become the environment during a disaster (45). Learning to trust physical examination techniques developed during routine care strengthened clinical care and saved the lives of neonates. Improvised CPAP and skin-to-skin warming methods extended care into these problematic settings.

The primary clinical problems encountered during a hurricane response are thermoregulation with more common hypothermia and assisting ventilation. Sensory deprivation from darkness or flooding of the senses, such as the heat and humidity or relentless water sounds driven by wind, have an under-recognized influence on performance. The capability for prolonged hand ventilation while ascending and descending stairs or in a confined space must not be under-appreciated.

With the power out in many NICUs, prolonged hand ventilation became the norm during Hurricanes Allison and Katrina. Without blood gas analysis, staff self-monitored their clinical examination, skin color, and the sensation from full inspiration. This approach for hand ventilation, whether short term or extended, has also been used for mouth-to-mouth resuscitation (personal experience, DvS), pediatric subacute care (46), pediatric critical care transport (47), and by a special group within SOCOM (Special Operations Command) (48).

With the elevators inoperable, physicians or nurses carried neonates in their arms to ascend or descend 4-12 flights of stairs to reach the ground level or the rooftop helipad. For example, during Hurricane Allison, with the Coast Guard helicopter waiting on the roof, a nurse transported a neonate up four flights of stairs. The infant had chronic lung disease and was notoriously difficult to hand-ventilate. Linked closely to her was the RCP carrying an oxygen tank and equipment. Other RN-RCP teams did the same or descended seven floors to the ambulance bay doors using only visual assessments and a stethoscope (14). A Neonatologist ascended six flights of stairs during Hurricane Katrina, hand ventilating a 700g infant twelve hours old. The baby was layered in plastic wrap and blankets (15). A Neonatologist and R.N. each had an infant weighing less than 1 kg in a helicopter with room only for the passengers. They hand ventilated for over an hour, including a necessary stop for refueling (16, 18).

"Sheltering in a storm before the emergency evacuation of the NICU seems to draw criticism. Presenting early evacuation as preferable focuses on abstract concepts such as risk and benefit. Emergency operations occur more appropriately in terms of risks of engagement and capabilities. A Neonatologist does not weigh risk and benefit before engaging in a resuscitation."

Sheltering

Sheltering in a storm before the emergency evacuation of the NICU seems to draw criticism. Presenting early evacuation as preferable focuses on abstract concepts such as risk and benefit. Emergency operations occur more appropriately in terms of risks of engagement and capabilities. A Neonatologist does not weigh risk and benefit before engaging in a resuscitation. The risks of engagement lie in matching capability to demands *from* the risk.

Hospitals are built to withstand hurricanes. The meteorological and structural engineering knowledge to judge any mismatch is likely beyond the knowledge of most physicians, hospital executives, and administrators. Please understand; healthcare would benefit from this much like the discussions that led to the earthquake refitting of hospitals in California. During Hurricane Sandy, the government requested hospitals in the storm surge zone to become shelter hospitals and remain open during the storm (44,

Condition	Hurricane	Treatment	Difficulty
Births (6) -Premature (3) -Term (3)	Allison Katrina Haiyan Yolanda	Admission, Intubate, Surfactant Umbilical catheter	Unable to intubate (improvised CPAP)
Hypoglycemia	Haiyan/Yolanda	Diluted glucose 50%	
Hypothermia	Ida, March Allison, June low that night, 73° F Katrina, Aug Irene, Aug Haiyan/Yolanda, Nov	Skin-skin (4) Warming pads (peri-pads) Plastic wrap Blankets Multiples in incubator	Death (1)
Hyperthermia	Katrina High ambient heat High relative humidity	Fanning	Irritable Decreased feeding Lethargic
Pulmonary	Allison (1) Katrina (3)	Reintubation Intubation	
Pulmonary	Allison Haiyan/Yolanda	Improvised CPAP	
Pulmonary	Allison	Bronchospasm Respiratory failure	Death (1)
Pulmonary	Haiyan/Yolanda	Apnea-Bradycardia	
Sensory	All	Darkness Ambient heat Extremely hot, lack of ventilation High relative humidity Sound of running water Smells: sewerage, body odors, body wastes, generator exhaust	
Emotion	All	Deteriorating condition, mother present No outside contact Minimal physiological monitoring	

Table 1: Clinical Care in Hurricane Situations

49). Sandy's transition to an extratropical cyclone confounded those plans.

Some NICUs did evacuate before a hurricane's landfall. Prior to Hurricane Rita's landfall, one hospital evacuated after a government mandate and the unavailability of staff. Because of staff's previous experience in large hurricanes, they were leaving the area or did not want to remain in the hospital during the storm (50). Two NICUs evacuated prior to landfall for each of Hurricanes Katrina (Texas), Irene (New York), and Sandy (New York) (15, 44, 49). Another option was to evacuate select neonates before landfall, such as premature infants, on conventional ventilators (15).

Reasons for sheltering are routine and contextual, therefore unlikely to be spoken. The vibration of transport causing intraventricular hemorrhage concerned two groups evacuating neonates (19, 51). One NICU evacuated all neonates except the neonate receiving ECMO (41). Not discussed is the effect of the NICU census on the care of the physiologically unstable neonate. During the drawdown or with a singular remaining infant on ECMO, the NICU loses depth of coverage and the group's nuanced, subtle knowledge of care that sometimes keeps these infants alive. Risk and capability may be a more balanced consideration when deciding to shelter or evacuate.

Two hospitals internally evacuated their NICUs before Hurricane Katrina's landfall. One to a lower, less exposed floor (15) and the other to internal areas away from windows (18).

All sheltering hospitals in this review did have to evacuate. One NICU evacuated the day of landfall following the evacuation order from the CEO (18). The others began evacuation the day after

landfall. Power outage led to three evacuations (14, 15, 44). High ambient temperature led to evacuation from one NICU (41). Two NICUs in under-developed countries were evacuated due to loss of facility structure (19, 20).

"Rather than deciding between evacuation and sheltering, contingencies, available and contextual information, and foreseeable consequences drove a pragmatic 'decision' for evacuation. We did not find an evaluative weighing of the risk of sheltering or evacuating against the benefit of sheltering or evacuating."

The Decision to Evacuate

Rather than deciding between evacuation and sheltering, contingencies, available and contextual information, and foreseeable consequences drove a pragmatic 'decision' for evacuation. We did not find an evaluative weighing of the risk of sheltering or evacuating against the benefit of sheltering or evacuating. Hurricane behavior alone confounds the ability to predict the hurricane path or intensity useful to the Neonatologist and staff in the NICU. Transportation is also challenging to predict because roads flood, government agencies commandeer air assets for rescue and damage surveys, and ground ambulances, also commandeered by government agencies, cannot guarantee experienced and knowledgeable personnel for neonatal transport. An approaching hurricane means the Neonatologist must simultaneously prepare to evacuate the NICU *and* shelter in response to a wildland fire (43). Prophylactic evacuation of the NICU is not rapid – it is labor and resource-intensive and takes part of a day (52). To shelter in place, the NICU could bring in extra staff and increase stockpiled supplies except for roads rendered dangerously impassable from flooding.

These are the Neonatologist decisions in the NICU to increase safety and security for the babies. Disaster infrastructure need not be confounding, or a barrier to obtaining aid and the services the neonates need for survival. Though the approach we advocate may appear daunting, it readily incorporates into routine operations: familiarity with what can happen in a NICU during a hurricane; the ability to offer objective, articulate, and succinct descriptions (5, 53); accuracy and a focus on consequences (13); appreciation for disaster infrastructure (54, 55); and identification and use of boundary objects (54, 56, 57).

Contacting NICUs

After evacuating, the Neonatologists began contacting NICUs out of the region. Complicating these contacts were competing for requests from other NICUs, a problem identified and discussed after the Northridge Earthquake in 1994 (44, 52), and failure of phone lines (15) necessitating some physicians to use personal cell phones (44). For others, help outside the NICU facilitated the process, such as Hospital Incident Command Systems, other NICUs hearing of the problem, and the initiative of regional hospitals to step in (14, 17, 41, 44).

Fortunately for one New Orleans NICU, an R.N. sent a text to a friend in Colorado who then followed a series of connections to the Women's Hospital in Baton Rouge while it was shutting down its evacuation center. The center had been told there were no more entrapped infants or children. The physician in charge then called the New Orleans NICU to assist (17). This, again, is similar to the Northridge earthquake when the Neonatologist called a friend at an outlying NICU who called the US Marine Corps who sent two helicopters (52, 58).

Generally, transfers of neonates occur through informal systems extemporaneously set up or, in a few cases, through regional groups (17, 59, 60).

Triaging Neonates

The triage method is likely determined during the disaster rather than during preparation or training. This created some difficulties, possibly because those performing triage in the disaster were not designated leaders and had little training (61). As used during hurricane operations, the term' triage' was used instead of the situationally appropriate action – "decide" or "prioritize." Triage for ranking order to evacuate was not used for relocating neonates from the damaged NICU to the PICU after Hurricane Ida (20).

Triage works best when the triage elements can be rapidly formed rather than calculated and easily understood. During Hurricane Katrina, evacuees were collected at Louis Armstrong International Airport, 'triaged,' then flown out of state (17). Medical personnel performing triage had only brief contact with the patient. In the hurricane disaster articles, simple methods for triage ranged from the self-evident, "We evacuated our most critical infants first," to the functional, "prioritized…taking into consideration acuity, degree of respiratory support, and equipment battery life" (44). Rather than requesting triage of patients, a more practical solution was to request medical and nursing directors to "evaluate their patients' conditions and to determine the order in which they should be evacuated" (62).

Triage appeared most useful during a hurricane disaster as succinct communication of the patient's acuity level to the receiving NICU. Triage of patients with direct communication between caregivers improved the assignment of neonates during Hurricane Katrina. The sickest infants could then receive care in a Level III regional facility (17).

"Triage appeared most useful during a hurricane disaster as succinct communication of the patient's acuity level to the receiving NICU. Triage of patients with direct communication between caregivers improved the assignment of neonates during Hurricane Katrina."

Evacuation of Neonates

Ground or Air

Helicopters for evacuation are not as straightforward as hospital-based systems have become accustomed. The Federal Emergency Management Agency (FEMA) commandeers helicopters and the skies. Assigned helicopters from the Coast Guard or National Guard may be too large for use on rooftop helipads. Utility helicopters for delivering supplies may transport patients, but with little room for equipment. This became a problem when evacuating several ICUs (18). Ambulances by number and maneuverability will expedite evacuations and capacity for specialized

equipment and NICU staff (44). On the southern coast of the U.S., NICUs used boats or helicopters because flooded roads blocked ground ambulances.

Regardless of transportation mode, unanticipated delays can be expected. Oxygen supplies for CPAP or assisted ventilation may be limited. Available vehicles might not accommodate the size or weight of equipment or the transport incubator. Nontraditional patient containment methods such as bassinets, infant car seats, and the arms of the caregiver became effective methods (15, 17, 18, 45).

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Armed Escort

Concern about looting and gun violence has increased since Hurricane Katrina. Stories of gun violence during a disaster too quickly become facts we cannot question. These fears then drive behaviors. When a threat has more significant influence through its absence than its presence, we live in the ecology of fear (63).

The night darkened by hurricane clouds, rapidly rising water, trapped on the roof, no cellphone service, rescue boats blocked by down power lines, the rooftop rescue of others by helicopter, and no way to tell people you need help or where you are, compound the fear. For some people in this predicament, gunshots become a sensible cry for help, a signal identifying where they are. Odd to many, but such incidents occur on Staten Island during Hurricane Sandy (64). Gunshots frighten people who will then understand the signal in the context of looting and violence, which it may be.

The disaster creates its environment and can bring rumors into the NICU, worsening the raw emotional state of already tricky situations. The Neonatologist or their designate can contact local law enforcement and query about rumors and locations where such threats occur. By responding to bona fide concerns, several transport programs were escorted by law enforcement (15, 17). We found this through interviews in an after-action report following a terrorist shooting (65). Examples include complaints of an ambulance service self-responding to the scene and a helicopter transporting a patient to a non-trauma hospital then diverted to the trauma center at the last moment. After interviews with all parties, we learned that the county had requested the ambulance service to respond but could not notify the firefighters on the scene. The helicopter was transported to a trauma center, but rapid patient deterioration prevented trauma center notification. We must guard against premature conclusions and judgments from close proximity to rapidly changing events.

We do not take the effects of rumors lightly. One author (DvS) prepared a pediatric critical care transport service to operate during a civil disturbance that was expected to follow the verdict for the Rodney King Trial (66). The team gained access to privileged law enforcement information for safe travel routes to the children's hospital and referral hospital. Whether to fly or drive would depend on gunfire and require an escort by law enforcement officers armed with long guns. Preparation was significant for the team. Some individuals and another transport team declined to participate.

The author is familiar with providing compassionate medical care while unprotected in a socially hostile setting. This is not unique. A pediatrician in a clinic for chronically ill children treated the victim of a terrorist shooting who had run into the clinic for shelter. After treating the victim, the pediatrician ran to the scene to see if he could help (65). Concerned that the shooters were still present, he ran up the stairs to check for victims on the floor above. He realized law enforcement would soon arrive and think he was one of the shooters. He left. This occurred in the five-minute time between the departure of the assailants and the arrival of police. Fear as an ecology makes everyone appear as a threat, but we can respond regardless. The rapidly approaching 'angry' man may be a distressed father of a baby born at home during a hurricane. He only seeks help. We must address rumors of violence while we prepare for violence, the only way for an honest matching of risk to capability.

Evacuation Time

Time to evacuate infants from the NICU was not consistently available. Transportation time while out of the NICU environment was not identified in the NICU evacuation literature. No adverse events were recorded in the literature.

The difference in evacuation times between Hurricanes Irene and Sandy, 19 neonates in 18 hours versus 21 neonates in 4 ½ hours, is accounted for by preparation before or after landfall. By evacuating before the hurricane, the hospital could use ambulances able to accommodate an incubator. Most hospitals or ambulance services have two at the most. The faster evacuation during landfall utilized available ambulances from FEMA waiting in line outside the hospital doors.

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Parent contacts

NICUs have the anticipated problem of uniting evacuated neonates with parents. The disaster complicates this when the family becomes displaced. In addition, the mother, as a patient in the hospital, is likely also to be transferred (15, 58, 67).

Internal Evacuation

Commonly referenced is *vertical* evacuation inside the hospital to a different floor compared to *horizontal* evacuations to another facility. For emergency evacuations with non-operational elevators, the neonate is carried in arms even while being hand ventilated. With less pressure to move neonates from the ninth floor to ground level, one NICU group found sled products and evacuation vests unsuitable because of the need for training or technical needs of the premature infant. The sickest infants would take up

Hurricane	Census	Landfall	Time (hours)	Mode
Allison (14)	79	Day 0	8	Ambulance Helicopter
Katrina (41)	25	Day 1-2	n/a	Ambulance Helicopter
Katrina (15)	30	Day 1 & 4	4	Boat Helicopter
Katrina (18)	16	Day 1	n/a	Helicopter
Katrina (17)	10	Day 2	n/a	Helicopter
Katrina (17)	2	Day 2	n/a	Private car*
Katrina (17)	14	Day 3	n/a	Helicopter
Rita (50)	8	Before	n/a	n/a
Irene (44)	19	Before	18**	Ambulance
Irene (49)	11	Before		Ambulance
Sandy (44)	21	Day 0	4 ½**	Ambulance
Total	**235**		**4-18h**	

Table 2. Evacuation Times after Landfall

*Physician's private cars, no ambulances available

** evacuation *before* landfall versus *during* landfall

to six staff members walking together for ten minutes to descend nine flights of stairs. Ascending flights of stairs can be more complicated than descending. Contributing to the difficulty is the lack of evacuation drills that escape upward (68).

The more elaborate "internal" or "horizontal" evacuation to the helipad came about from flooding that prevented ground access to the parking structure with the helipad. Building engineers connected the hospital to the parking structure by creating a 35 by a 45-inch hole through the ventilation and water pipes space. They could pass the incubator through the hole where it would be placed on the bed of a pickup truck, driven up nine floors to the roof, then carried up the last two floors using the fire escape steps to the helipad (16, 18).

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Ambulances

FEMA brings ambulances under contract, including most local ambulances. Availability of ambulances for evacuation is through FEMA or the local government agency. The hospital may have available ambulances through service for a neonatal critical care transport system. Generally, a hospital would have no more than two ambulances, insufficient to evacuate an entire NICU over a short period. Available ambulances will be in use, requiring coordination to supply NICU staff and equipment for the infant. Larger infants and those not receiving mechanical ventilation can travel in their parent's arms after being secured to the ambulance gurney.

One Hospital Incident Command Center coordinated transportation for the NICU evacuation (44), which freed the NICU staff to carry out the evacuations and accompany the neonate. Availability of NICU staff and equipment limited the rate of evacuation. The specialized critical care ambulance and crew were not available except for neonates evacuated to receiving hospitals with their teams. A NICU nurse and physician accompanied the infant with an RCP as needed.

After a hurricane, road debris following flooding is a consideration regarding vibration (39), and lengthy evacuations from rural areas may change airway management. For a three-hour surface evacuation, one team decided intubation increased risk. They improvised a delivery system for CPAP (19).

Helicopters

The helicopter for patient evacuation may not be an air ambulance equipped to carry an isolette and medical team. The Federal Emergency Management Agency (FEMA) may control the air space and have commandeered air and ground assets such as helicopters and ambulances. Assigned helicopters from the Coast Guard or National Guard may be too large for use on rooftop helipads. Utility helicopters for delivering supplies may transport pa-

tients. In the disaster infrastructure (37, 54), time is of the essence for helicopter missions. The pilot cannot wait on the ground as the team prepares the neonate for loading (15, 16, 45).

Disaster use of helicopters generates time compression and space constraints novel to the neonatology team. The neonatal team is likely unaccustomed to the tempo of helicopters lined up to serially load patients or rapid patient loading when the pilot has numerous critical missions. Rapid preparation of the neonate only to wait near the landing zone without electronic monitoring and with limited oxygen supply is part of disaster infrastructure and must be anticipated (45, 54).

Helicopters are more tightly integrated into the disaster infrastructure than NICUs (54). Government agencies may have other missions for helicopters or lack awareness of the NICU situation or needs (17, 52, 58, 59). Helicopters-of-opportunity may become available for NICU evacuation (15, 16, 18), in which case knowledge of air operations by the neonatal team can increase their practical use. For safety, the FAA controls the airspace over a disaster. Flight plans are important to that control. The disaster incident commander prioritizes and assigns missions such as rescue and evacuation. The pilot's flight decisions incorporate operational characteristics, fuel load, and "density altitude" (heat and humidity, like increased altitude, decrease a helicopter's lift).

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Boundary objects are objects used for different purposes by disparate groups; their signature value is an ambiguous definition (69). Boundary objects enable these groups to communicate and work together. Dynamic communication with different groups in a disaster can happen through boundary objects (57). 'Death' is a boundary object everyone addresses, and problem-solving through action and objective are commonly shared behaviors. For example, the Neonatologist can characterize the threats to a neonate in terms of the *mechanisms* that will increase the *possibility* of death, then *describe* the necessary immediate *objectives* to prevent this, and follow with *asking how* they can help. This will open communication and begin the necessary discussions for practical solutions. You are searching for clues to solve the mystery of saving the baby (31). Action verbs and concrete words enter the motor cognition regions of the brain to drive action. Abstractions, passive verbs, and nouns enter the more cognitive regions of thought (8, 70, 71). You can hear this in the speech of those experienced with disaster infrastructure.

Friction between Infrastructures

During Hurricane Katrina, one hospital arranged with a receiving hospital to accept two critically ill, deficient birth weight infants receiving mechanical ventilation. One child was a 6-week-old infant born at 24 weeks gestation with severe bronchopulmonary dysplasia weighing less than 1 kilogram. The other infant was receiving low ventilator settings. The team went to the roof seeking helicopter transport to the receiving hospital (16, 18).

"In the NICU infrastructure, helicopters serve for patient transportation. In disaster infrastructure, helicopters serve to search and rescue and deliver vital supplies. The NICU team contacted the pilot of a 3-seat utility helicopter delivering supplies to the hospital. The pilot advised the medical team that the flight plan for his assignment would take him to another hospital to deliver supplies."

In the NICU infrastructure, helicopters serve for patient transportation. In disaster infrastructure, helicopters serve to search and rescue and deliver vital supplies. The NICU team contacted the pilot of a 3-seat utility helicopter delivering supplies to the hospital. The pilot advised the medical team that the flight plan for his assignment would take him to another hospital to deliver supplies. After their explanation, the pilot obtained a new flight plan and accepted the team on board.

Leaving the hospital with the babies and transporting team, the pilot went straight away to refuel. Two Army helicopters were in the refueling line ahead of the medical team. Concerned about the cold air, the decreasing oxygen supply, and the "critical stage of the infants," the Neonatologist inquired about the wait for the Army helicopters. The pilot informed the Neonatologist that the Army helicopters "were picking up people from their rooftops who could die if they were not rescued promptly."

The United States Federal Aviation Administration (FAA) restricts airspace over a disaster to "provide a safe environment for the operation of disaster relief aircraft" (14 CFR [Code of Federal Regulations] Section 91.137(a)(2)). These flight restrictions "prohibit all aircraft from operating in the designated area unless that aircraft is participating in the disaster/hazard relief activities and is operated under the direction of the official in charge of on-scene emergency response activities" (Section 91.137(a)(1)). Aircraft must meet one of several conditions such as "participating in hazard relief activities" or "operating under an ATC [Air Traffic Control] approved IFR [Instrument Flight Rules] flight plan" (Section 91.137(a)(2)).

Aircraft over the disaster area were following identified flight paths for relief and evacuation, transporting emergency personnel, surveying the disaster area, or conducting search and rescue. The utility helicopter pilot was "participating in hazard relief activities" while "operating under the direction" of the 'disaster incident commander.' The pilot was also following an "ATC approved IFR." To change his flight plan, he must contact the Incident Command Air Operations Section and/or Air Traffic Control and file a new IFR flight plan.

Organizations working within a disaster infrastructure have practices in place for the occurrence of an individual on an assignment encountering a request to assume a new assignment. Generally,

the individual will describe the assignment to the requestor to evaluate which assignment will have priority and the disposition of the denied assignment.

"The friction between infrastructures became apparent as the transporting physician and nurse loaded the babies into the helicopter. The pilot believed they were joining him for his flight to the delivery hospital. The physician and nurse believed the pilot was transporting them to the receiving hospital."

The friction between infrastructures became apparent as the transporting physician and nurse loaded the babies into the helicopter. The pilot believed they were joining him for his flight to the delivery hospital. The physician and nurse believed the pilot was transporting them to the receiving hospital. After hours of waiting at the heliport holding area, with the sun setting, and the increasing possibility of floodwater shutting off the generators and losing electrical power, the physician accepted the redirection as a better solution than remaining at the medical center. "This is a disaster, and the babies will be taken to wherever the pilot is going," the physician affirmed. Concerned that the delivery hospital could not provide the indicated care for these critically ill newborns, the nurse was adamant that the babies be transported to the receiving hospitals. "If you both cannot figure out how to fly to Baton Rouge, then we will remove the babies from the helicopter and devise another plan." Meanwhile, the pilot obtained approval for new IFR flight plans to the receiving hospital.

A disaster is an *environmental* disruption of medical care, a *victim generator* that disrupts the *ability to treat* multiple patients (42). This disruption creates discontinuities between contexts, mistaken for conflicts between the system and person or technology and organization (37). These discontinuities lead to disputes when different disciplines use the same information differently or have different problem-solving methods (54), as described in the above vignette.

Rather than the common idea that infrastructure is a physical 'thing,' we can better view *infrastructure* as to how we *use* the thing, much like James Spradley's model for culture (21). As noted earlier, a helicopter within the medical infrastructure is used to transport critically ill patients, while in the disaster infrastructure, the helicopter is used to survey the area and search and rescue. Infrastructure shapes and is shaped by the discipline's practice conventions, embodying standards specific to the discipline (25). Failure to integrate into the disaster infrastructure can be deadly.

Boundary objects are ambiguous objects inhabiting diverse domains, satisfying the informational requirements for each. Boundary objects allow cooperation between differing domains, facilitating local understanding through reframing the object into a broader context of joint activity (69). In a disaster, the environment can kill. Death becomes a boundary object shared by the Neonatologist, NICU nurse, helicopter pilot, and government disaster agencies. Each will see death differently: reducing *mortality* by treating factors that cause death or increasing *survivability* by preventing deaths that result from post-disaster events (54).

In the vignette, NICU staff did not know the duties of the pilot and helicopter or the restrictions on a flight in a disaster area. The pilot did not understand the differences in neonatal care between hospitals. Once understood, the pilot filed a new IFR flight plan which was quickly approved.

Boats

Following Hurricane Katrina, New Orleans hospitals relied on boats, which were instrumental for evacuating neonates.

On Landfall Day 1, with minimal electric power, a Neonatologist arranged for admission to a nearby NICU in a safe zone (15). For the first few days after landfall, the mission for larger helicopters was search and rescue, making them unavailable for interfacility transports. A ground ambulance would transport the infants but could not drive near enough. A high wheelbase fire engine responded and could drive within three blocks of the hospital. Phone and two-way radio failed to reach assistance to travel those first three blocks. A hospital volunteer and ham radio operator became involved, relaying the request to the Louisiana Department of Wildlife and Fisheries, who offered the assistance of officers and an airboat. The Neonatologist stood at the entrance to the emergency department awaiting the airboat.

The Neonatologist saw a canoe in the streets with three orthopedic residents approaching the emergency department. They reported seeing the fire engine three blocks away. He explained the need for transporting the two infants receiving hand ventilation to the fire engine and the awaiting Neonatologist for onward transport to an ambulance and the next NICU. The Chief Orthopedic Resident would hand ventilate while the two residents paddled to the fire engine.

The Neonatologist gave a quick in-service presentation for endotracheal tube maintenance and hand ventilation sufficient for chest rise and to keep the baby pink. Each baby received 100% oxygen, was wrapped in a blanket, and traveled in an open acrylic infant crib. The Chief Resident gave the exact instructions to the receiving Neonatologist at the fire engine, then returned for the second baby. The clarity of instructions and the use of objectives (chest rise and pink baby) reflect George S. Patton's discussion of issuing orders, "Never tell people *how* to do things. Tell them *what* to do, and they will surprise you with their ingenuity" (72).

Both infants did well.

Landfall Day 3, a flatboat evacuated six infants and NICU staff to a nearby hospital for helicopter transport to an operable NICU (15). A law enforcement officer armed with a long gun accompanied them. They were turned back because of a miscommunication about who was being evacuated.

Landfall Day 4, an outside children's hospital (17), coordinated the emerging evacuation of a NICU with severely limited electric power. The Louisiana and Texas Departments of Wildlife and Fisheries would use airboats to transport neonates to a landing zone for military helicopter pick up. The plan was not needed because military helicopters responded directly to the hospital.

One hospital used boats to evacuate five infants with their mothers and other patients. This and another used boats to evacuate staff (15, 16).

Staffing

Some NICUs brought in staff before the storm, while others evacuated the NICU because the staff was evacuating the area.

Staff converged to help during the hurricanes. A nursing director, separated from the NICU by floods and doing what she could by phone overnight, learned a Coast Guard helicopter was transporting neonates to a hospital near her. She was waiting on the rooftop helipad, joining their return trip so she could help in the NICU.

At one NICU, "Labor-and-delivery nurses arrive to assist. 'Can we bag babies for you?'" The neonatal R.N.s can now check on their babies. Shortly afterward, R.N.s watching the news realized their colleagues needed flashlights, which they brought to the NICU, then began hand ventilating infants (14).

"One NICU RN was trapped in an elevator for nine hours. Firefighters stopped to rescue her mid-way but did not have a ladder long enough to reach down to her. They returned hours later with a ladder too short of reaching her. The firefighter rappelled down and passed the ladder into the elevator; she climbed out to the top of the elevator. "

One NICU RN was trapped in an elevator for nine hours. Firefighters stopped to rescue her mid-way but did not have a ladder long enough to reach down to her. They returned hours later with a ladder too short of reaching her. The firefighter rappelled down and passed the ladder into the elevator; she climbed out to the top of the elevator. The firefighter leaned the ladder against the wall, reaching halfway up the elevator shaft. Firefighters from above lowered another short ladder, hanging within reach of the ladder she was to climb. She climbed the ladder, switched ladders, and climbed out to the entrance. After nine hours, "I went to the bathroom, washed the grease from my hands, and went back to work" (14).

While it is laudable to praise those who staff a facility during a storm, we must not diminish the dangers of travel during a disaster or responsibilities to family. For example, following an earthquake, a police officer responding from home died driving onto a collapsed bridge (73). A wildland fire caught up with a nurse escaping the fire. One daughter died, and another was severely burned (74). Staff are also parents responsible for their children and dependent adult family members. Nurses left the hospital to rescue their children during the 1980 Panorama Fire, San Bernardino, CA (personal communications, DvS). The 23,800-acre fire destroyed 280 homes, damaged 49 homes, and caused four deaths and 77 injuries (75). A disaster of the magnitude where a NICU is evacuated reduces adolescents' cognitive skills and judgment beyond their capabilities even as the threat itself reduces their cognitive capacities (76). There is no "my adolescent is mature for his/her age" in life-threatening crises. Some hospitals bring staff in early and provide sleeping arrangements and food, while others make accommodations for family and pets (15, 16, 40, 41, 44). The family of patients and staff have also provided support (14, 16, 20).

Problems Encountered

For healthcare, a disaster is an *environmental disruption* of medical care that disrupts the *ability to treat multiple patients*. This is a functional, ecological definition (42). 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.

Clinical Management

Parental contact suffered from power and cell tower outages. This also created distractions for staff working in the NICU concerned about their relatives.

Keeping babies warm during a tropical cyclone may seem counterintuitive, except thermoneutral temperatures for neonates are around 90° F.

Hand disinfectant was a problem for all NICUs.

System Problems

Isolation from family and the expectations to care for premature babies in austere conditions became a serious problem. Staff felt less connected with hospital management during the prolonged isolation due to Hurricane Katrina (77). Staff provided mutual assistance to each other and patients' families (14-16, 20, 62, 77).

"As described earlier, contacting receiving NICUs was local from personal relationships. This works well for small-scale events, but regional problems like disasters tax the number of personal relationships, and NICUs begin competing for placement."

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Internal command lines of authority and communication did not function well (41, 44).

What Helped

Calmness, open-mindedness, tolerance, and improvisation are valuable traits (15).

The hospital command center kept staff informed about the status of preparations and then updated on the progress of the evacuation(44).

Thermoregulation. Several NICUs placed multiple neonates in the same incubator for warmth or to use the proximity for nursing care (16, 20). Solutions utilized included polyethylene bags, chemically activated warming or perineum pads, and skin-to-skin contact using kangaroo mother care if possible (14, 16, 20, 62).

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 (78).

A Lesson Learned must connect to a measurable change in behavior. The organization must take deliberate corrective actions from the Lesson Learned to enhance performance (78). Lessons Learned can prepare the organization for the next disaster or improve routine operations to support operations during the next di-

saster.

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

The Lessons Learned

Below, we list Lessons Learned that connect a problem described in the article with a solution that can be acted upon by the Neonatologist.

Thermoregulation

- Supplies – polyethylene bags, chemically activated warming, or perineum pads (14, 16, 20, 62)
- Interventions – multiple neonates in the same incubator for warmth and proximity for nursing care (16, 20); skin-to-skin contact using kangaroo mother care if possible (14, 16, 20, 62)
- Better charting and education on thermoregulation of preterm infants during disaster management (20)

Transfer of neonates (44), a central authority or system to facilitate mass transfers of patients.

Food supplies (15), from experience, it is recommended that each person should bring necessary food and supplies for three days separate from the hospital supply.

Created an organizational structure for NICU-specific disaster management (44):

- Evacuation and surge plans incorporated into preparedness plan
- Coordinated with the New York City Pediatric Disaster Coalition
- Explicitly detailed our NICU Incident Command Structure, which includes the designation of our staff social worker as liaison to NICU families
- NICU-specific evacuation equipment stocked in an easily accessible location
- Disaster plan includes strategic placement of transport isolettes (ground floor)
- Evacuation and power outage checklists
- Simulation center for neonates and vertical evacuation

"Whether to evacuate or shelter, standard support for neonates was not possible. The published narratives describe Neonatologists and NICU staff focused on the same objectives as before the hurricane, but now the methods to reach those objectives were generated through improvisation."

Conclusion

Deciding when to evacuate a NICU before an approaching hurricane is a judgment outside the authority of the Neonatologist. The Neonatologist can inform authorities regarding the infant's physiological demands, the capabilities of staff to support those demands, and the adequacy of the physical space. Communicating across various infrastructures created problems common to NICUs. Problems emerged from the lack of understanding of local objectives and missions, and most solutions were local. Boundary objects, vague objects used for shared work by various domains and infrastructures, can become effective methods for communication.

Whether to evacuate or shelter, standard support for neonates was not possible. The published narratives describe Neonatologists and NICU staff focused on the same objectives as before the hurricane, but now the methods to reach those objectives were generated through improvisation.

We do not disagree with efforts to characterize better the risks of sheltering or evacuating, but such arguments may benefit from the inclusion of structural characteristics necessary for hurricanes. While narratives revealed gaps in staff's mental and physical support and welfare, what must not be lost are the similar capabilities, judgment, and skill for improvisation exhibited around the world.

In nearly all the published hurricane experiences we reviewed, problem solving happened locally. One outside hospital directing evacuation efforts relied on a government agency's report that all hospitals were empty. They were reached by a text message from a NICU following a circuitous route they learned of an entrapped NICU and hospital. Neonatologists and NICU staff may look to government agencies and emergency services for help, but they must rely on their capabilities and improvisations to save babies.

It is a testament to the care and the evacuation of over 235 infants with prolonged care lasting hours to days that only two infants died. Hurricane planning would be well-served to exploit the ingenuity and dedication demonstrated by the neonatology community for answers about preparing to shelter and evacuate.

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Conflict of Interest: The authors have indicated they have no potential conflict of interest relevant to this article to disclose.

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Acknowledgments:

Karl Weick, Rensis Likert Distinguished University Professor of Organizational Behavior and Psychology, Emeritus, University of Michigan

Dan Kleinman, Operations Section Chief, National Incident Management Organization (retired)

Errol van Stralen, Ancora Education

William J. Corr, formerly with the Los Angeles City Fire Department, now deceased

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Disaster Series: Appendix 1: Hurricane Meteorology

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

The Hurricane Environment

For those who do not live where hurricanes are common, we offer a short glossary of terms to better appreciate the events and threats during a hurricane.

Monsoons are seasonal periods of a dramatic increase in precipitation and prevailing winds with a wet summer and dry winter. The summer heating of land greater than the ocean drives monsoonal weather. The reversal of surface winds is associated with heavy precipitation, often thunderstorms. Though seemingly regional, monsoons are part of the large-scale global weather circulation.

Tornadoes are part of a severe convective storm (thunderstorm) that can occur worldwide except in Antarctica. A 'supercell,' a tall, rotating thunderstorm with a well-developed anvil, creates the most destructive tornadoes. Supercell thunderstorms can form on the margins of a hurricane. In spring, tornado conditions often exist over the continental US when a cold front approaches warm, humid air in the south and east.

"Supercell thunderstorms can form on the margins of a hurricane. In spring, tornado conditions often exist over the continental US when a cold front approaches warm, humid air in the south and east."

Hurricanes, generically 'tropical cyclones,' are symmetrical, rotating low-pressure weather systems that gain energy from warm tropical or subtropical ocean waters. Thunderstorms organize from the hurricane's rotation rather than asymmetrical weather fronts between warm and cold air masses, which hurricanes do not contain. Hurricanes, typhoons, and cyclones are regional names for the same type of storm:

- Hurricanes – North Atlantic; central and eastern North Pacific
- Typhoons – western North Pacific
- Cyclones – South Pacific and the Indian Ocean

The maximum sustained windspeed classifies tropical cyclones. A tropical cyclone can change between classifications and categories within classifications because of the variability and nature of windspeeds and release of energy.

- Tropical Depression, 38 mph (33 knots) or less
- Tropical Storm, 39 to 73 mph (34 to 63 knots)
- Hurricane, 74 mph (64 knots)
- Major hurricane, 111 mph (96 knots) or higher

Energy and Encountering the Cold

Condensation distinguishes *tropical cyclones* from weather phenomena driven by temperature and pressure gradients. Warm tropical ocean water evaporates, transferring latent heat to the upper atmosphere where it condenses to form heavy rains. High winds and lower atmospheric pressure accelerate this heat transfer, creating a positive feedback loop (1, 2). There is a large vertical temperature gradient *within* the hurricane, creating a *warm core*, a characteristic of tropical cyclones. The energy gained from warm tropical ocean water evaporation and its condensation at altitude is converted to kinetic and potential energy, driving the hurricane.

"With little temperature difference between the hurricane and the environment, the environmental winds around the hurricane are minimal, having little significant change with altitude. This low wind shear prevents disruption of the hurricane's symmetric structure. The strongest hurricane winds are near the surface and decrease with altitude, whereas horizontal pressure gradients are also weakest. "

With little temperature difference between the hurricane and the environment, the *environmental winds* around the hurricane are minimal, having little significant change with altitude. This low wind shear prevents disruption of the hurricane's symmetric structure. The strongest *hurricane winds* are near the surface and decrease with altitude, whereas horizontal pressure gradients are also weakest. Larger pressure gradients at altitude would increase wind shear, disrupting the structure of the hurricane (1).

As these patterns move toward the earth's poles, hurricanes encounter cold air masses, cooler sea surfaces, greater air temperature differences, and stronger environmental winds. The resulting instability causes the hurricane to dissipate, particularly as it travels overland (2).

But if the hurricane encounters a large cold front, rather than dissipating, the strong horizontal temperature and pressure gradients (frontogenesis) generate energy to drive the hurricane. The change in energy source also changes the characteristics of the hurricane, the symmetrical *tropical cyclone* transitions to an asym-

metrical *extratropical cyclone.* Closer to the poles, temperature differences increase instability and decrease the predictability of extratropical cyclones (3). The winds can be as weak as a tropical depression or the strength of a hurricane.

"Extratropical Cyclones develop when a warm-core, symmetrical hurricane moves to higher latitudes (lower latitudes in the southern hemisphere). They usually dissipate while moving over cooler water or land. If the hurricane encounters a frontal weather system (air masses sharply differentiated by temperature or pressure), the cold air mass may surround and distort the hurricane. This can alter its direction and dangerously increase its variability."

Extratropical Cyclones

Extratropical Cyclones develop when a warm-core, symmetrical hurricane moves to higher latitudes (lower latitudes in the southern hemisphere). They usually dissipate while moving over cooler water or land. If the hurricane encounters a *frontal* weather system (air masses sharply differentiated by temperature or pressure), the cold air mass may surround and distort the hurricane. This can alter its direction and dangerously increase its variability.

During this 'extratropical transition,' residual vertical temperature gradients in the 'warm-core' tropical cyclone continue to generate energy while new horizontal pressure and temperature gradients from 'cold-core' storms begin to generate energy.

This combination produces dangerous, poorly understood, poorly forecast hurricanes (1, 2), often with larger wind fields and the heaviest rain, hail, or snow concentrated away from the central storm. In tropical cyclones, the heaviest rainfall occurs within the hurricane (3). Hurricane Sandy transitioned into an extratropical hurricane as it neared landfall in New Jersey.

"Structural and intensity changes can occur rapidly. Because of their unpredictability and damage, meteorologists continue studying the transition between a tropical cyclone and an extratropical one. Only recently have meteorologists developed universal definitions and classifiers of extratropical cyclones."

These changes also affect the characteristics and shape of the hurricane. Windspeed due to the warm-core character does not change with altitude, which stabilizes the hurricane, while the wind peed due to the cold-core structure does increase with altitude, which destabilizes the hurricane (1). The energy distribution between the warm-core hurricane and cold-core front further distorts the storm into the asymmetric shape of the extratropical cyclone (2). The symmetrical concentration of wind and rain changes to an asymmetrical distribution over a far greater area with less predictability (2). The result is a fast-moving extratropical cyclone producing intense rainfall, huge waves, hurricane-force winds, and the potential to intensify, impairing accurate forecasts (1).

Structural and intensity changes can occur rapidly. Because of their unpredictability and damage, meteorologists continue studying the transition between a tropical cyclone and an extratropical one. Only recently have meteorologists developed universal definitions and classifiers of extratropical cyclones. The evolving structure of an extratropical hurricane was developed through model simulations, but information developed from aircraft observations over the past 30 years has contributed to more accurate models (1).

An Asymmetric Extratropical Cyclone – Hurricane Sandy (4)

Hurricane Sandy's type of transition to become an extratropical cyclone is rare in the western North Atlantic. Hurricane Sandy changed in intensity and characteristics as it moved north, encountering a cold air mass. Its symmetric warm-core surrounded cooler air, developing into an asymmetric, less predictable extratropical cyclone. Sandy's core changed from warm to cold as an extratropical cyclone, and the strongest winds began to spread over a much larger area during its expansion.

- October 26. Sandy moved slowly north as a tropical cyclone, encountering strong wind shear, causing slightly decreasing intensity.
- October 27. Sandy briefly weakened to a tropical storm, traveling northeast, then merged with a cold front from the eastern US to re-intensify as a minimal hurricane while over the Gulf Stream's warm water (81° F).
- October 28. While continuing in a northeast direction, wind shear decreased, and, drawing energy from the cold front, Sandy began robust intensification as a Category 1 tropical cyclone, developing an eyewall.
- October 29. Turning to the northwest and New Jersey, Sandy encountered a cold front on its western periphery, with a warm front over the Canadian Atlantic on its eastern edge. Its warm-core remained intact as the surrounding environment became cold. Energy from the storms on either side intensified Sandy's energy, beginning the transition to an extratropical cyclone having a larger-scale cyclonic circulation. By 0630 EDT, cold continental air began wrapping around its warm core. By 1600 EDT, the warm core was entirely encircled by cooler continental air, and sea level pressure decreased. 1930 EDT, Sandy reached landfall along the New Jersey shoreline.
- October 30. Hurricane Sandy continued west.

Hurricane Damage

Storm damage. From the speed and intensity of the hurricane and the rising water level. For coastal margins, the major threat is wind, waves, and storm surge causing flooding while away from the flood zones the major threat is wind.

Speed and intensity. As a tropical cyclone moves to higher latitudes, the intensity of the hurricane, defined by central mean sea-level atmospheric pressure and maximum surface windspeed,

will decrease. However, upon encountering a cold front, a tropical cyclone can become an extratropical cyclone and re-intensify (1).

Water, rain, flooding. Water, not wind, is the biggest threat. Total Water Level = Storm Surge + Astronomical Tides (natural or lunar tides) + Waves + Freshwater Input.

Storm surge is the water level rise above the predicted astronomical tide level. Storm surge is caused by strong storm winds pushing water toward shore. The low pressure of the storm has minimal contribution to storm surge.

Storm tide is the water level rise due to the storm surge *and* the astronomical tide. While storm surge has no reference level, the astronomical tide does, as the height above mean sea level.

Waves generated by slower-moving tropical cyclones quickly advance of the storm as decaying swells. An extratropical hurricane produces large surface waves from constant high windspeeds and the speed of the faster-moving storm. The waves and the extratropical hurricane can arrive simultaneously with little or no warning.

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Rainfall increases in a hurricane when the greater moisture of warm air condenses as the air cools at altitude. High rainfall can occur farther inland with an extratropical hurricane, causing dangerous flooding.

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Disclosures: The authors have no relevant disclosures

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Acknowledgment

Errol van Stralen, Ancora Education

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Fellows Column: Capnocytophaga Sepsis in a Preterm Neonate: A Case Report

Najmus Sehr Ansari MBBS, MSc, Elizabeth Asztalos MD, MSc, FRCP(C), Asaph Rolnitsky, MD, MSc

Abstract

Background: *Capnocytophaga is an anaerobic gram-negative bacillus part of oral flora in humans, cats, and dogs. It usually causes periodontal infection but may exhibit systemic manifestations, particularly in immunocompromised individuals. In rare cases, it may cause chorioamnionitis leading to preterm birth and early-onset neonatal sepsis.*

Case Presentation: *We present a rare case of early-onset sepsis due to Capnocytophaga in an extremely preterm newborn presenting severe respiratory distress, lethargy, and leukopenia at birth. This was treated with Cefotaxime for 14 days.*

Conclusion: *Our case report highlights the importance of considering unusual pathogens such as Capnocytophaga as a cause for intra-amniotic infections leading to preterm birth and early-onset neonatal infection.*

Keywords: Preterm neonate, Sepsis, Chorioamnionitis, Capnocytophaga, Case report

List of Abbreviations

VDRL	Venereal disease research laboratory test
MRI	Magnetic resonance imaging
RNA	Ribonucleic acid

"Our case report highlights the importance of considering unusual pathogens such as Capnocytophaga as a cause for intra-amniotic infections leading to preterm birth and early-onset neonatal infection."

Introduction:

Capnocytophaga is an anaerobic gram-negative bacillus that is present in commensal oral flora of humans, cats, and dogs (1). It usually causes periodontal infection but may exhibit systemic manifestations such as endophthalmitis, keratitis, endocarditis, pyelonephritis, and septic arthritis, particularly in immunocompromised individuals (2,3). It has also been reported to cause chorioamnionitis leading to preterm birth and neonatal sepsis (1,3,4,5). We describe a rare case of early-onset sepsis due to Capnocytophaga Sputigens in a preterm neonate. This case report demonstrates the importance of considering unusual pathogens such as Capnocytophaga as a cause for chorioamnionitis leading to preterm birth and early-onset neonatal infection.

"Blood culture was drawn at birth, and Ampicillin and Gentamicin were started. Microscopic evaluation of the placenta showed acute chorionic vasculitis on the fetal surface of the placenta, patchy villous edema, and focal decidual necrosis suggestive of chorioamnionitis. His initial leukocyte count was 4.1x 10E9/l with neutrophils of 0.9x 10 E9/l. Blood and skin swab culture showed the growth of Capnocytophaga sputigens after 72 hours of inoculation."

Case Presentation:

A male neonate weighing 527 grams was delivered to a healthy 32-year-old woman at 23 weeks of gestation. She was Rubella immune and negative for Hepatitis B surface antigen, Venereal disease research laboratory test (VDRL), Human immunodeficiency virus, Gonococci, and Chlamydia. An ultrasound scan at 18 weeks of gestation showed normal fetal anatomy. This was an uneventful pregnancy until she presented with preterm labour at 23 weeks of gestation. She received one dose of Betamethasone and Ceftriaxone prior to delivery. Her labor progressed, resulting in a spontaneous vaginal delivery. He required resuscitation followed by intubation, surfactant administration, and placement on a high-frequency oscillator ventilator at delivery. He was lethargic and had poor tone.

Blood culture was drawn at birth, and Ampicillin and Gentamicin were started. Microscopic evaluation of the placenta showed acute chorionic vasculitis on the fetal surface of the placenta, patchy villous edema, and focal decidual necrosis suggestive of chorioamnionitis. His initial leukocyte count was 4.1x 10E9/l with neutrophils of 0.9x 10 E9/l. Blood and skin swab culture showed the growth of Capnocytophaga sputigens after 72 hours of inoculation. Due to poor growth on all susceptibility testing media, antibiotic susceptibility could not be done. Lumbar puncture was deferred given clinical instability. Antibiotics were changed to Cefotaxime after consulting a pediatric infectious disease specialist. Blood culture repeated on day 5 of life showed no growth. Serial monitoring of C-reactive protein was done which was 38mg/L on day 2 of life and subsequently dropped to less than 1mg/L by day 10. He received Cefotaxime for a total duration of 14 days. His clinical course was further complicated by Candida Albicans sepsis and meningitis at three weeks of age. He was treated with Amphotericin B followed by oral Fluconazole for six weeks from negative culture. His abdominal ultrasound, eye exam, and brain MRI were negative for fungal lesions. Serial cranial ultrasounds

showed bilateral subependymal and intraventricular hemorrhages, which resolved at 34 weeks of corrected gestational age. He was discharged home on oxygen support at 44+2 weeks of age. He came off oxygen support three months after discharge. His neurodevelopmental follow-up at eight months of corrected age showed normal milestones for his age, and he continues to be monitored in our follow-up clinic.

"Capnocytophaga is present in the human oropharynx as a commensal flora (2). In the susceptible individual, it has been postulated that proteolytic enzymes produced by these bacteria damage the oral mucosal barrier providing a route of entry into the bloodstream (6). The hematogenous spread to the placenta in the pregnant patient may result in chorioamnionitis (2,6)."

Discussion:

Capnocytophaga is present in the human oropharynx as a commensal flora (2). In the susceptible individual, it has been postulated that proteolytic enzymes produced by these bacteria damage the oral mucosal barrier providing a route of entry into the bloodstream (6). The hematogenous spread to the placenta in the pregnant patient may result in chorioamnionitis (2,6). Another possible route can be an ascending infection through the cervix after orogenital contact from a partner with periodontitis (1,7). With chorioamnionitis, there is an activation of proinflammatory cytokines and production of prostaglandin, which may trigger premature uterine contractions and degradation of the amniotic membrane leading to preterm birth (8-10).

Capnocytophaga species appear as thin fusiform gram-negative rods on gram staining. They require a carbon dioxide-enriched culture medium for their growth. Owing to this property and being slow in growth, their identification on routine culture media can often be difficult (2). However, molecular methods such as 16S ribosomal RNA gene polymerase chain reaction and sequencing can be used for rapid and accurate detection of this bacteria (1). Capnocytophaga species show susceptibility to third-generation cephalosporins, lincosamides, carbapenems, macrolides, and fluoroquinolones but are generally resistant to aminoglycosides, trimethoprim, and metronidazole (6).

Neonatal infection with Capnocytophaga is rare, with only a few cases reported in the medical literature. A current search in the literature revealed 27 reported cases of Capnocytophaga neonatal infection (1,3,10,11,12). Most of these neonates, 26/27, were delivered preterm with 19 less than 30 weeks gestation. All the mothers presented with symptoms suggestive of chorioamnionitis and preterm labor except one who presented with placental abruption (3). Most of these infants were treated with Ampicillin; however, four neonates were treated with Cefotaxime (3,7). Combination therapy was used in three neonates: Amoxicillin-Clavulanate in one (1) and Ampicillin, Cefotaxime, and Gentamicin in the other two infants (2). In our case, the mother presented with preterm labor with the infant presenting with signs of early-onset sepsis manifested by severe respiratory distress, lethargy, and leukopenia. This was treated with a 14-day course of Cefotaxime resulting in an effective eradication of this infection. However, he had complications related to prematurity which significantly impacted his clinical course in NICU. Our case and previously reported cases indicate that neonatal infections due to Capnocytophaga are usually not severe as they are highly susceptible to antimicrobial therapy (7). However, morbidity may increase significantly owing to premature delivery resulting from chorioamnionitis (2).

Conclusion:

"Our report demonstrates the importance of not only considering urogenital commensals but also the microbiota from distant sites as a potential etiology for chorioamnionitis leading to preterm birth and neonatal infection. This knowledge may guide clinicians in implementing therapeutic strategies which could potentially prevent preterm labor and early-onset neonatal sepsis."

The infectious etiology of preterm birth remains the leading cause of neonatal morbidity and mortality. An improved understanding of bacterial organisms and their route of invasion is obligatory to make progress in preventing preterm birth, which is a significant public health concern. The role of urogenital flora in causing chorioamnionitis is extensively studied, but much less is known about other bacterial populations causing intra-amniotic infection. Our report demonstrates the importance of not only considering urogenital commensals but also the microbiota from distant sites as a potential etiology for chorioamnionitis leading to preterm birth and neonatal infection. This knowledge may guide clinicians in implementing therapeutic strategies which could potentially prevent preterm labor and early-onset neonatal sepsis. Further research is required to understand better its role in causing chorioamnionitis leading to preterm birth.

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Consent for publication: Written informed consent was obtained from the patient's parents to publish this case report.

Competing interests: The authors declare that they have no competing interests.

Funding: No funding received from any public, commercial, or non-profit organization.

Authors' contributions: NSA, EA, and AR conceptualized writing this case report. NSA drafted the initial manuscript, which AR and EA revised. NSA conducted the literature review for this case study. AR and EA supervised the literature review, critically reviewed the manuscript, and approved the final version.

Conflicts of Interest: The author has no conflicts of interest relevant to this article to disclose.

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Briefly Legal: Term pregnancy, Uterine Rupture, Hypoxic-Ischemic Encephalopathy, Autism Spectrum Disorder – Part I

Barry Schifrin, MD, Maureen E. Sims, MD

Prenatal Course:

The patient is a 40 y/o G3 P1 Caucasian, married with a reliable menstrual history confirmed by ultrasound. She is of short stature, 62" tall, and weighs 141 lbs. at the outset of pregnancy. Beginning at 26 2/7 weeks, she complains of uterine contractions (UC's) and pain at the site of the cesarean section scar. She is admitted twice to the hospital for these complaints to rule out preterm labor (PTL). At 32 4/7 weeks, she receives two doses of Celestone and is scheduled for elective repeat cesarean section at 39 5/7 weeks gestation should she not go into labor before then. At 36 5/7 weeks, she has an episode of back and severe suprapubic pain with urinary retention of 850 cc urine. She is catheterized and treated for UTI with the resolution of the pain.

"Her cervix is 1.5/50%/-4, and contractions are coming every 3-6 minutes. The FHR pattern is Category I with accelerations and normal variability. Her providers agree to move the cesarean section to the next day at 08:00. She is discharged with instructions."

She returns labor & delivery at 39 1/7 weeks in the morning complaining of painful contractions for the last five days, getting much stronger, and she is exhausted. She is there to rule out labor and ask for the cesarean section to be moved up from the scheduled procedure four days later. Her cervix is 1.5/50%/-4, and contractions are coming every 3-6 minutes. The FHR pattern is Category I with accelerations and normal variability. Her providers agree to move the cesarean section to the next day at 08:00. She is discharged with instructions.

She returns to L&D about 4 hours later, complaining of pain (10/10). Her cervix is now 4-5 cm., 80% effaced with the vertex at -3 station. At this time, the caregiver notes that she will be given a trial of labor – there is no formal discussion. She is placed on a monitor where the FHR is about 120 bpm with accelerations - a "Category I" tracing. Contractions, however, are prolonged and frequent. Epidural anesthesia (for labor) is implemented with a continuous dose of Fentanyl and Bupivacaine.

Her cervix dilates rapidly to 7-8 cm with the head in the OP position when membranes rupture spontaneously (SROM). Immediately following SROM, there appear repetitive and increasingly severe variables and then prolonged and late decelerations – denoted as "Category 2." An intrauterine pressure catheter (IUPC) is placed, and an amnioinfusion is administered, which successfully relieves the decelerations. Hematuria is noted to be draining from the Foley catheter, with the patient feeling pain along her right lower abdomen despite the epidural anesthesia. Shortly thereafter, she reaches full dilatation (10 cm) with the fetal head at 0 station in the occipital posterior (OP). Immediately, there is a prolonged deceleration. Terbutaline, 25 mcg, is administered to diminish uterine contractions emergently. Simultaneously, the patient is taken to the operating room (OR) for an emergency cesarean section. Upon arrival in the OR, the deceleration has recovered.

"There is a stable baseline at 130 beats per minute (bpm) with good variability. The decision to perform a cesarean section is canceled, and shortly thereafter, she begins pushing. After 2 hours of pushing, she complains of severe pain (8/10) in the lower abdomen. An epidural bolus of Fentanyl/Bupivacaine is given (apparently without examining the abdomen). By this time, the fetal baseline heart rate has risen to 165 bpm (from 120) with obvious late and prolonged decelerations and indications of sinusoidal pattern."

There is a stable baseline at 130 beats per minute (bpm) with good variability. The decision to perform a cesarean section is canceled, and shortly thereafter, she begins pushing. After 2 hours of pushing, she complains of severe pain (8/10) in the lower abdomen. An epidural bolus of Fentanyl/Bupivacaine is given (apparently without examining the abdomen). By this time, the fetal baseline heart rate has risen to 165 bpm (from 120) with obvious late and prolonged decelerations and indications of sinusoidal pattern. The monitor is discontinued, and about 30 minutes later, the patient is delivered under epidural anesthesia by "rapid" but "non-urgent" cesarean section for arrest of descent at +3 station. At delivery, there is bloody amniotic fluid. After the delivery, a rupture of the right anterior uterus involving both the bladder and the vagina is discovered. The rent in the bladder passes through the trigone, with also a vaginal laceration. The uterus is removed, and the urinary tract is repaired.

At birth, the male infant weighs 3070 gm (25th percentile), length of 50.3 cm (50-75th percentile), and head circumference of 35.5 cm (90%). He receives "unexpectedly" low Apgar scores of 4 and 6 at 1 and 5 minutes, respectively. He is floppy and pale.". The umbilical venous pH is 7.03 with a base deficit (BD) 17; the arterial values are pH 6.96 with a BD of 18. The initial arterial blood gas at 30 minutes shows a pH of 6.96, with a BD. 24. These values represent a severe metabolic acidosis reflecting significant oxygen deprivation during late labor. The infant requires immediate resuscitation and is placed on continuous positive airway pressure (CPAP), and appropriately, is immediately referred for head cooling (therapeutic hypothermia - TH) for 72 hours. At 8.5 hours of age, he is intubated for apneas, thought to be related to seizures, and he is loaded with phenobarbital. His platelets are low and creatinine elevated. His diagnoses include hypoxic-ischemic encephalopathy (HIE), mild disseminated intravascular coagula-

tion (DIC), and renal insufficiency. Magnetic resonance imaging (MRI) and an electroencephalogram (EEG) on day 3 of life are interpreted as "normal."

He had a normal neurological examination after completion of the cooling protocol. His slow feeding improved, neonatal apnea resolved, hypotension resolved, and he passed his newborn hearing screen. He was sent home at eight days of life on phenobarbital with "normal tone, but sleepy."

At seven months of age, he was still on phenobarbital, with Keppra added along with vitamin D3. By 12 months of age, the baby is diagnosed with macrocephaly, cerebral palsy (CP), developmental delay, tremors, seizures, for which he is maintained on Keppra. At 18 months of age, the MRI is again "normal"; the infant has been weaned off of anticonvulsants, and various genetic tests are negative. At 27 months of age, the child underwent Bayley developmental testing, which showed significant speech and movement skills delays. The current clinical diagnosis from the medical records is Autism Spectrum Disorder (ASD).

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Allegations:

Numerous forensic issues surround the mother's obstetrical care, including the response to the abnormal FHR patterns, the timeliness of the delivery, and issues with informed consent; those will be considered in a subsequent submission. Irrespective, there was universal agreement that the fetus suffered a hypoxic-ischemic event during labor and delivery (a sentinel event) due to rupture of the uterus. From a forensic standpoint, however, the major issue with the case was the relationship of the events of labor and delivery to the subsequent diagnosis of autism spectrum disorder (ASD).

Discussion:

It is not the obstetrician's role to assign provenance to the child's signs and symptoms of neurological handicap; that is the role of the pediatric neurologist or other qualified individuals. It is the role of the obstetrical expert, however, to affirm that the fetus, neurologically responsive and without hypoxic or mechanical threat at the outset of labor; and irrespective of any genetic predisposition, affirmatively suffered a neurological injury during labor and delivery and that the literature strongly supports a relationship between the events of labor and subsequent neurological handicap including behavior abnormalities.

Thus, the plaintiff's pediatric neurologist, armed with the above, alleged that those behavioral abnormalities resulted from the neurological injury sustained during labor and were initially labeled as cerebral palsy. The defense alleged that the events of labor, dramatic as they were, were unrelated to the ultimate diagnosis of ASD. - a disorder of undeterminable provenance.

ASD is a neurodevelopmental condition that presents as a spectrum of lifelong problems of communication and social and behavioral challenges. A generation ago, studies estimated the prevalence of ASD at perhaps 5 / 10,000. Current estimates in the United States range between 1 in 54 and 1 in 36 children., *This dramatic increase in the US and other developed countries cannot be explained by ASD diagnostic criteria or case identification changes*. Further, ASD is not the only developmental disability increasing over this time. By 2010, there had been a 33 percent increase over the preceding decade in developmental disabilities of all types, including ASD, attention-deficit/hyperactivity disorder (ADHD), and other developmental delays. These statistics are paralleled by those related to the costs of diagnosing and treating patients assessed for ASD.

While much progress has been made in the neurodiversity movement, and many people with ASD live productive, even exceptionally successful lives, at least 25 percent of people with ASD have minimal language skills despite early intervention efforts, presenting life-long challenges.

The associated costs of dealing with ASD or its potential have become prohibitive. Costs are predicted to reach $461 billion by 2025 in the US. There is also an incalculable impact on the lives not only of the children but on the parents themselves. A recent study estimates the average cost for therapy for a child diagnosed with autism is $60,000 per year from when they are diagnosed (typically at age 3) until entering school at age 6 or 7—the total cost for these four years of treatment: $240,000. Costs increase in ASD patients with intellectual disabilities. Children diagnosed with autism incur further costs: 40% more visits to a pediatrician than children not diagnosed with autism, as well as more psychiatric visits for children older than four years old, etc. Nor can the enormous financial and spiritual toll on the family of children with ASD be overlooked. Half of the families of ASD children report the need to reduce or stop work; one-third report experiencing financial burdens related to ASD health care costs. 46% of parents need more help or information managing emotional and physical stress; 40% need more help or information balancing work/family responsibilities.

" A recent study estimates the average cost for therapy for a child diagnosed with autism is $60,000 per year from when they are diagnosed (typically at age 3) until entering school at age 6 or 7—the total cost for these four years of treatment: $240,000. Costs increase in ASD patients with intellectual disabilities."

With regard to causation, ASD is described as a behavioral disorder resulting from a complex interaction between genetics, the environment, and a host of maternal risk factors. However, results in each category have been inconsistent. A genetics-linked etiology of ASD was appealing and was the primary defense position in this case. But, of the more than 100 genes that have been associated with ASD (as well as ADHD and others), none, alone or in combination, appears directly causative, nor has any synergistic environmental factor been identified. While neither the cause of ASD nor the reason for its increasing prevalence is known or (for the purposes of litigation) deemed preventable, theories and initiatives for early detection and treatment abound.

Of the numerous attempts to elucidate the timing and mechanism

of the disorder, seemingly the most amenable to establishing a cause and effect relationship to ASD are the events of labor and delivery. Correlations have already been drawn between such "adverse" perinatal events as prematurity, intrauterine growth restriction, fetal distress, prolonged labor, use of oxytocin, operative delivery, anesthesia technique, evidence of hypoxia-ischemia, low Apgar scores, and the subsequent development of CP and ASD. (Figure 1) There also appears to be a protective benefit of elective cesarean section prior to labor, not only for ASD but also for a host of adverse fetal outcomes, including birth trauma, birth asphyxia, subdural hemorrhage, retinal hemorrhage, and CP.

"A further clue from beyond the perinatal period comes from the characterization of ASD as a dysregulation of the autonomic nervous system (ANS) often assessed by measuring Heart Rate Variability (HRV). Compared to typically developing children, those with ASD exhibit altered autonomic tone, evidenced by a diminished vagal tone and increased sympathetic activity. It must be remembered that the determination of heart rate variability (HRV) is one of the most important features of assessing fetal heart rate patterns in labor."

A further clue from beyond the perinatal period comes from the characterization of ASD as a dysregulation of the autonomic nervous system (ANS) often assessed by measuring Heart Rate Variability (HRV). Compared to typically developing children, those with ASD exhibit altered autonomic tone, evidenced by a diminished vagal tone and increased sympathetic activity. It must be remembered that the determination of heart rate variability (HRV) is one of the most important features of assessing fetal heart rate patterns in labor. (*see* below) The most obvious deficiency in these studies is the lack of demonstration that the fetus is neurologically (behaviorally) normal at the outset of labor.

Beyond these correlations, various authors have drawn parallels between the meteoric rise in ASD and changes in obstetrical practices, including the almost universal implementation of EFM and increases in the mean duration of labor, especially of the 2nd stage. Between the 1960s and 1990s, the mean duration of uncomplicated deliveries doubled from 8.5 hours to 17.5 hours for first-time mothers and from 7 hours to 13.8 hours for women who had previously given birth. Similarly, the rising use of epidural analgesia for labor has been associated with both longer labor, the need for operative delivery, and ASD. It has been alleged that even continuous EFM (exposure to doppler throughout labor) itself contributes towards longer labors and ASD. Compared to one-half a century ago, today's parturient is more likely than her predecessor to be overweight, older at first delivery, and have diabetes. These factors contribute statistically to both longer labors and ASD-affected offspring. These past several decades have also witnessed the increased use of Pitocin for the induction and augmentation of labor, cesarean section, and even assisted reproductive technology. All of these have been associated with ASD. Several meta-analyses examining over 60 perinatal and neonatal risk factors for ASD have implicated perinatal events in the genesis of ASD. Still, they offer no specific insight into the timing or mechanism of the problem or any testable hypothesis.

In none of these studies, including those alleging a relationship to "fetal distress," prolonged labor, or HRV of older children with ASD, has an assessment been undertaken of the behavioral responses of the individual fetus to the anticipated challenges of labor and delivery, *i.e.*, the tactile and hypoxemic effects of contractions and the ischemic effects of repetitive head compression? Thus, the studies have failed to include the features of fetal behavior (neurological responsiveness) illustrated by rest-activity cycles, quiet sleep, REM sleep, activity – all of which are readily seen on the FHR tracing along with fetal responses suggesting provocation, hypoxia/ischemia, trauma/hemorrhage, and infection. As in the case of subdural hemorrhage (SDH), retinal hemorrhages, cerebral palsy, and "stroke," such injuries during labor may not be evidenced in the immediate neonatal period, although they are discernible on the FHR pattern.

The dramatic increase in cesarean sections (often deemed "unnecessary") has failed to show obvious improvement in the prevalence of CP. The risk of stroke and ASD has been increasing. Most babies injured during labor are NOT asphyxiated at birth, whether the outcome is CP or stroke. Some with autistic features and the vast majority of asphyxiated are not injured. Succinctly put, the premise of the critical relationship of FHR patterns to fetal hypoxia/acidosis was flawed from the outset. In contrast, the behavioral, neurological insights provided by FHR patterns have been overlooked or undervalued for reasons of both scientific myopia and political (medicolegal) defensiveness.

There have been many attempts to "re-engineer" the approach to fetal heart rate patterns and the conduct of labor based upon them. These publications have shown strong correlations between certain specific FHR patterns and the subsequent development of CP and stroke. These have developed strategies for preventive obstetrical care whose objective is to keep the fetus out of trouble in the first place, thereby avoiding the need to "rescue" the fetus in severe distress.

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In this experience, often derived from medicolegal cases, alleging a relationship of obstetrical factors and the subsequent development of CP, there have been a limited number of patients with CP with signs of ASD as a complicating feature of CP. In a small subset of these patients, such as the present case, the diagnosis of ASD was considered exclusive, seemingly unattributed to the events of labor and delivery.

In this case, the child suffered a hypoxic-ischemic brain injury, demonstrable on the FHR pattern that then went on to have cognitive delays, behavioral problems, considered by the plaintiff as a manifestation of cerebral palsy. Notwithstanding the number of treating physicians, pediatricians, pediatric neurologists, social workers, and behavioral specialists who operated under the notion that the child has autism.

" When the case was adjudicated, the plaintiff's child neurology expert did not disagree with those who identified the problem as autism but pointed out that that approach took the child as he appeared to them without considering the perinatal history and a proper differential diagnosis. At a superficial level, autism is regarded as a behavioral diagnosis in children. At the same time, cerebral palsy is considered an affliction of posture and movement."

When the case was adjudicated, the plaintiff's child neurology expert did not disagree with those who identified the problem as autism but pointed out that that approach took the child as he appeared to them without considering the perinatal history and a proper differential diagnosis. At a superficial level, autism is regarded as a behavioral diagnosis in children. At the same time, cerebral palsy is considered an affliction of posture and movement. The relationship of ASD and CP was changed in 2006, however, when the definition of CP was revised to acknowledge that the motor disorders of CP are often accompanied by disturbances of sensation, perception, cognition, communication, and behavior, by epilepsy, as well as by secondary musculoskeletal problems. The limited data regarding their co-occurrence suggest that ASD is more frequent among children with CP (about 20%) and epilepsy (about 30%) than in the general population.

The pediatric neurology expert affirmed that the child indeed had autistic behavior, but that is not equivalent to a diagnosis of autism. One of the criteria for the diagnosis of autism requires that another etiology does not better explain the behavioral abnormalities. As pointed out, behavioral abnormalities are a well-recognized manifestation of a perinatally acquired hypoxic-ischemic injury, including CP. In the face of the obvious HI injury to his brain during labor and delivery, the expert opined that the injury was the cause of the constellation of findings, including the autistic behaviors.

The proof of hypoxia was incontrovertible. At birth, the pH of the umbilical artery was less than 7.0, with a base deficit of -18 and an elevated lactate level. At birth, the newborn was encephalopathic; he was pale and floppy, with a weak cry and poor respiratory effort. This constellation of acidemia and neurological findings was sufficient to qualify him for therapeutic hypothermia (TH). He then had seizure activity within the first 24 hours of life and was placed on phenobarbital. Subsequently, he was shown to have multiorgan failure, including respiratory distress, cardiac issues, renal failure, liver failure. all consistent with a severe hypoxic-ischemic injury to the brain.

While the decision to treat with TH should not by itself be considered an indication of injury, and while there is considerable creep away from the original diagnostic criteria for TH, this child met all those original criteria. Irrespective of the cooling, sufficient clinical features were indicated to underscore a hypoxic-ischemic injury.

The presence of macrocephaly at birth is another recognized feature of both ASD and hypoxic-ischemic injury. A recent study found that large fetal head size, a factor sometimes associated with ASD, was associated with a prohibitive incidence of cerebral white matter injury in the newborn. The authors consider prolonged labor the "missing link" in the causation cascade of subsequent neurological handicaps.

In the expert's opinion - the MRI does not have to be abnormal for a hypoxic-ischemic injury to the brain to have occurred. Perhaps as many as 25% of obviously injured children will fail to show lesions on the MRI. In this case, there was disagreement about the findings on the second MRI between the radiologist who wrote the report and the expert. The expert found "watershed" abnormalities on that MRI. "Irrespective," he opined, "MRI is just a test; it is necessary to look at the full clinical picture."

Did the child have epilepsy? As pointed out, both EEGs were normal. The expert considered the diagnosis of epilepsy as uncertain. The baby had had two seizures a month until he was 12 months of age. He was placed on phenobarbital, started on Keppra, and ultimately weaned off both.

The persistence of deficits after cooling was discussed with the expert who opined that at least some deficits encountered during injurious labor often remained after TH. The main benefits of TH are decreased mortality and some benefit in terms of profound cognitive delays. But, TH does not necessarily normalize children.

"Environmental influences can relate to exposure to different chemicals, antidepressants during pregnancy, even vaccination for a while (but now disregarded). However, consideration of uncertain environmental influences is moot under the current fact pattern. There was no demonstrable infectious, genetic, chemical, metabolic, or other discernible environmental etiology."

Concerning the failure to find any genetic markers for autism, the defense questioned whether that actually excluded a genetic etiology. The expert opined that autism is more often considered a combination of genetics and environmental influences. Environmental influences can relate to exposure to different chemicals, antidepressants during pregnancy, even vaccination for a while (but now disregarded). However, consideration of uncertain environmental influences is moot under the current fact pattern. There was no demonstrable infectious, genetic, chemical, metabolic, or other discernible environmental etiology. Still, there was an obvious hypoxic-ischemic injury related to a perinatal sentinel event which qualifies as causation in this case. The sequelae of that event, more properly deemed cerebral palsy, are the delays in his motor function that have not worsened over time. He manifests hypertonia with delays in speech and fine motor skills and other

motor functions. He also has behavioral sequelae, including his abnormalities in social interactions, his difficulties in groups, and problems with communication skills; His speech is vastly delayed, and he has abnormal reactions to environmental stimuli.

The case resulted in a structured settlement on behalf of the plaintiff.

Future research with long-term outcomes must attempt to better define the role of obstetrical care during labor, including a more nuanced approach to the neurological responses of the fetus and whether those are normal at the outset of labor. Further research should attempt to discern whether the wide spectrum of ASD behaviors can be explained by the multitude of perinatal variables influencing immediate and long-term outcomes.

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Disclosures: The authors have indicated no conflicts of interest.

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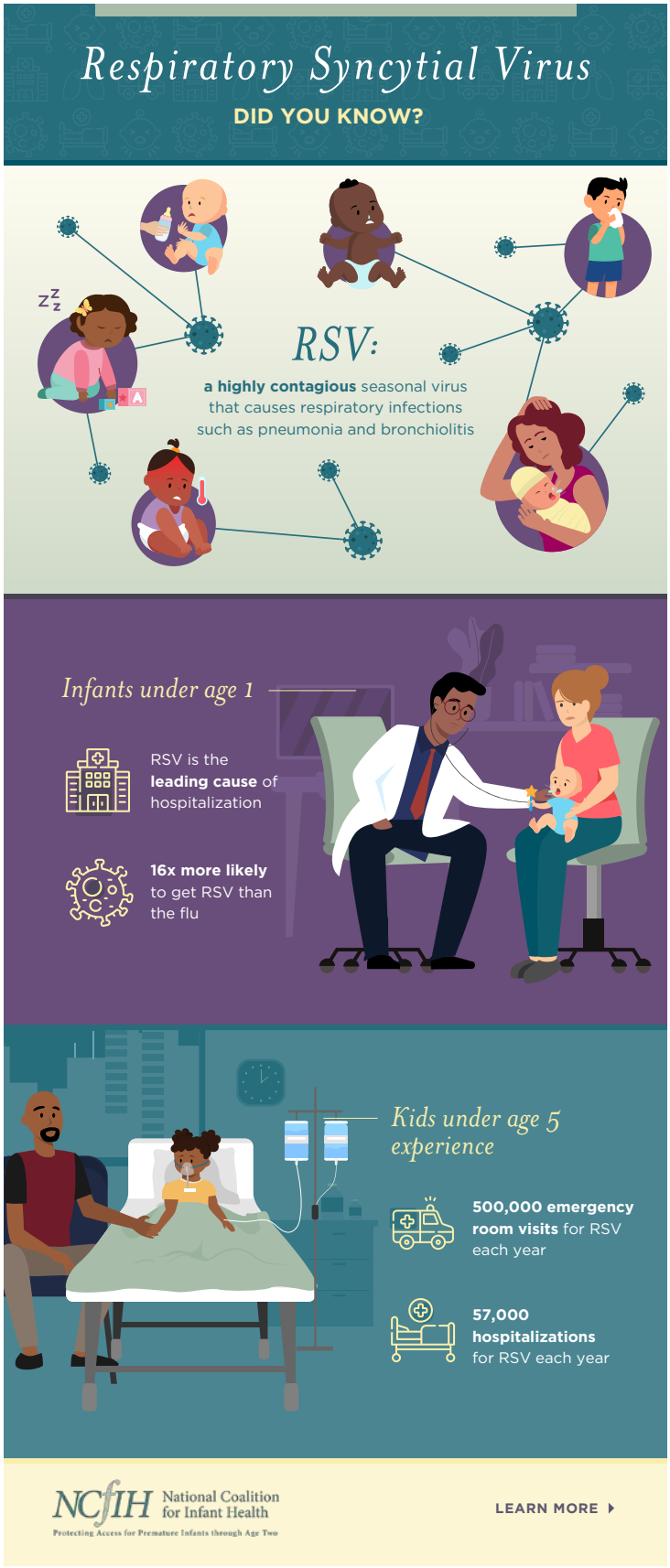

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Health Equity Column: Framing the Importance of Health Equity Pertaining to Black, Maternal Health

Jenné Johns, MPH, Duane Reynolds

January marks the annual recognition and celebration of Dr. Martin Luther King Jr., Baptist Minister and Civil Rights Leader. As we pause to reflect on his significant and selfless contributions to humanity, I am reminded of two powerful moments in Dr. King's life that have shaped history, policy, and the Civil Rights Act of 1964:

"While we have yet to see Dr. King's dream fully realized as a nation, we have tremendous opportunities to continue pushing, advocating, educating, demanding, and influencing healthcare equity for our nation's most vulnerable populations."

1. **The 1963 March on Washington for Jobs and Freedom for African Americans where he delivered the "I Have A Dream Speech," and**
2. **Dr. King's famous quote regarding injustice in healthcare, "Of all forms of inequality, injustice in health is the most shocking and inhuman."**

While we have yet to see Dr. King's dream fully realized as a nation, we have tremendous opportunities to continue pushing, advocating, educating, demanding, and influencing healthcare equity for our nation's most vulnerable populations.

In this month's Health Equity Column, I am honored to share highlights of my interview with my colleague, Duane Reynolds, CEO of Just Health Collective. Duane is not only a national health equity campion. He also embodies health equity personally, professionally, and spiritually to hold our healthcare systems and nation accountable to one day living Dr. King's dream of racial justice for all of humanity, particularly those who have experienced racial discrimination. As you read this column, I encourage you to reflect on your own dream and contributions to achieving Dr. King's dream of racial justice, equality, and equity within your respective institutions.

What is your definition of health equity?

My definition of health equity is really about removing the barriers that people face-some of them social, some of them in clinical settings, and some of them political-that keep them from obtaining optimal health. We want to remove those barriers that we can identify as unfair, and we should be addressing them to ensure that people have the opportunity to obtain that optimal health.

In your definition of health equity, are you pulling from standardized definitions? Are you sharing this definition based on professional and/or lived experiences? Tell me how you came to this definition of health equity.

I have an amalgamation of shared definitions that have come from some lived experience and a lot of professional reading, experience, and conversations with other subject matter experts in the field. If I were to think about it a little bit more from a purely personal perspective and consider things that my family and friends have faced, it's about making sure that our voices are heard and considered in both the care process and our daily lives. We know that health equity is not just about care processes but that it's also about social determinants of health. When I think about the layperson's understanding of that, it's all the situations and daily life challenges that we face that are unfair, which ultimately result in poorer health outcomes, particularly for marginalized communities.

"We know that health equity is not just about care processes but that it's also about social determinants of health. When I think about the layperson's understanding of that, it's all the situations and daily life challenges that we face that are unfair, which ultimately result in poorer health outcomes, particularly for marginalized communities."

What are your organizational priorities for addressing health and racial equity?

At Just Health Collective, we are trying to build an organization that can help others be transformative in their process to achieve health equity and belonging. We consider belonging to be the intersection of diversity, equity, and inclusion. In order to accomplish that mandate, we ourselves, the staff of Just Health Collective, have to be educated in racial/ethnic disparities, not just in health. Overall, we have to be committed and passionate about this work because this work doesn't get done through mediocrity. It requires

intensity, focus, and passion to sustain yourself as you move through some of these barriers that you inevitably will face when trying to do this work. In terms of priorities for the organization that we support, **if you are a healthcare organization, equity should be synonymous with your mission.** You're not going to achieve your mission without an intentional focus on equity. You may achieve your mission for certain groups that are more powerful and privileged, but if you are trying to achieve a mission around healthcare for all groups, then equity has to be a part of that.

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You are an African American male leading a powerful national equity-focused organization and community. You indicated that as a part of your organization's own priorities, your staff have to be educated on racial equity globally and not just in healthcare. Tell me why that's important for you as an organizational and a national leader. Why is that important for others to adopt as well?

Health inequity doesn't exist in a vacuum. It is as a result of many social, economic, environmental, political factors coming together to impact health. If we don't have a clear understanding of the historical injustices, laws, regulations, and policies that have led us to where we are not just someone's individual behavior, but the systemic things that have led us to where we are beyond just health, then we won't completely solve the problem. While we may be focused on addressing health equity and belonging as a company, we have to understand how we are a part of a larger wheel. We are a cog in the wheel of a larger system that is at play, and only when we have an understanding of the system at play can we begin to truly impact the small area that we are to impact.

We haven't talked a lot about the aspects of belonging within your organization's priorities. Tell me why that's so important: How do you help encourage organizations that you work with and do strategy work with to ensure that the populations that they are serving are a part of that belonging culture.

Our perspective is that if you can't create a culture inside of an organization or work environment that values the people that are at the table, then you really can't create an outward product or service that is fully inclusive and meets the needs of a diverse demographic. It would be like having a house that is beautiful on the outside, but you have no furniture on the inside, so the people who are in the house are uncomfortable. Yet, you're trying to display this very beautiful house that is a part of a larger neighborhood without the components that make it a home. It behooves organizations to be thinking to create a space that people can show up as their authentic selves and contribute. Knowledge, expertise, and lived experience then help to define what their product or service that advances health equity will be. It is much better informed and is much more closely aligned if you have an environment that is conducive to creating psychological safety. This can help employees feel that they can speak up, that they can challenge the status quo, and that they can provide insights and ideas that ultimately make your products and services that much more relatable, reliable, and impactful for diverse communities.

What experiences personally and professionally led you to where you currently are and the work that you're leading?

That's a really good question because it just makes me think more so about my lived experience. I can't block out my lived experience or forget it at the door-I can't. That is a facet of who I am, and it is those lived experiences that drive me to want more and better for other people who face some of the same or different challenges that make us, in essence, second-class citizens. And I'm not okay with that. It's that discomfort that drives me to want to make a change that hopefully outlasts my life on this Earth. **It's not about me; it's about bettering society.** Particularly in this health space, because professionally, this is where I work. This is a connection in calling. But at the end of the day, it's about my lived experience and how that translates to what I want for people, for communities- something better than what we have today.

"It's a calling. It's a calling that I can't and have never been able to turn my back on. Years ago, the calling was that I had a gift to give the world. And over the years, it materialized to help me understand what my purpose was. Every time that I might get frustrated by an experience, I know that I'm guided by a deeper, higher power. "

It's a calling. It's a calling that I can't and have never been able to turn my back on. Years ago, the calling was that I had a gift to give the world. And over the years, it materialized to help me understand what my purpose was. Every time that I might get frustrated by an experience, I know that I'm guided by a deeper, higher power. The higher power may look different for different people, but my higher power is the wind in my sail guiding me, sustaining me, encouraging me, and giving me the right messages to keep going. And that's why I can't explain it in any other way. For some people, that might not resonate, but for me, that is exactly why I do this work. And some of the extrinsic, outward things, the things that can impact individuals, get you down sometimes. I feel like I'm protected from that now because I'm fully living in my passion and purpose, and no one can do that better than me. No one can do me better than me. And when you accept that higher power and calling, you're unfathomable, unshakable. You can run into the burning building, and you would be okay.

What is your call to action for the industry as we seek to reduce and eliminate racial and ethnic disparities?

"For the people in these industries, the health industry, in particular, recognize that when it comes to equity, we have failed, and we continue to fail, but we don't have to stay in this place. First, we have to acknowledge our truth."

My call to action is industry agnostic-we have a problem to solve, and I think we know we have a problem to solve. What is required is that people of color, indigenous people, LGBTQ+ people, disabled people, and veterans-people of all of these communities that are typically marginalized realize that what people think of as a weakness is actually very much a strength for you. There's nothing that you can't do or can't accomplish that can improve the lives of yourself and others. For the people in these industries, the health industry, in particular, recognize that when it comes to equity, we have failed, and we continue to fail, but we don't have to stay in this place. First, we have to acknowledge our truth. **Get your ego out of the way, give way to the voices that understand these things, become an ally, and get to work.** If you can remove that ego, nothing is going to stop you, even if you grew up in the most racist part of the United States. You didn't come through that, but you've got to get your ego in check and out of the way. Because if you can, **there's a contribution that you can make to humanity that is bigger than yourself.**

Disclosure: *The authors have no disclosures.*

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About the Author: Jenné Johns, MPH:

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Founder, Once Upon A Preemie Academy www.onceuponapreemieacademy.com

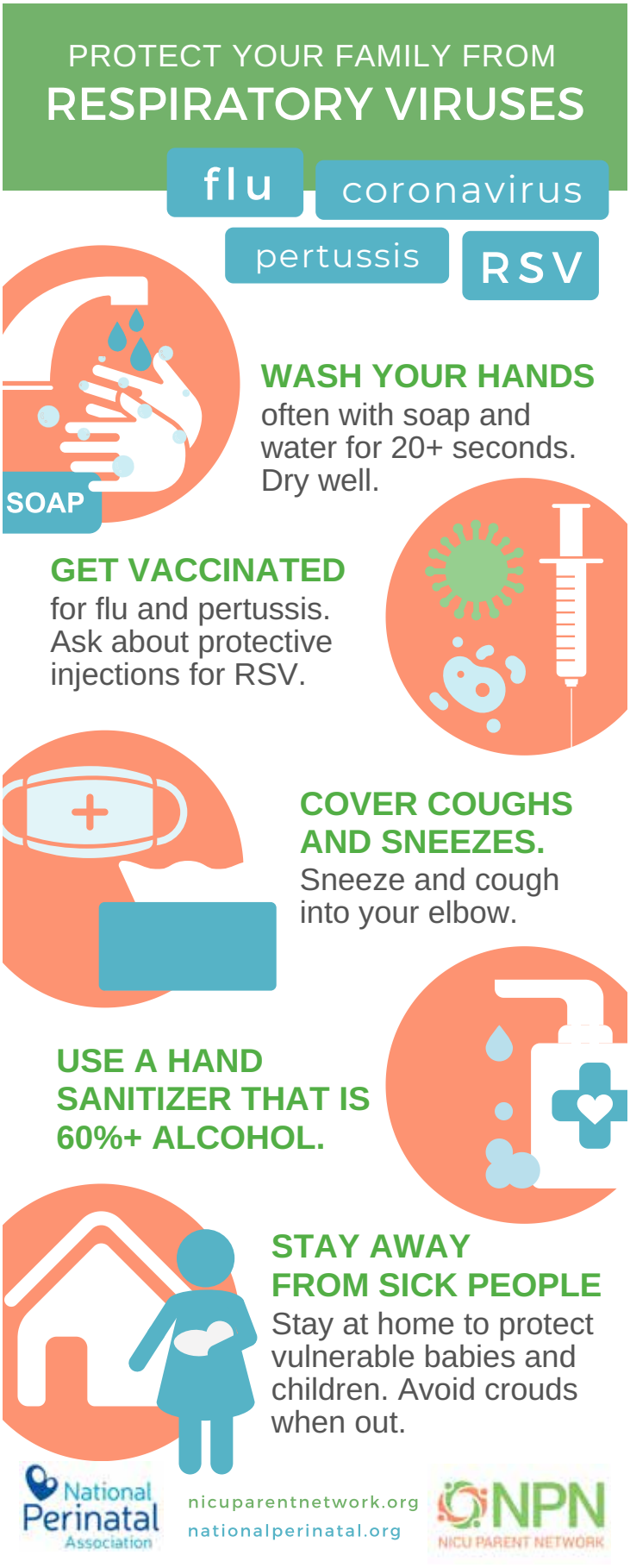
Jenné Johns, MPH is President of Once Upon A Preemie, Founder of Once Upon A Preemie Academy, mother of a micropreemie, author, speaker, advocate, and national senior health equity leader. Once Upon A Preemie is a non-profit organization with a two-part mission: 1.) to donate Once Upon A Preemie books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

About the Author: Duane Reynolds

Title: Founder and CEO of Just Health Collective

Organization: Just Health Collective

Bio: Duane Reynolds is the founder and CEO of Just Health Collective. Just Health Collective guides organizations in creating cultures of belonging, enabling a fair and just opportunity for everyone to achieve optimal health. Their services include learning collaboratives, consulting, and a digital engagement community called the Just Health Collective Village. The JHC Village brings together cross-industry professionals committed to sharing best practices, lessons learned, and innovative approaches to advancing belonging in health and health care. Previously Reynolds was a healthcare consulting director at The Advisory Board Company, developing the division's first inclusion and diversity department — and serving as its inaugural chief executive. Most recently, he was the president and CEO of the American Hospital Association's Institute for Diversity and Health Equity and has held operational leadership positions at Johns Hopkins Medicine, Emory Healthcare, OhioHealth, and Optum, a UnitedHealth Group company.



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

KEEPING MOTHERS + INFANTS TOGETHER

Means balancing the risks of...

- HORIZONTAL INFECTION
- SEPARATION AND TRAUMA

EVIDENCE

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

PARTNERSHIP

What is the best for this unique dyad?

SHARED DECISION-MAKING

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

TRAUMA-INFORMED

Both parents and providers are confronting significant...

- FEAR
- GRIEF
- UNCERTAINTY

LONGITUDINAL DATA

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

- MENTAL HEALTH
- POSTPARTUM CARE DELIVERY

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

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Gravens By Design: The Importance of NICU Discharge Planning Guidelines and Standards

Vincent C. Smith, MD, MPH; Kristy Love; Erika Goyer, BA

"They, however, should have had a plan because the American Academy of Pediatrics (AAP) has set clear expectations. The AAP recommends that the transition to home occur when the infant achieves physiologic maturity, and there is an active program for parental involvement and preparation for care of the infant at home. (1)"

Background

When families reflect upon their experiences preparing to transition from the NICU (Neonatal Intensive Care Unit) to home, most families generally do not use the terms "joyful," "easy," "perfect," or "stress-free." More often, families use terms like "abrupt," "sudden," "lonely," and "scary." In truth, some families wonder if they even had a discharge preparation plan at all.

They, however, should have had a plan because the American Academy of Pediatrics (AAP) has set clear expectations. The AAP recommends that the transition to home occur when the infant achieves physiologic maturity, and there is an active program for parental involvement and preparation for care of the infant at home. (1) The AAP does not, however, provide much detail about the program for parental preparation. This may be the crux of the issue or source of the problem. While we know that parents need to be prepared, we have not put programs in place to prepare them.

"The National Perinatal Association (NPA) hopes to help fill that gap. NPA formed an interdisciplinary work group that developed universal, adaptable, evidence-informed guidelines for NICU discharge preparation and transition planning in response to the unmet need for a program for thoughtful discharge preparation and transition planning."

The National Perinatal Association (NPA) hopes to help fill that gap. NPA formed an interdisciplinary work group that developed universal, adaptable, evidence-informed guidelines for NICU discharge preparation and transition planning in response to the unmet need for a program for thoughtful discharge preparation and transition planning. NPA hopes that NICU families and staff will find the guidelines beneficial, useful, and pertinent. Ideally, these guidelines will assist staff in providing clear and consistent messages of both action and guidance for parents and families and provide a systematic approach to required tasks and advanced planning of discharge teaching prior to their anticipated discharge. NPA hopes these guidelines will provide **more uniformity in discharge preparation** and **reduce uncertainty and stress with the discharge preparation and transition planning process**.

Using the guidelines

Smith et al. (2013) defined NICU discharge readiness as "the attainment of technical skills and knowledge, emotional comfort, and confidence with infant care by the infant's primary caregivers at the time of discharge"; and NICU discharge preparation as "the process of facilitating discharge readiness to make the transition from the NICU to home successfully." (2) Discharge readiness is the desired outcome, and discharge preparation is the process.

"We understand that it is impossible to create a comprehensive discharge preparation and transition planning program that will work for every family in every NICU setting. Instead, we propose guidelines and recommendations that focus on content and process."

We understand that it is impossible to create a comprehensive discharge preparation and transition planning program that will work for every family in every NICU setting. Instead, we propose guidelines and recommendations that focus on content and process. **We strived to create recommendations that are both general and adaptable while also being specific and actionable**. Each NICU's implementation of this guidance will depend on the unique makeup and skills of their team and the availability of local programs and resources. Our guidelines are divided into the following sections:

- **Basic information** that emphasizes the content that every family will need, without taking into account each family's and infant's specific needs
  - Discharge Education
    - Discharge Education Content
    - Family Preferred Educational Modality
    - Family Comprehension

        - Timing Of Discharge Education
        - Family Education Support
    - Discharge Planning Tools
        - Discharge Summary
        - NICU Roadmap
        - Discharge Planning Folder
        - Written Discharge Information
        - Supplemental Discharge Educational Materials
        - Journal
    - Discharge Planning Team
        - Infant Care Givers
        - Consistent Nursing Provider
        - Family Support People
        - Discharge Coordinator/Discharge Planner/Case Manager
        - Sibling Resources
    - Discharge Planning Process
        - Discharge Planning Timing
        - Discharge Planning Meeting
        - Discharge Planning Goals
- **Anticipatory guidance** in the context of NICU discharge preparation and transition planning--refers to helping the family develop a realistic idea of what their life will be like with their infant. This means in the immediate future following discharge as well as over their life course
    - Home and Family Life
    - Infant Behavior
    - Coping with a Crying Infant
    - Emergency Planning
    - Parental Mental Health
    - Paying for a NICU Stay
- **Family and Home Needs Assessment** reviews family and home needs assessment to inform discharge planning
    - Family and Home Needs Assessment Process
    - Family And Home Needs Assessment Content
- **Transfer and Coordination of Care** deliberate transfer and coordination of care from NICU providers to community providers and the medical home
    - Primary Care Involvement
    - Primary Care Contact
    - NICU Contact with the Family After Discharge
    - Parental Mental Health
    - Community Resources
    - Community Notification
- **Other Important Considerations** examines some important topics to consider when doing discharge planning. We are mindful of families who are
    - Limited English proficient
    - Active military
    - Lesbian, gay, bisexual, transgender, queer, intersex, and asexual (LGBTQIA+)-headed
    - Disabled
    - Culturally and/or philosophically distinct in ways that need to be considered in NICU discharge transition planning

Implications

This is a call to action. In implementing these guidelines, we need to address diversity, equity, inclusion, accessibility, and belonging. That may mean that policies need to change. Community connections may need to be adapted. “How we are” may need to change.

Conclusion

We know that parents whose babies are admitted to the neonatal intensive care unit (NICU) need support. Whether their baby’s stay is brief or long, uncomplicated or complex, a NICU stay changes how they care for their infant and how they will parent once they are discharged.

If parents are going to become confident and competent caregivers for their infants, they need guidance and support. The education they receive while in the NICU cannot be limited to performing caregiving tasks. It has to expand to meet their need to become a parent to a medically-fragile child. It has to meet their social and emotional needs. It must welcome them into a community of parents and providers. This is what a smart, timely, coordinated NICU discharge preparation and transition planning program implemented by an interdisciplinary NICU team can deliver.

“If parents are going to become confident and competent caregivers for their infants, they need guidance and support. The education they receive while in the NICU cannot be limited to performing caregiving tasks. It has to expand to meet their need to become a parent to a medically-fragile child. It has to meet their social and emotional needs.”

The guidelines are available as a supplement in the *Journal of Perinatology* and on the NPA website https://www.nationalperinatal.org/

We invite you to contribute to this effort. Have you developed policies and strategies that have improved the discharge process in your NICU? Do you know about programs and resources that are underutilized? Do you have insights that can improve the outcome for babies and families? We want to know. Please email us and contribute to a growing body of evidence-informed interventions.

Contact Dr. Vincent C. Smith and Erika Goyer, NICU Family Advocate, at egoyer@nationalperinatal.org

Coming soon: NICUtohome.org is your source for the tools and information you need to put the Interdisciplinary Guidelines and Recommendations for NICU Discharge Preparation and Transition Planning into action.

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1. *American Academy of Pediatrics Committee on Fetus and Newborn. Pediatrics. 2008;122(5):1119-26*
2. *Smith VC, Hwang SS, Dukhovny D, Young S, Pursley DM. Neonatal intensive care unit discharge preparation, family readiness and infant outcomes: connecting the dots. J Perinatol 2013 Jun;33(6):415-21.*

Special Thanks to Our Steering Committee: Vincent C. Smith, MD, MPH (Chair), Kristy Love, Erin Armknecht, BA, Patti Bridges, MSW, LCSW, Joy Browne, Ph.D., PCNS, IMH-E (IV), Brigitte Desport, DPS, ATP, OTR/L, Jenene Craig PhD, MBA, OTR/L, Heidi Gates, RN, Cristal Grogan, Carol Jaeger, DNP, RN, Trudi Murch Ph.D., CCC-SLP, Heather Cohen Padratzik, MHA, JD, Cuyler Romeo, M.O.T., OTR, SCFES, CLC, Betty Vohr, MD, Tiffany N Willis, PsyD, Julia Yeary, LCSW, IMH-E®

Sponsorship: The funding for the discharge guidelines was provided to National Perinatal Association by private donations and supported by an educational grant provided by Sobi.

Disclosure: The authors have no conflicts of interest

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COVID-19

STOP THE SPREAD AT HOME

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

HYGIENE TIPS

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

EYES
Wear protective eye gear (glasses)

HANDS
ALWAYS wash your hands

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

BATHROOM

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

PROTECT

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

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

SELF ISOLATION

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

6 FT

Practice social distancing

KITCHEN

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

TRACK COVID-19 NEAR YOU BY VISITING COVIDNEARYOU.ORG

#STOPTHESPREAD

MIORA

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COVID-19

DETENER LA PROPAGACIÓN EN CASA

Qué hacer cuando usted o un ser querido está infectado.

CONSEJOS DE HIGIENE

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

OJOS
Use equipo de protección para los ojos (lentes)

MANOS
SIEMPRE lávate las manos

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

BAÑO

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

PROTEGER

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

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

AISLAMIENTO

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

6 FT

Practica el distanciamiento social

COCINA

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

SIGUIR COVID-19 VISTAR COVIDNEARYOU.ORG

#STOPTHESPREAD

MIORA

Visitar Miora.org

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Ways to Manage Covid 19 @ Home

Household

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

Stop the Spread at HOME

MIORA

Sick

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

Maneras de manajer COVID-19 en casa

Hogar

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

Detén la propagacion en casa

MIORA

Enfermo

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

NT Behind the Scenes: Coming Soon

Kimberly Hillyer, DNP, NNP-BC

Neonatology Today has a new YouTube. As we previously announed in November of this year, we now have our own Neonatology Today Media. Please use the link to subscribe today, **"Neonatology Today Media."**

Neonatology Today Media will expand the knowledge of our subscribers with new insights into common problems and historical looks backwards into how technology has favored the enchanced care of our most at risk patients.

"Neonatology Today continues bring the journal to life on our YouTube channel: Neonatology Today Media. Here is a sneak peek at what we are currently working on."

Neonatology Today continues bring the journal to life on our YouTube channel: Neonatology Today Media. Here is a sneak peek at what we are currently working on.

Dr. Benjamin Rattray, a newborn critical care physician, is the author of When All Becomes New: A Doctor's Stories of Life, Love, and Loss. As an Associate Medical Director of Neonatal Intensive Care at the Cone Health Women's and Children's Center, we will sit down and discuss the impact of his role as a physician and advocate of the tiniest lives had on him.

Erica Komisar, a clinical social worker, psychoanalyst, and parent guidance expert, is the author of Chicken Little the Sky Isn't Falling: Raising Resilient Adolescents in the New Age of Anxiety. We will sit down and discuss how to help our kids navigate a complex world that is brimming with academic and social pressures. As parents, can we handle the social media and imminent technology gap between parents and children?

Shelly Tygielski is a self-care activist who invented the global mutual aid organization pandemicoflove.com. She is the author of Sit Down to Rise Up. We will sit down and discuss why self-care isn't self-centered but truly a selfless act during these extraordinary times.

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Disclosure: *The author has no disclosures.*

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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

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.

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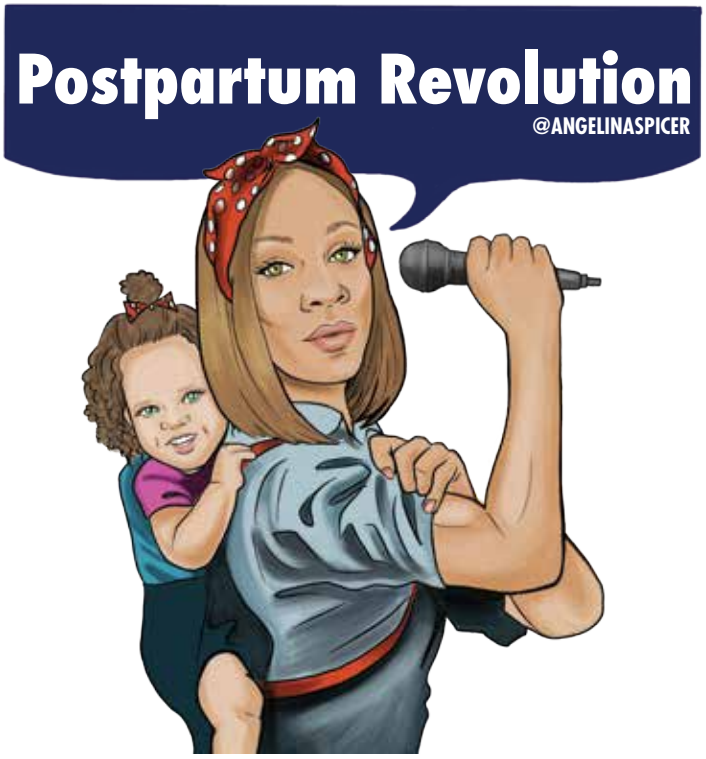

NICU-NET

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.

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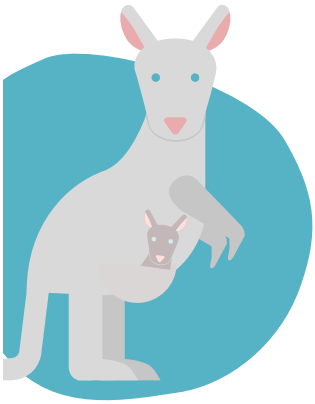


GET INFORMED ABOUT THE RISKS + BENEFITS

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

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

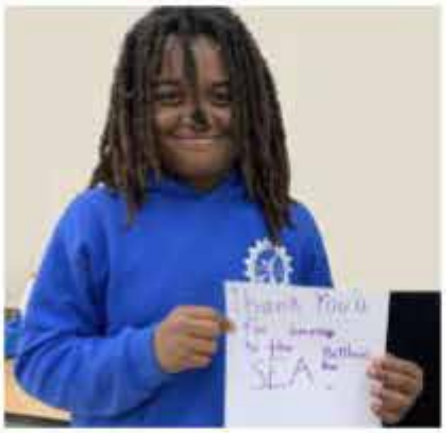
August 9, 1996 - April 3, 2010

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

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NPA's 42nd ANNUAL INTERDISCIPLINARY CONFERENCE

DATES May 2 - 4

SEEKING POSTER ABSTRACTS

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STUDENT RESEARCHERS ARE ENCOURAGED TO SUBMIT.

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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

Medical Legal Forum: Systematic Review Examines Medicolegal Claims and Complaints Involving Neonates

Jonathan M. Fanaroff, MD, JD, Gilbert I. Martin, MD

Medical malpractice is a global issue, not just limited to the United States. Indeed, many other countries with national health care systems often have much clearer data on the financial impact of medical malpractice litigation. The United Kingdom's (UK) National Health Service, for example, reported malpractice costs of £8.3 billion ($11.2 Billion in current US dollars) in 2019/2020. The NHS notes that due to increasing claims values, birth injury claims represented close to 50% of the total claim value despite accounting for less than 10% of the number of claims filed. These claims may involve the neonatal team in addition to the obstetric team, generally concerning the resuscitation and post-resuscitation care of the newborn. They continue to improve safety culture in maternity and neonatal units across the UK.

" The United Kingdom's (UK) National Health Service, for example, reported malpractice costs of £8.3 billion ($11.2 Billion in current US dollars) in 2019/2020. The NHS notes that due to increasing claims values, birth injury claims represented close to 50% of the total claim value despite accounting for less than 10% of the number of claims filed."

This focus, in part, led researchers in the UK to conduct and publish a "[s]ystematic review of medical literature for medicolegal claims and complaints involving neonates." (BMJ Paediatrics Open 2021;5: e001177) As there is relatively little literature focusing on neonatal malpractice, it is worthwhile to examine their findings. The authors performed a structured search in multiple databases and then examined 378 articles. Twelve articles were selected for inclusion in the systematic review and underwent a detailed thematic analysis. A unique aspect of this work is that multiple countries were included in the review.

The authors determined that there were the following ten major categories of complaints:

- Delay or incorrect diagnosis
- Delay in or incorrect treatment [not including resuscitation]
- Delay in resuscitation/emergency drugs
- Inappropriate initiation/continuation of resuscitation
- Communication issue
- Medication error
- General improper care
- Equipment issue
- Service issue (includes data / medical records loss)
- Procedural complications

As some complaints' fit' in more than one category and studies did not all use the exact same categories, the listed categories were not quantified or ranked. However, delayed/incorrect diagnosis and delayed/incorrect treatment were cited as the two most frequent categories.

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Understanding the types of claims is certainly relevant when considering neonatal malpractice, but perhaps more important is considering potentially modifiable factors that led to those claims. In the systematic review, the authors listed the following "[f]actors implicated for complaint against neonatal units":

- Inadequate supervision of junior colleagues in resuscitation setting – delay in senior arriving
- Lack of training of junior doctors in resuscitation
- Culture of work and hierarchy resulting in fear of asking for help
- Errors due to lack of adequate on-site expert medical assistance
- Not adequately listening to maternal or family concerns
- Reduced access to proper equipment in a timely fashion
- System failures (Example: lack of available NICU bed leading to phototherapy delay)
- Lack of training in Communication

- Staff shortage and high workload
- Human factors (Example: fatigue)

The authors appropriately note the study's limitations, including restricting searches to the English language and excluding case reports. They are to be commended for a thorough review of the available literature and a concise but comprehensive thematic analysis. As noted in the review, the ultimate goal is to use this information to "optimize patient outcomes and improve the experience for families requiring neonatal care."

" As noted in the review, the ultimate goal is to use this information to 'optimize patient outcomes and improve the experience for families requiring neonatal care.' "

References:

1. *National Health Service. NHS Resolution's Annual report and accounts 2019/20, 2020.*
2. *Aiyengar A, Morris T, Bagshaw K, et al. Systematic review of medical literature for medicolegal claims and complaints involving neonates. BMJ Paediatrics Open 2021;5:e001177. doi:10.1136/bmjpo-2021-001177*

Disclosure: There are no reported conflicts.

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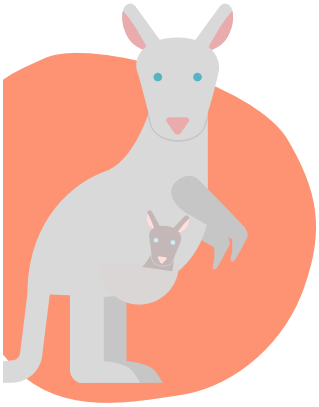
Disclaimer:

This column does not give specific legal advice, but rather is intended to provide general information on medicolegal issues. As always, it is important to recognize that laws vary state-to-state and legal decisions are dependent on the particular facts at hand. It is important to consult a qualified attorney for legal issues affecting your practice.

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

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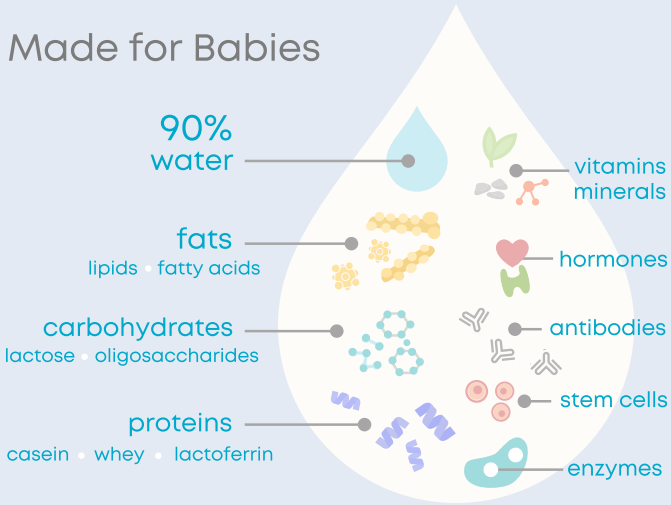
The Composition of BREAST MILK

200+ components

Made for Babies



Breast Milk is Living Tissue

National Perinatal Association

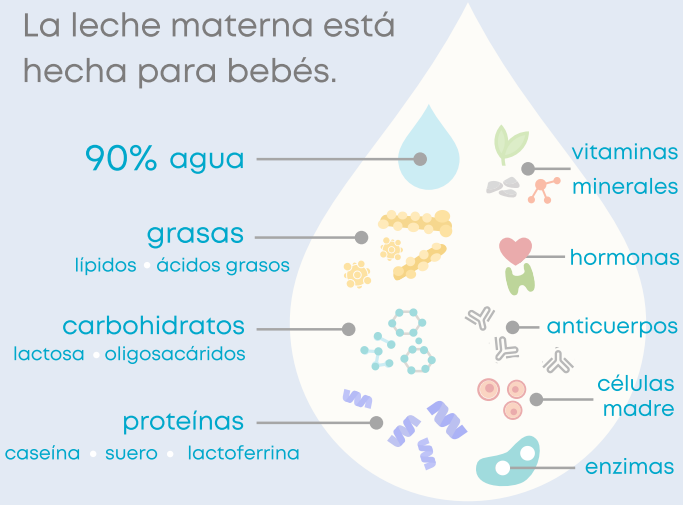
Educate. Advocate. Integrate.

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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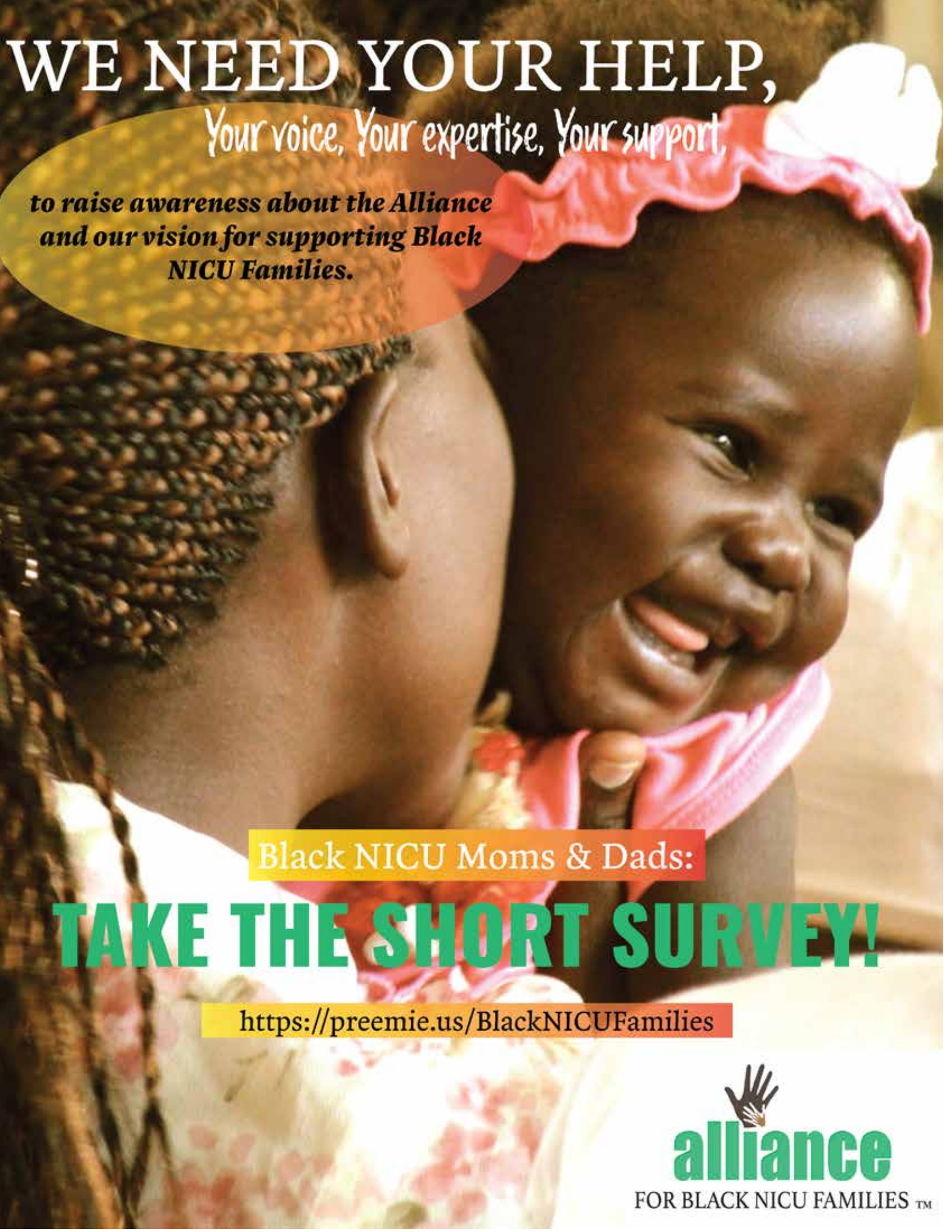
nationalperinatal.org/feeding_our_babies

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 ™

Looking Ahead: Evolving Perspectives in 2022 on Infant Safe-Sleep Practices

Alison Jacobson

first candle

Saving babies. Supporting families.

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

"First Candle has played a role in addressing sleep-related infant death since the 1990s, when, then known as the SIDS Alliance, it was a member of the original collaboration led by the National Institutes of Health that launched the Back to Sleep (now Safe to Sleep ®) campaign. "

First Candle has played a role in addressing sleep-related infant death since the 1990s, when, then known as the SIDS Alliance, it was a member of the original collaboration led by the National Institutes of Health that launched the Back to Sleep (now Safe to Sleep ®) campaign.

This public education campaign centered on recommendations developed by the American Academy of Pediatrics (AAP), advising that infants should be placed on their backs for sleep, by themselves, in a firm bed or crib with no loose bedding. As the campaign continued, the rates of sleep-related infant death declined by more than 50 percent.

Since then, the classification of Sudden Infant Death Syndrome (SIDS) has broadened into Sudden Unexpected Infant Death (SUID), which includes SIDS and accidental suffocation and strangulation in bed (ASSB).

The number of babies dying of accidental suffocation before their first birthday has been rising in recent years, and as of 2019, it has accounted for 28.3 percent of sleep-related infant deaths. (1) Research indicates that this is partly driven by an increase in the number of parents bed-sharing with their infants in unsafe ways. (2) And in focus groups we conducted last year with family members and care providers, we found that the majority of parent participants believed the safest place for a baby to sleep is in bed with them.

"Further, bedsharing continues despite an awareness of the risks. In a study of mothers of infants aged three months, (3) 89 percent agreed there were some risks associated with bedsharing, including overlay, suffocation on bedding, falling out of bed, and getting entrapped within the bed or between the bed and wall, yet 72 percent bedshared on a regular or occasional basis."

Bed-sharing is rising the most among Black families, and rates of ASSB for Black infants are more than twice (48.5 per 100,000 live births) than that (21.8/100,000) of white infants.

Further, bedsharing continues despite an awareness of the risks. In a study of mothers of infants aged three months, (3) 89 percent agreed there were some risks associated with bedsharing, including overlay, suffocation on bedding, falling out of bed, and getting

entrapped within the bed or between the bed and wall, yet 72 percent bedshared on a regular or occasional basis.

"In addition, even when moms do receive information from providers, fathers and extended family members do not necessarily have the same opportunity to hear these important messages first-hand. In many cases, exhausted and overwhelmed parents may lack support from providers to help them access resources, find solutions, and ongoing support. "

The AAP Safe Sleep Guidelines state that parents should not bedshare, and several safe sleep activist groups also promote this message. While we agree, First Candle's position is to be evidence-based *and* reality-based. Directives of "don't bed share" are proving ineffective and polarizing.

Therefore, we intend to engage in conversations with families to understand their personal choices on bedsharing and then offer ways to mitigate the risk of accidental suffocation. This includes removing pillow-top or memory foam mattresses, only using a sheet, not a comforter or heavy blanket, and using an in-bed sleeper with firm sides to prevent overlay, rather than using pillows.

These approaches lead to creating a trusted and respectful relationship with parents and modifying infant safe sleep behaviors to reduce death rates.

During 2021 we conducted focus groups with moms, dads, grandparents, and care providers across Connecticut, Georgia, and Michigan, in part, to identify the barriers families face in accessing safe sleep information, as well as their perceptions of what they are told. We heard about the practical issues of childcare, work schedules, and transportation that hinder parents' ability to access quality health care and influence their behaviors.

In addition, even when moms do receive information from providers, fathers and extended family members do not necessarily have the same opportunity to hear these important messages first-hand. In many cases, exhausted and overwhelmed parents may lack support from providers to help them access resources, find solutions, and ongoing support. There also may not be the chance to develop a level of trust with providers that could lead to the adoption of infant safe-sleep practices.

Therefore, to establish an ongoing relationship with families and provide options for making their baby's sleep environment as safe as possible, we have developed the Let's Talk! Safe Sleep and Breastfeeding Support Community Chats initiative.

We will create in-person and virtual pop-up events every month with trusted community care providers and leaders. They will be held at local churches, retail establishments, community centers and staffed by public health nurses, doulas, lactation consultants, "dad ambassadors," and grandparents who can engage in conversations with everyone in the family.

Unlike traditional health fairs, these will be one-on-one conversations where families can discuss issues unique to them and have questions answered around safe sleep and breastfeeding. The sessions will support families struggling with the exhaustion and stress of a new baby and provide much-needed items such as swaddles, pacifiers, and diapers.

Digital and printed materials tailored to audiences including dads, grandparents, and other caregivers will be distributed. Messaging will reflect the lived experiences of community members and focus on practical solutions. A new social media channel will also support the program on Instagram and Facebook, SaferSleepForBabies, providing videos and other resources on safer sleep solutions.

We know that some of our in-person community chats might be hindered by COVID-19, and we are ready to work with community organizations to provide online solutions.

In 2022, we want to bring our Let's Talk program to as many communities as possible. We understand that nothing is more important to parents than the health and safety of their babies and, working with our community partners, we believe we can reduce SUID rates by meeting parents where they are and where they are comfortable and providing this safer sleep education in addition to infant safe sleep guidelines.

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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.

Health Equity and Implicit Versus Unconscious Bias

Kelly Welton, BA, RRT-NPS

Because we do not have enough annual hospital competencies to complete, the past 2 or 3 years have given us even more. I thought we had outdone ourselves when Active Shooter got added to the annual list. Some hospitals require a host of other sensitivity training classes such as health equity and implicit versus unconscious bias.

Suppose I am in the middle of my unconscious bias training when a Code C is called overhead. Here is what rolls through my head

1. This online class platform better save my place in this module because I am not starting over from the beginning.
2. Hurry.
3. All the NRP questions (How many babies? Gestational age? Etc.)
4. Who is my backup
5. Do I have time to take the elevator, or should I take the stairs and panic everyone because I can hardly breathe?

All kidding aside, here is what is NOT going through my mind:

What color is mom/baby? Are they disadvantaged? What is their health literacy level?

I resuscitate each baby the same way. Follow the steps. Communicate with the team. A bigger picture may emerge once the baby is stabilized and transported to the NICU.

If I have an unconscious bias, it is usually based on my previous experience, coupled with science.

For example, moms who use cocaine during pregnancy are more likely to deliver prematurely.

Black babies are more likely to have SCT than other babies.

RSV is highly prevalent in disadvantaged and minority populations with limited access to care resources.

Bias does indeed enter into policy. When the socio-economic disparity is ignored (crowded living conditions, pollution, issues of intact vs. broken families), these babies at risk for disparities suffer.

Once I am back in NICU and taking care of that baby, and the whole story emerges, does my level of care or caring change? No. Do I treat Mom or Dad or the baby differently because they do not speak English or are on MediCal or Medicaid? All I care about is that the parents get educated during their NICU stay to care for their newborn and avoid repeating the same mistakes, if possible. The things that feed my bias and judgment are people who do not learn. That is just how we are as humans. When we tell mom her baby's prematurity and subsequent issues are due to her substance abuse, and she returns ten months later in labor at 26 weeks with a second addicted child, we struggle to understand.

"Bias does indeed enter into policy. When the socio-economic disparity is ignored (crowded living conditions, pollution, issues of intact vs. broken families), these babies at risk for disparities suffer."

We could all use more training in improving communications skills and better awareness of how we initially see people. But please do not ask me to bend over backward for a specific ethnic or socio-economic group. I already do my very best for every patient I see. All babies' lives matter, and I have complete faith and confidence that anyone that works with babies day in and day out has the baby's and the family's best interests at heart, no matter how the parents look or their actions.

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2. https://www.ucsfhealth.org/education/substance-use-during-pregnancy
3. https://peacelearningcenter.org/implicit-bias-workshops/?gclid=Cj0KCQiAoY-PBhCNARIsABcz772L3RYtAvOHNIxMfU-EuRjQQfLhg2MGzBL1LfYOM46mJ-LsH5rpH00aAog9EALw_wcB

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."

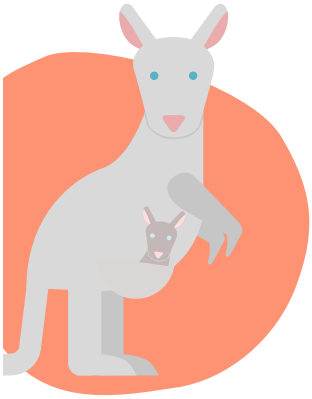
10 HELP US HEAL

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

SUPPORT4NICUPARENTS.ORG

SUPPORTING KANGAROO CARE

SKIN-TO-SKIN CARE DURING COVID-19



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ONCE UPON A PREEMIE ACADEMY

eLearning Courses

Health and Racial in the NICU

Meet Our Faculty

+ Jenné Johns, MPH
Once Upon A Preemie Academy

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

+ Chavis A. Patterson, Ph.D.
Children's Hospital of Philadelphia

+ Shanté Nixon
Connect2NICU

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

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

+ Terri Major- Kincade, MD, MPH
Pediatrician and Neonatologist

+ Ashley Randolph
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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

Kids & COVID: Part Two
New Insights into Potential Problems Warrant Caution

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.

" It pains me to report that this virus is far from over with us; it is no lady, has no etiquette, and knows not the appropriate time to take its leave. So, here we go again."

To say that we're all "done" with this pandemic, I suspect, will garner unanimous agreement. Whether one is a healthcare worker dealing with this everchanging pathogen, a parent at wits end trying to work from home while dealing with homeschooling, or even an "anti-vaxxer," "Covidiot," or conspiracy theorist, it is a universally shared sentiment. It pains me to report that this virus is far from over with us; it is no lady, has no etiquette, and knows not the appropriate time to take its leave. So, here we go again.

Research into the ongoing pandemic is proceeding at a furious pace such that freshly published information may be obsolete or incomplete shortly after dissemination. Immediately after December's COVID & Kids column, new studies, some preprint, offer insights into how COVID-19 produces its path of destruction and show increasing evidence of an emerging potential public health catastrophe and how it happens: Long-Covid.

We are also discovering more about the Omicron variant (OV) and a new variant of concern in France identified as "IHU." Initial (unconfirmed) reports speculated IHU (suspected to have originated in Cameroon) was even more contagious than OV, which is currently the dominant strain in France. The type and location of IHU mutations support the premises of both its contagiousness and vaccine/immune evasion. The fact that the first identified French patient had been vaccinated also supports the latter. The small number (12) of IHU cases identified and the fact that OV is by far the dominant strain in France may indicate decreased transmissibility of IHU. Still, too many factors are at play, and it is too early to draw any conclusions (1) (preprint).

In December, I reported on rising cases of children in hospitals in several U.S. states, namely New York and Arkansas. These reports continued to come out of other areas like LA County. Since then, the OV has exploded worldwide, and we are seeing paediatric hospitalizations rising in Canada.

Initial data from South Africa indicated OV was not as likely to result in severe disease but that the variant seemed to be attacking more young children, and symptomatically at that. Understandably the world grabbed onto news of "milder" infection and held on for dear life. Recent data out of Ontario, Canada appears to reflect the South African experience showing a 65% decrease chance of hospitalization with OV c.f. Delta variant (DV) and risk of hospitalization & death 83% lower with OV (2). (This data was gathered between November 22 and December 25, 2021, so it does not represent the current post-holiday exponential surge in OV in Ontario).

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What is being found is hospitalization for children is increasing in Ontario, and children's hospitals are preparing for a surge. While only nine deaths have been reported in those <19 to January 7, 2022, this vastly underrepresents OV. That number includes two children under age six dying in the past week, variant unreported (3). As of January 6, 2022, 51 children <5, 9 children 5-11, and 8 children 12-19 were hospitalized in Ontario. Those <5 are currently ineligible for vaccination, which may partially account for their disproportionate numbers in the hospital (there were 4830 <5 infected at the time of reporting). Ontarians >12 have been vaccine eligible since May 23, 2021 (currently 16530 cases, 82.1% fully vaccinated) and those 5-11 (currently 11112 cases, 1.7% fully vaccinated) since November 23, 2021 (4,5). Since children do not require hospitalization nearly as much as adults do, there

is a paucity of paediatric hospital beds, especially intensive care beds, relative to available adult facilities. A smaller fraction of children getting seriously ill could easily overwhelm our ability to treat them.

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With OV, a disturbing trend is emerging: breakthrough infection. In Ontario, 88% of those >12 are fully vaccinated (x2), and 3rd "booster" doses are being rapidly deployed; 72.4% >80 and 69.1% 70-79 are "boosted" with all >18 eligible. Despite Ontario's level of vaccine uptake, current hospitalizations paint a stark picture; 572 non-immune (no or partial vaccination) patients are in hospital (non-ICU) compared to 1353 fully vaccinated patients. One hundred forty-one non-immune patients are in ICU, while 137 fully vaccinated occupy ICU beds, a statistical tie. As of January 8, 2022, Ontario has 13745 active cases. Of these, a staggering 10865 are fully vaccinated. This demonstrates the ability of OV to evade vaccine-induced immunity while simultaneously showing the protective effect of vaccination; 12.45% vaccinated in non-ICU beds and 0.126% in ICU. Comparing the nearly 20% of the non-immune cases in the hospital and nearly 5% in ICU makes a compelling argument for vaccination regardless of OV's immune avoidance capability (6).

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Preliminary analysis of OV infections in Ontario supports the reassuring premise that OV universally does not result in as severe an illness as Delta variant (DV) (7). What is not comforting is rapidly accumulating evidence that recovery from even mild infection may be followed by "Long Covid" (LC): 203 symptoms that may persist at six months or more post-recovery, and that 1 in 7 Covid-19 (C19) infected patients remain symptomatic at 12 weeks (8). One comprehensive analysis found at least one symptom present after six months in 54% of cases, regardless of hospitalization status (9).

OV replication occurs primarily in the nasal and oropharyngeal tract but not in deeper pulmonary tissue, but it appears to infect more cell types than other variants readily. This and its rapid replication in the nasal cavity (up to 100 times faster than DV) contribute to its high transmissibility early in its course. Still, titers decline rapidly after 24 hours (10) (preprint). While OV is less contagious than measles (currently the most contagious virus we know of), its short incubation period makes it effectively more contagious. With a doubling time of 1.5 – 3 days c.f. measles 15 days, a single case of measles becomes 50600 cases at 60 days, while OV results in a staggering 244,000,000 (11).

What are the long-term implications? While one is less likely to end up in hospital with OV, C19 pneumonia is far less prevalent with OV. Unfortunately, OV's ability to infect other organs, including the brain and nervous system, is quite intact, perhaps even more so (10). Follow-up studies have found the presence of C19 virtually everywhere (12) (preprint) and raised concerns about neurological sequelae (13). A post-mortem study found changes in the brain. Still, it could not identify these as being directly caused by C19 (14), while a British study comparing pre and post C19 brain imaging found a host of alterations compared to controls (15). While the long-term significance of these alterations remains to be seen, any alteration in brain structure is concerning. This is particularly true if these alterations occur during neurodevelopment, and LC in children is a real concern.

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This brings us back to C19 and kids. With more children infected with OV, we will indubitably see more neurological symptoms. One post-mortem case report on a 14-month-old infant showed extensive damage to multiple systems (16). The Kölliker-Fuse nucleus (KFN) is a structure within the brainstem intricately linked to upper airway control, swallowing, and vocalization. While normally fully developed at birth, neurochemical alterations/dysfunction in the KFN have been implicated in sudden infant death syndrome and Rett syndrome (17). Two case reports are particularly troubling in young children, a 16-month-old girl and a 17-month-old boy (previous 34 week PCA with uneventful NICU stay) infected with C19. These children presented with new-onset solid food aversion, and the girl lost her limited vocabulary suggesting KFN dysfunction (18). (I would like to thank Dr. Denise Dewald for bringing the aforementioned case reports to my attention).

It has been recently discovered that C19 produces an autoantibody response, particularly in women post asymptomatic infection and in men with mild symptoms at a minimum (19). This may help explain a significant increase in newly diagnosed diabetes >30 days post C19 infection in those <18 thought to be caused by the infection (20). (The quality of this CDC study is facing a great deal

of criticism from academia). Whether or not this has implications for a host of other autoimmune disorders remains to be seen, and it may be years before we can answer this question.

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"It may be too early to determine if OV causes less severe disease. While hospitalization during acute illness may be decreased in adults, it is increased in children. Time will tell, but we do not have enough evidence yet to label OV as less worrisome. Given the plethora of systems affected by C19 infection, the possibility remains that OV is not less severe; it may just take longer to kill."

Several studies have found an increased risk of death following C19 recovery (60% higher than the general population), especially in those who've had a severe illness or are elderly. Eight excess deaths per 1000 patients occurred in all C19 survivors, but if hospitalized, that number increases to 29 (22). Symptomatic infection in children prior to OV has been rare, hospitalization even more so. A surge in children in hospital with OV begs the question of mortality risk post-recovery in children, and the incidence of newly diagnosed autoimmune or other diseases in recovered children should be closely followed. LC has not seemed to spare children with previous C19 variants. While "milder disease" (at least initially) seems to be the hallmark of OV, the increasing number of children ill enough to require inpatient care suggests this is not the case for this cohort. It is too early in the OV wave to draw reliable conclusions, but it is reasonable to assume OV will result in as much LC in children as we've seen to date, if not more so.

It may be too early to determine if OV causes less severe disease. While hospitalization during acute illness may be decreased in adults, it is increased in children. Time will tell, but we do not have enough evidence yet to label OV as less worrisome. Given the plethora of systems affected by C19 infection, the possibility remains that OV is not less severe; it may just take longer to kill. In any event, the sheer number of people almost certain to be infected with OV may make its relative severity a moot point from a systemic perspective; it's folly to expect a smoother ride from this point on.

Finally, there is a hidden pandemic within the C19 pandemic. It is estimated that worldwide, 1,134,000 children had experienced the loss of at least one primary caregiver, and 1,562,000 had lost at least one primary or secondary caregiver as of April 30, 2021 (23). This has major socioeconomic and developmental implications for children, families, and society.

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Those working in healthcare have endured a living hell for the past two years. While those of us in the NICU have largely been spared the agony of watching our charges succumb to this horrible virus (their parents not so much), we have not been spared the constant stress of wondering and worrying if one of our loved ones or we will be C19's next victim. It is vitally important for us to take time out to de-stress. Smell the flowers. Pet the dog (or cat if it's in the mood!). Enjoy your favourite foods, watch your favourite shows, go for a walk. Avail yourself of whatever support services available to you; seeking help is a sign of strength, not weakness. Life goes on, C19 notwithstanding; it has taken far too much from us already. If we surrender our happiness, its victory will be complete.

Be well. Stay safe. And a happy new year!

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Disclosures: The author receives compensation from Bunnell Inc for teaching and training users of the LifePulse HFJV in Canada. He is not involved in sales or marketing of the device nor does he receive more than per diem compensation. Also, while the author practices within Sunnybrook H.S.C. this paper should not be construed as Sunnybrook policy per se. This article contains elements considered "off label" as well as maneuvers, which may sometimes be very effective but come with inherent risks. As with any therapy, the risk-benefit ratio must be carefully considered before they are initiated.

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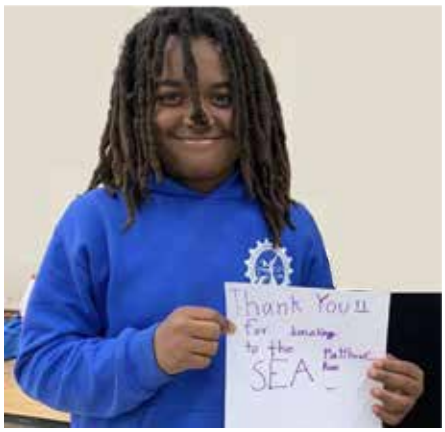

1 session	$15
1 week	$30
1 month	$120
1 semester	$540
1 year	$1,080
Middle School	$3,240

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Extinguishing Burnout: Practical Recommendations for NICU Providers

Peggy Burke, Pamela A. Geller, Ph.D., Leah Sodowick, Chavis A. Patterson, Ph.D.

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.

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Educate. Advocate. Integrate.

Between worrying about their baby's health, hospital bills, and maintaining a semblance of a normal life, parents in the NICU often feel mentally and physically exhausted; however, the medical staff involved in NICU patient care (hereafter referred to as "NICU providers") also experience hardships related to their work in this setting."

The Neonatal Intensive Care Unit (NICU) can be a place that is filled with stress, anxiety, and overwhelming grief. Between worrying about their baby's health, hospital bills, and maintaining a semblance of a normal life, parents in the NICU often feel mentally and physically exhausted; however, the medical staff involved in NICU patient care (hereafter referred to as "NICU providers") also experience hardships related to their work in this setting. Providing care for preterm and ill babies while simultaneously offering support and guidance to the parents of these babies can be demanding and emotionally taxing.

Overall nursing shortages, uncertainty, safety concerns, and shifting policy changes due to the COVID-19 pandemic have played a significant role in increasing stress levels for NICU front-line providers. This constant exposure to high levels of daily stress in the workplace can lead to burnout, and rates of burnout in providers have accelerated in the face of COVID-19. (1) Pre-pandemic, Profit, and colleagues (2014) (2) reported that an average of 26% of NICU providers experience burnout compared with up to about 20% of healthcare workers in general. (3) Since the onset of the pandemic, Haidari and colleagues (2021) (4) have reported that, on average, 66% of NICU providers experience burnout compared with approximately 51% of healthcare workers in general. (5) This article will review how to recognize symptoms of burnout and provide practical individual and organizational level recommendations to help address burnout in NICU providers.

What is Burnout?

Burnout describes an occupational phenomenon when workplace stress becomes chronic and is not managed effectively. (6) Burnout is typically cumulative and develops gradually over time. The three dimensions of burnout include exhaustion, cynicism, and reduced professional efficacy. (7) Exhaustion, or emotional exhaustion, describes what is experienced when a worker's resources to adaptively manage stress and challenges become depleted, leading to feeling drained and unable to support patients fully. (7) The second dimension, cynicism, involves mentally distancing oneself from work and negative attitudes towards work, patients, and families. General life dissatisfaction also can be evident. The third dimension, reduced professional efficacy, refers to feelings of incompetence and a lack of achievement and productivity. (7)

Serious work-related and personal consequences can result from burnout. De Hert (2020) (2) reported that burnout can lead to lowered effectiveness at work and impaired quality of care, factors that can contribute to increased risk to patient safety. High rates of burnout can be associated with increased "healthcare-associated infection," decreased reporting of errors, increased patient mortality, and decreased patient-reported satisfaction. (8)

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NICU providers experiencing burnout also can have difficulties in their personal lives outside of the hospital. These effects may include elevated psychological symptomatology (e.g., depression, posttraumatic stress, anxiety), alcohol and drug abuse, and even gambling. (9) Providers also can experience increased physical health problems, such as sleeplessness, headaches, muscle tension, immune dysfunction, gastrointestinal and cardiovascular disturbances. (10) Difficulties in interpersonal functioning, such as withdrawing and distancing from loved ones and taking out frustrations on loved ones, also may result. (11)

Recognizing Signs of Burnout

Several symptoms can signal burnout. Because burnout is a gradual process, the signs and symptoms may be subtle at first but become worse over time. Physical

symptoms often include fatigue and lack of energy, sleep disturbances, and deteriorating health sequelae or modifications such as frequent illness and appetite disturbance. (11,12) The emotional signs can include self-doubt, feelings of helplessness or hopelessness, and loss of motivation. (11) Often, there are feelings of dread about returning to work each day. Other signs involve feeling emotionally exhausted, incompetent in the workplace, and a decreased sense of satisfaction and accomplishment. (13) Finally, behavioral symptoms can include becoming distant and isolated, not only from family and friends but also withdrawing from patients and co-workers. (11) Workplace symptoms may involve taking out frustration on others, skipping work, consistently arriving late for work, or leaving early. (13)

Recognizing signs of burnout can help NICU providers prevent burnout symptoms from escalating. The earlier one can recognize signs of burnout in themselves, the sooner one can take action, practice self-care, and use practical tools to improve work motivation and quality of life.

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Risk Factors for Burnout

In the NICU, some factors can elevate rates of burnout more for NICU providers than for medical professionals in other settings. These factors include high workload, long hours, the need to deliver high-quality, compassionate care in a high-stakes, technical environment while simultaneously providing informational and emotional support to distressed family members of critically ill infants. (8) With a high NICU census, NICU nurses can have patients and families that they must check on frequently. This means that the provider needs to know all the facts, statistics, and tests occurring on each patient and in the NICU overall, and these change frequently. NICU providers must make decisions regarding life-sustaining measures and end-of-life care measures for their patients, which aids in the stress of the job each day. (14) Moreover, NICU providers work with babies receiving palliative care and experience the death of some patients, which further adds to job stress and increases the risk of burnout.

Because the NICU serves medically ill and fragile babies, NICU providers are frequently confronted with life-or-death scenarios. (15) As such, a notable risk factor that has been associated with burnout in the NICU is moral distress. Moral distress is defined as the inability to act according to one's core values and perceived obligations due to internal and external constraints. (16) For example, with increased advancements in medical technology, the age of viability has decreased, although the survival of infants born at earlier gestational ages may result in significant disabilities and poorer quality of life. NICU providers may decide to provide continued aggressive treatment to support families, even though this may conflict with the provider's sense that reducing aggressive treatment and focusing on comfort care is the more appropriate decision.

Other risks for burnout include administrative and bureaucratic challenges, such as the constant policy and procedure changes in the NICU and hospital-wide, especially in response to the COVID-19 pandemic. (17) Other challenges may include limited job resources and a sense of personal control, such as meaningful participation in decision-making and creating development opportunities. (18) Perceptions of unfairness and inequity in the workplace, insufficient rewards and recognition, and a mismatch between personal and organizational values are also risk factors for burnout. (19)

Recommendations for Coping with Burnout

Overall, burnout can be addressed in several ways and on multiple levels. There are internal and external factors in the development of burnout that need to be understood, as well as individual and organizational dynamics that can assist in lowering rates of burnout. (20) When it comes to internal factors, we must consider NICU providers' individual resources and restore physical and emotional well-being. Primarily, NICU providers must prioritize their physical and mental health, even caring for sick babies and their family members. This is especially true at present when COVID-19 is surging across the world and is adding tremendous stress to the hospital system. Prioritizing one's health involves maintaining a balanced diet, exercising consistently, and getting proper sleep each day. (2, 21) Even though it may conflict with other demands on their time, rest and downtime are essential restorative activities during non-work hours. Identifying and practicing self-care activities may also include partaking in enjoyable activities, cultivating specific personal interests, or obtaining professional counseling to resolve symptoms and help prioritize life values. (2) Stress-reducing activities can include breathing, meditation practices, yoga, and mindfulness exercises. (22) There are numerous free online resources to promote these activities.

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When a NICU provider is working long and strenuous hours in a high-demand setting, they must take time for themselves and prioritize social connections with others. While nurturing relationships with their partners, families, and friends outside of the NICU environment is critical, (21) meaningful interpersonal connections within the work setting are also essential. Talking to supervisors or co-workers experiencing similar situations can help decrease anxiety about NICU work. (23) Further, establishing personal relationships with work colleagues can help to limit burnout, as it allows opportunities to debrief informally and discuss the hardships and emotional aspects of their work. (2) Building relation-

ships with colleagues can aid in more effective communication, limit setting, and increasing self-awareness in the workplace. (21) Because the NICU has such a specific way of working and treating patients, talking with colleagues allows the opportunity to vent to someone who understands, provides, receives social support, and exchanges ideas for managing various situations. (23)

Professional growth and development activities can also decrease burnout. (21) Seeking continuing education, getting involved in professional organizations, and volunteering for altruistic and leadership activities can add meaning to the work that a NICU provider is doing each day and remind the person why they selected such a strenuous and challenging job in the first place. (21)

"Because burnout symptoms are surging in these times of the COVID-19 pandemic, hospital and NICU leadership must acknowledge the added challenges their providers are experiencing and make tangible efforts to protect staff and reduce the incidence of burnout. The hospital can help by offering interventions that aim to empower NICU providers with knowledge about burnout and assist them in developing new skills to manage burnout. "

Organizational Recommendations

Because burnout symptoms are surging in these times of the COVID-19 pandemic, hospital and NICU leadership must acknowledge the added challenges their providers are experiencing and make tangible efforts to protect staff and reduce the incidence of burnout. The hospital can help by offering interventions that aim to empower NICU providers with knowledge about burnout and assist them in developing new skills to manage burnout. Additional hospital-level interventions that have been effective are aimed at improving communication, interpersonal relationships, and teamwork to offer more provider support. Aryankhesal (2019), (20) demonstrated that such interventions showed a 67% positive impact on nurse burnout and 50% positive impact on physician burnout. These findings evidence that rates of burnout can be reduced when providers are confident in their work, learn how to support one another, and learn how to manage stress.

Cricco-Lizza (2014) (23) found that hospitals that offer psychosocial services in the NICU proved helpful to the NICU providers. Having a social worker or psychologist on-site for the NICU helped the families and created the opportunity to offer support to providers. NICU providers should have the opportunity to debrief cases and seek advice from a professional at any time during their shift. (23) Fawke and colleagues (2020) (24) found that debriefing was associated with improvements in the care process and a decrease in challenges in communication which can then decrease burnout. Mills and Cortezzo (2020) (14) also found that NICU workshops, debriefings, ethics training, and other debriefing practices, such as reflective writing, have also helped with burnout. These practices help providers examine the emotional impact of their stressful work situations and use these experiences as a way of coping and processing. (14)

Providing staff education and social support to NICU providers is essential in aiding staff competence. First, educating providers about the emotional burden and psychosocial needs of NICU families is empowering. (25) Next, staff education should include properly taking care of oneself both inside and outside of the hospital, including self-care practices (e.g., taking adequate breaks) to minimize burnout. (10) To be most effective for each NICU, training should be delivered to the staff of all disciplines who have any interaction with NICU families. Ideally, staff education should occur at new staff orientations and periodically throughout each year.

As noted in the 2022 Trends Report of the American Psychological Association *Monitor on Psychology*,(1) because "pandemic-related stressors likely won't stop anytime soon, stress-reducing measures should be top of mind for employers and legislators alike." In the article, Maslach is quoted as saying, "As demands increase, organizations need to focus on maintaining balance, taking things off the plate when they add something new. That is especially important in health care settings, where attrition rates are especially high". (1)

Conclusion

The NICU is filled with constant stressors, physical and emotional strain, and difficult decisions to be made by NICU providers. The COVID-19 pandemic has only exacerbated the many factors that elevate the risk for burnout in NICU providers. Because burnout can lead to lowered effectiveness at work, impaired quality of care, and issues with patient safety and satisfaction, (2) it is imperative to address burnout among NICU staff to maintain adaptive functioning. Providers need to prioritize their self-care, and NICU and hospital leadership need to convey support and dedicate resources to allow NICU providers to recharge and maintain a sense of meaning and control in the work environment. Implementing strategies to reduce burnout may enhance NICU providers' well-being and job satisfaction and thereby help NICU providers continue to serve their patients and families with high-quality care.

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

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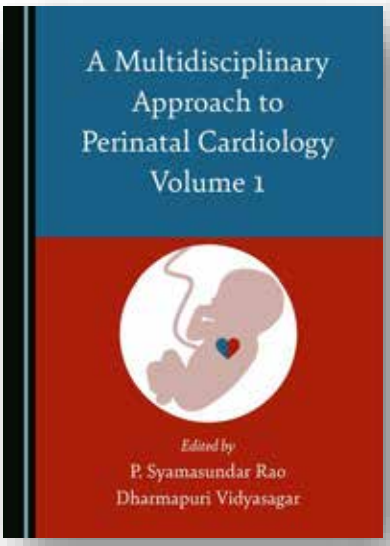
Cambridge Scholars Publishing is registered in the United Kingdom.

Companies House Reg. Number: 4333775.
VAT Number: 108280727.

A Multidisciplinary Approach to Perinatal Cardiology *Volume 1*

Edited by P. Syamasundar Rao and Dharmapuri Vidyasagar



Hardback

ISBN-13:
978-1-5275-6722-1

ISBN-10:
1-5275-6722-2

Date of Publication:
24/04/2021

Pages / Size:
794 / A5

Price:
£99.99

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

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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.

Interpreting Umbilical Cord Blood Gases
Section 7: Fetal Circulatory Failure, Part III

Jeffrey Pomerance, MD, MPH

"Contractions were irregular. Shortly after admission, there was a prolonged deceleration lasting over four minutes associated with a uterine contraction. At times there was a sinusoidal pattern to the baseline. Over the next several hours, variable decelerations ensued with recovery to about 160 bpm."

Case 21: Fetal Septic Shock with Acute Fetal Heart Failure

The mother was a 26-year-old, gravida 2, para 0, aborta 1, with an intrauterine pregnancy at 40 2/7 weeks gestation. She was group B streptococcus (GBS) positive. Her membranes ruptured spontaneously an hour prior to admission. The fluid was clear and slightly pink. There was no vaginal bleeding. The mother reported good fetal movement up until the night before admission. She further reported fever and chills the night before admission, but at the time of admission, her temperature was 37.4° C (99.3° F). The FHR tracing revealed a fetus with tachycardia to 160-175 bpm with moderate variability and intermittent decelerations on admission. The mother reported an allergy to amoxicillin and was administered cefazolin every four hours (twice prior to delivery). There were no accelerations throughout the tracing.

Contractions were irregular. Shortly after admission, there was a prolonged deceleration lasting over four minutes associated with a uterine contraction. At times there was a sinusoidal pattern to the baseline. Over the next several hours, variable decelerations ensued with recovery to about 160 bpm. A deceleration to about 50 bpm occurred in association with a coupled contraction. The bradycardia remained below 90 for three minutes and below 100 for two minutes more. Terbutaline was administered to the mother, she was moved to the operating room for cesarean delivery, and amnioinfusion was begun. The FHR was 160-170 bpm with absent variability. This segued into a sinusoidal pattern. The mother was returned to the labor room. The baseline rate was about 130 bpm with absent variability immediately after decelerations. Shortly, the fetal baseline rose to 140 bpm. More severe variable decelerations appeared, prompting various maneuvers to deal with fetal distress. The cervix was 6/70%/-2. The fetal baseline heart rate trended down to 130 and then 120 bpm. A variable deceleration to 60 recovered to only 100 bpm. Terbutaline was given again. Acoustic stimulation produced a deceleration rather than an acceleration. The baseline was 120 bpm. Shortly thereafter, the baseline was 100 bpm, followed by deceleration to 60 bpm, which remained unchanged until the monitor was discontinued six minutes prior to emergent primary low-transverse cesarean delivery. All told, the FHR was 100 bpm or less for the final 22 minutes of monitoring prior to delivery. Thick, meconium-stained fluid was present. Apgar scores were 1, 1, 1, 4, and 4 at one, five, 10, 15, and 20 minutes, respectively.

Cord blood venous gases were as follows (an attempt at obtaining an umbilical arterial sample was unsuccessful):

	Umbilical Vein	Umbilical Artery
pH	7.04	Missing
Pco_2 (mmHg) ***(kPa)***	54 *7.20*	Missing
Po_2 (mmHg) ***(kPa)***	47 *6.27*	Missing
BD (mmol/L)	16	Missing

The birthweight was 3550 g. The infant was apneic and cyanotic. Resuscitation included repeated suctioning, but large amounts of fluid emanating from the trachea and esophagus prohibited adequate visualization of the glottis. Positive pressure ventilation by bag and mask did not improve the heart rate. The infant was successfully intubated at eight minutes of age. At that time, ETT suctioning yielded fluid with a curdled milk appearance. The ETT was removed under suction, and a second ETT was placed at age 10 minutes. Chest compressions began almost immediately after birth. Both epinephrine and sodium bicarbonate were administered IV twice, followed by a normal saline volume bolus. The heart rate became greater than 100 bpm at age 12 minutes.

"The infant was apneic and cyanotic. Resuscitation included repeated suctioning, but large amounts of fluid emanating from the trachea and esophagus prohibited adequate visualization of the glottis. Positive pressure ventilation by bag and mask did not improve the heart rate. The infant was successfully intubated at eight minutes of age."

At age 35 minutes, the initial neonatal blood gas results were as follows:

	Infant's ABG
pH	6.59
Pco_2 (mmHg) ***(kPa)***	60 *8.00*
Po_2 (mmHg) ***(kPa)***	109 *14.53*
BD (mmol/L)	32

The base deficit did not normalize until age 30 hours. Low blood pressure was treated with dopamine. The corrected WBC count at

age 30 minutes was 14,640/mm^3 with an immature to total neutrophil (IT) ratio of 0.31; the follow-up corrected WBC count, and IT ratio were 9,820/mm^3 and 0.75, respectively. Initial and follow-up hematocrits were 53 and 54%, respectively. The blood culture was positive for GBS. Follow-up blood and spinal fluid cultures were negative. Initial treatment was with ampicillin, gentamicin, and cefotaxime. On day of life three, gentamicin and cefotaxime were discontinued; ampicillin was continued for a total of 21 days as the CRP remained positive for an extended period. The placenta demonstrated severe, acute chorioamnionitis and acute funisitis.

Blood lactate, liver function tests, serum creatinine, and clotting studies were all abnormal. An initial echocardiogram showed decreased right ventricular systolic function, a patent foramen ovale with bidirectional shunting, and a small patent ductus arteriosus with a left to right shunt.

The liver was palpated three cm below the right costal margin on initial physical examination. The infant was evaluated for total body cooling and qualified by: comatose/stupor, distal flexion/frog-legged, absent spontaneous activity and suck, incomplete Moro, and periodic breathing.

"The umbilical venous blood sample demonstrates mild respiratory acidosis, severe metabolic acidosis, and an elevated Po2. An elevated umbilical venous Po2 is associated with slowed venous blood flow, thus allowing improved downloading of oxygen across the placenta. (1)"

Interpretation

The umbilical venous blood sample demonstrates mild respiratory acidosis, severe metabolic acidosis, and an elevated Po_2. An elevated umbilical venous Po_2 is associated with slowed venous blood flow, thus allowing improved downloading of oxygen across the placenta. (1) As obtaining an umbilical arterial sample is considerably more difficult than a venous sample (especially when there is little or no umbilical arterial blood flow), it is not unusual for this sample to be missing. The follow-up arterial blood gas taken from the infant shows mild respiratory acidosis and extremely severe metabolic acidosis. This is the second-worst metabolic acidosis I have ever seen in an infant who survived. It is worse than the great majority of infants who do not survive.

Now for the more difficult part, trying to reconstruct what the umbilical arterial blood gas would have been had it been successfully obtained. This is not as hard as it might seem. Categorically speaking, there are only two possibilities –similar to the umbilical venous gas or significantly worse. The hallmark of placental abruption is the presence of similar derangements in venous and arterial cord gases (see Case 8). In this infant, no abruption is reported, and although there was an occasional late deceleration present during the approximately seven hours of recorded FHR monitoring, it was hardly a prominent feature. Further, in placental abruption, the umbilical venous cord gas would be expected to demonstrate not only a significant base deficit, as was found in this infant, but additionally, a very elevated Pco_2 and a depressed Po_2, quite the opposite of this cord gas. These findings could result from significant exposure to an air bubble. This is a possibility. However, having the cord venous Po2 result fall in a physiologically plausible range would be a major coincidence.

The other categorical possibility is an arterial cord gas that is significantly worse than the venous cord gas. This finding is associated with terminal fetal bradycardia with either cord compression or fetal heart failure. In this case, variable decelerations were rather prominent in the recorded fetal monitoring strip, and some of them were quite deep and lasted more than 60 seconds. However, the terminal bradycardia was not precipitous but relatively gradual, suggesting the absence of cord occlusion as the terminal event. Additionally, cord gases associated with cord occlusion usually demonstrate a normal or near-normal umbilical venous blood gas, rather than the severe metabolic acidosis present in this infant. That leaves fetal heart failure as the one remaining established cause of an umbilical arterial cord gas that is significantly worse than its paired umbilical venous cord gas.

In this infant, profound anemia was not the cause of fetal heart failure as it was in Case 19. However, another known cause of fetal heart failure is present – septic shock. What supports this diagnosis? The mother was GBS positive and had a fever and chills the night before admission. The FHR tracing was tachycardic without an associated maternal fever and was never reactive or reassuring. There was severe umbilical venous metabolic acidosis and an umbilical venous Po_2 that was elevated, a finding consistent with slowed blood flow, as would be typical in fetal heart failure. Slowed fetal blood flow allows for an increased time for oxygen to download across the placenta to the fetus. Additionally, the newborn's liver was enlarged, further supporting the diagnosis of fetal heart failure. Neonatal sepsis was also supported by the WBC count and differential and the persistently elevated CRP. Of course, the sine qua non of neonatal sepsis is a positive blood culture — in this case, GBS. Further, the diagnosis of septic shock was supported by initial hypotension after birth, the requirement for pressor therapy, and the profound metabolic acidosis present at age 35 minutes which took over 30 hours to normalize. The base deficit in a "usual" case of hypoxic-ischemic encephalopathy normalizes within 4.5 to 7.9 hours. (2) This infant demonstrated the classic findings of septic shock.

"Fetal heart failure would be expected to generate widened venoarterial pH and Pco2 differences, as it does in both children and adults (although the differences are in the opposite direction). (3) A widened umbilical venoarterial base deficit difference would occur in the same manner as described in the previous infant (Case 20), i.e., right heart failure leading to elevated central venous pressure, which in turn can lead to slowed umbilical venous blood flow, as well as slowed systemic blood flow."

Fetal heart failure would be expected to generate widened venoarterial pH and Pco_2 differences, as it does in both children and adults (although the differences are in the opposite direction). (3) A widened umbilical venoarterial base deficit difference would oc-

cur in the same manner as described in the previous infant (Case 20), i.e., right heart failure leading to elevated central venous pressure, which in turn can lead to slowed umbilical venous blood flow, as well as slowed systemic blood flow. Terminally, there is complete cessation of umbilical venous blood flow. (2) Just as in the previous infant, complete cessation occurs prior to complete cessation of umbilical arterial flow for a substantial base deficit difference to exist. If the complete cessation of umbilical venous blood flow has not occurred, the base deficit on the arterial side will be transmitted to the venous side.

Why is it that this fetus with septic shock and heart failure, unlike the previous infants with heart failure, had severe umbilical venous metabolic acidosis? I am unsure as this is the only newborn with septic shock in whom I have seen umbilical cord blood gases (only a venous gas). Although we seldom obtain arterial and venous blood gases on newborns in the NICU, undoubtedly, if an arterial blood gas shows a metabolic acidosis, so will a venous gas. On the other hand, children or adults with heart failure alone do not develop metabolic acidosis until near death. What makes it clear is that the same thing that happens in the fetus is finding an absence of metabolic acidosis in the umbilical vein (see Case 19).

Perhaps the difference between a fetus with heart failure and a fetus with sepsis *and* heart failure (septic shock) is that heart failure without sepsis occurs slowly over time and better allows for compensation. Once further compensation is no longer possible, an additional insult, such as a further decrease in hemoglobin, results in a greater increase in central venous pressure that brings umbilical venous blood flow to a halt. Now that the only source of oxygen is entirely cut off, metabolic acidosis develops rapidly. The placenta continues to accept blood from the umbilical arteries for a short period, but because umbilical venous blood flow has stopped, metabolic acidosis cannot be transferred to the venous side. At this point, decompensation occurs very quickly. Unlike chronic fetal heart failure, fetal septic shock is a relatively acute event. At first, metabolic acidosis is transmitted to the umbilical vein, but terminally, umbilical venous blood flow also comes to a halt as it does in chronic fetal heart failure, allowing for very wide umbilical venoarterial blood gas differences.

"A sinusoidal FHR pattern may be secondary to any cause of fetal heart failure, including severe fetal anemia. Additional study in this area is warranted."

A sinusoidal FHR pattern may be secondary to any cause of fetal heart failure, including severe fetal anemia. Additional study in this area is warranted.

It is also worth noting that despite prompt and appropriate prophylactic antibiotic therapy administered to the mother, the infant had a positive blood culture. An interesting study (4) demonstrated that newborns with proven sepsis treated directly with IV antibiotics typically still had positive blood cultures 24 hours later. However, newborns may still be septic without positive blood culture (5) with or without prior maternal antibiotics.

Key Points

- A fetal sinusoidal heart rate pattern may be secondary to any cause of fetal heart failure, including severe fetal anemia. Further study on this point is warranted.
- Fetal septic shock appears to be associated with umbilical cord blood gases similar to those seen in other newborns who have heart failure at the time of birth, i.e., widened differences between venous and arterial cord pH, $Pco_{2,}$ and base deficit.
- Additionally, unlike a non-septic fetus in heart failure, a fetus with septic shock may show a significant umbilical venous base deficit rather than a normal or near-normal base deficit.

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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?

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

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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:

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- **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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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.

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Addressing the Maternal Health Crisis: A Nationwide Call to Action

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.

"For some women, it's a matter of access to care, or missed or delayed diagnoses. Women of color and those living in rural communities are disproportionately affected by maternal mortality, highlighting the need to improve the equity of health care during and after pregnancy. (2)"

Why do pregnant women die in childbirth more often in the United States than in other developed countries? (1) The answer is complex.

For some women, it's a matter of access to care, or missed or delayed diagnoses. Women of color and those living in rural communities are disproportionately affected by maternal mortality, highlighting the need to improve the equity of health care during and after pregnancy. (2)

Policy Efforts

Maternal health is receiving new attention among policymakers, who are calling for investments in programs to support safe pregnancies and reduce post-birth complications.

During the first-ever White House Maternal Health Day of Action held in late 2021, the Biden-Harris Administration issued a nationwide call to action. (3) The administration challenged the private and public sectors to get serious about improving the nation's maternal health outcomes through initiatives at the state and federal levels.

Among the programs highlighted are those that will help improve maternity and postpartum care and increase health insurance coverage in the months following birth.

Improving Hospital Outcomes

The Department of Health and Human Services and Centers for Medicare & Medicaid Services announced they will partner to establish a new "Birthing-Friendly" designation for hospitals. (4)

Hospitals must provide perinatal care, participate in a maternity care quality improvement collaborative and have implemented recommended patient safety practices to earn the distinction. Taken together, these criteria signify the facility is committed to improving maternal health outcomes.

The designation will also appear on the national "Care Compare" website so patients can select hospitals with best practices. (5)

"Providing 12 months of Medicaid eligibility after birth will help mothers get vital postpartum services. It will also give them prolonged access to care for the management of chronic conditions like hypertension and diabetes, and access to behavioral health services."

Extending Postpartum Coverage

A provision in the COVID-19 rescue package, passed last March, gave states the option to extend Medicaid coverage to 12 months after birth, a significant extension of the current 60-day minimum. Federal officials used the Maternal Health Day of Action as an opportunity to re-emphasize their recommendation that all states expand coverage in this way.

Providing 12 months of Medicaid eligibility after birth will help mothers get vital postpartum services. It will also give them prolonged access to care for the management of chronic conditions like hypertension and diabetes, and access to behavioral health services.

As of early January, 26 states had taken some sort of action to expand coverage. (6) An additional 720,000 women nationwide could gain coverage if all states were to extend postpartum Medicaid eligibility to 12 months, according to a new report. (7)

Every pregnancy-related death is tragic, especially because about 3 in 5 deaths could be prevented. (8) The Biden-Harris Administration's call to action and initiatives to improve health outcomes for pregnant women couldn't have come at a better time.

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This content article was also published at InstituteforPatientAccess.org

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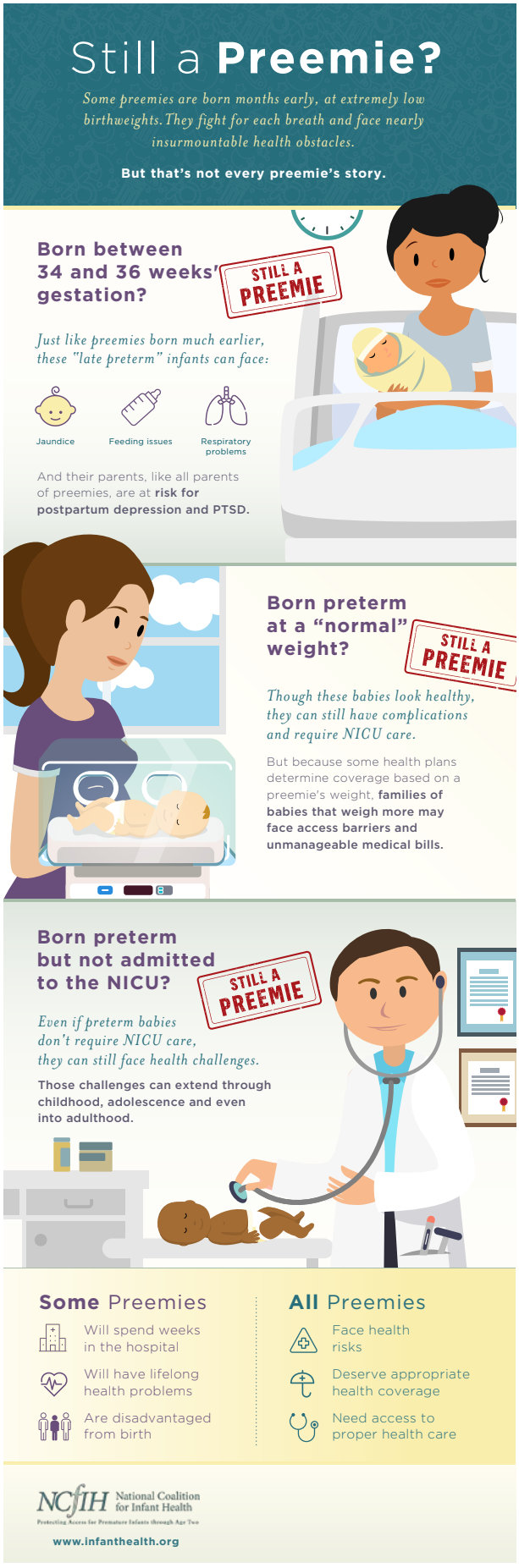

Keeping Your Baby Safe

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): iCAN/Pediatric Trials Network

Amy Ohmer

"We are dedicated to sharing the expert voices and experiences of kids, many of whom live with rare, chronic, and complicated medical conditions, to help support pediatric healthcare and clinical research. If you are new to iCAN, please visit our website at www.icanresearch.org to learn more about how to get involved and how you can support our mission of helping children around the world."

Happy New Year from the International Children's Advisory Network, Inc. (iCAN)! We are dedicated to sharing the expert voices and experiences of kids, many of whom live with rare, chronic, and complicated medical conditions, to help support pediatric healthcare and clinical research. If you are new to iCAN, please visit our website at www.icanresearch.org to learn more about how to get involved and how you can support our mission of helping children around the world.

Kicking off the month of January, iCAN has partnered with the Pediatric Trials Network (PTN.org) to support a new anthology created by iCAN Youth Members to share their creative work of participating within clinical research trials. Using the prompt: *"If you could go back in time to tell yourself what you know now about research, what would you say?"*. iCAN Youth Members will be submitting ideas using short stories, poems, illustrations, electronic art, and original photographs to be included in a book to be shared at the 2022 iCAN Summit from June 11th - June 15th, 2022 in Lyon, France. To learn more about joining, please watch our 2022 Summit video to understand better what iCAN is all about. (1) Registration opens on March 15th, 2022, at www.icanresearch.org. (1)

Get ready for the iCAN 2022 Summit Lyon, France! (2)

Additionally, iCAN and the Multi-Regional Clinical Trials (MRCT) team have joined together to support a three-part video series of children sharing their experiences in clinical trials. Using their own experiences, young people from India, Spain, Italy, Uganda, and the United States (Nebraska, Texas, Georgia, and Washington D.C.) share insights into what kids think about the many factors, challenges, and opportunities that support pediatric research. Each video will be shared at the upcoming MRCT 5-part webinar series, (3)*Advancing international Pediatric Clinical Research*. The first of the webinar series, entitled: ***Time to Listen: Hearing from Young People in Clinical Research,*** will focus on incorporating the perspectives of young people and the adults who care for them in clinical research and product development. (3)This webinar will again be hosted twice (on February 2nd, 2022, from 9-11 am EST and 8-10 pm EST) to ensure ease of participation for colleagues from around the globe. To learn more, visit www.mrctcenter.org. (4)

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iCAN's unique youth series 'Ask the Experts' will be kicking off this month on January 15th, 2021, at 10:00 am, with KIDS and Covid-19 - Where are we now? To join this fun and free event, please register at www.icanresearch.org/events. (5) All are welcome to attend, and kids of all ages are invited to join.

Looking ahead, iCAN will be at the American Academy of Pediatrics National Conference and Exhibition from October 7th - 11th, 2022, at the Anaheim Convention Center, Anaheim, California. We cannot wait to see our community of friends in person.

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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

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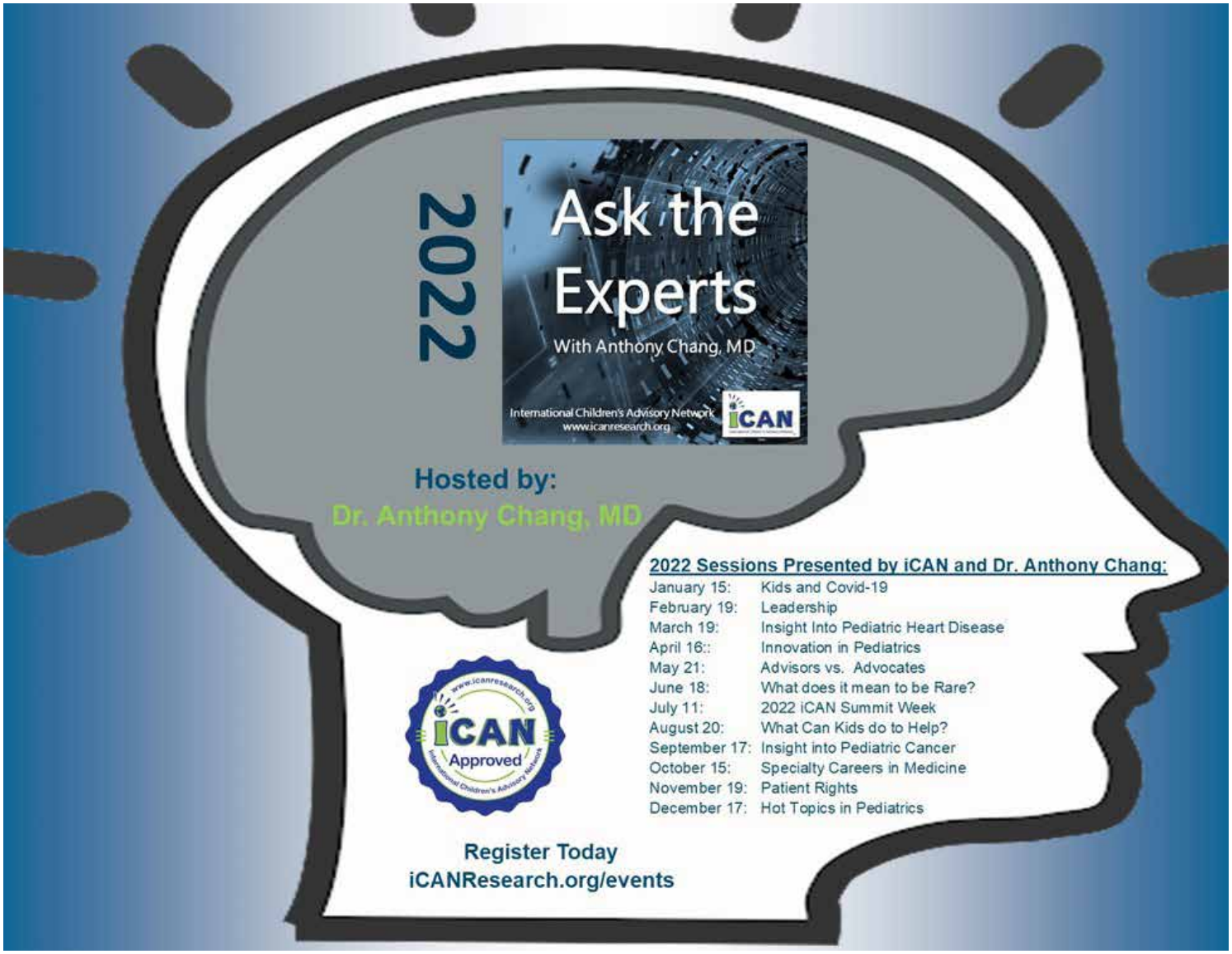

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Disclosure: *The author has no conflicts of interests to disclose.*

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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

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

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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.

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

KEEPING MOTHERS + INFANTS TOGETHER

Means balancing the risks of...

- HORIZONTAL INFECTION
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- EVALUATE THE DECISION

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Partnering for patient-centered care when it matters most.

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

Take precautions
& LIMIT INTERACTIONS.

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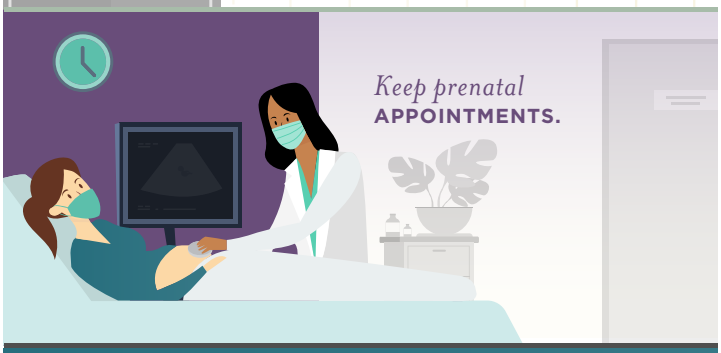
Maintain at least
A 30-DAY SUPPLY OF YOUR MEDICATIONS.



Keep prenatal
APPOINTMENTS.

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

LEARN MORE ›

NCFIH National Coalition for Infant Health

newly validated

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

7- Module Online Course in NICU Staff Education

and

National Perinatal Association and NICU Parent Network

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PROTECT YOUR FAMILY FROM
RESPIRATORY VIRUSES
flu
coronavirus
pertussis
RSV
SOAP
WASH YOUR HANDS
often with soap and warm water.
GET VACCINATED
for flu and pertussis. Ask about protective injections for RSV.
COVER COUGHS AND SNEEZES.
Sneeze and cough into your elbow.
USE AN ALCOHOL-BASED HAND SANITIZER.
STAY AWAY FROM SICK PEOPLE
Avoid crowds. Protect vulnerable babies and children.
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FREE RESOURCES FOR YOUR NICU
Coping During COVID-19
Targeted interventions to improve the mental health of parents, infants, families, and providers
BONDING WITH YOUR BABY
HELPING CHILDREN AND FAMILIES COPE
CAREGIVERS NEED CARE TOO
National Network of NICU Psychologists
nationalperinatal.org/psychologists

Respiratory Syncytial Virus:

How you can advocate for babies this RSV season

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

Identify babies at greatest risk

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

Teach families how to protect

their babies from respiratory infections

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

Use your best clinical judgement

when prescribing RSV prophylaxis

Tell insurers what families need

and provide the supporting evidence

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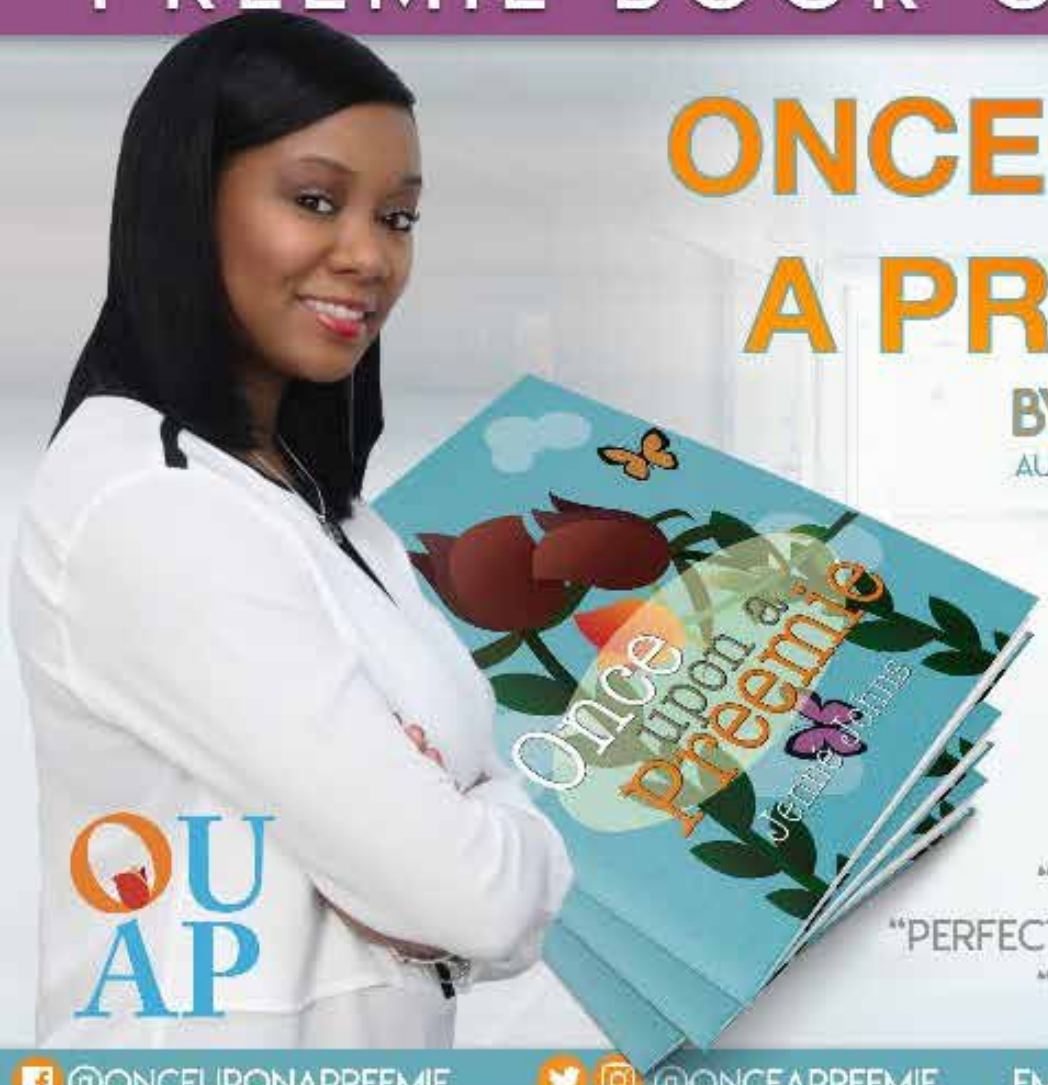
*See the NPA's evidence-based guidelines at www.nationalperinatal.org/rsv

PREEMIE BOOK ON SALE



ONCE UPON A PREEMIE

BY JENNÉ JOHNS

AUTHOR | SPEAKER | ADVOCATE

QUAP

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

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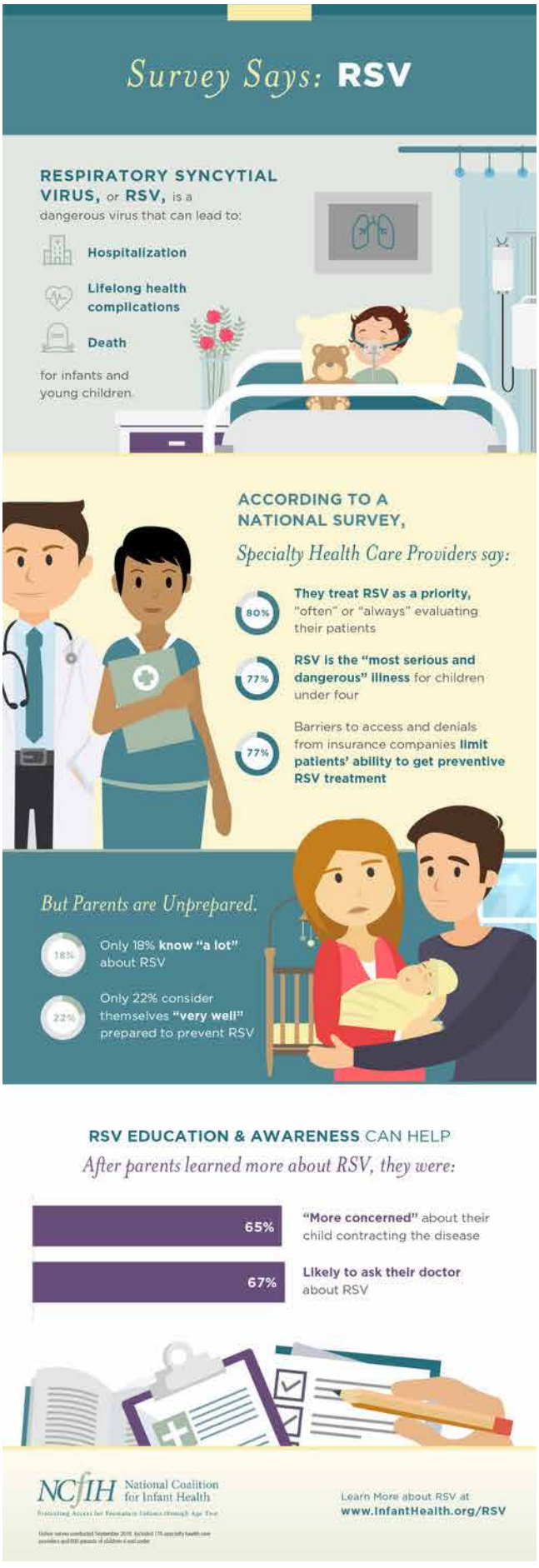

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When reporting on mothers, babies, and substance use

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Compiled and Reviewed by David Vasconcellos, MS IV

2022 VIRGINIA APGAR AWARD IN NEONATAL - PERINATAL MEDICINE

CALL FOR NOMINATIONS

Deadline: March 1, 2022

The American Academy of Pediatrics' Section on Neonatal-Perinatal Medicine is now accepting nominations for the 2022 Virginia Apgar Award. This award is given annually to an individual whose career has had a continuing influence on the well being of newborn infants.

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

The nominations must be received by March 1, 2022. Please send all nominations to:

Jim Couto, MA

Director, Hospital & Surgical Subspecialties

American Academy of Pediatrics

345 Park Blvd

Itasca, IL 60143

jcouto@aap.org

630/626-6656

The Apgar Award is sponsored by a grant from Abbott Nutrition and will be presented at the meeting of the Neonatal – Perinatal Medicine Section during the 2022 National Conference & Exhibition of the American Academy of Pediatrics in Anaheim.

NT

2022 AVROY FANAROFF NEONATAL EDUCATION AWARD

CALL FOR NOMINATIONS

Deadline: March 1, 2022

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

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

The recipient is chosen by the SONPM Executive Committee each year at the SONPM Perinatal Spring Workshop. Final AAP Board of Directors approval will be granted in June of 2022 and the recipient will be notified at that time.

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

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

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

ALL INFORMATION MUST BE COMPLETE BEFORE MAILING IN YOUR NOMINATION. Please send all materials no later than March 1, 2022 to:

Jim Couto, MA

Director, Hospital & Surgical Subspecialties

American Academy of Pediatrics

345 Park Blvd

Itasca, IL 60143

jcouto@aap.org

630/626-6656

The Avroy Fanaroff Neonatal Education Award is sponsored by a grant from Mead Johnson Nutrition and will be presented at the meeting of the Section on Neonatal - Perinatal Medicine during the 2022 National Conference & Exhibition of the American Academy of Pediatrics in Anaheim.

NT

2020 NEONATAL LANDMARK AWARD

Call for Nominations

Deadline: March 1, 2022

Nominations are now accepted for the Section on Neonatal-Perinatal Medicine Landmark Award. This award will be presented at the 2022 AAP National Conference & Exhibition in Anaheim and is awarded for a seminal contribution, which has had a major impact on Neonatal-Perinatal practice. Not necessarily the original description or publication but recipient could be the individual responsible for dissemination and acceptance within/by the professional and/or lay community. To be eligible the "event" must have occurred at least 15 years ago, and the nominee must not have received the Virginia Apgar Award. The award can be awarded posthumously.

The recipient is chosen each year at the Perinatal Spring Workshop. Final AAP Board of Directors approval will be granted in June of 2022 and the recipient will be notified at that time.

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

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

ALL INFORMATION MUST BE COMPLETE BEFORE MAILING IN YOUR NOMINATION. Please send all materials no later than March 1, 2022 to:

Jim Couto, MA

Director, Hospital& Surgical Subspecialties

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345 Park Blvd

Itasca, IL 60143

Phone: 630/626-6656

FAX 847/434-8000

jcouto@aap.org

The Landmark Award is supported by Mead Johnson Nutrition.

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

Released: Thursday 12/13/2018 12:32 PM, updated Saturday 3/16/2019 08:38, Sunday 11/17/2019 and Friday 11/20/2020

The American Academy of Pediatrics' Section on Advances in Therapeutics and Technology (SOATT) invites you to join our ranks! SOATT creates a unique community of pediatric professionals who share a passion for optimizing the discovery, development and approval of high quality, evidence-based medical and surgical breakthroughs that will improve the health of children. You will receive many important benefits:

- Connect with other AAP members who share your interests in improving effective drug therapies and devices in children.
- Receive the SOATT newsletter containing AAP and Section news.
- Access the Section's Website and Collaboration page – with current happenings and opportunities to get involved.
- Network with other pediatricians, pharmacists, and other health care providers to be stronger advocates for children.
- Invitation for special programming by the Section at the AAP's National Conference.
- Access to and ability to submit research abstracts related to advancing child health through innovations in pediatric drugs, devices, research, clinical trials and information technology; abstracts are published in Pediatrics.

AAP members can join SOATT for free. To activate your SOATT membership as an AAP member, please complete a short application at http://membership.aap.org/Application/AddSectionChapterCouncil.

The Section also accepts affiliate members (those holding masters or doctoral degrees or the equivalent in pharmacy or other health science concentrations that contribute toward the discovery and advancement of pediatrics and who do not otherwise qualify for membership in the AAP). Membership application for affiliates: http://shop.aap.org/aap-membership/ then click on "Other Allied Health Providers" at the bottom of the page.

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

Christopher Rizzo, MD, FAAP, Chair, crizzo624@gmail.com

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

Jackie Burke

Sections Manager

AAP Division of Pediatric Practice

Department of Primary Care and Subspecialty Pediatrics

630.626.6759

jburke@aap.org

Dedicated to the Health of All Children

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The American Academy of Pediatrics is an organization of 67,000 primary care pediatricians, pediatric medical subspecialists and pediatric surgical specialists dedicated to the health, safety and well-being of infants, children, adolescents and young adults. For more information, visit www.aap.org. *Reporters can access the meeting program and other relevant meeting information through the AAP meeting website at http://www.aapexperience.org/*

NT

CDC Releases Updated School Guidance; Pediatric COVID Hospitalizations Hit Record High

January 7, 2022

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

Federal health officials have updated COVID school guidance on isolation and quarantine as some schools grapple with whether to return to virtual learning.

"Our updated recommendations for isolation and quarantine and our prior publications and continued assessment of test-to-stay protocols in schools provide the tools necessary to get these schools reopened for in-person learning and to keep them open for the rest of the school year," Centers for Disease Control and Prevention (CDC) Director Rochelle P. Walensky, M.D., M.P.H., said in a media briefing Friday.

The recommendations come amid a flurry of COVID-related moves from federal health officials Thursday and Friday. Those included releasing data showing record-breaking pediatric hospitalizations driven by children under 5 years, publishing a new study showing high vaccine effectiveness against multisystem inflammatory syndrome in children (MIS-C) and shortening the interval for adult Moderna

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vaccine recipients to get a booster.

School guidance on isolation and quarantine

The CDC updated its isolation and quarantine guidance for students and teachers in K-12 settings to align with guidance it recently released for the general public.

Students and school staff infected with SARS-CoV-2 should stay home and isolate for at least five full days following the day that symptoms begin or they tested positive (for people who are asymptomatic), according to the CDC isolation guidance.

People who never develop symptoms can end isolation after at least five days. Those who have had symptoms can end isolation after five full days if they are fever-free for 24 hours without medication and other symptoms have improved. People who develop symptoms after testing positive should restart the isolation period from the time their symptoms began.

After the isolation period, people who were infected should continue to wear a well-fitting mask around others at home and in public through day 10 or continue to isolate for 10 days. They also should avoid people who are immunocompromised or at high risk for severe disease during this time.

Everyone in a school over age 2 years should wear a mask indoors regardless of vaccination status. Anyone coming out of isolation should be adequately distanced from others when removing a mask during lunch.

Students, teachers and staff who have been in close contact with someone who is infected should quarantine for at least five days if they have not completed a primary vaccine series or if they are an adult who did not receive a booster when eligible, according to the CDC's school guidance on quarantine. Schools may implement a test-to-stay program as an alternative to traditional quarantine.

Quarantine is unnecessary for adults who have been boosted, children ages 5-17 years who completed a primary series of COVID-19 vaccines and those who had confirmed COVID-19 within the last 90 days.

Everyone who is in close contact with an infected person should wear a well-fitting mask around others for 10 days and get tested at least five days after contact. If they test positive or develop symptoms, they should follow isolation recommendations.

Record-Breaking Pediatric Hospitalization

The updated school guidance comes as the rate of children hospitalized with COVID has grown to two of every 100,000 children, the highest since the start of the pandemic. The latest spike occurred largely among those under 5 years, a group that has a hospitalization rate of four per 100,000 children and is too young to get vaccinated.

Dr. Walensky said the CDC has not seen a signal indicating the omicron variant is more severe for children. The increasing hospitalization rates may be due to increasing rates of virus in the community.

Vaccine effectiveness against MIS-C

A new study released Friday in the *Morbidity and Mortality Weekly Report* found the Pfizer-BioNTech vaccine is 91% effective against MIS-C, a severe condition in children that can follow COVID-19. In addition, none of the MIS-C patients in the study who were vaccinated required life support.

"Vaccination is the best tool we have to protect children from COVID-19," Dr. Walensky said.

Since the start of the pandemic, there have been about 6,431 cases of MIS-C, and 55 of those children have died, according to CDC data.

About 54% of adolescents ages 12-17 years and about 16% of children ages 5-11 years are fully vaccinated, according to CDC data. Earlier this week, a Pfizer representative said she expects clinical trial data on vaccines for children under 5 years to be available in late March or early April.

Moderna booster interval

The Food and Drug Administration announced Friday adults who received a Moderna COVID-19 vaccine primary series are eligible for a booster at five months instead of six months since their last vaccine. The move, which was approved by the CDC, aligns with the timing of boosters for Pfizer-BioNTech recipients approved earlier in the week.

Resources

- CDC guidance for schools during the pandemic and clinical considerations for administering COVID-19 vaccines
- AAP interim guidance on school safety during the pandemic, MIS-C and vaccination
- Information for parents from HealthyChildren.org on in-person school during the COVID-19 pandemic and preparing children for a COVID-19 vaccine

Melissa Jenco, News Content Editor

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New AAP main number: 630-626-6000

NT

CDC Study Shows Flu Vaccination Prevents Severe Flu Illness in U.S. Children Vaccine protects, even when vaccine virus and circulating viruses are different

Press Release

For Immediate Release: Thursday, Janu-

pac-lac

Perinatal Advisory Council:
Leadership, Advocacy and Consultation

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The Continuing Education Department at PAC/LAC is pleased to consider requests to be a joint provider of your CME activity. PAC/LAC is actively involved in direct and joint-providership of multiple continuing education activities and programs and works with our partners to ensure the highest standards of content and design. PAC/LAC is the recipient of the 2018 Cultural & Linguistic Competency Award. This award recognizes a CME provider that exemplifies the goal of integrating cultural and linguistic competency into overall program and individual activities and/or a physician who provides leadership, mentorship, vision, and commitment to reducing health care disparities

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Providing a voice for healthcare professionals and healthcare systems to improve public policy and state legislation on issues that impact the maternal, child and adolescent population.

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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.

ary 13, 2022
Contact: Media Relations
(404) 639-3286

A new CDC study published in the journal Clinical Infectious Diseases (CID)external icon shows that flu vaccination protected children against serious flu illness even when they were infected with a flu virus that was antigenically different from the vaccine virus. This reinforces the benefit of flu vaccination, even when circulating flu viruses have drifted and are different from the virus used in vaccine production.

"This study highlights that flu can cause serious illness in children, but flu vaccines can be lifesaving. This is very good news" said CDC Director Rochelle P. Walensky, M.D., M.P.H. "It's especially important that children get a flu vaccine in addition to their recommended COVID-19 vaccines this season. Flu season has started and currently flu vaccination is down in children, so now is the best time to get your child vaccinated, if you have not already."

A hallmark of flu viruses is that they are constantly changing through a process called antigenic drift, especially H3N2 viruses, which are often associated with more severe flu seasons. How well flu vaccines work is determined in part by the similarity between the viruses chosen for vaccine production and viruses circulating in populations. While the composition of flu vaccines is reviewed annually and updated to match evolving viruses, even then, changes in the virus can outpace vaccine production.

The CDC study reports that flu vaccination reduced the risk of severe flu in children by 78% against similar flu A viruses and 47% against flu A viruses that had drifted from the vaccine virus. Further, the vaccine was 76% effective at preventing life-threatening influenza, which included invasive mechanical ventilation, CPR, and other severe complications including death. This study adds to evidence showing that some people who are vaccinated still get sick, but the vaccination can decrease illness severity.

This large CDC study summarizes findings from a CDC vaccine effectiveness network that looks at how well flu vaccines work at preventing serious flu illness in children. This network is now called the Overcoming COVID-19 Network and will investigate how well COVID-19 vaccines work to prevent COVID-19 hospitalizations in children in addition to how well flu vaccines protect children against flu hospitalization during 2022.

Researchers looked at data from the 2019–2020 flu season, during which a record-breaking 199 flu deaths in children were reported to CDC and when most flu activity was caused by two viruses that were antigenically different from their corresponding vaccine viruses.

According to CDC flu surveillance systems, flu season has started in many parts of the country with continued flu activity expected over the coming weeks. Most flu detected so far has been H3N2 flu found in children and young adults. These circulating H3N2 flu viruses are genetically closely related to the H3N2 vaccine virus, but have some differences that may result in reduced protection against those viruses from the vaccine. As this study highlights, however, vaccination can still have important benefits even when this happens. It is also important to note that usually many flu viruses spread over any one season and flu vaccines protect against four different viruses.

Flu illness can be dangerous for children. Each year, millions of children get sick with seasonal flu, thousands of children are hospitalized, and some children die from flu. Two flu deaths in children have been reported to CDC already this season. Flu can be especially dangerous for children younger than 5 years old because they are at higher risk of getting very sick from flu because of their age.

With flu activity just getting started, that means there's still time to benefit from flu vaccination this season. It takes about two weeks after vaccination for antibodies to develop in the body and provide protection against influenza virus infection. The

U.S. Advisory Committee on Immunization Practices (ACIP) has recommended annual vaccination for all persons aged 6 months or older since 2010. Despite this recommendation, during the 2020–2021 flu season U.S. flu vaccination coverage remained between 50.8%–68% for children younger than 18 years old.

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U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICESexternal icon

CDC works 24/7 protecting America's health, safety and security. Whether disease start at home or abroad, are curable or preventable, chronic or acute, or from human activity or deliberate attack, CDC responds to America's most pressing health threats. CDC is headquartered in Atlanta and has experts located throughout the United States and the world.

NT

Infant Formula Recalled Due to Possible Health Risks

January 10, 2022

Moor Herbs of Detroit is recalling its Angel Formula brand infant formula after the Food and Drug Administration (FDA) determined the product does not meet nutrition and labeling requirements and

may cause health risks to infants.

The recalled formula was sold at Moor Herbs' retail store in Detroit and nationwide through its website. The product is sold in 16-fluid-ounce plastic bottles. The labeling does not have any UPC or lot codes. The formula began shipping in February 2019, and the recall includes all distributed units.

According to an FDA alert, tests on the infant formula concluded its iron, sodium and potassium content are well over the maximum allowed, which could lead to iron overload and/or electrolyte imbalances. In addition, the product does not have vitamin D. Vitamin D deficiency could lead to rickets, a softening and weakening of bones.

No injuries or illnesses have been reported.

Parents and caregivers of infants who purchased the recalled product should stop using it and either throw the formula away or return it for a refund. Those who are concerned about the health of their child after using the formula should contact their health care provider.

The FDA first issued a consumer alert about the formula in late December, saying Moor Herbs was not registered with the agency and continued to manufacture the product without a state license.

The Michigan Department of Agriculture and Rural Development seized Moor Herb products in August 2021 and placed a cease-and-desist order on the company. Moor Herbs, however, continued to sell its products in violation of the order, the FDA said.

Following discussions with the company last month, the FDA said it began working with Moor Herbs to voluntarily recall the product.

The FDA is encouraging consumers to report any problems with the product to the agency. For more information, call 313-583-9709 or visit https://www.fda.gov.

Resources

- FDA consumer complaint coordinator
- Online form to report adverse events to the FDA
- FDA consumer and industry assistance

Steve Schering, Staff Writer

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NT

COVID Hospitalizations Rising in Kids Too Young for Vaccine

Jan. 13, 2022, at 8:16 a.m.

By Serena McNiff HealthDay Reporter

THURSDAY, Jan. 13, 2022 (HealthDay News) -- While COVID-19 has taken the lives of many children and caused serious illness for many more, it is generally

agreed that the virus is much less likely to inflict severe damage in the young.

But new data from the U.S. Centers for Disease Control and Prevention has revealed a concerning trend: The rate of COVID-19-linked hospitalizations among children younger than 5 grew substantially last week, while the same rate for children between the ages of 5 and 17 remained relatively stable.

The latest numbers have sparked concerns that the youngest members of society may be more vulnerable to the Omicron variant than their older peers. The affected children, ages 4 and under, are in the age group not yet eligible for a coronavirus vaccine.

While scientists' knowledge of Omicron is still evolving, experts say the upsurge in pediatric hospitalizations does *not* indicate that Omicron is more dangerous to young children than other variants were.

Overall, the CDC report revealed that the record number of infections in recent weeks has triggered a hospitalization surge.

But among children, the under-5 age group experienced the most notable increase.

During the week of Dec. 26 through Jan. 1, the CDC›s data shows that more than 5 in every 100,000 hospitalized children ages 0 to 4 were infected with COVID-19, which is nearly double the rate reported in early December before the Omicron variant began to take over. For older children, ages 5 to 17, the rate was significantly lower, at 1.4 per 100,000, in keeping with past weeks.

Throughout the pandemic, children have only made up a small subset of hospital admissions, and the hospitalization rates for all other age groups remain much higher than those seen in children.

Still, the surge in pediatric hospital admissions is worrying. But according to Dr. Richard Malley, a pediatric infectious disease specialist at Boston Children's Hospital, the numbers are not particularly surprising. Malley said the increase in hospitalizations is a predictable consequence of the unprecedented case counts.

"If the risk of catching the virus has increased, even if children are generally less susceptible to severe consequences from that infection, that small number of children who would normally have been hospitalized due to COVID increases," he explained.

To add to the uncertainty, CDC Director Dr. Rochelle Walensky has emphasized that hospitalization rates can be distorted by "incidental" cases. The CDC's data, she said, includes children who tested positive for COVID-19 but may be in the hospital for other reasons. "Many children are hospitalized *with* COVID as opposed to *because of* COVID," Walensky said in December.

Some states are sorting hospital numbers

"Hospitals have gotten very good at screening everybody who gets admitted to the hospital," Malley explained. "So now, people are being hospitalized for one reason, and then a positive test comes back and gets reported as a child hospitalized with COVID, even if the reason for the hospitalization could be, for example, a broken bone."

Some states, including Massachusetts and New York, are correcting this problem by instituting a system that differentiates between incidental cases and true hospitalizations due to COVID. But at this point, it is unclear what portion of hospitalizations are incidental.

Another factor to consider is that young children who seek treatment at a hospital are not always severely ill.

Dr. Santhosh Nadipuram, a pediatric infectious disease specialist at Cedars-Sinai Maxine Dunitz Children's Health Center in Los Angeles, explained that hospitals will accept young children even if their symptoms are not particularly alarming. Most often, these kids are in need of supportive care, such as oxygen, hydration and monitoring by a team of professionals while they fight off the infection.

When severe infections do occur in children, they tend to strike those with underlying conditions, including obesity, prediabetes, heart problems and asthma. According to Nadipuram, symptoms that should prompt parents to bring their young children to the hospital include difficulty breathing, fast breathing, dehydration and extreme irritability or fatigue.

Unfortunately, "the symptoms are actually very generic, and they hold true for other respiratory viral infections," he said.

For the most part, young patients seeking care for COVID-19 at hospitals are not seriously ill, according to Malley.

"While not minimizing how scary and worrisome it might be for a child to be hospitalized with COVID, in general, those children are not severely affected. Most of them are not critically ill like the adults that we see with COVID-19," he said.

However, doctors are on the lookout for Multisystem Inflammatory Syndrome (MIS-C), a rare condition that some children develop a few weeks after being infected with COVID-19.

Dr. Allison Messina, a pediatric infectious disease specialist at Johns Hopkins All Children's Hospital in St. Petersburg, Fla., said a spike in MIS-C cases might pop up in the coming weeks.

"We haven't been seeing a ton of MIS-C yet, but I'm waiting to see what's going happen in the next month because we may see a rise," Messina said.

Omicron may be less likely to trigger long-term problems

But there is some hope that Omicron may be less likely to cause long-term or delayed effects, including MIS-C, than other COVID-19 variants.

At this early stage in the Omicron wave, experts are still learning about its unique mechanisms and how it may or may not impact patients differently. However, evi-

dence is mounting that this particular breed of COVID-19 concentrates its attack on the nose and throat. Other variants, such as Delta, were typically more adept at moving down to the lower respiratory tract and wreaking havoc on the lungs.

With earlier COVID-19 variants, the timeline of a severe infection is often drawn out, and the problems usually begin once the virus reaches the lungs, Nadipuram explained.

"The severe symptoms in those first couple of waves were kind of delayed -- meaning that you caught COVID, and then you were intubated for a while, especially in those really high-risk folks who are 70 years old and over," he said. "Then there would be this inflammatory reaction, and they would crash, and those were the folks that we saw in our intensive care units."

Nadipuram said Omicron appears to operate on a tighter timeline. "Right now, this seems to be acting much more like a very acute disease, very short-term, where you catch it, and then 12 to 24 hours later, there are symptoms."

The signs that an Omicron infection is taking a turn for the worse tend to materialize more quickly and obviously. With Omicron, "patients kind of pick a lane," Nadipuram said. "If they're low-risk and they're doing OK, then they convalesce, meaning they get better. And if they're the high-risk patients, they get sick during that acute period of time."

From the available evidence and what he has observed at the hospital, Nadipuram believes that Omicron is less likely to surprise doctors with long-term effects and delayed reactions, including MIS-C.

"We're not worrying about these long-term after-effects that happened two, three, four weeks later where our patients used to get these horrible inflammatory diseases, including this other entity MIS-C that we worried about in kids," he said. "We're just not seeing it anywhere because this particular strain really seems to act in the here and now."

Still, only time will tell what to expect from the Omicron variant. Even if it proves to be less dangerous than prior strains, the sheer number of infections will result in a great deal of injury and loss, Malley said. "That's not the right message we want to send, that this virus is not as bad, and therefore it's OK if we drop some of our precautions," he added.

For now, kids under 5 will remain vulnerable, especially while waiting vaccine approval for this age group. A vaccine is unlikely to become available anytime soon because clinical trials are still in progress.

In the meantime, Walensky said the key to protecting those children who are too young for a COVID vaccine is to ensure everyone around them is vaccinated and boosted.

"Please, for our youngest children, those who are not yet eligible for vaccination, it's critically important that we surround them with people who are vaccinated to provide them protection," she pleaded during a Friday media briefing on the issue.

More information

The U.S. Centers for Disease Control and Prevention has more on COVID-19 in kids.

SOURCES: Richard Malley, MD, pediatric infectious diseases, Boston Children's Hospital, and professor, pediatrics, Harvard Medical School, Boston; Santhosh Nadipuram, MD, pediatric infectious diseases, Cedars-Sinai Maxine Dunitz Children's Health Center, Los Angeles; Allison Messina, MD, chief, pediatric infectious diseases, Johns Hopkins All Children's Hospital, St. Petersburg, Fla.; U.S. Centers for Disease Control and Prevention, COVID Data Tracker Weekly Review, Jan. 7, 2022

U.S. News & World Report is a weekly American news publication. It is notable for its yearly rankings of America's Best Colleges and America's Best Hospitals. U.S. News & World Report is published in Washington, D.C. but headquartered in New York, New York.

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Breastfeeding May Protect a Mom's Heart Years Later

Jan. 12, 2022, at 8:01 a.m.

By Denise Mann HealthDay Reporter

WEDNESDAY, Jan. 12, 2022 (HealthDay News) -- Chloe Jo Davis is a vocal advocate for breastfeeding.

The Wilton, Conn.-based writer breastfed her three sons for years to make sure they reaped all of the benefits associated with the practice.

"Breastfeeding helps build up kids' immune system and keeps colds, virus, ear infection and stomach bugs at bay, and this is more important today than ever before with the spread of COVID-19," said Davis, who counsels moms on breastfeeding via an online platform.

Now a new study of close to 1.2 million women shows that Davis and other moms who breastfeed may reap some big time health benefits of their own.

Compared to women who had babies but never breastfed, mothers who breastfed for any period of time were less likely to develop heart disease, have a stroke or die from heart disease during 10 years of follow-up.

Earlier studies have found that women who breastfed are less likely to develop type 2 diabetes and some cancers, but less has been known about how breastfeeding affects a woman's heart.

The new study wasn't designed to say exactly how breastfeeding protects the heart, but researchers have some ideas.

"Breastfeeding could facilitate a more rapid weight loss after delivery, and this may be beneficial, as it is known that elevated weight is a risk factor for cardiovascular disease," said study author Lena Tschiderer, a postdoctoral researcher at the Medical University of Innsbruck, in Austria.

What's more, breastfeeding may help reset a woman's metabolism."This includes resetting factors that are also associated

with an increased cardiovascular risk," Tschiderer said.For the study, her team analyzed information on close to 1.2 million women in eight studies conducted between 1986 and 2009 across several countries. They looked at how long women breastfed, how many children they had, their age at first birth, and whether they had a heart attack or a stroke during follow-up.

Fully 82% breastfed at some point, according to the report. These women were 11% less likely to develop heart disease; 12% less likely to have a stroke; and 17% less likely to die from heart disease during 10 years of follow-up when compared to mothers who never breastfed, the investigators found.

These benefits held for women who breastfed for any length of time and seemed to be even greater for those who breastfed for up to one year. The study can't say whether breastfeeding for even longer periods is more beneficial because there weren›t enough women in the study who breastfed for more than two years.

The American Academy of Pediatrics recommends that infants be exclusively breastfed for around the first 6 months of life.

The new study was published online Jan. 11 in a special pregnancy issue of the *Journal of the American Heart Association*.

"This study was done in a very scientifically rigorous manner, and that's important as it means we can have pretty good confidence that the results are true," said Dr. Shelley Miyamoto. She is chair of the heart association's Council on Lifelong Congenital Heart Disease and Heart Health. Miyamoto is also director of the cardiomyopathy program at the Children's Hospital Colorado, in Aurora.

"If you breastfed for any period of time, there is some benefit to your heart, and there is progressive risk reduction for up to one year," said Miyamoto, who was not involved in the new study.

It's time to make it easier for women to breastfeed, she said.

"We really need to raise awareness and educate moms and health care providers about the benefits of breastfeeding," Miyamoto said. "New mothers need to think about this before giving birth to help ensure access to a lactation consult where they give birth."

She said it's also important for women to talk to their employers about creating breastfeeding-friendly environments.

More information

The American Academy of Pediatrics has more information on the benefits of breastfeeding.

SOURCES: Chloe Jo Davis, founder, GirlieGirlArmy.com, Wilton, Conn.; Lena Tschiderer, PhD, postdoctoral researcher, Medical University of Innsbruck, Austria; Shelley Miyamoto, MD, chair, American Heart Association Council on Lifelong Congenital Heart Disease and Heart Health in the Young, and director, cardiomyopathy program, Children's Hospital Colorado, Aurora; *Journal of the American Heart Association*, Jan. 11, 2022, online

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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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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.

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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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Genetics Corner: "Coat-hanger" ribs and Bell-Shaped Thorax in an Infant with Paternal Uniparental Disomy for Chromosome 14

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

"Authors' note: We have chosen to describe a historical case from 15 years ago because this disorder still goes unrecognized in affected infants."

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Clinical Summary:

In 2007, a genetic consultation was requested for a 31-week gestation female infant with omphalocele and a bell-shaped thorax. A fetal ultrasound had detected a fetal cystic hygroma, scalp edema, and an abdominal wall defect. An amniocentesis was performed, and fetal chromosome analysis was normal: 46,XX. There was limited prenatal care. The mother denied teratogenic exposures during the pregnancy. The infant was born by emergency C-section for fetal distress to a 19-year-old primigravida mother in preterm labor. Amniotic fluid was meconium stained. BW was1535 g (50th %ile). APGAR scores were 1^{1} (-2 respiratory, reflex, color and tone and -1 rate), 5^{5} (-2 reflex, -1 respiratory, color, tone) and 8^{10} (-1 tone and reflex). She was intubated and transferred to the NICU.

The family history was non-contributory, although the mother, all 6 of her siblings (including four maternal half-siblings), and maternal grandmother, who were of African American ancestry, had postaxial polydactyly.

An echocardiogram detected a medium-sized patent ductus arteriosus (PDA), patent foramen ovale (PFO) with stretched septum primum, and severe pulmonary hypertension (PPHN). On an abdominal ultrasound exam, there was mild pelviectasis, bilateral ureterectasis, and a dilated bladder.

"The physical exam was noteworthy for small, simple ears, short palpebral fissures, flat nasal bridge, and mild micrognathia. She had redundant nuchal skin. Her thorax was short and narrow with distal flaring of ribs. An abdominal wall defect was wrapped in gauze. The forearms were short (mesomelia), and fingernails were hypoplastic."

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A radiographic survey noted bell-shaped thorax and rib deformities. Twelve pairs of ribs were seen without evidence of segmentation anomaly of the spine. Outside expert review of the radiographs described the narrow, bell-shaped thorax, 'coat-hanger' ribs (Figure 1) with anterior beaking of vertebrae on the lateral view and suggested the diagnosis of uniparental disomy (UPD) of chromosome 14. Molecular genetic testing using microsatellite markers and comparing the infant's sample with her parents' confirmed paternal UPD for chromosome 14 (isodisomy).

"The infant had a complicated NICU course. She could not be weaned from ventilatory support for pulmonary hypoplasia and restricted, narrow thorax. During the last two weeks of her life, she required higher pressures and more respiratory support. "

The infant had a complicated NICU course. She could not be weaned from ventilatory support for pulmonary hypoplasia and restricted, narrow thorax. During the last two weeks of her life, she required higher pressures and more respiratory support. She had several episodes of respiratory arrest and CPR. She died in the NICU at two months of age.

"UPD can be isodisomic when the two chromosomes are derived from the same homolog (sister chromatids) or heterodisomic, when the two chromosomes are different, each derived from one of the two homologs that make up the chromosome pair. Chromosome microarrays were not widely available when this patient was diagnosed in 2007. It is noteworthy that routine chromosome analysis was performed in this child, but conventional chromosome analysis (that produces a karyotype) cannot detect UPD."

Discussion:

This infant with an abdominal wall defect and "coat-hanger" ribs has clinical features consistent with Kagami-Ogata syndrome (KOS), which was caused by paternal uniparental disomy for chromosome 14 (pUPD14). Uniparental disomy describes the inheritance of both members of a pair of chromosomes (or a portion of a chromosome pair) from only one parent.

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The phenomenon of *genomic imprinting* (Figure 2) affects gene expression from the chromosome 14q32.2 region. Genes located in this region are differentially expressed based on the parent of origin. Genomic imprinting, an epigenetic phenomenon, affects gene expression by modifying molecules that bind to DNA and thereby regulate it. The best understood of several epigenetic changes is the addition of methyl groups to cytosine residues, which effectively keeps the DNA tightly coiled and stops gene expression. In normal circumstances, only one of the chromosomes 14 (chr 14) is methylated, and the other is unmethylated. Differentially methylated regions (DMRs) occur during the formation of the egg or sperm and are determined by the sex of the parent that contributed that chromosome. The paternally-derived chr 14 is normally methylated, and the maternally-derived chr 14 is normally unmethylated. When both copies of chr 14 are methylated, there is no gene expression from the genes normally expressed from the maternally-derived chr 14. This effectively silences these maternally expressed genes, also called MEGs.

KOS occurs when genes on the maternally-derived 14q32.2 are not expressed: *MEG3* and *IG* DMRs. Paternal UDP14 is the most common cause of KOS, but it can also be caused by a microdeletion or epimutation involving these differentially methylated regions (DMRs) (Figure 3)

Paternal UPD14 is the cause of KOS in 2/3 of patients. UPD can follow a phenomenon known as *trisomy rescue*. When two homologs from a chromosome pair fail to segregate into two daughter cells during parental meiosis, the germ cell is disomic instead of haploid. After fertilization, the resulting zygote is trisomic for that chromosome pair. As many trisomies are not viable, the embryo can survive only if one of the extra chromosomes is lost, so-called trisomy rescue. When this happens, about a third of the time, the chromosome originating from the haploid (normal) gamete is eliminated, resulting in a cell with two chromosomes from a pair that originated from the same parent UPD (3).

"Of the other mechanisms that can generate UPD, monosomy rescue is the most likely in our patient. This rescue occurs when a gamete without a copy of chr 14 is fertilized by a normal haploid gamete that then duplicates its single copy of chr 14, which populates both members of the chr 14 pair in the surviving zygote."

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gamete without a copy of chr 14 is fertilized by a normal haploid gamete that then duplicates its single copy of chr 14, which populates both members of the chr 14 pair in the surviving zygote. This coupling results in 2 identical chromosomes 14, also called *isodisomy*, which can be detected on SNP (single nucleotide polymorphism) chromosome microarray analysis. Microarray analysis can also detect deletions in the imprinted region from the maternally-derived chromosome 14. Both inherited and *de novo* Robertsonian translocations involving chromosome 14 increase the risk for KOS due to trisomy and monosomy rescue. This was ruled out in our patient by her normal chromosome analysis.

"Both inherited and de novo Robertsonian translocations involving chromosome 14 increase the risk for KOS due to trisomy and monosomy rescue. This was ruled out in our patient by her normal chromosome analysis."

Methylation analysis is recommended as a first-tier test in evaluating suspected KOS because it detects hypermethylation of *IG*-DMR and *MEG3*-DMR regardless of the mechanism. Chromosome analysis *and* chromosome microarray testing should be ordered to detect a Robertsonian translocation involving chr 14 or a copy number variant or isodisomy of chromosome 14, respectively.

The most striking feature of KOS (1,2) is the characteristic 'coat-hanger' appearance of the ribs on plain radiographs. The ribs bow in the cranial direction posteriorly and in the caudal direction anteriorly. This rib arrangement is considered a pathognomonic feature. The dysmorphic facial features of KOS are recognizable as a facial 'gestalt': full cheeks, short palpebral fissures, broad, flat nasal bridge, protruding philtrum, and small ears. Abdominal wall defects, including omphalocele, placentomegaly, and polyhydramnios, are common (Figure 4). Respiratory failure from pulmonary hypoplasia and pulmonary insufficiency causes infantile death, and survivors can have short stature and intellectual disability.

"The most striking feature of KOS (1,2) is the characteristic 'coat-hanger' appearance of the ribs on plain radiographs."

Practical applications:

1. Recognize the significance of a bell-shaped thorax with "coat-hanger" ribs in diagnosing Kagami-Ogata syndrome (KOS), a disorder caused by abnormalities affecting the differentially methylated region on distal chromosome 14.
2. Understand that the most common cause of KOS is paternal uniparental disomy for chromosome 14.
3. Recall that UPD, caused by *trisomy rescue* or *monosomy rescue*, is not detectable with a routine chromosome analysis, but other causes of KOS, including a Robertsonian translocation of chr 14, can be detected by conventional chromosome analysis.
4. Order methylation analysis, chromosome analysis, and chromosome microarray. Isodisomy for chromosome 14 to diagnose Kagami-Ogata syndrome.

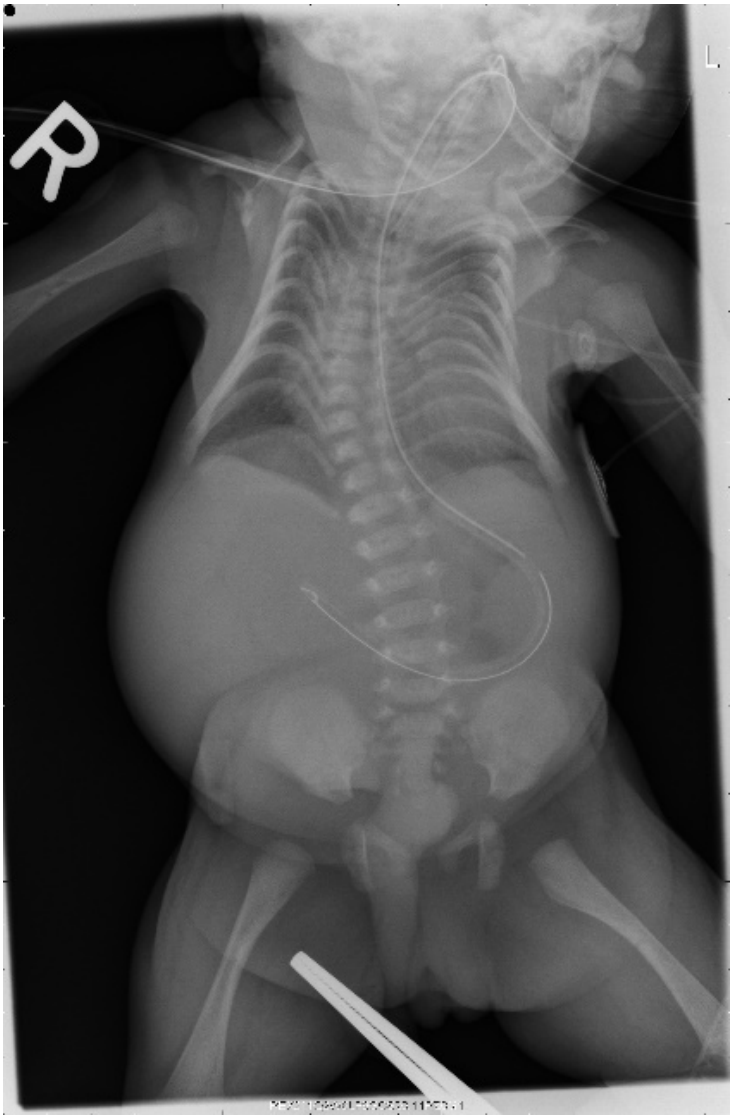

Figure 1: Our patient had a bell-shaped thorax and "coat-hanger" shaped ribs, features that are key to the diagnosis of Kagami-Ogata syndrome.

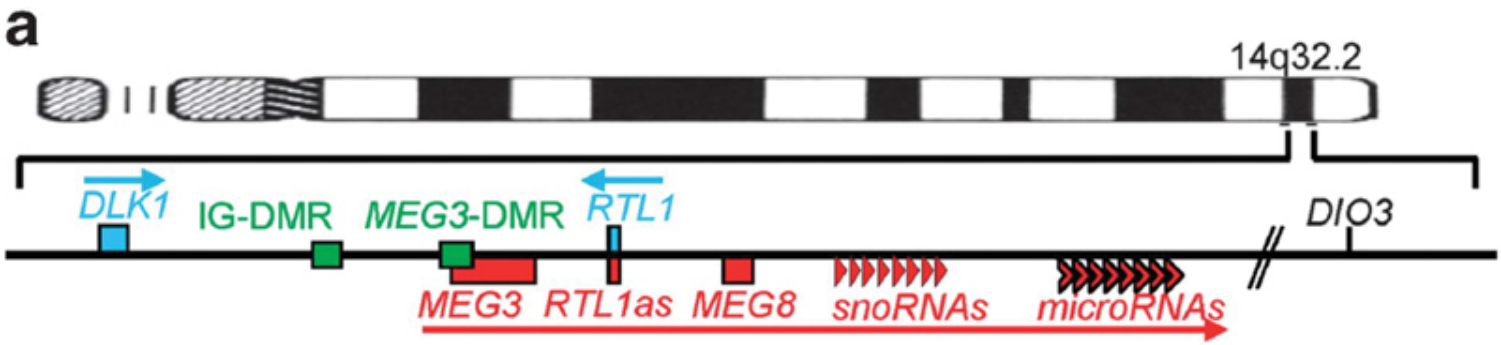

Figure 2: Paternally expressed genes (PEGs-in blue) and maternally expressed genes (MEGs- in red) on chromosome 14q32.2 (1)

Hypomethylated DMRs (where genes are expressed) are shown in green, and hypermethylated DMRs (where genes are silenced) are shown in red. Normally, paternal DMRs are hypermethylated, and maternal DMRs are hypomethylated.

All are hypermethylated in uniparental disomy of chromosome 14 with two copies of paternal DMRs.

In maternally derived epimutations, both DMRs of maternal origin are hypermethylated.

"Hypomethylated DMRs (where genes are expressed) are shown in green, and hypermethylated DMRs (where genes are silenced) are shown in red. Normally, paternal DMRs are hypermethylated, and maternal DMRs are hypomethylated."

	Paternal DMRs		Maternal DMRs	
	MEG3	IG	MEG3	IG
Normal				
UPD(14)pat				
Epimutation				
Microdeletion				

Figure 3: Paternally and maternally differentiated methylated regions (DMRs) (2):

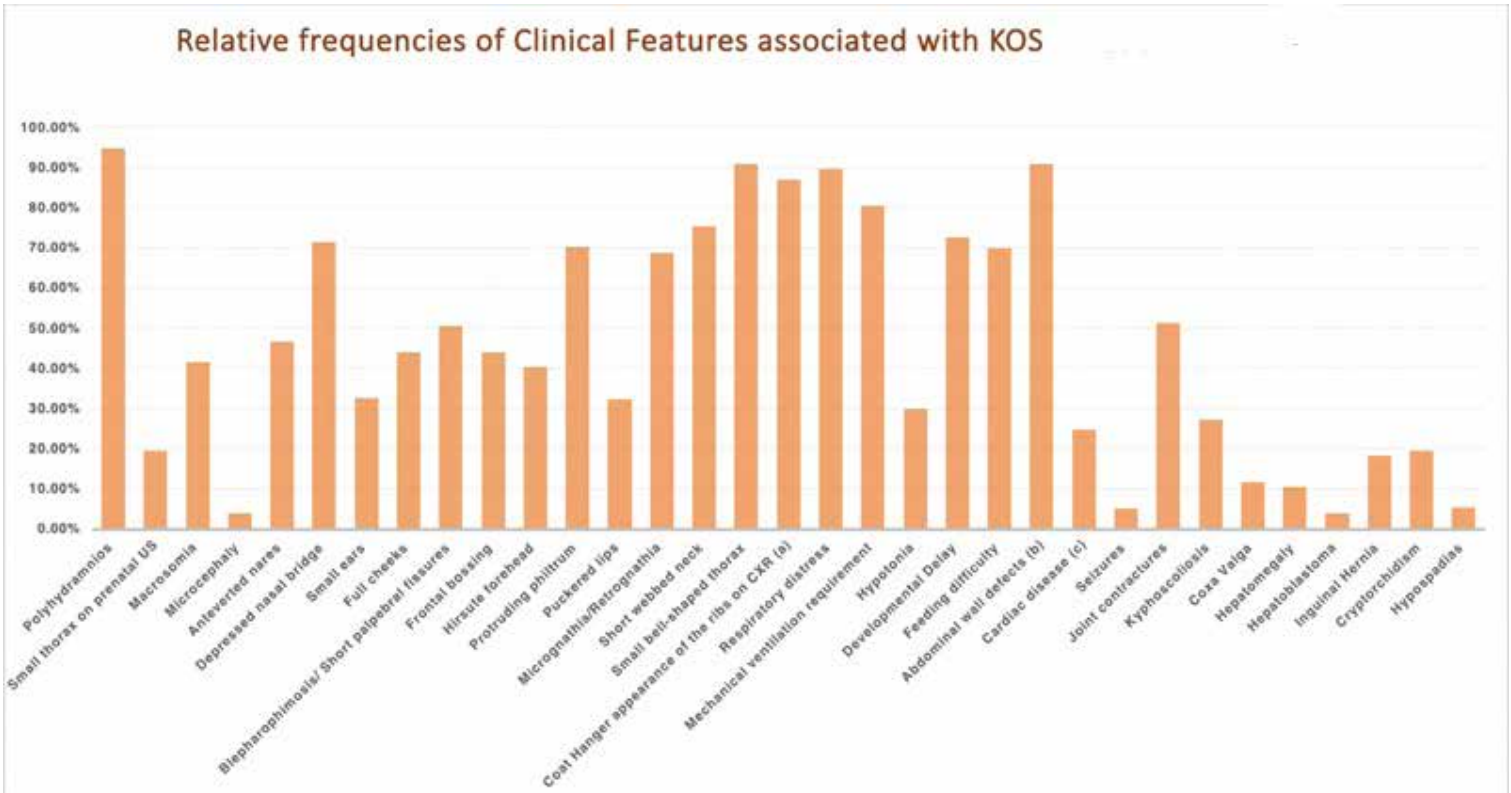

Figure 4: Relative frequencies of clinical features associated with KOS:N= 77; (2)

In maternally derived microdeletions, the maternal hypomethylated alleles are absent

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Disclosures: The authors have no relevant disclosures.

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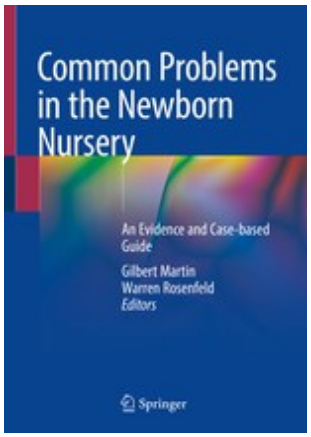

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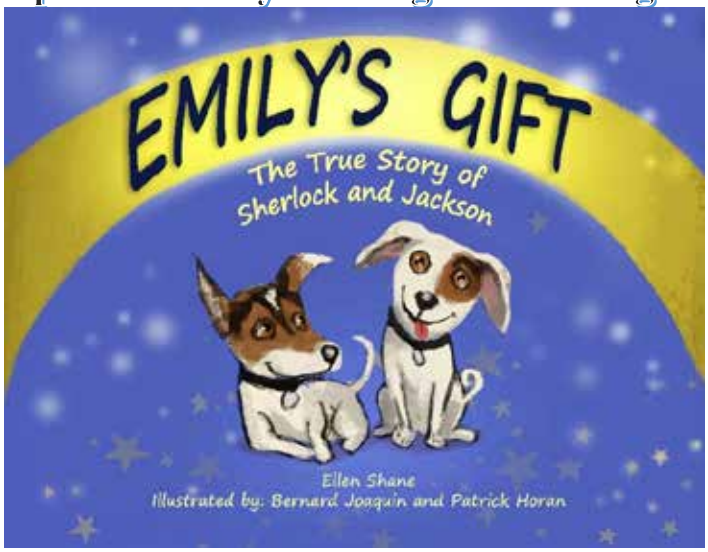

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Infant Health Matters: Raising the Profile of Rare Diseases

Susan Hepworth, Mitchell Goldstein, MD, MBA, CML

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.

Thanks to a rapidly expanding movement, the rare disease community is finally getting a voice in state policy discussions.

Creating Rare Disease Advisory Councils

State legislatures create Rare Disease Advisory Councils to provide a unique opportunity for stakeholder engagement about important issues to the rare disease community. (1) In addition to elevating the policy conversation around rare diseases, some councils also conduct surveys and publish resources that are used to advance policy priorities.

"The National Organization for Rare Disorders helped to create the first Rare Disease Advisory Council in North Carolina in 2015. Since then, 21 councils have been established. With the help of patients and advocacy organizations, NORD is working to develop one in every state."

The National Organization for Rare Disorders helped to create the first Rare Disease Advisory Council in North Carolina in 2015. Since then, 21 councils have been established. With the help of patients and advocacy organizations, NORD is working to develop one in every state.

The word "rare" implies that these councils benefit only a few people. However, about 10% of Americans have a rare condition. This means 20-30 million patients' interests are not being adequately represented in the policymaking process.

Councils' objectives vary from state to state, but most are used to:

- Provide the rare disease community's perspective in the policymaking process,
- Raise awareness about the 7,000 known rare diseases, and
- Identify barriers to appropriate care and propose solutions to improve access.

Patients, caregivers, and clinicians are commonly included and are valuable council members in that they provide a firsthand perspective about the challenges of living with a rare disease. Most councils have rare disease experts, researchers, and patient advocates. Some also include health plan representatives and policymakers.

About Rare Diseases

In the United States, a rare condition is defined as one that does not affect more than **200,000 people**. (2) Some of the most well-known are Huntington's disease, spina bifida, fragile X syndrome, Crohn's disease, cystic fibrosis, and Duchenne muscular dystrophy. Many other rare diseases, including post-transplant lymphoproliferative disease, IgG4-related disease, and amyloidosis, are not as well known, which can be increased by the work of Rare Disease Advisory Councils.

Most rare diseases are chronic and debilitating. Some are deadly. More than **80%** are caused by genetic variations that can strike at any age.

Many patients who have a rare condition spend years looking for clues and getting an accurate diagnosis. And even when they do, more than 90% of rare diseases have no FDA-approved treatment.

Patient advocates are optimistic that new energy brought on by the expanding network of Rare Disease Advisory Councils will lead to the discovery of breakthrough treatments and renewed support for the rare disease community. And creating a seat at the table for rare disease patients promotes the inclusion of their interests when health care policies are being considered.

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Disclosure: No relevant disclosures noted

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National Coalition for Infant Health Values (SANE)

Safety. Premature infants are born vulnerable. Products, treatments and related public policies should prioritize these fragile infants' safety.

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

Nutrition. Proper nutrition and full access to health care keep premature infants healthy after discharge from the NICU.

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

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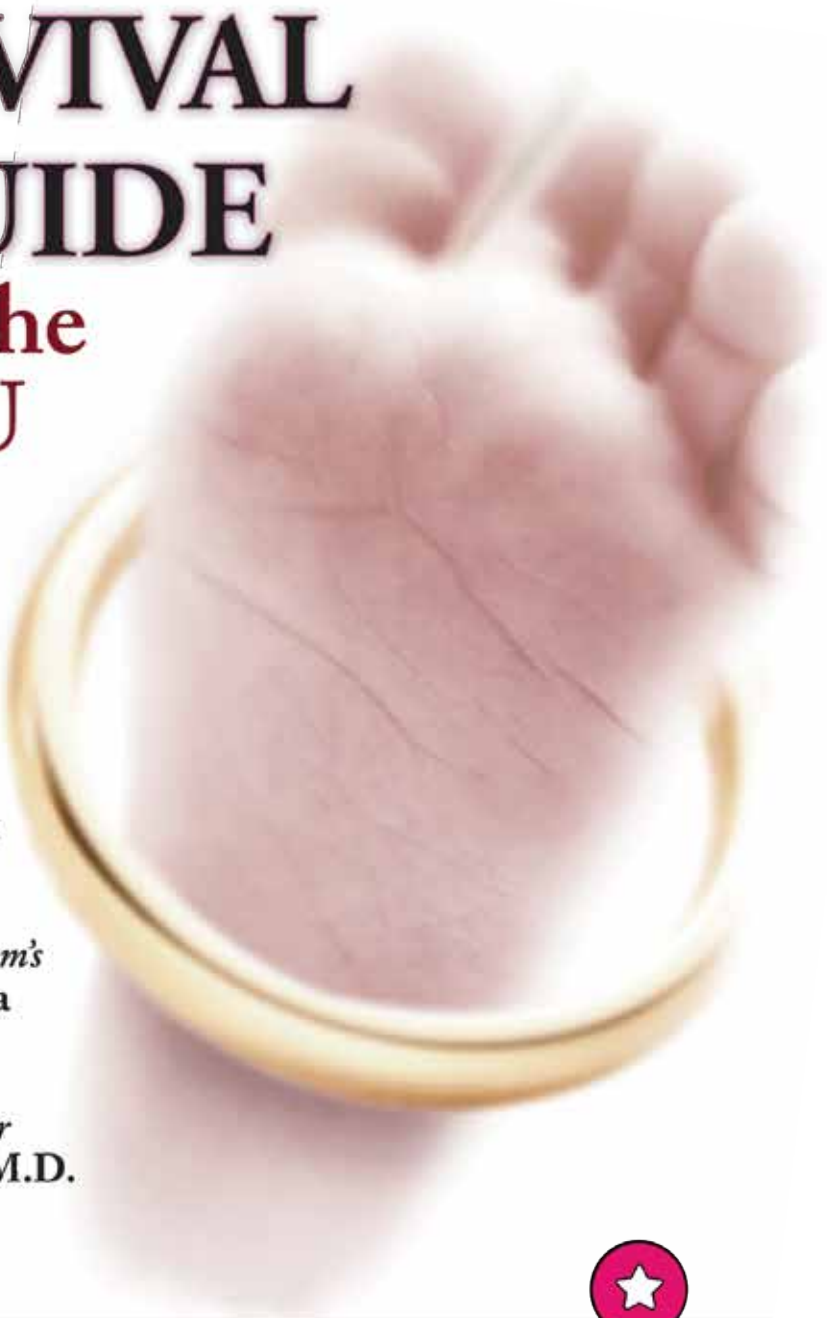

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- Difficulty Eating
- Lethargy
- Wheezing

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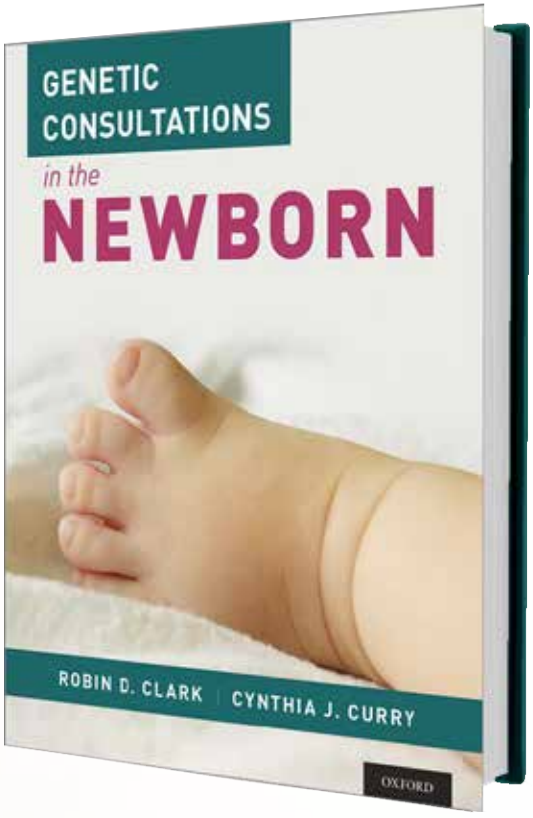

Robin D. Clark | Cynthia J. Curry

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Comprising of more than 60 chapters organized by system and symptom, *Genetic Consultations in the Newborn* facilitates fast, expert navigation from recognition to management in syndromes that manifest during the newborn period. Richly illustrated and packed with pearls of practical wisdom from the authors' decades of practice, it empowers readers to recognize the outward signs and symptoms crucial for an effective diagnosis.

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Clinical Pearl:
Clinical Pearl: Evaluation of Stillbirth Among Pregnant People with Sickle Cell Trait

Melanie Wielicka, MD, Monica Pomaville, MD, Joseph Hageman, MD

Stillbirth remains a devastating pregnancy complication for many families, with an estimated incidence of about 1 in 160 births and approximately 24,000 cases each year in the United States (1). Although the direct cause is not always identified, some well-known risk factors include obesity, diabetes, and hypertension. There is also abundant data on persistent racial, ethnic, and socioeconomic disparities for stillbirth.

"Universal newborn screening for sickle hemoglobinopathies has been introduced to identify individuals with sickle cell disease (SCD) that has, by default, identified individuals with sickle cell trait (SCT). While the diagnosis of SCD comes with extensive counseling and follow-up, patients with SCT are not reliably notified, and genetic counseling may be minimal (2)."

Universal newborn screening for sickle hemoglobinopathies has been introduced to identify individuals with sickle cell disease (SCD) that has, by default, identified individuals with sickle cell trait (SCT). While the diagnosis of SCD comes with extensive counseling and follow-up, patients with SCT are not reliably notified, and genetic counseling may be minimal (2). Although SCT is not broadly perceived as a disease state, SCT can increase the risk for complications such as exertion-related injury, venous thromboembolism, renal medullary carcinoma, and chronic kidney disease (3). There is particularly limited literature looking into the impact of SCT on reproductive health and pregnancy-associated complications. While some studies have shown an increased risk of stillbirth in those with SCT, work to date has led to conflicting results, likely due to limitations that include small sample size, limitation of analysis to one race or ethnicity, and presence of confounding variables (4-6).

In a recent retrospective cohort study by Canelon et al., authors assessed the association between SCT and stillbirth outcome in patients at Penn Medicine between 2010 and 2017 (7). Of the 63,334 deliveries that occurred during this time, 2482 newborns had SCT, and 215 newborns had SCD. 0.8% of deliveries in the general population resulted in stillbirth. While of the deliveries in patients with SCT, the prevalence of stillbirth was 1.1% and 2.3% in patients with SCD. After adjusting for additional risk factors, patients with SCT were still at increased risk for delivery resulting in stillbirth relative to those without SCT (adjusted odds ratio, aOR 8.94; 95% CI, 1.05-75.79; p = 0.045). Stillbirth did not show predominance in those with SCT from any specific race or ethnicity. Multiple gestation deliveries were also associated with stillbirth (aOR, 4.68; 95%CI, 3.48-6.29; P < .001).

Many studies on sickle cell hemoglobinopathies in the United States have isolated analysis to African American populations only, leading to limitations on the applicability of data and assumptions of disease prevalence. This may be because SCD and SCT are most commonly diagnosed amongst African American patients. By including all patients who experienced stillbirth, the authors could provide a comprehensive assessment of SCT's impact on stillbirth. Further, the authors were the first to consider each racial and ethnic identity independently to gauge the role of racism in stillbirth. In doing so, the authors could not find an association between SCT and stillbirth among Black or African American patients. Given conflicting information with previous studies and the presence of confounding factors that are difficult to separate, the data can be challenging to interpret. The authors emphasize the importance of looking at diverse patient populations and the need for further studies on the role of racism in stillbirth.

"Given conflicting information with previous studies and the presence of confounding factors that are difficult to separate, the data can be challenging to interpret. The authors emphasize the importance of looking at diverse patient populations and the need for further studies on the role of racism in stillbirth."

In conclusion, this study used data from a large population to show that, in addition to patients with SCD, SCT also confers a higher risk for stillbirth than the general population. The authors identify a need for increased support for genetic counseling that could be provided during prenatal gynecologic and the postnatal period. It would also be of interest to identify the mechanistic role

of SCT in its various associated disease processes. Further work should include all patients with SCT instead of isolating studies to one race or ethnicity.

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Disclosures: The authors have no disclosures

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Which Infants are More Vulnerable *to Respiratory Syncytial Virus?*

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

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

*Source: Respirator Syncytial Virus and African Americans

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

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

AfPA
Alliance for Patient Access

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.

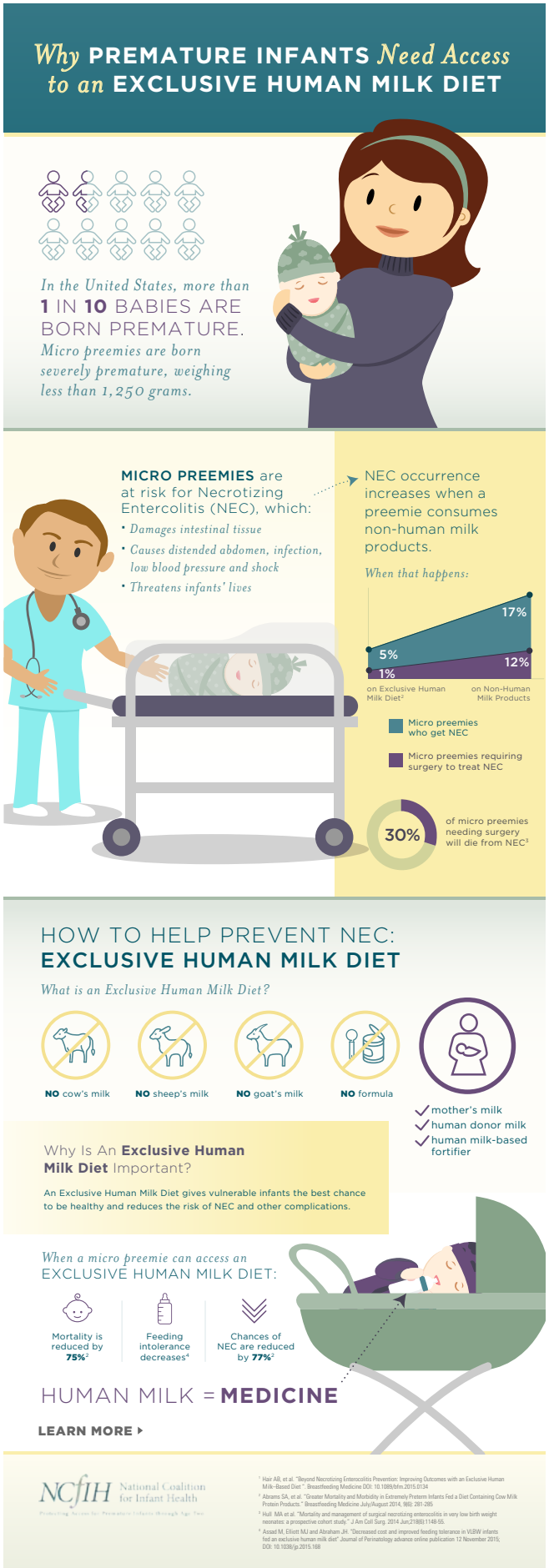
She might be receiving Medication-Assisted Treatment (MAT). My NAS may be a side effect of her appropriate medical care. It is not evidence of abuse or mistreatment.

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



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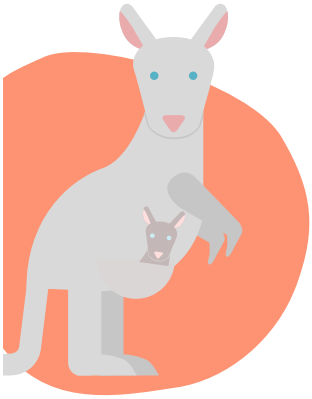

GET INFORMED ABOUT THE RISKS + BENEFITS

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

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NPN NICU PARENT NETWORK

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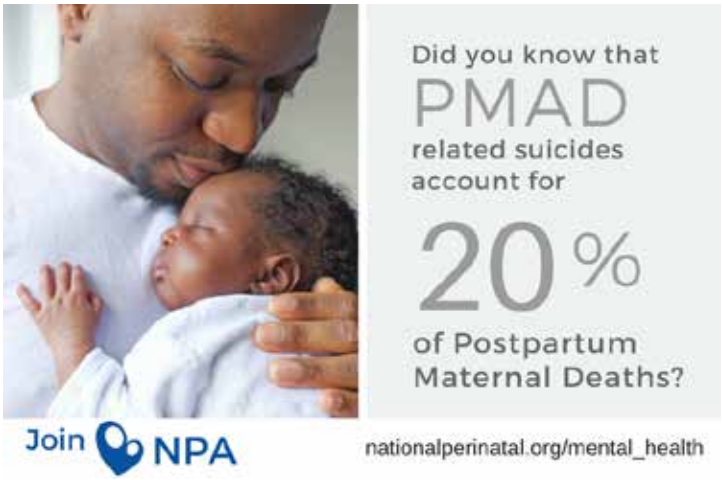
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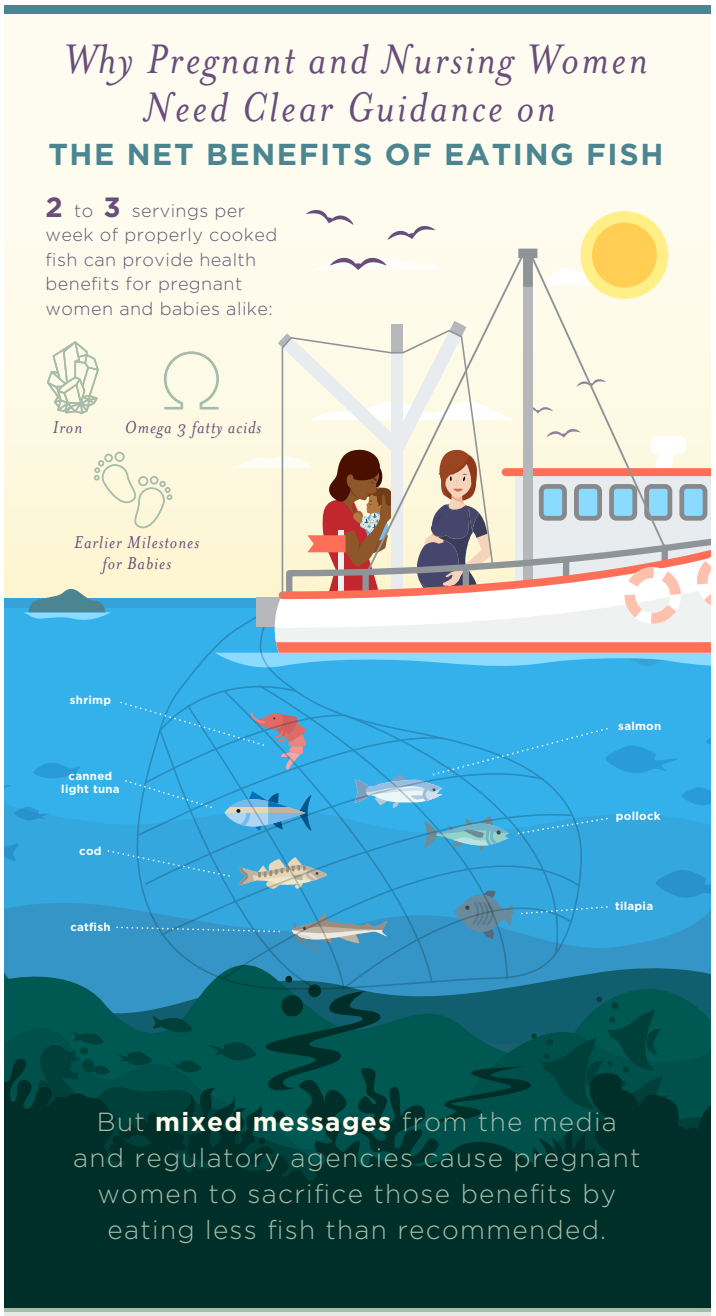
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fish can provide health
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women and babies alike:
Iron
Omega 3 fatty acids
Earlier Milestones
for Babies
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canned
light tuna
cod
catfish
salmon
pollock
tilapia
But mixed messages from the media
and regulatory agencies cause pregnant
women to sacrifice those benefits by
eating less fish than recommended.


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Letters to the Editor

Urgent Need of Antibiotic Stewardship in the NICU

Letter to the Editor

Antibiotics usage has increased in neonatal intensive care units (NICU). Recently, Jiang et al. (1) described a high antibiotic use rate among infants in the NICU in China. It was alarming to note that the median duration of each antibiotic course was nine days. One plausible reason for the increased use of antibiotics in the NICU is the overdiagnosis of suspected sepsis and inappropriate use of Neonatal Early-Onset Sepsis Calculator (EOS) in suspected cases of chorioamnionitis. (2)

In our unit, we use parenteral ampicillin and gentamicin as empiric regimens for early-onset sepsis and vancomycin and piperacillin-tazobactam combination for late-onset sepsis. In most cases, we discontinue antibiotics within 48-72 hours if cultures are negative at that point. However, there is some variation in practice with elevated C-reactive protein (CRP). In a recent systematic review and meta-analysis, Brown et al. (3) reported serum C-reactive protein's low diagnostic test accuracy. They found the median specificity of CRP as 74% and pooled sensitivity of 62%. Burstein et al. (4) suggested that clinicians should not stop using CRP. Thus, controversy exists among clinicians, and some continue antibiotics while waiting for the final culture report.

Despite the best practice, variation remains in the length of antibiotics use, which has changed the resistance pattern of organisms. We recently encountered a case of positive urine culture where the *Serratia marcescsens* isolate was resistant to piperacillin-tazobactam. Moreover, endotracheal cultures obtained as a workup for newborns with suspected late-onset sepsis have shown that Klebsiella oxytoca and Enterobacter cloacae isolates are both Carbapenem-resistant Enterobacteriaceae (CRE) organisms. Fifty isolates of CRE from intensive care units samples were processed at a tertiary center in Pakistan to determine their molecular characterization; 16 % of these cultures, obtained during the 9-month study period, correspond to patients in the NICU. (5)

We could not find similar reports of CRE organisms in NICUs of the United States of America, which is, in fact, alarming. As such, our Division of Pediatric Infectious Diseases, along with Infection Control, has taken strong notice of the evolving antibiotic resistance patterns and would be reviewing the antibiotic usage in the NICU, as suggested by Cantey et al. (6) This will be one of the main interventional targets of the novel Antibiotic Stewardship committee at our academic medical center.

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Dear Drs. Manzar and Pichilingue-Reto,

Thank you for drawing attention to these issues. Sepsis evaluation and workup are constantly in flux. Penicillin was seen as a panacea for all bacterial infections going back to the beginning of

antibiotic therapy. Emerging patterns of resistance and bacteria formerly unknown to cause sepsis displaced Penicillin as a cure-all. In those days, the emergence of antibiotic resistance was a sobering reminder of the imperfectness of innovation.(1, 2)

With newer antibiotics came new resistances and new infections with other opportunistic bacteria that often occupied niches that were previously occupied by bacteria that were more easily treated by antibiotics like Penicillin. As we innovated, bacteria followed our example. Now, we are seeing increasingly evolved bacteria that do not respond to even the more sophisticated strategies developed to deal with the myriad patterns that we have identified over the generations.(3, 4)

Carefully selecting patients who should receive antibiotic therapy may be useful to prevent the rapid emergence of resistance. Indeed, Antibiotic stewardship should help, not by preventing the emergence of resistance in the bacteria that we need to treat, but by preventing the emergence of resistant bacteria in individuals who do not actually have a clinical infection. It is important to acknowledge that many of these bacteria have genetic variations that code for resistance that has been traced back for millennia. It is the selection of these variants that we wish to avoid. (5, 6)

Carbapenem-resistant resistance is a relatively new phenomenon in the scope of antibiotic resistance. The usual delays in publishing may be responsible for the apparent absence of data in the US literature. We must take careful note of what happens across the globe. (4) As with COVID, what happens on the other side of the planet has far-reaching implications for the care of our babies here in the United States. Antibiotic resistance is not confined to other countries, and the emergence of these patterns in other countries is not an indictment of the care provided there. Instead, it is an expression of the globalization of healthcare and the need to recognize even what appears to be another region's concern as our own.

I applaud your center's initiative to look more carefully into this issue and would welcome further correspondence on the results of your inquiry.

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NEONATOLOGY TODAY

Loma Linda Publishing Company

A Delaware "not for profit" 501(c) 3 Corporation.

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11175 Campus Street, Suite #11121

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Erratum (Neonatology Today December 2021

Neonatology Today is not aware of any erratum affecting the December, 2021 edition.

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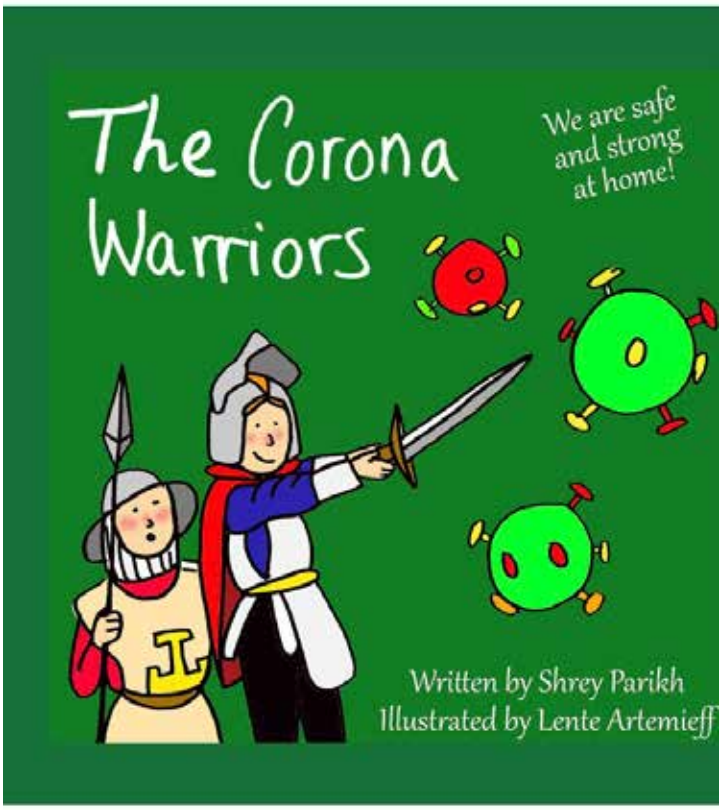

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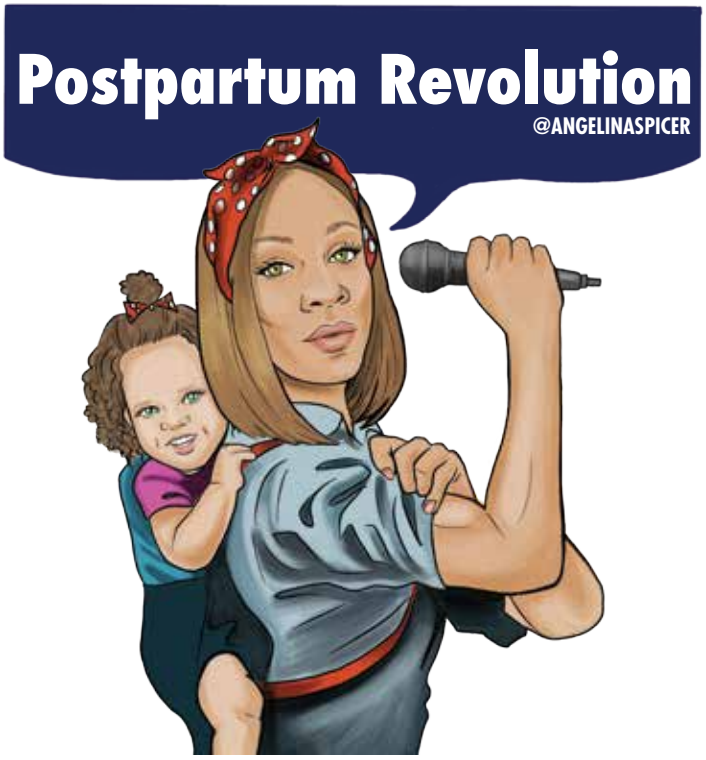

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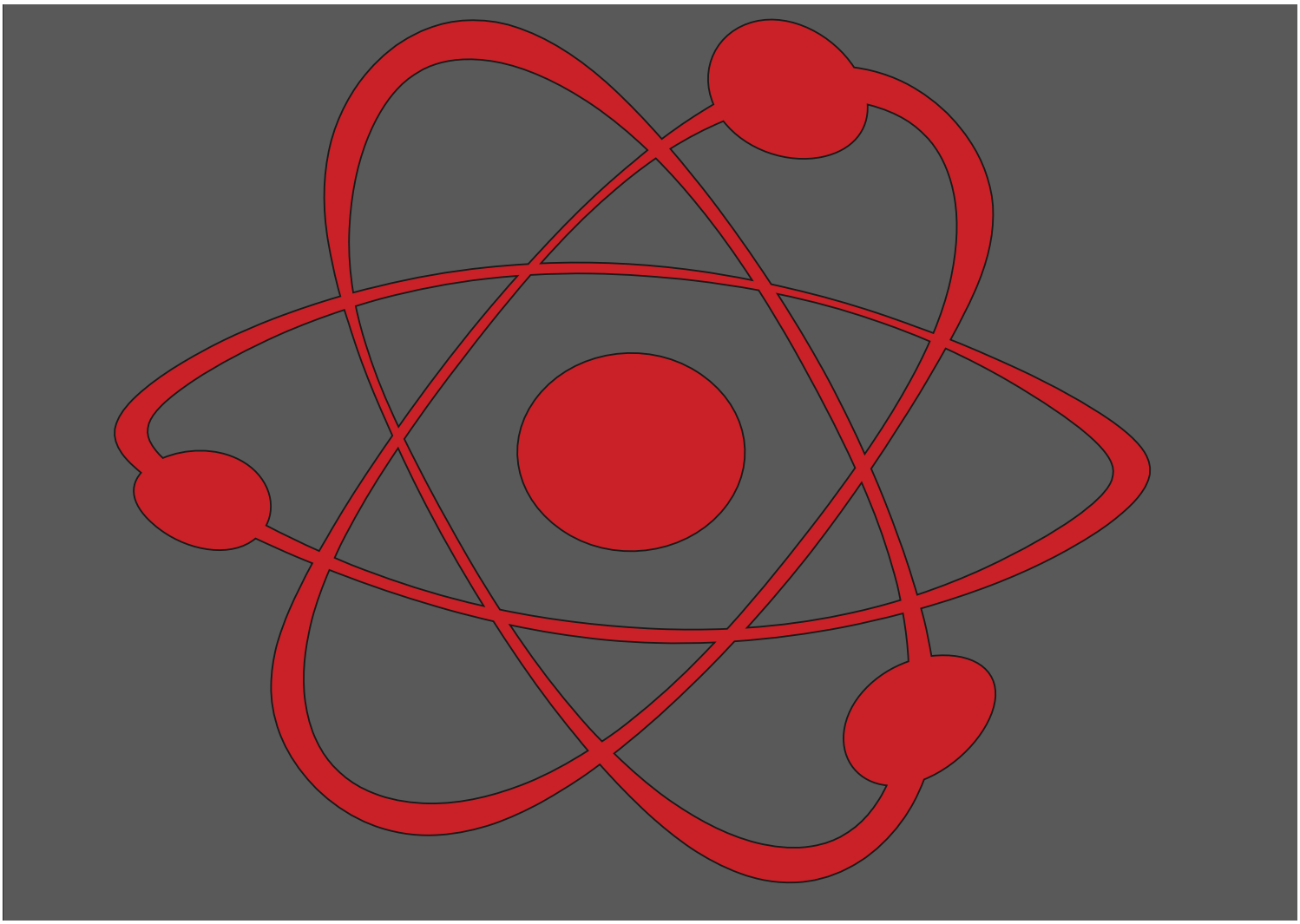

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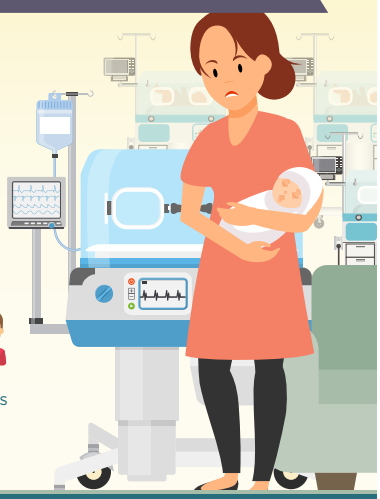
Will your **PRETERM INFANT** *need* **EARLY INTERVENTION** *services?*

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



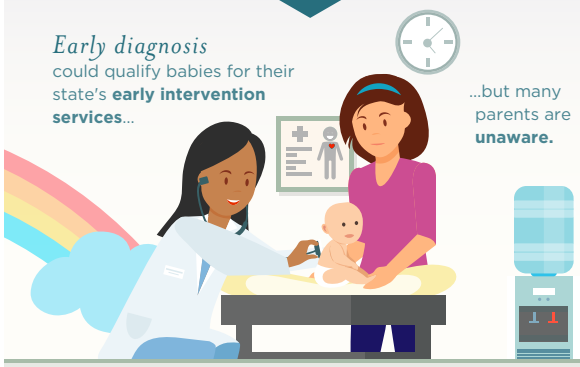
Early intervention can help preterm infants:

- 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.

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Visit **CDC.gov** to find contact information for your state's early intervention program.

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- Llanto incontrolable
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- Ideas de hacerse daño a sí mismas o al bebé
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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*

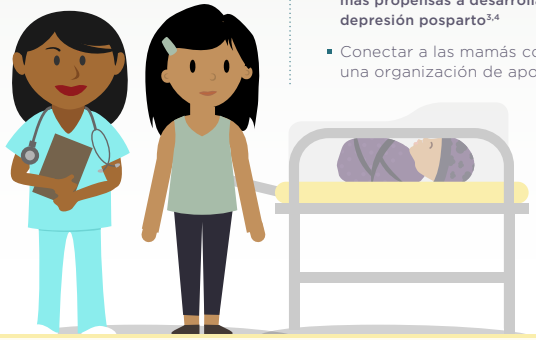
PARA AYUDAR **A LAS MADRES A ENFRENTAR LA DEPRESIÓN POSPARTO**

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

www.infanthealth.org

[1] American Psychological Association. Accesible en: http://www.apa.org/pi/women/resources/reports/postpartum-depression.aspx

[2] National Institute of Mental Health. Accesible en: https://www.nimh.nih.gov/health/publications/postpartum-depression-facts/index.shtml

[3] Journal of Perinatology (2015) 35, 529–536; doi:10.1038/jp.2015.147.

[4] Prevalence and risk factors for postpartum depression among women with preterm and low-birth-weight infants: a systematic review. Vigod SN, Villegas L, Dennis CL, Ross LE BJOG. 2010 Apr; 117(5):540-50.

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2022

Perinatology at the Intersection of Health Equity and Social Justice

NPA's 42nd ANNUAL INTERDISCIPLINARY CONFERENCE

DATES May 2 - 4

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- Innovative Models of Care
- Applied or Basic Research
- Public Policies or Local Initiatives

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VENUE Hyatt Regency Aurora-Denver

www.NPAconference.org

National Perinatal Association

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An Intensive Review and Update of Neonatal-Perinatal Medicine
January 22-26, 2022
San Antonio, Texas
https://shop.aap.org/live-activities/

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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.

NEONATOLOGY TODAY

ISSN: 1932-7137 (Online). ISSN:: 1932-7129 (Print). Published monthly.

Publication
Mitchell Goldstein, MD
Loma Linda Publishing Company
11175 Campus Street
Suite #11121
Loma Linda, CA 92354
www.NeonatologyToday.net
Tel: +1 (302) 313-9984
LomaLindaPublishingCompany@gmail.com

Editorial and Subscription
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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!

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AcademyofNeonatalCare.org/register

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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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Loma Linda Publishing Company | c/o Mitchell Goldstein, MD | 11175 Campus St, Ste. 11121 | Loma Linda, CA 92354 |
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NT

Neonatology and the Arts

This section focuses on artistic work which is by those with an interest in Neonatology and Perinatology. The topics may be varied, but preference will be given to those works that focus on topics that are related to the fields of Neonatology, Pediatrics, and Perinatology. Contributions may include drawings, paintings, sketches, and other digital renderings. Photographs and video shorts may also be submitted. In order for the work to be considered, you must have the consent of any person whose photograph appears in the submission.

Works that have been published in another format are eligible for consideration as long as the contributor either owns the copyright or has secured copyright release prior to submission.

Logos and trademarks will usually not qualify for publication.

This month we continue to feature artistic works created by our readers on one page as well as photographs of birds on another. This month's original artwork is features Paula Whiteman, MD. Her first piece is a Dimetrodon (the "cutest one ever," her words) and a Peacock. Perhaps she'll set up a gallery one of these days?

Herbert Vasquez, MD,
Associate Neonatologist, Queen of the Valley Campus
Emanate Health, West Covina, CA
VasquezH1@gmail.com

NT

Manuscript Submission: Instructions to Authors

1. Manuscripts are solicited by members of the Editorial Board or may be submitted by readers or other interested parties. Neonatology Today welcomes the submission of all academic manuscripts including randomized control trials, case reports, guidelines, best practice analysis, QI/QA, conference abstracts, and other important works. All content is subject to peer review.

2. All material should be emailed to: LomaLindaPublishingCompany@gmail.com in a Microsoft Word, Open Office, or XML format for the textual material and separate files (tif, eps, jpg, gif, ai, psd, or pdf) for each figure. Preferred formats are ai, psd, or pdf. tif and jpg images should have sufficient resolution so as not to have visible pixilation for the intended dimension. In general, if acceptable for publication, submissions will be published within 3 months.

3. There is no charge for submission, publication (regardless of number of graphics and charts), use of color, or length. Published content will be freely available after publication. There is no charge for your manuscript to be published. NT does maintain a copyright of your published manuscript.

4. The title page should contain a brief title and full names of all authors, their professional degrees, their institutional affiliations, and any conflict of interest relevant to the manuscript. The principal author should be identified as the first author. Contact information for the principal author including phone number, fax number, e-mail address, and mailing address should be included.

5. A brief biographical sketch (very short paragraph) of the principal author including current position and academic titles as well as fellowship status in professional societies should be included. A picture of the principal (corresponding) author and supporting authors should be submitted if available.

6. An abstract may be submitted.

7. The main text of the article should be written in formal style using correct English. The length may be up to 10,000 words. Abbreviations which are commonplace in neonatology or in the lay literature may be used.

8. References should be included in standard "NLM" format (APA 7th may also be used). Bibliography Software should be used to facilitate formatting and to ensure that the correct formatting and abbreviations are used for references.

9. Figures should be submitted separately as individual separate electronic files. Numbered figure captions should be included in the main file after the references. Captions should be brief.

10. Only manuscripts that have not been published previously will be considered for publication except under special circumstances. Prior publication must be disclosed on submission. Published articles become the property of the Neonatology Today and may not be published, copied or reproduced elsewhere without permission from Neonatology Today.

11. NT recommends reading Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals from ICMJE prior to submission if there is any question regarding the appropriateness of a manuscript. NT follows Principles of Transparency and Best Practice in Scholarly Publishing(a joint statement by COPE, DOAJ, WAME, and OASPA). Published articles become the property of the Neonatology Today and may not be published, copied or reproduced elsewhere without permission from Neonatology Today.

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Earn:

- Up to **14 *AMA PRA Category 1 Credit*™**
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For the latest updates and to register, visit shop.aap.org/perinatal2022.

Save $150!
Register by February 25, 2022 for early bird rates

REGISTER

Be sure to register for the Neonatal Coding Seminar!

S01: Coding Seminar ***(Separate Registration Required)***
Friday, March 25, 2022
7:30AM-12:30PM
Scott Davis Duncan, MD, FAAP

This session will update the audience on changes in neonatal coding practices, using didactic presentations and clinical scenarios. There will be time for questions and discussion with audience participation.

S02: Neonatal Coding: Afternoon Deep Dive* ***(Must be registered for S01 Coding Seminar)***
Friday, March 25, 2022
1:00PM-3:00PM
Scott Davis Duncan, MD, FAAP

Join the Section on NPM Coding Trainers Committee immediately after lunch for an afternoon discussion exclusively devoted to issues and concerns relevant to your practices.

**Not designated for CME credit*

Sessions Include:

- Challenged to Change: Confronting Structural Racism within the NICU Ecosystem
- Developing National Standards to Support Risk-Appropriate Neonatal Care
- Trauma Informed Clinical Care Practice: An Introduction Patient Revenue vs Patient Care
- The Credible Pediatrician Advocate
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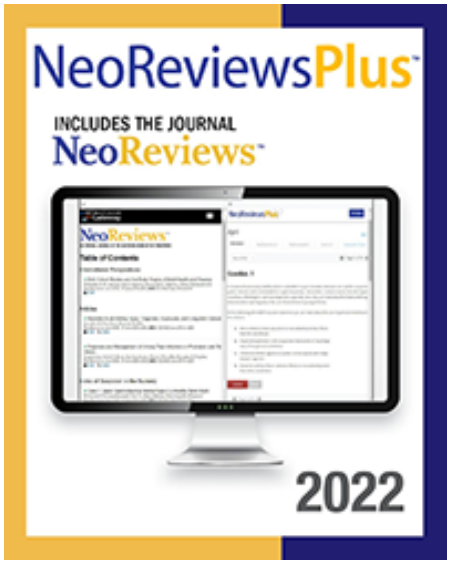

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Due to Covid-19 restrictions, space at this course is limited. The course may fill, registration may close, and hotel room blocks may sell out, even before the early bird deadline. Register early to avoid disappointment.

The AAP cannot be responsible for expenses incurred by an individual who is not confirmed and for whom space is not available at the course. Costs incurred, such as airline and hotel penalties, are the responsibility of the individual.

COVID-19 Safety Precautions
As this course approaches, the AAP will seek guidance from local and national public health experts on implementing the necessary precautions to ensure the health and safety of all attendees, staff, and local community members.

Proof of vaccination will be required for all registrants. Instructions for providing proof will be sent to registrants soon. Adults and children older than 2 years of age are required to wear a mask in all AAP course settings.

Save $150!
Register by February 25, 2022 for early bird rates

REGISTER

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.**


"Dimetrodon"