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Guidelines for Perinatal Management of the Extremely Premature Infant During the First Week of Life

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PROVISIONAL BEST PRACTICE STATEMENT:

Regardless of the level of care, every perinatal unit should implement an organized plan to address the unique physiologic needs and challenges of the preterm infant.

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While Intraventricular Hemorrhage (IVH) remains the most common cause of brain injury in pre-term infants, it is recognized that neurologic injury can be caused by a variety of insults including, but not limited to, white matter injury, inflammatory changes, infection, intermittent hypoxia, and nutritional deficiencies. For IVH, there is an inverse relationship between gestational age at birth and injury risk, with nearly all cases occurring in the first week of life and many within the first 24 hours of life. (1) Other causes of neurologic injury may be more insidious, and the infant is at risk throughout the NICU hospitalization. Prevention of preterm birth and extension of gestation is the ultimate strategy to reduce rates of neurologic injury in extremely premature infants. Several interventions exist to reduce the risk of adverse outcomes if preterm birth cannot be prevented. These guidelines will describe strategies in the antepartum period, during resuscitation and transition to extra-uterine life, and the early postnatal phase of care.

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"While the primary focus is reducing the risk of IVH, the guidance attempts to address all causes of adverse outcomes. Wherever possible, the available evidence in the literature was used to guide recommendations. When evidence is equivocal, recommendations are based on committee consensus opinion. Overall, consistent care with the implementation of guidelines and a multidisciplinary team approach is imperative for caring for extremely premature neonates. (2–4)"

While the primary focus is reducing the risk of IVH, the guidance attempts to address all causes of adverse outcomes. Wherever possible, the available evidence in the literature was used to guide recommendations. When evidence is equivocal, recommendations are based on committee consensus opinion. Overall, consistent care with the implementation of guidelines and a multidisciplinary team approach is imperative for caring for extremely premature neonates. (2–4)

"American College of Obstetricians and Gynecologists (ACOG) Interim Update, Oct 2017 (5), defined periviability as 'newborns delivered near the limit of viability whose outcomes range from certain or near-certain death to likely survival with a high likelihood of serious morbidities.'"

ANTENATAL CARE:

American College of Obstetricians and Gynecologists (ACOG) Interim Update, Oct 2017 (5), defined periviability as "newborns delivered near the limit of viability whose outcomes range from certain or near-certain death to likely survival with a high likelihood of serious morbidities." The Joint Workshop of SMFM (Society for Maternal-Fetal Medicine), NICHD (National Institute of Child Health and Human Development), AAP (American Academy of Pediatrics) Section on Neonatal-Perinatal Medicine, and ACOG define periviable birth as 20+0/7 to 25+6/7 weeks gestational age (GA). (6) Doshi et al, published in 2022 on the survival of extremely

premature infants to discharge and secondary outcomes including, bronchopulmonary dysplasia, necrotizing enterocolitis stage ≥2, periventricular leukomalacia, severe intraventricular hemorrhage, and severe retinopathy of prematurity.

Of the 71,854 infants born ≤ 24 weeks GA from 2009-2018, 34,251 (47.7%) survived < 1 day and were excluded from the study. Among 37,603 infants included in the study cohort, 48.1% were born at 24 weeks GA. Of these, survival to discharge increased from 58.3 to 65.9%. Survival to discharge for infants ≤23 weeks GA increased from 29.6% in 2009 to 41.7% in 2018. About 90% of infants born ≤ 23 weeks GA either died or had at least one major morbidity (BPD, severe NEC, severe neurological injury, and severe ROP) compared with 80% of infants born at 24 weeks GA.

"Communicate discussion and plan of care with obstetrics/maternal-fetal medicine (OB/MFM). Outcomes should be discussed with parents and OB/MFM to understand possible treatment options. The parents should receive the most accurate and up-to-date prognostic data to help them make decisions. Counseling should be individualized—avoid "always" or "never" as a part of the consult; care should be provided in steps, with frequent re-evaluation."

Younge et al. reported on outcomes of 4,000 births between 2001–2011, at 22+0/7 to 23+6/7 weeks gestation, 64% died, and 16% were severely impaired. Among infants 22+0/7 to 22+6/7 weeks gestational age, death rates were 97–98%, with only 1% surviving without neurodevelopmental impairment. In those born at 24+0/7 to 24+6/7 weeks gestation, 55% of neonates survived, 32% without evidence of neurodevelopmental impairment at 18–22 months corrected gestational age (CGA).

Death, neurodevelopmental impairments, and adverse outcomes remain high in newborns born at periviable age despite improvements in care. Outcomes are better grouped with adjacent weeks—i.e., 22+6/7 week outcomes are closer to 23-week vs. 22-week outcomes, and 22+1 week outcomes are closer to 21-week versus 22-week outcomes.

Prenatal Periviable Counseling:

When possible, offer an antenatal consultation with neonatology for families anticipating the delivery of an extremely immature periviable infant. Document the consultation and recommendations in the mother's electronic record. The attending neonatologist should be notified of a pending delivery of an infant in the periviable period and, ideally, personally attend the delivery.

Communicate discussion and plan of care with obstetrics/maternal-fetal medicine (OB/MFM). Outcomes should be discussed with parents and OB/MFM to understand possible treatment options. The parents should receive the most accurate and up-to-date prognostic data to help them make decisions. Counseling should be individualized—avoid "always" or "never" as a part of the consult; care should be provided in steps, with frequent re-evaluation.

NIH (National Institutes of Health) provides a website called Extremely Preterm Birth Outcomes Tool [https://www.nichd.nih.gov/research/supported/EPBO] with national data for survival and morbidity based on gestational age, gender, antenatal steroid use, singleton/multiple births, and birth weight, that may be utilized when counseling parents. (8,9) Gestational age, fetal weight, family values, and ongoing evaluation of fetal or neonatal conditions should guide resuscitation decisions. It is also guided by institutional policy and local/relevant law. The decision should not be based on gestational age alone.

During parental counseling on periviable birth, including the option that comfort care may be the most appropriate. Parents and professionals need to understand that choosing non-resuscitation is not a decision to provide no care but rather a decision to redirect care to comfort measures.

Electronic fetal heart rate monitoring should not be seen as an intervention but as a tool to guide decision-making. However, fetal monitoring is not synonymous with the need to perform a cesarean section or provide full resuscitation.

"According to the Cochrane Review for use of antenatal corticosteroids, published in 2020, corticosteroids are associated with a reduction in multiple severe neonatal outcomes, including perinatal death, neonatal death, and respiratory distress syndrome (RDS). Antenatal corticosteroids probably reduce the risk of intraventricular hemorrhage (IVH) and childhood developmental delay. (10) Based on this review, a single course of antenatal corticosteroids is recommended in women at risk for preterm birth."

Antenatal Corticosteroids:

According to the Cochrane Review for use of antenatal corticosteroids, published in 2020, corticosteroids are associated with a reduction in multiple severe neonatal outcomes, including perinatal death, neonatal death, and respiratory distress syndrome (RDS). Antenatal corticosteroids probably reduce the risk of intraventricular hemorrhage (IVH) and childhood developmental delay. (10) Based on this review, a single course of antenatal corticosteroids is recommended in women at risk for preterm birth. Per their research findings, continued information is needed for the optimal timing of administration, which corticosteroid to use, and the potential benefits of subsequent courses.

Corticosteroids work by maturing many organ systems. (11) They increase the appearance of pulmonary surfactants and thereby decrease RDS. The corticosteroid effect on decreased IVH appears to be due to the enhanced circulatory stability in the vulnerable vascular germinal matrix and the subsequent protection from

alterations in cerebral blood flow. (12)

"According to the 2009 Cochrane review, antenatal magnesium is neuroprotective to preterm fetuses by decreasing the risk of cerebral palsy and gross motor dysfunction at two years of age. There was not a significant effect on childhood mortality or other childhood disabilities."

Corticosteroids have the greatest efficacy within 2–7 days of anticipated delivery after the first dose. The current practice is administering corticosteroids in two doses, 24 hours apart. (13) The current dosing recommendation is betamethasone 12 mg q24h x 2 doses or dexamethasone 6 mg q12h x 4 doses. ACOG most recently updated their recommendation on antenatal steroid administration in 2021, stating that OB providers may consider administering corticosteroids between 22+0/7 to 22+6/7 weeks gestational age if resuscitation is planned after appropriate counseling. There may be a role for a shortened dosing interval if delivery is imminent and two doses, 24 hours apart, is not feasible. (14)

Per the ACOG 2017 committee opinion, OB providers may consider a single repeat (rescue) course of corticosteroids if the first course was more than 14 days and imminent delivery is suspected in the next week. (15) However, a recently published quality improvement project advocated for "rescue betamethasone" if the initial course was >7–10 days before expected delivery. (16)

"According to ACOG, to reduce maternal and neonatal infections and GA-dependent morbidity, a 7-day course of therapy of latency antibiotics is recommended during expectant management of women with preterm pre-labor rupture of membranes (PROM) for <34+0/7 weeks of gestation."

Magnesium:

According to the 2009 Cochrane review, antenatal magnesium is neuroprotective to preterm fetuses by decreasing the risk of cerebral palsy and gross motor dysfunction at two years of age. There was not a significant effect on childhood mortality or other childhood disabilities. (17)

The mechanisms are not well understood, but several hypotheses have been made, including decreased excitotoxicity NMDA receptor antagonism, thereby decreasing excitatory neurotransmitters (such as glutamate). Additionally, magnesium may have anti-inflammatory effects, resulting in less oxidative stress and cytokine injury. (18)

ACOG supports the short-term (<48 hours) use of magnesium sulfate for fetal neuroprotection in preterm delivery (<32 weeks) suspected to occur within 24 hours. In a trial looking at doses of magnesium, there was no difference in outcomes between 4 g versus 6 g; therefore, the recommended loading dose is 4 g. Continued magnesium maintenance may be given over the next 48 hours though current data do not specify the optimal duration of therapy before delivery. (19)

ACOG lists the absolute or relative contraindications for maternal magnesium as myasthenia gravis, severe renal failure, cardiac ischemia, heart block, and pulmonary edema. Alternative therapy may include levetiracetam, but efficacy is uncertain. (20)

Infection Screening:

According to ACOG, to reduce maternal and neonatal infections and GA-dependent morbidity, a 7-day course of therapy of latency antibiotics is recommended during expectant management of women with preterm pre-labor rupture of membranes (PROM) for <34+0/7 weeks of gestation. (21)

Preterm delivery complications following PROM may include clinical intra-amniotic infection, abnormal fetal testing, and significant abruptio placentae.

Best Practice Summary for Antenatal Care:

- Offer multidisciplinary counseling with OB/MFM, the NICU team, and parents when preterm delivery is a possibility.
- Use the NIH website for up-to-date survival and morbidity estimates.
- The parents may choose not to resuscitate between 22+0/7 to 23+6/7 weeks GA after counseling.
- Unless there is a significant or lethal known co-morbidity, recommend universal resuscitation beginning at 24 weeks GA.
- When resuscitation is planned: Antenatal steroids may be given starting at 22+0/7 weeks gestation
- Consider shorter interval steroids if delivery is imminent and two doses, 24 hours apart is not feasible.
- Consider a rescue course of steroids if the initial course was given >7–10 days from the expected delivery
- Magnesium (short term, <48 hours) beginning at 22+0 weeks GA for possible preterm delivery
- Routine fetal monitoring may begin at 22+0 weeks gestation
- Cesarean delivery would not be routinely offered before 23+0 weeks gestation, unless for maternal indications, after discussion as a multidisciplinary team with OB/MFM.
- A 7-day course of therapy of latency antibiotics is recommended during expectant management of women with preterm PROM <34+0/7 weeks of gestation.

DELIVERY ROOM MANAGEMENT:

When there is an impending delivery of an extremely premature infant, the NICU resuscitation team should lead the resuscitation. Specialized procedures and equipment checklists can be utilized for these deliveries to coordinate care and improve outcomes. A sample checklist is included in the Appendix. The NICU resuscitation team should brief the OB/MFM team on the resuscitation plan, including, but not limited to, the candidacy of delayed/deferred cord clamping and initial steps to be taken while the baby is still on placental support.

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Delayed/Deferred Cord Clamping:

Delayed/deferred cord clamping (DCC) is associated with many benefits for preterm infants, including reduced relative risk of death before discharge, improved transitional circulation, decreased need for blood transfusion, and decreased intraventricular hemorrhage. (22)

ACOG defines and recommends delayed cord clamping in both term and preterm for 30–60 seconds in vigorous infants. The AAP supports this statement and recommendation. The World Health Organization (WHO) recommends that the umbilical cord not be clamped earlier than 1 minute (60–180 seconds). The duration of DCC still needs further research, and some professionals may advocate for using signs of adaptation, such as ventilation, rather than an exact time. (23) Potential contraindications for DCC may include significant maternal bleeding, including separation of the placenta or compromised cord integrity.

The initial steps of newborn resuscitation should be started during DCC. Umbilical cord milking (UCM) continues to be researched, but a study published in 2015 was halted in 23–27 week GA premature infants due to increased risk of severe IVH. (24) There is not enough evidence to support or refute cord milking >32 weeks GA, and more research is needed on UCM <32 weeks GA safety. (25)

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Delivery Room Temperature:

Extremely premature infants lack brown adipose tissue and thereby cannot activate thermogenesis. Both hypothermia and hyperthermia can be harmful during the stabilization of extremely low birth weight (ELBW) infants. Every 1 °C below 36 °C on admission increases mortality by 28%. (26)

Hyperthermia also carries significant morbidity and mortality in ELBW infants, including changes in cerebral blood flow and the release of neuro-excitotoxic products. (27,28)

The World Health Organization (WHO) recommends setting the delivery room temperature at 25 °C. (29)The Neonatal Resuscitation Program (NRP) guidelines recommend a delivery room (DR) temperature of 26 °C for infants < 1500 g. (30)

"The World Health Organization recommends setting the delivery room temperature at 25 °C. The Neonatal Resuscitation Program guidelines recommend a delivery room temperature of 26 °C for infants < 1500 g."

Adjunctive Temperature Control Methods:

Heat loss in the delivery room includes convective, conductive, evaporative, and radiant heat loss. During the first few minutes of life, peak water loss occurs, resulting in a significant loss of heat and fluid. (31) Without drying, all ELBW infants should be placed in a polyethylene or polyurethane bag /wrap (e.g., NeoWrap) to prevent evaporative and conductive heat losses. (32) The infant should be placed immediately in the plastic wrap during delayed cord clamping.

"Heat loss in the delivery room includes convective, conductive, evaporative, and radiant heat loss. During the first few minutes of life, peak water loss occurs, resulting in a significant loss of heat and fluid. Without drying, all ELBW infants should be placed in a polyethylene or polyurethane bag /wrap (e.g., NeoWrap) to prevent evaporative and conductive heat losses."

After the cord is cut, the infant should continue resuscitation under the radiant warmer while in the polyurethane bag, with an exothermic mattress placed underneath the infant. The head should be covered with a hat. Transfers of ELBW infants among beds and inter-hospital transfers provide additional risks of thermal stress. Resuscitation in an isolette is recommended to limit transfers from bed to bed.

Initial Oxygen during Resuscitation:

Use warm, humidified gases during resuscitation for infants <32 weeks of gestation. (30,33) For infants ≥35 weeks of gestation, start with an initial FiO_2 of 0.21. For infants 32–35 weeks of gestation, start with an initial FiO_2 of 0.21–0.3. For infants 32–35 weeks of gestation, there is not enough evidence to support a specific starting FiO_2 within the range of FiO_2 0.21-0.3. In two blinded RCTs comparing initial FiO_2 of 0.3 versus 0.6 or 0.65, there was a tendency toward an increased survival rate in the group with 0.3 initial oxygen. (34–36) For infants <32 weeks of gestation, start with an initial FiO_2 of 0.30. Target a SpO_2 of 80%–85% within 5 minutes, as failure to achieve this goal is associated with poor outcomes, including IVH. (37–39)

Intubation in the Delivery Room:

An attending physician, if possible, or a person most skilled at performing endotracheal intubation should be present for the resuscitation of ELBW infants. The most experienced resuscitation team member should intubate the ELBW infant.

"Intubation of ELBW should be reserved for those demonstrating persistent difficulty with transition after birth, after non-invasive measures such as PPV and oxygen. These indicators include but are not limited to, persistently low heart rate, high oxygen amount, and high pressures."

The increased number of attempts at intubation increases the risk of IVH. (40) There should be no more than two attempts at intubation by any team member, if possible. An intubation attempt includes direct laryngoscopy and an attempt at passing the endotracheal tube through the cords. (40,41) Before any intubation attempt on ELBW babies, trainees, such as fellows, must demonstrate competency in independent procedures.

Intubation of ELBW should be reserved for those demonstrating persistent difficulty with transition after birth, after non-invasive measures such as PPV and oxygen. These indicators include but are not limited to, persistently low heart rate, high oxygen amount, and high pressures.

"Similarly, for infants <30 weeks, there is not strong data supporting any specific non-invasive method over another (CPAP vs. NIMV) with the currently available studies. The key is helping the extremely premature infant to acquire and maintain functional residual capacity (FRC)."

Non-invasive Mechanical Ventilation (NIMV) During Resuscitation:

No convincing evidence shows that elective intubation confers any specific protective neurologic effects, and initial non-invasive ventilatory support should be considered the default. (42) Similarly, for infants <30 weeks, there is not strong data supporting any specific non-invasive method over another (CPAP vs. NIMV) with the currently available studies. The key is helping the extremely premature infant to acquire and maintain functional residual capacity (FRC). (43) However, given the equal lack of data showing harm, it may be pragmatic to utilize whichever mode that units feel more confident and comfortable with. (44–47)

Utilizing a CO_2 colorimetric detector with bag-mask-ventilation or T-piece ventilation during resuscitation may improve recognition of airway obstruction and may be an early indicator of improvement before changes in heart rate or saturation. (48,49)

"Therapeutic positioning and sound control start in the delivery room. Handling, touch, and noise may all represent noxious stimuli to an ELBW infant. An ELBW infant cannot self-regulate due to a lack of neurological organization during the third trimester. (50) Physiologic responses to these stimuli include changes in heart rate, respiratory rate, and saturation, which may be under-recognized."

The Environment During Resuscitation:

Therapeutic positioning and sound control start in the delivery room. Handling, touch, and noise may all represent noxious stimuli to an ELBW infant. An ELBW infant cannot self-regulate due to a lack of neurological organization that would have occured during the third trimester. (50) Physiologic responses to these stimuli include changes in heart rate, respiratory rate, and saturation, which may be under-recognized.

Several small studies are looking at the cerebral and systemic hemodynamic changes during periods of handling which suggest there may be early parenchymal abnormalities seen on ultrasound. (51)

Most studies have examined positioning, handling, and sensory integration during the NICU stay, but many do not report recommendations during the resuscitation period. It seems prudent to start protective interventions such as neutral (midline) positioning, decreased sound, gentle handling, minimal transferring, and early positional support (nesting) as soon as possible after delivery, beginning in the delivery room.

Best Practice Summary for Delivery Room Management:

- Set the resuscitation area to 25-27 °C.
- Deliveries should be attended by the NICU resuscitation team and include the attending physician if possible.
- The NICU and OB teams should discuss the resuscitation plan, including delayed cord clamping.
- Delayed cord clamping should be implemented for at least 60 seconds unless there is a clear contraindication.
    - Cord milking is not recommended in ELBW infants.
    - Resuscitation measures should be implemented during delayed cord clamping, including placing the infant in a plastic wrap/bag.
- Once the cord is cut, the resuscitation should continue using a radiant warmer while still in plastic wrap/bag.
    - Adjuncts to temperature control include thermal mattresses and hats.
- Place on servo warmer as soon as stable to avoid hypothermia and hyperthermia.
- Set starting FiO_2 at 0.21-0.30 (0.30 for infants <32 weeks GA),

and use warmed humidified oxygen for infants <32 weeks GA.

- Use a CO_2 colorimetric detector in line with mask ventilation when PPV is required.
    - Intubation, if required, should be done by the most experienced provider with no more than two intubation attempts per provider if more than one skilled provider is present.
- Therapeutic positioning, gentle handling, and sound control start in the delivery room.
- Ideally, the resuscitation bed should become the NICU care bed, if feasible, to limit bed transfers.

"There is currently insufficient evidence to support the optimal primary mode of non-invasive ventilation in extremely premature infants, and in particular, that choices impact the risk of mortality or bronchopulmonary dysplasia. (46,52,53) However, recent evidence suggests that NIMV may decrease the need for intubation, as well as decreased extubation failure, in the first week of life."

RESPIRATORY MANAGEMENT

Non-invasive Ventilation:

Not all pre-term infants require intubation and mechanical ventilation at birth. There is currently insufficient evidence to support the optimal primary mode of non-invasive ventilation in extremely premature infants, and in particular, that choices impact the risk of mortality or bronchopulmonary dysplasia. (46,52,53) However, recent evidence suggests that NIMV may decrease the need for intubation, as well as decreased extubation failure, in the first week of life. (54–57)

For infants not requiring intubation, place infants on non-invasive mechanical ventilation using appropriately-sized nasal prongs or masks. (58) Occlusive binasal prongs and nasal masks have been shown to reduce the risk of CPAP failure and the incidence of nasal trauma. (59,60) The nasal mask and prongs may be alternated to prevent damage to the nose as long as functional residual capacity (FRC) is maintained during the switching of interfaces.

The continuation of NIMV or bubble CPAP is recommended until a minimum of 32 weeks CGA. (61) Consider continuing NIMV or bubble CPAP to extend to 34 weeks CGA to support FRC with possible benefits that persist to 40 weeks CGA. (61) Weaning off respiratory support is based on weight, stability of respiratory status, frequency of spells, and status of nares/septum.

Conventional Invasive Ventilation:

Volume-targeted ventilation (VTV) offers several advantages over pressure-limited ventilation (PLV). Therefore, assist-control volume guarantee is the preferred invasive conventional modality for respiratory support for the authors of this guideline.

A 2017 Cochrane Review showed that VTV modes resulted in a reduction of death or bronchopulmonary dysplasia (BPD) at 36 weeks CGA (RR: 0.73, CI 0.59–0.89), pneumothorax (RR: 0.52, CI 0.31–0.87), mean days of mechanical ventilation, rates of hypocarbia, Grade 3 and 4 IVH (RR: 0.53, CI 0.37–0.77), and combined periventricular leukomalacia (PVL) with or without grade 3 or 4 IVH (RR: 0.47, CI 0.27–0.8). (62) Normocarbia (45–55) should be maintained, hypocapnia avoided, and swings in $PaCO_2$ due to the vasoactive effect (dilation and constriction) of blood vessels in the brain.

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Tidal volumes should be initiated at 6 mL/kg and increased by 0.5 mL/kg to a maximum of 8 mL/kg unless the baby has a pneumothorax, pulmonary interstitial emphysema, or high settings on conventional mechanical ventilation before other ventilation modes should be considered. Initial ventilator frequency should be 30–40 bpm with PEEP at 6 cm. (63) The appropriate settings are not delineated for ELBW, particularly the most immature infants. In other populations, these settings have been discussed.

High-Frequency Ventilation:

Options for high-frequency ventilation (HFV) include High-Frequency Oscillatory Ventilation (HFOV), High-Frequency Jet Ventilation (HFJV), and High-Frequency Flow Interrupters (HFFI) (historically). Most comparative studies used the HFOV.

There is no clear evidence that early elective use of high-frequency ventilation offers any benefits over conventional ventilation and may cause harm. In a Cochrane Review, there was an inconsistent trend towards decreased chronic lung disease (CLD) in the HFOV group versus conventional ventilation. The same review showed an increased risk of pneumothorax and pulmonary interstitial emphysema (PIE) in the HFV group. There was no difference in IVH or PVL risks. All studies compared HFV to pressure-limited conventional ventilation. Both HFOV and HFFI were used. (64)

Direct comparison of HFV versus VTV has not yet been well studied. A systemic review comparing HFOV to HFJV failed to produce any relevant results. (65) Consider switching to high-frequency ventilation as a rescue mode for pneumothorax, pulmonary interstitial emphysema, and high settings on conventional mechanical ventilation (mean airway pressure >12 cm, increasing tidal volumes requirements persistently above >8 mL/kg).

Approach to Extubation:

Intubated infants should be assessed at least once daily for extubation readiness. This includes ventilator settings, gases, presence/absence of air leak around the endotracheal tube, and assessment of nares.

Early extubation (prior to 48 hours of life) in infants born 24–29 weeks gestation is not associated with an increase in severe

IVH compared to delayed extubation, even when considering re-intubation rates. (66) Studies are limited in infants 22–24 weeks GA. However, extubation failure is associated with an increased risk of death, prolonged respiratory support, and prolonged hospitalization. (67)

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Short-term dexamethasone may be considered if there is an absence or inadequate air leak around the endotracheal tube, particularly if the baby has been intubated for a prolonged period. (68) Other strategies may include short-term Lasix to improve pulmonary mechanics (69), fluid restrictions, and/or a caffeine bolus.

Early extubation (≤48 hours) to CPAP is associated with decreased incidence of IVH and decreased incidence of re-intubation. (71) NIMV is associated with decreased extubation failure in the first week post-extubation compared to CPAP, but it does not affect chronic lung disease or mortality. (54,70)

"The Support Trial and Neoprom Meta-analysis showed increased mortality in the low saturation target group (85–89% vs 91–95%). The main driver of mortality seems to be necrotizing enterocolitis (NEC). CLD and retinopathy of prematurity (ROP) were higher in the high saturation target group. Reducing mortality is the clear priority, and target saturations should be 91-95%."

Oxygen Saturation Targets:

The Support Trial and Neoprom Meta-analysis showed increased mortality in the low saturation target group (85–89% vs 91–95%). The main driver of mortality seems to be necrotizing enterocolitis (NEC). CLD and retinopathy of prematurity (ROP) were higher in the high saturation target group. Reducing mortality is the clear priority, and target saturations should be 91-95%. (72)

"The ELBW infants that require intubation should receive surfactant regardless of FiO_2. Studies suggest improved outcomes with early (<2 hours of life) rescue therapy, including fewer pneumothoraces, severe IVH, and need for post-natal steroid therapy."

Adjuncts to Respiratory Support:

Surfactant Administration:

The ELBW infants that require intubation should receive surfactant regardless of FiO_2. (52,73) Studies suggest improved outcomes with early (<2 hours of life) rescue therapy, including fewer pneumothoraces, severe IVH, and need for post-natal steroid therapy. (74,75)

Surfactant should not be given until confirming appropriate endotracheal position by chest x-ray. Also, ensure careful movement and positioning while delivering surfactant, including keeping the head midline and avoiding rapid turning.

All intubated ELBW infants with a persistent oxygen requirement (such as FiO_2 greater than 0.3) and/or increased ventilator requirement (increasing PIP) may be considered for up to two additional doses of surfactant as early as 12 to 36 hours of life to minimize the risk of air leak, RDS, and morbidity and mortality. (76) In certain circumstances, one may repeat surfactant until the baby is 72 hours of life. Extended surfactant out to 2 weeks has no apparent benefit. Additional modalities of delivering surfactant, such as Less Invasive Surfactant Administration (LISA) or Minimally Invasive Surfactant Therapy (MIST), are being studied and may be available for delivering surfactant without intubation. These modalities may lead to improved outcomes, including BPD and IVH in ELBW. (77,78)

Caffeine and Control of Recurrent Apnea, Bradycardia, and Desaturation Episodes:

Caffeine is utilized as an adjunctive measure for the treatment of apnea of prematurity as well as BPD prophylaxis. Studies indicate that administering the first dose within 2 hours of life correlates with improved blood pressure and systemic blood flow. (79–83) The current caffeine dosing is a 20 mg/kg loading dose followed by 5–10 mg/kg with a maintenance dose every 24 hours for the course duration. (80)

Based on symptoms and overall physiologic maturity, the caffeine maintenance dose should be continued until the age of 34–36 weeks post-menstrual period. Some providers continue treatment beyond 36 weeks if apnea persists to prevent intermittent hypoxic events, improving neurologic outcomes. (84)

Recurrent apneas, bradycardia, and desaturations increase the risk of long-term adverse outcomes, including ROP and neurologic injury. When maximized non-invasive support fails (NIMV and caffeine), placing the infant back on the ventilator may be necessary. (85)

Vitamin A:

Supplementing very low birth weight infants with vitamin A is associated with a decreased risk of death or oxygen need at one month and oxygen requirement at 36 weeks post-conceptual age. There was no benefit in neurodevelopmental outcome at 18–22

months of age. (86) Small benefits should be weighed against the need for intramuscular dosing and repetitive, prolonged national shortages of available vitamin A preparations.

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Best Practice Summary Respiratory Management and Ventilator Strategies:

The initial modality for non-invasive mechanical ventilation is not yet elucidated, and units may choose CPAP versus NIMV based on comfort. Non-invasive mechanical ventilation should be continued until a minimum of 32 weeks CGA.

All ELBW infants who require intubation should receive surfactant as soon as a chest x-ray verifies the endotracheal tube position. These infants may be evaluated for additional doses of surfactant based on clinical status.

- Volume guarantee ventilation is the preferred mode of conventional primary ventilation.
- HFV can be considered rescue therapy or when air leak syndromes are present.
- Early extubation in eligible infants does not increase the risk of IVH.
- Caffeine should be started for apnea of prematurity and BPD prophylaxis.
- Routine O_2 saturation targets should be set at 91-95%.

EARLY NEONATAL CARE:

The following guidelines should be implemented at birth and continued for the first 72 hours to 1 week of life. Some experts advocate for dedicated small baby units. Such units include a dedicated zone with dark rooms, a quiet location, and a select group of providers trained and experienced in small baby care (i.e., NNP teams as front-line providers) and limiting resident trainee exposure. (16)

Fluids, Electrolytes, and Nutrition:

Prevent initial hypoglycemia by immediate initiation of IV glucose following delivery. It is essential to keep in mind the fact that glucose tolerance in the immature infant is decreased. Glucose delivery should be started at 4–5 mg/kg/min and titrated to tolerance. If glucose intolerance persists with glucose delivery at or slightly below 4, an insulin infusion may need to be considered. The safe upper tolerance for glucose delivery is ~12 mg/kg/min to protect against liver disease.

"Some experts advocate for dedicated small baby units. Such units include a dedicated zone with dark rooms, a quiet location, and a select group of providers trained and experienced in small baby care (i.e., NNP teams as front-line providers) and limiting resident trainee exposure."

Nutrition is critical for both somatic growth and brain development. The brain of the ELBW infant uses 50% of the required energy and quadruples its volume between 25 and 40 weeks. During this period, there is a remarkable increase in the proliferation, synaptogenesis, and connectivity of neurons and glial cells. (87)

Sufficient and well-balanced delivery of macronutrients is crucial. Glucose is the primary energy source for the brain, fat for membrane integrity and myelination; protein provides structural building blocks and signaling molecules, such as growth factors, neurotransmitters, and enzyme components, which are of utmost importance for brain growth and development. Adequate intake of essential micronutrients like iron, zinc, copper, iodine, phosphorus, and vitamins is also necessary for brain development and function.

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There are critical windows for mental development associated with nutrition intake. They describe specific fetal, neonatal, and infant life periods when deficient delivery of specific nutrients is associated with life-lasting effects on neurodevelopment. For example, it is well known that a deficiency in iodine or folic acid in the mother's diet may lead to neurologic abnormalities in the fetus. It is also well described that low iron intake during the first year of life may lead to developmental delay. (88)

A crucial window is the preterm infant's initial weeks, where rapidly developing systems and structures are at risk for under or aberrant development. Some of these systems are the cerebral cortex, basal ganglia, and hippocampus (important for learning and memory), myelin (responsible for the speed of processing), and cerebellum (important for balance, motor integration,

and cognition). (89) Neurodevelopment impairment inversely correlates with growth during NICU stay. (90–92)

Start of TPN during first hours of life. Parenteral solutions should initiate the delivery of protein (~3 gm/kg/day), glucose (~4–6mg/kg/min), and lipid emulsions (~2 gm/kg/day). Fish oil lipid emulsions (SMOF) contain DHA, which is important for premature infant lung, brain, and retinal development. Advance all macronutrient components to deliver 100–120 calories per kg daily within 1–2 weeks of life. Intake of total non-nitrogen to nitrogen calories should be balanced, achieving a ratio of 150–200 to promote lean body mass accretion. A direct correlation exists between linear growth and fat-free mass (not just weight) and higher Bayley mentation scores at school age. (93)

"Early start of TPN during first hours of life. Parenteral solutions should initiate the delivery of protein (~3 gm/kg/day), glucose (~4–6mg/kg/min), and lipid emulsions (~2 gm/kg/day). Fish oil lipid emulsions (SMOF) contain DHA, which is important for premature infant lung, brain, and retinal development. Advance all macronutrient components to deliver 100–120 calories per kg daily within 1–2 weeks of life. Intake of total non-nitrogen to nitrogen calories should be balanced, achieving a ratio of 150–200 to promote lean body mass accretion."

The mother's colostrum should be used to provide oral care. This has been proven to improve early immune responses and prepare the bowel to tolerate feedings by tightening enterocyte junctions. Mothers should be encouraged to express colostrum, starting at delivery, so infants can receive this treatment in the first few hours of life. In addition to providing colostrum for oral care, early hand expression and pumping after birth have also been shown to increase the mother's milk supply to ensure adequate mother's milk nutrition during the NICU stay and beyond. (97,98)

"Multiple immune modulators are found within human milk and are essential for establishing an infant's initial healthy microbiome. "

Enteral feedings should be started early with mother's milk with fortification. This strategy provides optimal nutrition and growth factors that lead to improved neurodevelopment. Every 10 ml per kg per day of mother's milk increases Bayley II Mental Developmental Index (MDI) by ~0.6 points. (94) Mother's own milk is preferred over donor milk as it is individualized for her baby and has not lost nutritional integrity to pasteurization or freezing. As soon as a volume of 50–100 ml/kg is tolerated, fortification of breast milk is mandatory to ensure the provision of extra calories, protein, minerals, and vitamin intake. The presence of umbilical catheters or treatment with indomethacin is not a contraindication for enteral feeds.

Fluid intake should be adjusted to the clinical status need, considering the utmost need for nutrition delivery beginning day 1. As a general rule, crystalloid boluses should be avoided, optimizing environmental humidity to decrease insensible losses and the need for excessive additional fluids. (64,81) Parenteral fluids and enteral feed concentration improve the ability to deliver adequate nutrition despite fluid restriction.

High humidity is necessary to prevent insensible water losses and to regulate temperature and electrolytes. It is also of utmost importance to maintain skin integrity in these neonates. High humidity up to 85–90% is recommended for the first week of life at a minimum. (100) Weaning slowly down on humidity over the next few weeks to minimize fungal infection risk defines best practice. (101,102)

The disruption and interruption of ideal nutrition delivery must be minimized. TPN should be optimized each day, and prolonged periods of NPO should be avoided.

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Continue ongoing nutritional assessment for prompt identification and rapid correction of deficits.

Hematology:

Currently, studies are examining the neuroprotective effects of early erythropoietin and darbepoetin but have conflicting results. The last Cochrane Review published in 2021 does not recommend

routine early use of erythropoietin in preterm infants until further research elucidates outcomes. (103)

"A recent randomized trial for platelet transfusion showed that neonates in the high (>50,000) threshold group had an increased risk of death or major bleeding than the low threshold (>25,000) group. (112) Platelet transfusions in the extremely low birth weight neonate may be considered to maintain a platelet count > 25,000 or if there are signs of active bleeding until there are further studies."

Coagulation protein synthesis begins in the fetus at 5–10 weeks gestation and is independent of maternal coagulation as these factors do not cross the placenta. (104) However, the development of the hemostatic system is age-dependent and matures with older gestational age. Studies are evaluating the immature coagulation system as a risk factor for IVH and possible therapeutic interventions. (105,106)

"Red blood cell transfusion thresholds comparing restrictive and liberal thresholds do not change morbidity and mortality, including death, bronchopulmonary dysplasia, retinopathy of prematurity and interventricular hemorrhage, or neurodevelopmental outcome at two years of age. (110,116,117) Restrictive transfusion guidelines differ in each study but range between 21–26 and up to 30% to maintain hematocrit."

VLBW infants frequently receive at least one transfusion during their hospitalization. There are variable transfusion practices across the United States, and the optimal transfusion thresholds in neonates remain unclear. (107–110)

Thrombocytopenia is defined as ≤150,000 and commonly seen in the NICU with an incidence of 18–35% at some point in the hospitalization. (109,111) Though thrombocytopenia is a risk factor for intraventricular hemorrhage during the first week of life, no correlation has been found between the severity of thrombocytopenia and the risk for IVH. A recent randomized trial for platelet transfusion showed that neonates in the high (>50,000) threshold group had an increased risk of death or major bleeding than the low threshold (>25,000) group. (112) Platelet transfusions in the extremely low birth weight neonate may be considered to maintain a platelet count > 25,000 or if there are signs of active bleeding until there are further studies.

Fresh frozen plasma transfusions may be considered during signs of active bleeding or disseminated intravascular coagulation, but there does not seem to be a role in preventing intraventricular hemorrhage. (113–115)

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Per AAP Committee on Fetus and Newborn Policy Statement on Vitamin K, preterm infants with birth weight ≤1500 grams should receive 0.3 mg/kg to 0.5 mg/kg of Vitamin K intramuscular (IM) as prophylaxis. (118) Intravenous Vit K is not recommended.

Infection Screening

Though the rates of culture-proven early onset sepsis (EOS) in the United States have seemed to decline, the morbidity and mortality of these infections are high, particularly in extremely premature infants. (119) The clinical features of EOS are challenging to discern. Alternatively, the risk of prolonged antibiotic exposure carries a risk of poor outcomes. (120,121)

"ELBW neonates should be evaluated for EOS with consideration of starting antibiotics based on delivery risk factors such as preterm labor, prolonged rupture of membranes, and clinical chorioamnionitis. (120) Antibiotics, if started, can be discontinued if blood cultures are negative after 36–48 hours."

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Multiple immune modulators are found within human milk and are essential for establishing an infant's initial healthy microbiome. (122,123)

Prophylactic systemic antifungals are effective against invasive fungal infection in extremely preterm infants. (124,125) Data on the safety, including the impact on fungal resistance and the long-term neurodevelopmental outcomes, is limited. (124,126) Additionally, newer studies are looking at the efficacy of oral nystatin prophylaxis as an alternative to systemic fluconazole. (127) Prophylactic fluconazole may be used in infants < 28 weeks gestation in a 4-–6 week regimen to prevent systemic infection. (128)

Preventing Brain Injury:

Mechanisms of Brain Injury (129–131)**:**

Cerebral pathology in extremely premature infants can present as white matter injury, such as periventricular leukomalacia (PVL) or periventricular-intraventricular hemorrhage (PIVH).

The following postnatal factors may be associated with brain injury: respiratory distress syndrome, hypocapnia due to inadvertent hyperventilation, hypotension, perturbations in arterial and venous pressure, and low cerebral blood flow (CBF). Hyperoxia, hypoxia, and fluctuations in cerebral oxygenation, indicative of poor cerebral autoregulation, can adversely affect brain development.

Premature infants with hypotension have CBF that is more affected by cardiac cycle changes than term infants. During diastole in a hypotensive preterm neonate, CBF is passive to diastolic blood pressure and is often absent. CBF autoregulation, when it occurs, is present during the systolic phase of the cardiac cycle compared to autoregulation of the mean and diastolic phases."

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The premature brain is vulnerable to oxidative stress from hypoxic-ischemic injury because of three risk factors: heart-rate-dependent cardiac output, the immature vascular supply, and disturbances in vascular autoregulation.

IVH Prophylaxis with Indocin:

In the Cochrane meta-analysis, prophylactic indomethacin significantly reduced the incidence of severe intraventricular hemorrhage (typical RR 0.66, 95% CI 0.53 to 0.82). Meta-analyses found no evidence of an effect on mortality (typical RR 0.96, 95% CI 0.81 to 1.12) or a composite of death or severe neurodevelopmental disability assessed at 18 to 36 months old (typical RR 1.02, 95% CI 0.90, 1.15). (132) Single-dose indomethacin prophylaxis (given within 12 hours after birth) is associated with decreased incidence of IVH, adjusted for gestation. (133,134)

Mirza et al., however, showed that indomethacin that was given ≤6 hours of life was not associated with decreased severity of IVH or death but was associated with decreased incidence of patent ductus arteriosus (PDA). (135) Prophylactic indomethacin therapy has become controversial due to a lack of a positive effect on long-term neurodevelopmental outcomes.

"There may still be a role in selective use for ELBW infants at higher risk of IVH, and a scoring tool (based on antenatal steroids, prematurity, sex, and other factors) based on individual hospital prevalence may guide the use of prophylactic indomethacin in high-risk infants. The Neonatal Quality Improvement Collaborative of Massachusetts has a scoring tool at: https://www.neoqicma.org/sivh."

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There is an increased risk of spontaneous intestinal perforation (SIP) with concomitant use of indomethacin and corticosteroids in very low birth weight infants (VLBW). (136) SIP in VLBW with co-exposure to steroids and indomethacin typically occurs in the distal ileum. (137) The timing of co-exposure with the highest risk for SIP is yet to be elucidated, but there is a significant increase if used together in the first postnatal week versus after the first week of life. (138,139)

IVH Screening:

Cranial ultrasound (HUS) has become the mainstay for screening symptomatic and asymptomatic injuries occurring in the neonatal period, particularly in ELBW infants. Early head ultrasound more often detects hemorrhages; later ultrasounds may detect white matter injury, particularly cystic periventricular leukomalacia (cPVL). (140) Ultrasound is highly sensitive to injuries surrounding the ventricles and blood products, which are echogenic but may not be the best modality for subtle white matter or parenchymal injuries. (141)

Most intraventricular hemorrhages occur early in the hospital course, with approximately 50% occurring in the first 8 hours of birth, and nearly all are apparent by the third day of life though they may occur in the first two weeks of life. (142) A screening HUS for all ELBW infants should be obtained by day of life 7 to detect silent

peri/intraventricular hemorrhages. An earlier head ultrasound may be obtained if an ELBW is symptomatic or has a profound clinical illness, such as an unexpected drop in hematocrit, hemodynamic instability, and increased and frequent apneic events.

Post-hemorrhagic hydrocephalus (PHH) is seen in 30-50% of infants with severe IVH and is typically detected on HUS 7–14 days after the bleed. (143) A repeat head ultrasound is recommended when an abnormality is detected. If there is a progressive disease, such as ventricular dilation, serial monitoring, such as weekly imaging, is indicated. Other head imaging modalities, such as magnetic resonance imaging (MRI) or computed tomography (CT), may be necessary later in the hospital course, such as closer to term gestation, pending the clinical team's discretion. However, MRI may be preferred.

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Best Practice Summary Early Neonatal Care:

- TPN should be started during the first hours of life. Parenteral solutions should deliver protein (~3 gm/kg/day), glucose (~6 mg/kg/min), and lipid emulsions (~2 gm/kg/day).
- Early start of enteral feedings with mother's milk with fortification is best practice. Donor human milk is preferred over formula when maternal breast milk is unavailable.
- Using a formal standard feeding schedule may decrease the risk for NEC.
- Fluid intake should be adjusted to the clinical status need, considering nutrition delivery needs.
- Overall growth should be monitored and optimized, including linear growth, head circumference, and possibly body composition, early in the hospital course to improve neurodevelopmental outcomes.
- All preterm infants should receive Vitamin K prophylaxis at 0.3 mg/kg to 0.5 mg/kg IM to a maximum of 1 mg IM (term dose). Intravenous Vit K is not recommended.
- Fluconazole prophylaxis is recommended for candida prophylaxis in infants < 28 weeks.
- In units that consider indomethacin for IVH prophylaxis, a risk-based strategy may be appropriate to minimize harm and direct therapy to the highest-risk neonates.
- If prophylactic indomethacin is administered, caution should be used if administered with concomitant corticosteroids, and a high suspicion for possible SIP should be maintained.
- A screening HUS should be obtained on day seven or sooner if clinical instability and high suspicion of a bleed are noted.
- If there is a concern for PHH, serial HUS should be obtained.
- If there is a high concern for PVL, an MRI is more sensitive than a HUS.
- Monitor and optimize overall growth, including linear growth, head circumference, and possibly body composition, early in the hospital course to improve neurodevelopmental outcomes.

HEMODYNAMICS:

Hemodynamic instability is common in preterm infants and is associated with an increased risk of IVH. The traditional parameters, such as heart rate (HR), blood pressure (BP), capillary refill time (CRT), serum lactate, and urine output, to evaluate hemodynamic instability lack sensitivity and specificity.

These are proxy parameters of cardiovascular well-being. Furthermore, there is a lack of consensus on the actual definition of hypotension or the appropriate BP range in preterm infants.

"Cerebral blood flow is affected by systemic vascular resistance and pulmonary vascular resistance, cardiac output, end-organ resistance of the brain, and the effects of therapy on circulation. There is no consistent link between BP and poor neurodevelopmental outcomes. Concurrent continuous blood pressure and near-infrared spectroscopy (NIRS) monitoring can be used to detect loss of cerebral autoregulation."

Cerebral Autoregulation:

Cerebral autoregulation is a physiologic mechanism that holds cerebral blood flow relatively constant across changes in cerebral perfusion pressure. Cerebral blood flow (CBF) autoregulation is functional in normotensive infants; however, this may not be the case in a hypotensive VLBW infant, in whom CBF may become pressure passive. (129) Dysregulation of cerebral blood flow significantly contributes to the risk of IVH and white matter injury, making it essential to optimize brain perfusion. (129) BP is a poor surrogate for cerebral blood flow. (62)

Cerebral blood flow is affected by systemic vascular resistance (SVR) and pulmonary vascular resistance (PVR), cardiac output (CO), end-organ resistance of the brain, and the effects of therapy on circulation. There is no consistent link between BP and poor neurodevelopmental outcomes. Concurrent continuous blood pressure and near-infrared spectroscopy (NIRS) monitoring can be used to detect loss of cerebral autoregulation. This loss of autoregulation should prompt the evaluation of etiologies leading to such a compromise.

Cerebral NIRS may better reflect adequate cerebral oxygen delivery than arterial oxygen saturation (SpO_2) alone during the immediate transition period. Cerebral NIRS measures will be affected by inadequate systemic oxygenation and hemodynamic instability, anemia, and hypocarbia. Addressing these factors may have implications for improving cerebral oxygenation. (144)

Limited data have demonstrated an association between early cerebral oxygenation measures and the development of IVH and longer-term neurodevelopmental outcomes. (145) Early continuous cerebral NIRS monitoring in very preterm infants revealed an association between lower cerebral oxygen saturation and the primary adverse outcome of death before hospital discharge or severe neuro-radiographic brain injury. (145) Alderliesten found that regional oxygen saturation (rSO_2) <55% was significantly associated with severe IVH and that 20% of time spent with rSO_2 of <55% in the first postnatal 72 hours was also associated with death or unfavorable cognitive outcome at 24 months. (146)

Blood Pressure Monitoring:

Hypotension is blood pressure (BP) below the 5th or 10th percentile for gestational and postnatal age. Historically, in weeks, blood pressure has been targeted at or above gestational age. Correlation to CBF is now supported. This definition should only be considered in conjunction with other markers of tissue perfusion before initiating therapies.

Figure 1 shows the systolic blood pressure range seen in babies of 24 to 40 weeks of gestation when (A) 4 to 24 hours old and (B) 10 days old. (147)

The above blood pressure values can be used as objective values to help identify babies needing further assessment to determine circulatory compromise and guide therapy. Continuous blood pressure monitoring via arterial catheter should be done at least during the initial transitional period of 72 hours after birth in the critically ill neonate.

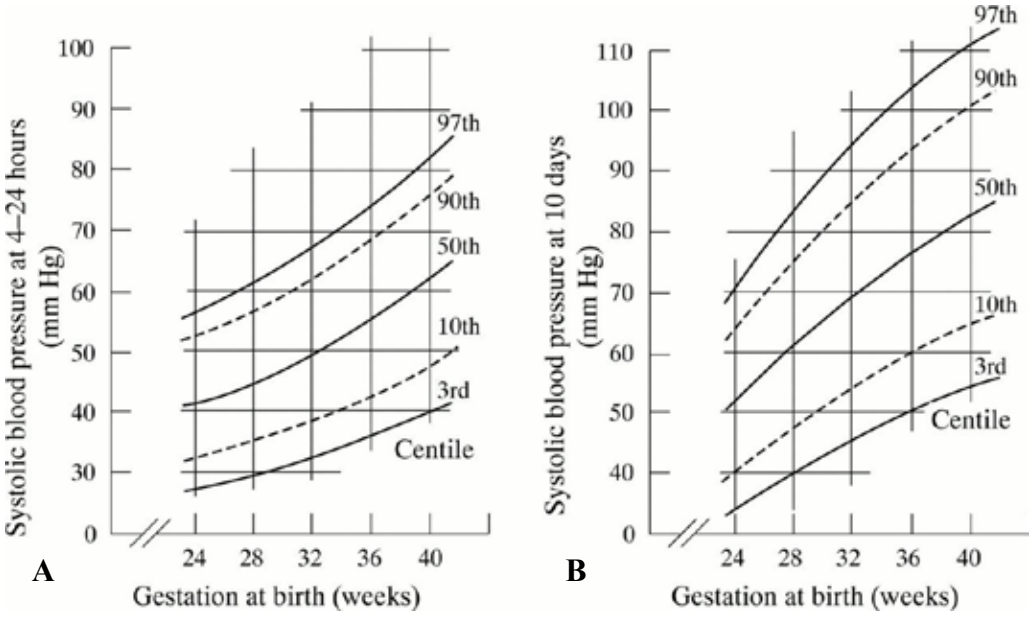
"Care must be taken to avoid sudden changes in cerebral blood flow. Attempts must be made to avoid frequent and rapid flushes or fluid boluses. Care should be taken in titrating pressor medication drips to avoid wide swings in blood pressure. Ventilator management should include strategies to avoid wide swings in $PaCO_2$."

Noninvasive arterial blood pressure assessment using oscillometry frequently overestimates arterial BP and should be used cautiously. This method may be sufficient for assessment in a stable neonate. In addition to the mean BP, attention should be paid to the systolic and diastolic pressures to direct management.

Care must be taken to avoid sudden changes in cerebral blood flow. Attempts must be made to avoid frequent and rapid flushes or fluid boluses. Care should be taken in titrating pressor medication drips to avoid wide swings in blood pressure. Ventilator management should include strategies to avoid wide swings in $PaCO_2$.

Infants at increased risk of IVH and hemodynamic instability should have a comprehensive hemodynamic evaluation that should include meticulous examination, review of traditional parameters (as above), functional echocardiography (to assess preload, afterload, and cardiac contractility, estimation of cardiac output), and assessment of end-organ perfusion using NIRS.

Figure 1: Systolic BP ranges in 24–40 wks GA



Comprehensive multi-modal hemodynamic monitoring will allow for understanding the physiology better and help understand which infants develop IVH. There is a need for further research to evaluate "optimal cerebral perfusion pressure," and adopting multi-modal monitoring tools (including traditional parameters + functional echo + NIRS) is the way forward.

Near Infrared Spectroscopy (NIRS):

Near-infrared spectroscopy (NIRS) measures the combined effects of tissue oxygenation, perfusion, and oxygen extraction. It can provide information on end-organ perfusion and oxygenation by providing a direct, continuous, and absolute estimate of the tissue oxygen saturation (rSO_2). Cerebral blood flow (CBF) autoregulation is functional in normotensive infants. However, this may not be the case in a hypotensive VLBW infant, in whom CBF may become pressure passive. Concurrent continuous blood pressure and NIRS monitoring can be used to detect loss of cerebral autoregulation. This concern should prompt the evaluation of etiologies leading to such a compromise.

"When feasible, all VLBW infants should receive continuous multi-organ (cerebral and renal) rSO_2 monitoring using NIRS in the first 72 hours of life and subsequently, if a hemodynamic compromise is suspected. Normal rSO_2 range is dependent on the sensor type used at the institution."

When feasible, all VLBW infants should receive continuous multi-organ (cerebral and renal) rSO_2 monitoring using NIRS in the first 72 hours of life and subsequently, if a hemodynamic compromise

Table 1 Abnormal $CrSO_2$: Potential Causes and Clinical Interventions (from Plomgaard) (152)

Change in Cerebral Oximetry (rSO_2)	Potential Causes	Clinical Interventions
$CrSO_2$ <60% (risk of hypoxemia)	Cardiac, CNS, or vascular anomaly	Correlate with other clinical findings. Consider congenital heart disease. Evaluate for seizures?
>20% decrease below baseline	Decreased O_2 delivery to the brain	Anemia – transfuse pRBCs Low arterial oxygen saturation – increases FiO_2 Hypotension – raises BP, improves cardiac output Hemodynamically significant PDA – close. Low pCO_2 (increase pCO_2) – correct hypocarbia, avoid high vent mean airway pressure Possible pneumothorax? Infant's head positioning (impeded cerebral venous outflow)?
	Increased O_2 consumption	CNS issue – treat pain and agitation; sedate appropriately. Evaluate for seizures Febrile? – treat fever, hyperthermia
$CrSO_2$ > 85% >20% Increase above baseline	Increased O_2 delivery	Hyperoxia/hypercapnia – correlate with pulse oximetry and decreasing FiO_2 as needed
	Decreased O_2 extraction	Over-sedation – evaluate for excess sedation. Severe CNS injury – evaluate for cortical tissue death or perinatal asphyxia Pulmonary hypertension Apnea Cares
	Hypoglycemia	Treat low blood glucose.
	SGA	

is suspected. Normal rSO_2 range is dependent on the sensor type used at the institution. In literature, normal values are typically between 55% and 85% (the normal range is sensor-dependent). Renal rSO_2 readings are typically 5–15 points greater than cerebral rSO_2 readings. (148–150)

There is an inverse relationship between cerebral rSO_2 ($CrSO_2$) and gestational age, and it also decreases with postnatal age. (151) Each infant's $CrSO_2$ reading should be compared to the baseline and range; variation within this reference range may indicate dysregulation of brain oxygenation. Consider a response to changes in rSO_2 values 20% above or 20% below the infant's baseline (see Table 1). (152)

Echocardiogram:

An early comprehensive echocardiogram within 72 hours after birth can help establish structural normality and evaluate the transitional circulation. This screening will help with further focused assessment using functional echocardiography in infants with hemodynamic instability. A hemodynamically significant PDA has been associated with IVH, acute pulmonary hemorrhage, NEC, and BPD. (153) Subsequent functional echocardiography (POCUS: point of care ultrasound) can help in the hemodynamic evaluation of infants with PDA, shock, or other causes of hemodynamic instability. (154,155) Functional echocardiography can offer additional information on organ blood flow.

"A hemodynamically significant PDA has been associated with IVH, acute pulmonary hemorrhage, NEC, and BPD."

Functional echocardiography can also provide information on global myocardial function, intravascular volume status, pulmonary hypertension, and PDA. The presence of PDA should encourage further prompt evaluation for signs of left atrial overload and compromise of the systemic circulation. Measures such as left ventricular output (LVO) and right ventricular output (RVO) can be unreliable in a newborn in the presence of shunts (PDA and PFO).

"Serial assessments with functional echocardiography and continuous rSO_2 measurements using NIRS should be used to direct the management of PDA."

Serial assessments with functional echocardiography and continuous rSO_2 measurements using NIRS should be used to direct the management of PDA.

Management of Hemodynamic Compromise:

Hemodynamic instability should be managed based on altered physiology and a precise individualized approach. The traditional pressure-driven approach relies on surrogate markers of cardiac output, which are neither reliable nor evidence-based.

Functional echocardiography may help adopt a physiology-based approach to treatment in infants with hypotension or shock. This modality may assist in choosing fluid resuscitation therapy versus inotropic support. When inotropic support is chosen, functional echocardiography may inform the provider of the appropriate choice of inotrope or vasopressor therapy based on preload, afterload, and cardiac function assessment. Ideally, it should be used to evaluate all infants with shock or needing two or more inotropes.

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Pharmacological Treatment of Neonatal Shock (see Table 2):

Inotropes/vasopressors are ideally given via a central venous line. Blood pressure fluctuations are associated with the development of cerebral lesions and should be avoided.

A time delay should be considered (approximately 20 minutes) after the initial administration, and do not rush increasing the dose if there is no effect within this timeframe. Inotropes/vasopressors must be titrated according to the response on mean ABP (i.e., mean ABP reassessed in 15-20 minutes after dose adjustment).

Reperfusion injury plays a role in intraventricular hemorrhage. Consequently, hypertension should be strictly avoided.

An echocardiogram should be obained in refractory cases to evaluate cardiac structure and function.

Hydrocortisone may be helpful in preterm babies and refractory cases of hypotension.

Other causes in refractory cases should be considered: high MAP, pneumothorax, effects of drugs like opioids/paralytic agents, and others that may cause physiologic impairment of CO.

Best Practice Summary Hemodynamics:

- Infants at increased risk of IVH and hemodynamic instability should have a comprehensive hemodynamic evaluation that should include meticulous examination, review of traditional parameters (such as heart rate [HR], blood pressure [BP], capillary refill time [CRT], serum lactate, urine output and arterial oxygen saturation [SpO_2)], functional echocardiography (to assess preload, afterload, and cardiac contractility, estimation of cardiac output) and assessment of end-organ perfusion using NIRS.
- The physiology-based approach is best to target specific etiopathology leading to hemodynamic compromise.

Neuroprotective Family Centered Developmental Care:

Time in the NICU environment is associated with many stressors placed on fragile and developing premature neonates, including care times, procedures, harsh and loud sounds, and lighting, all of which have negatively impacted neurocognitive and behavioral outcomes. (156) Neuroprotective family-centered developmental care for extremely premature infants has been shown to improve the outcomes of these infants. (157,158) The final stages of fetal brain development, including organization, synaptogenesis, and myelination, begin during the third trimester. During this time, sensory networks are establishing appropriate connections. (159) An integral aspect of care is providing a healing environment to support the formation of these neural networks while in the artificial extra-uterine environment of the NICU.

"A time delay should be considered (approximately 20 minutes) after the initial administration, and do not rush increasing the dose if there is no effect within this timeframe. Inotropes/ vasopressors must be titrated according to the response on mean ABP (i.e., mean ABP reassessed in 15-20 minutes after dose adjustment)."

Neuroprotective Care During and Immediately After Delivery:

The use of slow and gentle movements helps to protect the vestibular system and minimize stress. Keeping the baby's head midline and limbs flexed, supported by soft boundaries to mimic the fetal position, also helps minimize stress, decrease energy expenditure, and support physiologic stability. (134)

One study found a significant decrease in tissue hemoglobin and oxygen index during head rotation in infants <26 weeks gestation. (160) A second study found a significant cerebral blood volume (CBV) increase during 90-degree head rotation, pronounced in infants <1200 g. (161) A third study found cerebral blood flow velocities were significantly higher in the supine or prone position. (162)

Keeping the baby in a horizontal position with feet at the level of the head during movement and diaper placement helps to prevent sudden increases in intracranial pressure and blood flow. Diaper changes can be done in a side-lying position to accomplish this goal. A hat can keep the baby's eyes covered and protect them from direct light during resuscitation and care. Ambient light should be kept to a minimum needed for care and procedures. Monitoring noise levels and keeping voice levels low helps to maintain a calm environment and prevent stress from loud sounds.

Neuroprotective Care Throughout the NICU Stay:

Preterm infants' eyes should always be protected from bright light until 32 weeks postmenstrual age (PMA) due to the absence of pupillary reflex. After 32 weeks of PMA, incubator covers can be removed during the day to allow for diurnal variation. (163) All infants' eyes should be protected from direct bright lights during exams and procedures.

Preterm and sick infants should be protected from loud sounds. (164,165) The AAP recommends that sound levels remain below the maximum level of 45 decibels. (166) Excessive noise levels may impair the appropriate development of the auditory cortex and interfere with language development. (167) Loud sounds interrupt sleep and increase stress, interfering with healing and growth. Parents should be encouraged to talk and/or sing softly but directly to their baby during short awake times, which has been shown to promote language development at 18 months CGA. (168) Alarm volumes should be turned to minimum, easily heard levels, and turned off quickly to reduce sound levels further.

Table 2. Pharmacological treatment of shock based on etiology

Etiology	Underlying pathophysiology	First line treatment	Second line treatment
Sepsis/NEC	↓SVR, ↑CO, capillary leak, and relative intravascular hypovolemia	Volume (crystalloid, blood products) Norepinephrine	Vasopressor agents: Dopamine (max 10 mcg/kg/min) Vasopressin
PDA	↑ Pulmonary flow ↓ Systemic flow	Consider ductal closure Limitation of left-to-right shunt by strategies to increase PVR (e.g., permissive hypercapnia, ↑PEEP).	Dopamine (if PDA is being treated after 72 hours) Dobutamine may be 1st line if there is RV/LV dysfunction
Hypovolemia (less common- check for h/o blood loss/IVH)	Low filling, ↓CO	Volume (crystalloid, blood products)	
Post PDA ligation	LV systolic dysfunction and high afterload	Milrinone	Dobutamine
Hypoxic- ischemic injury	LV and/or RV systolic dysfunction, PPHN	Dobutamine	Low dose Epinephrine

Protecting the preterm infant's muscles from extensor contractures can be done by supporting a flexed position with soft boundaries to maintain the "fetal position" of the womb. Softly containing limbs helps to prevent excessive energy loss by minimizing uncontrolled flailing of the infant's limbs. Softly molded positioning aids placed under the infant's head can help avoid/minimize abnormal head molding. Headgear used to secure non-invasive nasal ventilation must be closely monitored to avoid abnormal head molding.

"Keeping the baby's head midline and limbs flexed, supported by soft boundaries to mimic the fetal position, also helps minimize stress, decrease energy expenditure, and support physiologic stability."

Efforts should be made to minimize painful procedures and to provide adequate nonpharmacological and pharmacological analgesia as needed. Clustering cares, exams, and procedures should be done whenever possible to protect sleep, which is essential for healing and growth.

Exams, nursing cares, and especially painful procedures for infants <32 weeks CGA or critically ill should be done with two-person/four-handed handling to maintain physiologic stability. Parents can be encouraged to be one of the persons to help provide support whenever possible. Parent-infant bonding and attachment should be supported at every opportunity, which is essential for optimal brain and emotional development. (169,170) Parents should be encouraged to be actively involved in their baby's daily care and understand their infant's unique behavioral cues to facilitate bonding and attachment.

"Keeping the baby in a horizontal position with feet at the level of the head...helps to prevent sudden increases in intracranial pressure and blood flow...Ambient light should be kept to a minimum needed for care and procedures. Monitoring noise levels and keeping voice levels low helps to maintain a calm environment and prevent stress from loud sounds."

Skin-to-Skin Contact:

Skin-to-skin contact (SSC), sometimes called Kangaroo Care, has improved outcomes, including clinical stability (temperature, glucose, respiratory and hemodynamic) through enhanced vagal tone. (171–173) The impact of improved vagal tone, in turn, has many long-term outcomes, including improved prosocial behavior, emotional regulation, improved health, and developmental outcomes. (156,174)

Early SSC also improves breastfeeding establishment and duration, benefits maternal bonding, improves mental health, and reduces stress. (175) SSC in the first 72 hours of life has not been shown to increase the incidence of severe IVH. (175,176) Intubation is NOT a contraindication for skin-to-skin care but requires more staff support to transfer the infant from the bed to the parent's chest. If an infant is intubated, a reclining chair or rocking chair, with rockers wedged to prevent rocking, should guard against inadvertent extubation (otherwise, parents will instinctively rock).

"Preterm and sick infants should be protected from loud sounds. The AAP recommends that sound levels remain below the maximum level of 45 decibels. Excessive noise levels may impair the appropriate development of the auditory cortex and interfere with language development. Loud sounds interrupt sleep and increase stress, interfering with healing and growth. Parents should be encouraged to talk and/or sing softly but directly to their baby during short awake times, which has been shown to promote language development at 18 months CGA.."

Best Practice Summary for Neuroprotective Family-Centered Developmental Care:

- Neuroprotective care for the extremely premature infant includes a family-centered approach which begins in the delivery room and is extended throughout the entire hospital stay.
- A healing environment should protect the preterm infant's development sensory system, including protection from loud noise, bright lights, and pungent odors.
- Positioning should support flexed, midline "fetal" posture with soft boundaries to decrease stress, support sleep, and prevent extension contractures.
- Stress and pain should be minimized to support hemodynamic stability and minimize sudden cerebral blood flow fluctuations.
- Mothers should be supported in providing expressed breast milk for optimal brain development and immune protection.
- Optimal physiologic stability and parent-infant bonding/attachment should be augmented with early, frequent, and prolonged skin-to-skin contact.
- Parents should be encouraged to softly talk (or sing) to their preterm babies during awake times to support emotional connections and language development.

Appendix 1: Small Baby Supplemental Resuscitation Checklist

Small Baby Supplemental Resuscitation Checklist (<30 weeks GA and/or <1,000 grams)

RT Equipment	RN/MD Equipment	Resuscitation Plans
• 42 mm Extra Small mask attached to Neo-puff	• 2nd RN present (check room temp and dim lights)	• OB and NICU provider to perform delayed cord clamping
• FiO_2 set to 30%	• Isolette used (pre-warmed to 36.8° and H_20 tank filled)	• Support/contain, stimulate, welcome infant during DCC
• Suction catheter attached to suction tubing	• Sterile Neowrap given to OB scrub nurse	• Blot chest, place ECG leads first, then place pulse ox
• 00 Laryngoscope blade with 2.5 and 3.0 ETT	• Bunting, chuck, and hat bundle prepared	• Wrap infant completely and keep midline position
• Ensure Curosurf available	• Suction decreased to 60 mmHg	• Start CPAP 5 immediately
• NIMV prepared with Fisher-Paykel interface	• Order Fluids/Meds: TPN/lipids, 0.45 NaAcetate, Caffeine (Goal all given by 2hrs)	• Place hat, cover eyes, take temp and place temp probe

"Skin-to-skin contact...has improved outcomes, including clinical stability (temperature, glucose, respiratory and hemodynamic) through enhanced vagal tone. The impact of improved vagal tone, in turn, has many long-term outcomes, including improved prosocial behavior, emotional regulation, improved health, and developmental outcomes. "

Appendix 2: Tiny Baby Delivery and Golden Hour Checklist

Mins		Time Completed	Reason for Variance	Q.I.
0	Place baby in preheated Neohelp wrap (for transitional nursery, give OR nurse unopened sterile Neohelp wrap to use during delayed cord clamping), keep midline with head/body level on mother on Life Start table.			
	Have OB perform 60 seconds of delayed cord clamping or cord milking per protocol			Delayed cord clamping Y/N Secs
1	Provide gentle stimulation and welcome baby in a soft voice			
	Place Neo-wrapped baby in bunting, keeping midline and level, limbs flexed, moving slowly and talking softly			Cord milking Y/N
	Start resuscitation per NRP guidelines			
	Start Neopuff CPAP 5 or PPV 18-22/5 depending on RR, HR, and chest rise (Attempt to avoid intubation for a minimum of 3 mins of life with effective ventilation/CPAP delivery. Consider increasing pressure and i-time before intubation)			
	Place ECG leads on the chest first, then place a pulse ox on the right wrist.			
2	Place warmed hat (cover eyes to protect from light), then adjust room lights to normal.			
	Take vitals, including temperature, place temp probe, and switch isolette to the correct baby mode.			
3	Place gavage tube once HR and saturations are stable			Initial Temp ^{0}C
5				
5-10	Obtain cord blood labs (type and screen, blood culture, CBC w/ diff, procalcitonin)			Labs drawn from cord Y/N
	Set up and apply respiratory support device (BCPAP, NIMV, VG/AC)			CPAP _____ NIPPV _____
	Finish preparation and start placement of umbilical lines			Vent _____
	Assess respiratory status and administer surfactant as needed (all intubated infants should receive surfactant after chest x-ray)			Surfactant Y/N
10-15	Obtain measurements (Wt, Length, HC) if the infant is stable			
	Prime Starter TPN and A-line fluids			
	Notify the unit secretary and TL1 of the admission			
15-50	Place PIV			UVC successful Y/N UAC successful Y/N UVC completed: _____
	Begin infusion of starter TPN and A-line fluids			UAC completed: __
	Give caffeine loading dose within 2 hours of birth (<32 wks)			
	Once umbilical lines are placed, obtain remaining labs, blood glucose, and blood gas			1st Glucose: __ Time:
	Call secretary to page for x-ray tech, obtain chest and abdominal 2V X-ray (chest x-ray must be done prior to surfactant administration)			TPN started: ____
	Give vitamin K and erythromycin as ordered			Caffeine given: ___
	Give antibiotics if indicated			Abx given: _____

Appendix 2 (cont'd)

50-60	Close the isolette and check that humidity is turned on starting at 85% Transfer to the tiny baby unit in the same isolette as used for resuscitation Send admission labs			
Post Golden Hour	Obtain temperature Elevate HOB Remove Neohelp wrap once 85% humidity is reached and the baby's temperature is stable. Debrief with all delivery team members Update parents and encourage early SSC If not contraindicated, encourage the mother to pump colostrum and emphasize the importance of human milk for preterm infants. Start oral care with colostrum as soon as available.			The time arrived in NICU: Admission Temp: ^{O}C

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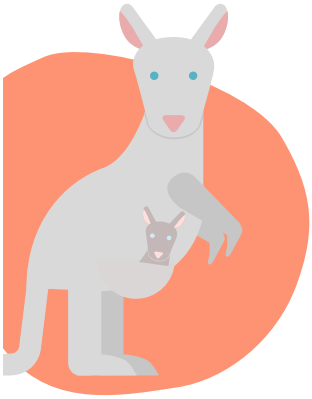

GET INFORMED ABOUT THE RISKS + BENEFITS

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

nationalperinatal.org/skin-to-skin

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

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.

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Why Do Parents Choose or Reject Circumcision at Birth?

Adriana Portela-Hernandez, Rebecca Megchelsen, Vishakha Nanda, Andrew Altiveros, Manhal Khilfeh

Abstract

Background: Male newborn circumcision is a common practice in the U.S.

Objective: To elucidate which factors affect the parental decision to request or decline newborn circumcision in our institution. We decided to evaluate parental knowledge of the benefits and disadvantages of the procedure.

Design/Methods: Prospective, questionnaire-based study. A questionnaire was filled out by all consented parents of male newborns in the first week of life. Included: All male infants admitted to NICU and nursery from April 2020 to February 2021. Excluded: Infants with major congenital malformations, chromosomal aberrations, and infants with contraindications to the procedure. Demographics, cultural information, medical history, and questions about the benefits and disadvantages of the procedure were included. Local IRB approval 19-197. Statistical analysis: T-test for continuous and Chi-square, or Fisher exact test for categorical variables. Logistic regression for demographic variables.

"Objective: To elucidate which factors affect the parental decision to request or decline newborn circumcision in our institution. We decided to evaluate parental knowledge of the benefits and disadvantages of the procedure."

Results: Of 97 responders, 73 supported circumcision, while 24 opposed it.

More African American parents desired circumcision than Hispanic parents, who often rejected the procedure (P≤0.0001). The most frequent reasons for pursuing circumcision were hygiene (71.2%), the father being circumcised (42.5%), and the penis looking better after circumcision (31.5%). The reasons most often reported for rejecting circumcision were uncircumcised father (41.7%), it is not medically necessary (37.5%), other sons were uncircumcised (29.2%), and baby does not have input in the decision (20.8%). Parents that supported circumcision knew more about the advantages and disadvantages of the procedure than parents that declined circumcision (P≤0.001).

"More African American parents desired circumcision than Hispanic parents, who often rejected the procedure (P≤0.0001)."

Conclusion: Parental decision on neonatal circumcision was influenced by ethnicity, cultural background, the father being circumcised, and hygiene rather than medical reasons.

Keywords:

Male newborn, circumcision, parental knowledge, benefits and complications, decision making

Introduction:

Neonatal male circumcision is an elective procedure involving removing the prepuce covering the glans penis. This common procedure is performed on male newborns in many countries, including the United States. Circumcision during the neonatal period is usual, and it is often performed on male newborns prior to their discharge from the hospital.

Male circumcision has remained a subject of discussion and controversy over time. In the 1960s, circumcision was performed in approximately 95% of male newborns in the U.S., but the high rate of complications prevented healthcare providers and parents from supporting it (1). In 2011 the Centers for Disease Control and Prevention (CDC) reported that the national rate of newborn circumcision had declined from 63.5% in 1999 to 54.7% in 2010 (2,3). Changes in the American Academy of Pediatrics (AAP) policies may have also influenced the perception of the procedure. In the 1970s, AAP did not support the procedure. In 1999, AAP took a neutral position. However, the policy was revised, and in 2012 AAP supported the procedure for parents who chose it. AAP has concluded that circumcision in the neonatal period has health benefits, parents are entitled to receive nonbiased information on the benefits and risks of the procedure, and neonates should have access to the procedure under adequate sterile technique

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and analgesia, with a third-party reimbursement of the procedure costs when parents request circumcision (4, 5).

"AAP has concluded that circumcision in the neonatal period has health benefits, parents are entitled to receive nonbiased information on the benefits and risks of the procedure, and neonates should have access to the procedure under adequate sterile technique and analgesia, with a third-party reimbursement of the procedure costs when parents request circumcision."

Historically, ritual circumcision was performed on Jewish and Muslim males as a religious tradition. Over time this procedure gained medical connotation. Lately, factors such as geographical area, socioeconomic status, insurance coverage, hospital type, race, ethnicity, culture, family history of circumcision, hygiene, the impression that circumcision affects sexual satisfaction, or that the penis looks better after circumcision have been recognized as factors which affect a parent's decision regarding selection of this procedure for their newborn (5,6,7). Recent reports describe that some parents prefer to wait until their child can make an informed decision to avoid ethical controversies (7). It is also recognized that healthcare providers' recommendations during pregnancy would influence expecting parents' decision-making process (7).

Studies published over the last decade have demonstrated that circumcision during the neonatal period decreases the incidence of urinary tract infections and their complications and that later in life, circumcised males will have decreased incidence of sexually transmitted diseases (STD) (8), including Human Immune Deficiency Virus (HIV). Some authors even consider circumcision in the neonatal period a public health strategy to decrease STD and HIV transmission, especially in African countries (5,9,10,11). These findings may play a role in the current rate of newborn circumcision.

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We conducted this study to elucidate the factors that influence a parent's decision to circumcise their male newborn in our institution and to evaluate the parents' knowledge about the advantages and risks of neonatal male circumcision.

Materials and Methods:

This study was conducted at John H. Stroger Jr. Hospital of Cook County, Chicago, IL. The study lasted from April 20th, 2020, to February 15th, 2021. Parents of male newborns in the mother-baby unit and NICU were contacted close to the discharge date and before circumcision was performed. They were asked if circumcision for their male infant was desired. Independent of their answer, they were invited to participate in a questionnaire survey. The parents signed informed consent before participation.

Parents of infants with major malformations, chromosomal abnormalities, and contraindications for circumcision, such as hypospadias, epispadias, penial anomalies, family history of bleeding disorder, and maternal active herpes simplex infection, were excluded. Study approval was obtained from the Institutional review board (IRB) of the Cook County Health and Hospitals system. The study was performed at John Stroger, Jr. Hospital of Cook County, Chicago, Illinois.

Expectant parents followed at Stroger Hospital and its affiliated clinics received written information about circumcision on a general basis. If the expected infant is known to be male, parents were asked if they desire circumcision for their infant in the newborn period. The parents also received an educational brochure after the birth of their child based on AAP recommendations on circumcision.

Questionnaire designs:

Two questionnaires were created for this study. These questionnaires were designed based on previous studies which evaluated factors affecting circumcision (12,13).

Questionnaire A was for parents who pursued circumcision and included nine reasons to elect circumcision (Table 2) and one open-ended question to write down other reasons. Questionnaire B was for parents who rejected circumcision and included ten reasons for rejection (Table 3). All participants were advised to select one or more reasons for their decision.

"Questionnaire A was for parents who pursued circumcision and included nine reasons to elect circumcision and one open-ended question to write down other reasons. Questionnaire B was for parents who rejected circumcision and included ten reasons for rejection."

The questionnaires contained participant demographic questions (mother's and father's age, ethnicity, race, country of birth, religion, education level, and occupation), the father's circumcision status, and personal reasons to elect or reject circumcision. (Tables 4 and 5).

Statistical analysis:

SPSS 26 was used for data analysis. We used a t-test for continuous variables and Chi-square and Fisher exact test for the categorical variables. Logistic regression was used for interaction between parent demographic country of origin, ethnicity, race, religion, occupation, and level of education.

Results:

One hundred and twenty parents were invited to participate in the study. Twenty-three parents declined to participate in the study. No contraindications to the procedure were found in our study population. Ninety-seven parents completed the questionnaire (response rate of 80.8%). Seventy-three parents desired circumcision for their newborn child. There was no statistical difference between the two groups in gestational age, birth weight, maternal age, paternal age, religion, level of education, and occupation (Table 1).

More African American parents accepted their newborn's circumcision (74%), and more Hispanic parents refused it (87.5%). 13.7% of Hispanic mothers preferred circumcision versus 87.5% who declined it (P =0.001) (Table 1). All African-born parents requested circumcision.

Seventy-five percent of fathers in the circumcision group were born in the U.S., while 33.3% of fathers in the non-circumcision group were born in the U.S. (P = 0.0001). Similarly, mothers born in the U.S. had a higher preference for circumcision. Seventy-five percent of mothers in the circumcision group were born in the U.S., while 20.8% of mothers in the non-circumcision group were born in the U.S. (P = 0.0001).

In the non-circumcision group, 70.8% of mothers and 54.2% of fathers were born in Mexico, Central or South America, or the Caribbean.

Seventy-one percent of the fathers who desired their newborn to be circumcised were circumcised, and none of the fathers in the non-circumcision group were circumcised (Table 1).

The most frequent reasons for pursuing circumcision were hygiene (71.2%), health reasons (64.3%), the father being circumcised (42.5%), the penis looking better after circumcision (31.5%), and the belief that the baby was going to have a better sexual life in the future (26%, Table 2).

"The most frequent reasons for pursuing circumcision were hygiene (71.2%), health reasons (64.3%), the father being circumcised (42.5%), the penis looking better after circumcision (31.5%), and the belief that the baby was going to have a better sexual life in the future (26%)."

The reasons most often reported for rejecting circumcision were father was uncircumcised (41.7%), parents stated that the procedure was not medically necessary (37.5%), other sons uncircumcised (29.2%), the baby did not have input in the decision (20.8%), and other reasons such as side effects of the procedure (12.5%, Table 3).

"The reasons most often reported for rejecting circumcision were father was uncircumcised (41.7%), parents stated that the procedure was not medically necessary (37.5%), other sons uncircumcised (29.2%), the baby did not have input in the decision (20.8%), and other reasons such as side effects of the procedure (12.5%)."

When asked about the benefits of circumcision, more parents in the circumcision group knew about the decreased incidence of urinary tract infections (UTI), balanitis, and male genital cancer in patients who have been circumcised (Table 4). Regarding adverse effects, more parents in the circumcision group knew about the possibility of pain and bleeding (Table 5).

Logistic regression was performed for the effects of the interaction of parents' characteristics. The father's ethnicity (P=0.003), the father's race as non-Hispanic black (P=0.034), and maternal ethnicity (P=0.002) were all found to be statistically significant. Maternal country of birth was not significant (P=0.069).

Discussion:

The study's results suggest that ethnicity, race, and to some extent, the father's country of origin are key factors in the circumcision decision-making process. Hispanic parents did not request the procedure, while non-Hispanic black fathers frequently requested circumcision in our institution.

Regarding religious beliefs, only 20.5% of parents listed their religion as a reason to elect circumcision for their sons. Islam and Judaism historically support circumcision after birth (1). Our population did not include Jewish parents and included only six Muslim mothers and eight Muslim fathers. All of them requested circumcision. Among the parents that requested circumcision, 54.8% of mothers and 45.2% of fathers were Christian. Interestingly, in our population, 24% of the families that requested circumcision were atheists.

The parents' ages, education levels, and occupations were similar, suggesting they may not strongly correlate with the decision-making process. According to the literature, circumcised fathers prefer to have their sons circumcised, and uncircumcised fathers do not request circumcision for their sons (6,8).

Compatible with our results, two studies by Rediger et al. (6) and Jeffrey D. Tiemstra (13) found that the most common reasons for circumcision include hygiene, health reasons, the fact that the procedure is easier to do at a younger age, and the father of the baby being circumcised.

Interestingly, in our population, the fifth most frequent reason to

Table 1. Parental Demographics

	Mother		Father	
POPULATION n=97	**Circumcision** n=73	**No Circumcision** n=24	**Circumcision** n=73	**No Circumcision** n=24
Age (median/SD)	28.3 / 6.8	28.9 / 6.6	31.7 / 9.5	31.8 / 8.3
Ethnicity (n / %)				
Hispanic	10 / 13.7	21 / 87.5**	6 / 8.2	18 / 75**
Non-Hispanic	63 / 86.3	3 / 12.5	65 / 89	5 / 20.8
Missing data	0	0	2 / 2.7	1 / 4.2
Race (n / %)				
Caucasian	7 / 9.6	11 / 45.8**	7 / 9.6	10 / 41.7†
Black	54 / 74.0	1 / 4.2**	53 / 72.6	2 / 8.3**
Asian	6 / 8.2	1 / 4.2	7 / 9.6	1 / 4.2
other	6 / 8.2	11 / 45.8	5 / 6.8	10 / 41.7*
Missing data	0	0	1 / 1.4	1 / 4.2
Place of birth (n / %)				
USA	55 / 75.3	5 / 20.8**	55 / 75.3	8 / 33.3**
Africa	7 / 9.6	0	9 / 12.3	0
India, Pakistan, Middle East	3 / 4.1	1 / 4.2	3 / 4.1	1 / 4.2
China and Thailand	3 / 4.1	0	1 / 1.4	0
Mexico, South America, and Carribean	4 / 5.5	17 / 70.8**	4 / 5.5	13 / 54.2**
Europe	0	1 / 4.2	0	1 / 4.2
Missing data	0	0	1 / 1.4	1 / 4.2
Religion (n / %)				
Atheist	18 / 24.7	0	18 / 24.7	2 / 8.3
Catholic	5 / 6.8	16 / 66.7	6 / 8.2	10 / 41.7
Christian	40 / 54.8	7 / 29.2	33 / 45.2	7 / 29.2
Muslim	6 / 8.2	0	8 / 11	0
Other	2 / 2.8	1 / 4.2	4 / 5.5	2 / 8.3
Missing	2 / 2.7	0	4 / 5.5	3 / 12.5
Education (n / %)				
<HS	8 / 11	4 / 16.7	9 / 12.3	9 / 37.5
≥HS	63 / 89	20 / 83.3	66 / 85	12 / 50
missing data	0	0	2 / 2.7	3 / 12.5
Occupation (n / %)				
Employee	39 / 53.4	12 / 50	50 / 68.5	23 / 95.8*
Unemployed	30 / 41.1	11 / 45.8	13 / 17.8	1 / 4.2
Missing data	4 / 5.5	1 / 4.2	10 / 13.7	0
Father Circumcised				
Yes			52 / 71.2**	0
No			15 / 20.5	22 / 91.7**
Unknown			6 / 8.3	2 / 4.3

* significant P value ≤ 0.05 , ** P≤0.0001, † P≤0.0003. H.S.: High School.

Table 2. Reasons to elect circumcision

	N	(%)
Hygiene reasons	52	71.2
Health reasons	47	64.3
Father was circumcised	31	42.5
Looks better after circumcision	23	31.5
Better sexual life in the future	19	26
The previous son was circumcised	17	23.3
To look like other boys in the family	16	21.9
Religious belief	15	20.5
Encouraged by health care provider	12	16.4
Other reason	6	8.2

request circumcision was the belief that the baby would have a better sexual life. This factor caused no rejection of circumcision. This finding opposes previous studies that suggest that circumcision may modify sexual satisfaction (14,15).

Our results showed that many parents from both the circumcision and non-circumcision groups are unaware that circumcision can decrease the incidence of STDs and HIV among teenagers and adults, genital cancer, and female cervical cancer. According to the literature (11), the most common complications of male circumcision are infection in the surgical area and excessive bleeding, followed by unsatisfactory cosmetic results or surgical injury. Only 12.5% (3 families) in our population rejected circumcision due to procedure complications.

The American Academy of Pediatrics (4), as well as the American College of Obstetricians and Gynecologists (ACOG), supports circumcision for those parents that choose the procedure for their sons. Since parents may need time to understand and evaluate the risks and benefits of the procedure, we believe that education on the circumcision procedure should start early during prenatal care, when the families find out that they are expecting a boy during their first or second-trimester ultrasound.

In this study, we administered the questionnaires before performing the procedure. This allowed us to evaluate parental knowledge of the benefits and risks of the procedure. Our results suggest that current public knowledge concerning the risk and benefits of circumcision is unsatisfactory and educational efforts are needed.

"Our results showed that many parents from both the circumcision and non-circumcision groups are unaware that circumcision can decrease the incidence of STDs and HIV among teenagers and adults, genital cancer, and female cervical cancer."

None of the previous studies have compared parents who requested circumcision with parents who did not request circumcision. Interestingly, our results suggest that parents who

Table 3. Reasons to decline circumcision

	N	(%)
Not medically necessary	9	37.5
FOB not circumcised	10	41.7
Other sons are not circumcised	7	29.2
Baby has no input in the decision	5	20.8
Discouraged by health care provider	2	8.3
To look like other boys in the family	1	4.2
Looks better without circumcision	0	
Better sexual life in the future	0	
Cost of procedure	0	
Other reasons, other complications	3	12.5

FOB: father of the baby

Table 4. Parental knowledge on benefits of circumcision

BENEFITS OF CIRCUMCISION	Circumcision N (%)	No Circumcision N (%)	P Value
Prevention of UTI	46 (63)	12 (50)	0.003*
Prevention of STD	35 (47.9)	7 (29.2)	0.107
Prevention of Phimosis	33 (45.2)	7 (29.2)	0.166
Prevention of Balanitis	21 (28.8)	3 (12.5)	0.05*
Prevention of Paraphimosis	19 (26)	3 (12.5)	0.09
Prevention of Male cervical cancer	17 (23.3)	0	0.03*
Prevention of Female cervical cancer	7 (9.6)	0	0.188
Do not know any	14 (19.2)	7 (29.2)	0.3

* significant P value ≤ 0.05. UTI: urinary tract infection; STD: Sexually transmitted disease.

"The American Academy of Pediatrics, as well as the American College of Obstetricians and Gynecologists (ACOG), supports circumcision for those parents that choose the procedure for their sons. Since parents may need time to understand and evaluate the risks and benefits of the procedure, we believe that education on the circumcision procedure should start early during prenatal care, when the families find out that they are expecting a boy during their first or second-trimester ultrasound. ."

did not request circumcision knew less about the advantages and side effects of the procedure when compared with those who requested the procedure.

A limitation of the study is that it was performed in a single center. Additionally, our patient population has a larger proportion of African American people who generally have higher rates of circumcision.

We believe that patient education programs are essential in any medical field. In the case of circumcision, parents should be familiar with this procedure's health benefits and risks before making a decision.

Conclusions:

Our findings confirm that hygiene, the father of the baby being circumcised, an opinion that the penis looks better circumcised, personal preferences and racial and ethnic background are key factors in electing circumcision in our population.

In our population, African American parents are more likely to choose circumcision, and Hispanic parents are more likely to reject it.

Table 5. Parental knowledge of adverse effects of circumcision

ADVERSE EFFECTS	Circumcision N (%)	No Circumcision N (%)	P Value
Pain	62 (84.9)	15 (62.5)	0.018*
Bleeding	57 (78.1)	13 (54.2)	0.023*
Infection	43 (58.9)	14 (58.3)	0.683
Irritation of glans penis	32 (43.8)	6 (25)	0.1
Injury/disfiguring of penis	31 (42.5)	8 (33.3)	0.42
Increased risk of meatitis	15 (20.5)	7 (29.2)	0.35
Do not know any	6 (8.2)	6 (25)	0.08

* significant P value ≤ 0.05

Parental knowledge concerning short- and long-term benefits and complications of circumcision is limited. The decision to choose or reject neonatal circumcision was influenced by cultural background, ethnicity, race, and the father of the baby being circumcised.

"Our findings confirm that hygiene, the father of the baby being circumcised, an opinion that the penis looks better circumcised, personal preferences and racial and ethnic background are key factors in electing circumcision in our population."

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Ethics and Wellness Column: Introduction to A New Column Nurturing Wellness and Ethics: Addressing Burnout and Rediscovering Fulfillment in Our Careers

Maha Amr, MD

Introduction:

In our relentless pursuit of success and honorable careers, we often neglect a crucial aspect of our lives – our well-being. Have you taken a moment to check in with yourself lately? Do you truly know how you feel amidst your accomplishments? Unfortunately, burnout has become an all-too-common term without proper explanations or solutions. We aim to launch a column to rekindle satisfaction in our careers, alleviating pain, discouragement, and lack of motivation. We will delve into the definitions of burnout and wellness, exploring their relationship and identifying potential causes. Our ultimate goal is to outline strategies to break the burnout cycle, focusing on overall wellness as the key to reviving our passion and purpose.

"We aim to launch a column to rekindle satisfaction in our careers, alleviating pain, discouragement, and lack of motivation. We will delve into the definitions of burnout and wellness, exploring their relationship and identifying potential causes. Our ultimate goal is to outline strategies to break the burnout cycle, focusing on overall wellness as the key to reviving our passion and purpose."

Defining Burnout:

Burnout is more than stress; it is a state of emotional, physical, and mental exhaustion. It arises from chronic work-related stress and manifests as feelings of detachment, cynicism, and reduced effectiveness. Burnout affects individuals differently, making understanding its nuances and manifestations essential to provide appropriate interventions.

Defining Wellness:

Wellness, on the other hand, encompasses a holistic approach to health and happiness. It involves nurturing all aspects of our lives, including physical, emotional, social, intellectual, and spiritual well-being. Striving for wellness helps us achieve balance, enabling us to lead more fulfilling lives and perform better in our careers.

"Wellness, on the other hand, encompasses a holistic approach to health and happiness. It involves nurturing all aspects of our lives, including physical, emotional, social, intellectual, and spiritual well-being. Striving for wellness helps us achieve balance, enabling us to lead more fulfilling lives and perform better in our careers. "

The Prevalence of Burnout:

Burnout is alarmingly prevalent in various professions, especially those that demand high dedication and compassion. Healthcare workers, physicians, teachers, and other caregiving roles are particularly vulnerable to burnout due to the emotional toll of their work. Understanding its prevalence allows us to appreciate the urgency of addressing this issue and finding solutions.

Potential Causes of Burnout:

Several factors contribute to burnout, including excessive workload, lack of control or autonomy, inadequate support, organizational issues, and personal characteristics. Identifying the root causes helps develop targeted interventions to prevent and manage burnout effectively.

Breaking the Cycle and Focusing on Wellness:

To combat burnout, we must develop a scale to assess its severity, with corresponding intervention strategies at different levels. These interventions might involve improving work-life balance, establishing support systems, encouraging self-care, promoting mindfulness practices, and fostering a positive work environment.

The Role of COVID-19:

The COVID-19 pandemic brought to light the immense stress and emotional burden healthcare workers and other essential professionals face. While it was a challenging time, it also served as a wake-up call, emphasizing the necessity of prioritizing our well-being.

"The time has come to focus on ourselves and make lasting changes that will enable us to continue making a positive impact on others while living a healthier and more fulfilling life. Together, let us break the burnout cycle and embrace a future filled with wellness and renewed purpose."

Conclusion:

Nurturing wellness and combating burnout are not opposing forces but interconnected aspects of a fulfilling and successful life. By recognizing the signs of burnout, understanding its impact, and taking proactive steps towards wellness, we can revitalize our careers and regain the joy and satisfaction in our chosen paths. As healthcare providers strive to improve the lives of others, we must also acknowledge our need for healing and self-care. The time has come to focus on ourselves and make lasting changes that will enable us to continue making a positive impact on others while living a healthier and more fulfilling life. Together, let us break the burnout cycle and embrace a future filled with wellness and renewed purpose.

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Ethics and Wellness Column: The Five R's of Retention

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The great resignation will go down in history as one of the most significant workplace changes that resulted from the pandemic, social engineering, and governmental policy directed toward moving people away from congregating in the workplace. Although the decrease in numbers has hit hard in other areas, in medicine, in particular, in academic physicians, there has been an unprecedented change in the workforce. Be it the stress induced by the pandemic, inadequate compensation, or a generational shift in expectations from the workplace. Some hospital systems are experiencing physician turnover above 20% per annum. How can this immediate need to transition the workforce be accommodated? What can stem the tide? (1-4)

"Be it the stress induced by the pandemic, inadequate compensation, or a generational shift in expectations from the workplace. Some hospital systems are experiencing physician turnover above 20% per annum. How can this immediate need to transition the workforce be accommodated? What can stem the tide? (1-4)"

First, the turnover is expensive. On the low end, it costs $250,000 to onboard a new physician, although some estimates are as high as $1,000,000 (personal communication) over their first several years in practice due to various training, getting used to a new system, and the new hire not having the efficiency of the physician they are replacing. Placement firms have largely taken over recruitment. These services further impact the cost. Hospitals and university systems must figure out better ways to prevent physicians from going to other practices. Even if a physician from Hospital A is hired from Hospital B and vice versa, there is a net loss. Hiring a new physician, even at a much lower salary, will not balance the books when high hiring costs must be overcome. With a larger medical staff, these costs skyrocket. Because of the diversity of specialty and practice, there is no discount for "bulk" hiring.

After much discussion with colleagues from different institutions, those who have left, and those who have stayed, five "Rs" must be reckoned with to retain physicians.

"Because of their reputation, some institutions will have no problem recruiting physicians. Harvard, Stanford, Yale, and Johns Hopkins have no trouble attracting high-performing physicians to their medical staff. Their reputation helps these physicians establish national reputations and facilitates their grant applications."

Reputation:

First, reputation is a starting point. Because of their reputation, some institutions will have no problem recruiting physicians. Harvard, Stanford, Yale, and Johns Hopkins have no trouble attracting high-performing physicians to their medical staff. Their reputation helps these physicians establish national reputations and facilitates their grant applications. However, this reputation is a double edge sword. There is ongoing pressure to publish and advance academically. Some physicians cannot handle the stress, and others leave so that they can parlay their institutional-influenced national reputation into a leadership role at another institution.

Remuneration:

Remuneration is a significant driving force. Most physicians graduate with extensive debt. After four years of college, four years of medical school, three or more years of residency, and potentially more years of fellowship, physicians must pay off their loans, gear up for house purchases, and pay for their children's college education. There are some unrealistic expectations of physicians early in their careers. They expect to be able to buy a house, have a nice new car, and live the good life too soon. These urges must be postponed. While inflation grips the nation, physician payments have stagnated. Because of changes in RVUs and work valuations, a physician cannot afford to work for what his predecessor

did five years ago. Also, the generous deals of the past are gone.

"There are some unrealistic expectations of physicians early in their careers. They expect to be able to buy a house, have a nice new car, and live the good life too soon. These urges must be postponed. While inflation grips the nation, physician payments have stagnated. Because of changes in RVUs and work valuations, a physician cannot afford to work for what his predecessor did five years ago."

A physician often starts a job and quickly realizes that the anticipated bonuses and raises will not materialize as hoped. As housing prices increase further and interest rate spikes preclude borrowing, there are places in the US where it is highly doubtful that a primary care practitioner would be able to make enough even to rent an apartment close to the medical center, let alone purchase a small house. Yes, there are programs for loan assistance and repayment, but these are in areas where the particulars of the location make physician retention challenging as well. While there is no good solution to this problem, remuneration cannot be ignored as long as cost of living increases cannot keep up with the economy.

"This piece is undoubtedly essential, but WLB may interfere with the amount of remuneration offered. Moreover, ACGME mandates for training readily translate into expectations for career work. Often these cannot be reconciled with the demands of the job, leading to disenfranchisement and dissatisfaction."

Rest:

Rest is another criterion. Generational changes have impacted how much time physicians feel they need to be off before taking on their next assignment. Some programs have built-in obligatory respite time or enforced vacation schedules to ensure that their physicians are not overtired. In neonatology, long the home of innumerable three-letter acronyms that describe the most pressing problems, PDA, NEC, RDS, and IVH have been supplanted by WLB (Work-Life-Balance). This piece is undoubtedly essential, but WLB may interfere with the amount of remuneration offered. Moreover, ACGME mandates for training readily translate into expectations for career work. Often these cannot be reconciled with the demands of the job, leading to disenfranchisement and dissatisfaction.

"A Zoom conference does not provide the measure of relaxation that going to a national meeting provides, catching up with one's colleagues and learning outside the traditional work environment."

Relaxation:

Relaxation is the other component of this WLB. It is not sufficient to rest, but physicians must feel they have enough resources and backup to enjoy their time off work. This piece is somewhat tricky to define but constitutes the difference between sleeping in one's bed between calls and being able to participate in family activities, going on vacations, and taking a meaningful part in various CME activities. A Zoom conference does not provide the measure of relaxation that going to a national meeting provides, catching up with one's colleagues and learning outside the traditional work environment.

"Finally, however, respect is most important. In many ways, respect is embodied by the four other areas, but it is the quintessential piece that most physicians identify as lacking in their place of previous employment. It is imperative to note that even the most established physician can be affected if the four previous R's are aligned and have been for a long time."

Respect:

Finally, however, respect is most important. In many ways, respect is embodied by the four other areas, but it is the quintessential piece that most physicians identify as lacking in their place of previous employment. It is imperative to note that even the most established physician can be affected if the four previous R's are aligned and have been for a long time. Often it is a sense that the employer may see them as only a cog in a much larger wheel or someone who is a "worker bee" or a feeling that there is no trajec-

tory for them in terms of professional advancement. A physician may be asked to move their laboratory or workspace many times in a short interval at the cost of productivity. Sometimes the physician feels like a ghost, or in some instances, "constructive termination" seems operational when business cards are delayed, and names and titles do not appear in office space.

In some cases, re-organization of office space may result in a more seasoned physician losing significant resources or simply not having a dedicated desk space. An experienced physician denied an opportunity to teach or engage with fellows or residents regularly feels marginalized. Exclusion from decision-making activities within the group, whether or not inadvertent, may be translated to a perceived loss of respect for this person's opinion. Limiting or constraining the practice without a good reason may discourage that physician. In creating opportunities for others, careful attention must be directed towards those who have committed a significant work effort, resources, funding, and even recruitment because even those physicians may feel marginalized by a loss of respect.

"Respect may also be diminished in the presence of a narcissist, especially if this individual has been given oversight of significant programs within a division or department. These individuals initially appear to have excellent people skills, form excellent first impressions, and rise quickly through the ranks in a receptive environment. Narcissist behavior may initially be dismissed as quality focused, competitive, or detail-conscious but is identifiable in its pervasiveness and shifting of targeted individuals."

Respect may also be diminished in the presence of a narcissist, especially if this individual has been given oversight of significant programs within a division or department. These individuals initially appear to have excellent people skills, form excellent first impressions, and rise quickly through the ranks in a receptive environment. Narcissist behavior may initially be dismissed as quality focused, competitive, or detail-conscious but is identifiable in its pervasiveness and shifting of targeted individuals. Whole divisions may be marginalized by one bad actor in a position of authority. These behaviors require evaluating every instance as the narcissist solicits support and validation from other unwitting faculty. Blameless individuals are often subject to meaningless inquisitions and begin to conclude that they actually did something wrong. "Gaslighting" of faculty for their "achievements" is never constructive and may result in considerable feelings of less worth.

What is the solution? In years gone by, tenure was offered to those who were valued in their practice. Although this does not have an analogy in other systems, several of these groups have instituted practices that resemble tenure (e.g., Kaiser Permanente Group) while paying physicians more than an academic model. Indeed, in some private practices, a partnership offers job security and economic advantage that can exceed that offered by tenure. In academic practices, tenure was increasingly considered a high-end luxury item that was not in line with workplace productivity. But is it? Suppose a senior physician has put in twenty to thirty years of high-impact academic performance in an academic setting and appears poised to continue that effort for the foreseeable future. Is there really a risk associated with honoring that individual's commitment to the institution? Arguably, the cost of replacing that individual would be manyfold greater than that of replacing a physician who has been out of training for two to three years. (5-6)

"Further, with the rapid turnover, retention of senior faculty may be more important than those just looking to pass their boards and then "look for a real job." Ultimately, again, it is about respect. With a turnover of greater than 20% in some practices and high costs to recruit and re-establish new faculty, prioritizing a budget and strategy for retention may be more practical and economical in the long run."

Further, with the rapid turnover, retention of senior faculty may be more important than those just looking to pass their boards and then "look for a real job." Ultimately, again, it is about respect. With a turnover of greater than 20% in some practices and high costs to recruit and re-establish new faculty, prioritizing a budget and strategy for retention may be more practical and economical in the long run.

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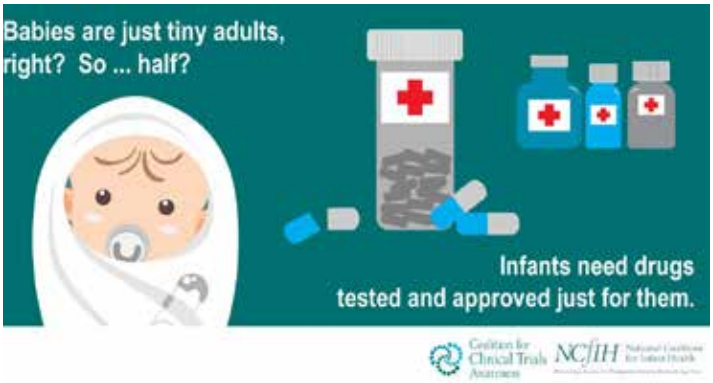

Letters to the Editor

Letter to Editor: Comment on "Disparities in Perinatal Care Among the Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ+) Community"

Dear Editor:

With great interest, I read "Disparities in Perinatal Care Among the Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ+) Community" Prakash-Zawisza, V; Goldstein, M (Disparities in Perinatal Care Among the Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ+) Community, Neonatology Today. June 2023; 91-92)

"In this article, Drs Prakash-Zawisza and Goldstein address numerous health disparities that affect the LGBTQ+ community, primarily focusing on perinatal care. The authors give examples of the consequences of these health disparities, emphasizing the increased chances of miscarriages, stillbirths, low birth weight infants, and very preterm births (1)."

In this article, Drs Prakash-Zawisza and Goldstein address numerous health disparities that affect the LGBTQ+ community, primarily focusing on perinatal care. The authors give examples of the consequences of these health disparities, emphasizing the increased chances of miscarriages, stillbirths, low birth weight infants, and very preterm births (1). Their manuscript discusses multiple ways to address these barriers to care, discrimination, and stigma. Due to the rising legislation targeting the LGBTQ+ community (2), I deemed it essential to provide additional findings and studies to increase the overall care experience for the LGBTQ+ community.

"Members of the LGBTQ+ community described their childbirth experience as fair, poor, or very poor 31% of the time compared to their cisgender, heterosexual counterparts, who described it only 18% of the time."

Members of the LGBTQ+ community described their childbirth experience as fair, poor, or very poor 31% of the time compared to their cisgender, heterosexual counterparts, who described it only 18% of the time. 51% of the LGBTQ+ birthing people reported that their childbirth experience was impacted by bias and discrimination, compared to 35% of their cisgender, heterosexual counterparts (3). Healthcare providers have a crucial role in caring for the most vulnerable populations. They need to be educated on the stigmas and prejudice LGBTQ+ individuals face. With a simple 40-minute gender and sexuality training, there can be an improvement in knowledge, attitudes, intended behaviors, misconceptions, prejudice, language sensitivity, and normativity for pregnant patients in the LGBTQ+ community (4).

"A primary area of concern for LGBTQ+ individuals is in receiving social support during pregnancy and the postpartum period. Involvement with LGBTQ+ communities is associated with lower rates of postpartum depression among sexual minorities. Many individuals reported that parenting and mother-centered groups did provide emotional and informational resources but lacked sexuality-specific support. "

A primary area of concern for LGBTQ+ individuals is in receiving social support during pregnancy and the postpartum period. Involvement with LGBTQ+ communities is associated with lower rates of postpartum depression among sexual minorities. Many individuals reported that parenting and mother-centered groups did provide emotional and informational resources but lacked sexuality-specific support. Others did report that they received support from LGBTQ-identified friends and communities, which helped them feel accepted in their sexual and parental identities, although many individuals had a challenging time acquiring this type of social support. Some individuals have felt that their unacceptance from specific communities was not due to their pregnancy status but strongly associated with the gender of their partner. Only 31% stated they received support during pregnancy and early parenthood (4). Finding an accepting community is crucial to providing the best pregnancy and parenting for the child. Many mothers found inclusive daycares attractive for their LGBTQ+-affirming actions (5). Offering recommendations to sexual minorities of accepting spaces makes for a welcoming experience instead of a discriminatory one. For some individuals without a local community, online communities have become a place of acceptance and connection (5). Healthcare providers need to provide resources to local and online communities for sexual minorities to have a sense of connection and relationship with others in similar life circumstances.

Another primary concern is for trans and non-binary child bearers and the cisheteronormative model of care that lacks awareness of their issues. This population receives microaggressions such as endorsement of binary gender norms, exoticization, mocking, questioning, awkwardness, avoidance, assumptions of sexual pathology, and denial of individual needs (6). These microaggressions are often from health care providers; through this, they are effectively dehumanized by the people who are supposed to care for them. This is further emphasized by the fact that some health-

care providers perceive being trans as incompatible with parenthood (6). These attitudes and views increase minority population stressors that negatively impact gender nonconformist health. Trans are often discriminated against when giving birth as it is viewed as a "female act," this significantly impacts those who live full time in their experienced gender, who already experience the most significant amount of transphobic discrimination (6). These prejudiced groups who discriminate against the trans and nonbinary community are focused on medicalizing women's bodies and childbirth and are suspicious of trans individuals being who they claim to be (6). With this information, it is essential to provide additional protections for trans and nonbinary people. Healthcare providers need to be educated on the realism of childbearing as a trans or nonbinary person. This includes using inclusive language and creating policies for supporting childbearing trans and nonbinary individuals. Healthcare providers have stated a preference for hearing from trans and nonbinary individuals as one of the ways they would become more inclusive (6). Additionally, medical record systems will need to recognize the existence of trans and nonbinary child-bearers. Integrating a range of identities in the medical record system that accurately and individually represents the person is vital so that trans and nonbinary people are not segregated.

" Additionally, medical record systems will need to recognize the existence of trans and nonbinary child-bearers. Integrating a range of identities in the medical record system that accurately and individually represents the person is vital so that trans and nonbinary people are not segregated."

The task of confronting the health disparities that the LGBTQ+ community experiences is large. There are many tools we can use to fight this injustice. One is the *Birth Includes US* survey; this survey helps identify which identities and geographies are most underrepresented and informs policy action to address these health disparities, two of which are perinatal mortality and morbidity (7). Another is using the *Three Principles Model* presented by Light & Obedin-Maliver, which states that 1.) "Transgender and nonbinary (TGNB) people are different from cisgender and straight people, TGNB individuals have unique experiences garnered from living in a world designed for cisgender straight people." 2.) "Transgender and nonbinary people are the same as cisgender and straight people. Despite having some unique healthcare needs, TGNB patients also have the same healthcare needs." 3.) "Transgender and nonbinary people are unique and different from one another. The concerns of one TGNB individual cannot be applied to all TGNB individuals. It is imperative to treat each TGNB individual as unique and customize their care" (8).

Lastly, we will discuss methods and opportunities to provide exceptional care to the LGBTQ+ community at each stage of pregnancy; preconception, antepartum, intrapartum, postpartum, and future considerations.

Preconception:

According to medical guidelines, testosterone administration is an absolute contraindication to pregnancy. Considering that some TGNB patients take gender-affirming hormone therapy, counseling patients on the effects on fertility, fecundity, and fetal development is necessary. It is also essential to weigh the positive effects on the mental health of gender-affirming hormones when considering cessation of testosterone. Likewise, gender-affirming surgery can impact pregnancy and be delayed if pregnancy is desired. The preconception phase is also an appropriate time to screen for adverse health conditions and promote risk-reducing behaviors.

"Likewise, gender-affirming surgery can impact pregnancy and be delayed if pregnancy is desired. The preconception phase is also an appropriate time to screen for adverse health conditions and promote risk-reducing behaviors."

Antepartum:

Screening for previously missed health concerns can be accomplished in the antepartum phase, as there are numerous healthcare visits in this period. It is also critical to consider that accidental pregnancies can occur in TGNB individuals, and access to clinical abortion care has increased barriers in the LGBTQ+ community (8). Notably, healthcare providers should attempt to break down these barriers and connect TGNB people with safe options for abortion care. As mentioned earlier, discussion about community and familial support should be conducted to optimize a safe and accepting environment for pregnancy.

Intrapartum:

Ob/Gyn is a hyper-gendered field. This can be traumatizing for patients who do not partially identify as a woman or a woman. It is imperative to inquire about patient pronouns, as this is part of their identity. This can be difficult to implement, as all healthcare professionals who interact with the patient must be educated on the patient's preferred pronouns. One way to implement this is to have training on how to care for pregnant TGNB patients; another is to have a multidisciplinary round before treating a TGNB pregnant patient to endure healthcare needs are met, and a positive birthing experience will be achieved. Some TGNB patients can have dysphoria regarding vaginal delivery and may request an elective cesarean (8). If an elective cesarean is requested, measuring the risk of a surgical delivery is essential.

"One way to implement this is to have training on how to care for pregnant TGNB patients; another is to have a multidisciplinary round before treating a TGNB pregnant patient to endure healthcare needs are met, and a positive birthing experience will be achieved."

Similarly, some TGNB patients, 44%, chose to deliver with non-physicians, and 17% chose to deliver at home (8). These desires should be inquired about and respected as long as there is no exceptional risk. Birth can be traumatic and scary for everyone. TGNB pregnant patients can have increased fear due to the hyper-gendered field that comes with reproductive care.

"After delivery, treatment of TGNB patients should include similar care to cis-gendered patients, with some exceptions to individualize care for each person. After delivery, one of the most critical assessments is to look for postpartum depression. This should be done in all postpartum individuals regardless of gender identity. "

Postpartum:

After delivery, treatment of TGNB patients should include similar care to cis-gendered patients, with some exceptions to individualize care for each person. After delivery, one of the most critical assessments is to look for postpartum depression. This should be done in all postpartum individuals regardless of gender identity. For TGNB patients, the re-initiation of testosterone therapy can be considered. It is recommended to resume testosterone supplementation 4-6 weeks after delivery (8). Research has shown that testosterone supplementation can delay or decrease milk production (8), so it is crucial to consider the plans for infant feeding. One possibility is to have the non-birthing partner feed the infant if possible. The induction lactation protocol that can be applied to TGNB individuals is the Zil-Goldstein protocol which states; "1.) administering elevated levels of estradiol and progesterone, 2.) stimulating hormone shifts of birth, 3.) using a galactagogue, and 4.) breast/chest pumping for nipple stimulation" (8). The current information regarding nutritional content and production volume is lacking, and further study should be done.

"Each provider is responsible for individualizing pregnancy-related care and improving access to safe and supportive healthcare. LGBTQ+ patients who present for care should be evaluated using standard protocols emphasizing individualized care to each individual. "

Future Considerations:

One of the significant future considerations is uterine transplantation for TGNB individuals that desire pregnancy. This new field has only recently been conducted on cisgender women who desire pregnancy. With long-term outcomes being assessed, including TGNB individuals in research and future cases is critical. Many resources are available to heterosexual and cisgender individuals that exclude TGNB persons (8); this needs a systemic change in the perceptions and care given to TGNB patients in all areas of healthcare.

Each provider is responsible for individualizing pregnancy-related care and improving access to safe and supportive healthcare. LGBTQ+ patients who present for care should be evaluated using standard protocols emphasizing individualized care to each individual. Thank you, Doctors, for your continued goal to treat all people equally and provide education about the health disparities in the LGBTQ+ community.

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Sincerely,

Benjamin Hopkins, OMSIV

Western University of Health Sciences

Pomona, CA

Dear Doctor to be Hopkins,

I want to express my heartfelt appreciation for your thoughtful and engaging letter discussing the article "Disparities in Perinatal Care Among the Lesbian, Gay, Bisexual, Transgender, and Queer (LGBTQ+) Community" by Drs. Prakash-Zawisza and Goldstein. Your comprehensive response highlights the significance of the research findings and delves into various important aspects of perinatal care for the LGBTQ+ community.

"Your attention to the health disparities faced by the LGBTQ+ community during pregnancy is commendable. The examples you provided, which underscore the increased chances of adverse outcomes such as miscarriages, stillbirths, low birth weight infants, and very preterm births, emphasize the urgency of addressing these issues."

Your attention to the health disparities faced by the LGBTQ+ community during pregnancy is commendable. The examples you provided, which underscore the increased chances of adverse outcomes such as miscarriages, stillbirths, low birth weight infants, and very preterm births, emphasize the urgency of addressing these issues. Healthcare providers must be aware of these disparities and work towards reducing them through targeted interventions and inclusive care practices.

I found the statistics you cited, revealing that members of the LGBTQ+ community often describe their childbirth experience as fair, poor, or very poor compared to their cisgender, heterosexual counterparts, to be particularly compelling. The impact of bias and discrimination on LGBTQ+ birthing individuals during this critical time further underscores the need for healthcare providers to be educated on the unique challenges faced by this community. Your suggestion of a 40-minute gender and sexuality training to improve knowledge, attitudes, and intended behaviors is practical and can contribute to more empathetic and equitable care.

"The impact of bias and discrimination on LGBTQ+ birthing individuals during this critical time further underscores the need for healthcare providers to be educated on the unique challenges faced by this community. "

Moreover, your exploration of the importance of social support during pregnancy and the postpartum period is enlightening. The involvement of LGBTQ+ communities in providing emotional and informational resources can significantly enhance the well-being of sexual minorities during this vulnerable period. However, the lack of sexuality-specific support in specific parenting and mother-centered groups underscores the need for more inclusive and accepting spaces that cater to the unique needs of LGBTQ+ parents.

"Your mention of the challenges faced by trans and non-binary child bearers within the cisheteronormative model of care is very revealing. The microaggressions and discrimination experienced by this population, often from healthcare providers, are deeply troubling."

Your mention of the challenges faced by trans and non-binary child bearers within the cisheteronormative model of care is very revealing. The microaggressions and discrimination experienced by this population, often from healthcare providers, are deeply troubling. The urgent need to educate healthcare professionals on the realities of childbearing as a trans or nonbinary person and the importance of implementing inclusive language and policies cannot be overstated. Additionally, recognizing and accommodating diverse gender identities within medical record systems is crucial to ensure that trans and nonbinary individuals receive appropriate and personalized care.

I commend your advocacy for utilizing tools like the Birth Includes US survey and the Three Principles Model to address healthcare disparities and improve care for the LGBTQ+ community. These innovative approaches can provide valuable insights into this diverse population's unique needs and experiences, allowing for targeted and evidence-based interventions.

"Your detailed overview of methods and opportunities to provide exceptional care during each stage of pregnancy - preconception, antepartum, intrapartum, and postpartum - demonstrates a comprehensive understanding of the complexities involved in caring for LGBTQ+ individuals."

Your detailed overview of methods and opportunities to provide exceptional care during each stage of pregnancy - preconception, antepartum, intrapartum, and postpartum - demonstrates a comprehensive understanding of the complexities involved in caring for LGBTQ+ individuals. Recognizing the potential impact of gender-affirming hormone therapy and gender-affirming surgery on fertility, fecundity, and fetal development during preconception is crucial for informed decision-making. Your emphasis on screening for adverse health conditions and promoting risk-reducing behaviors in this phase is essential for optimizing maternal and fetal health.

Additionally, your focus on breaking down barriers to clinical abor-

tion care in the antepartum period and ensuring a safe and accepting environment for pregnancy is commendable. Your suggestions for implementing patient-centered care for TGNB pregnant patients during the intrapartum and postpartum phases, considering individual preferences and considerations, demonstrate the need for personalized and compassionate care for all patients.

"Your call for systemic changes in the perceptions and care given to TGNB patients in all healthcare areas is timely and crucial."

Finally, your foresight in highlighting future considerations, such as uterine transplantation for TGNB individuals, speaks to the ongoing advancements in medical technology and the need for inclusive research and care practices. Your call for systemic changes in the perceptions and care given to TGNB patients in all healthcare areas is timely and crucial.

In conclusion, I want to express my gratitude for your dedication to raising awareness and advocating for the well-being of the LGBTQ+ community in perinatal care. Your letter serves as a reminder of the work ahead in creating a more equitable and compassionate healthcare system for all individuals, irrespective of their sexual orientation or gender identity.

Sincerely,

Mitchell Goldstein, MD, MBA, CML

Editor in Chief

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

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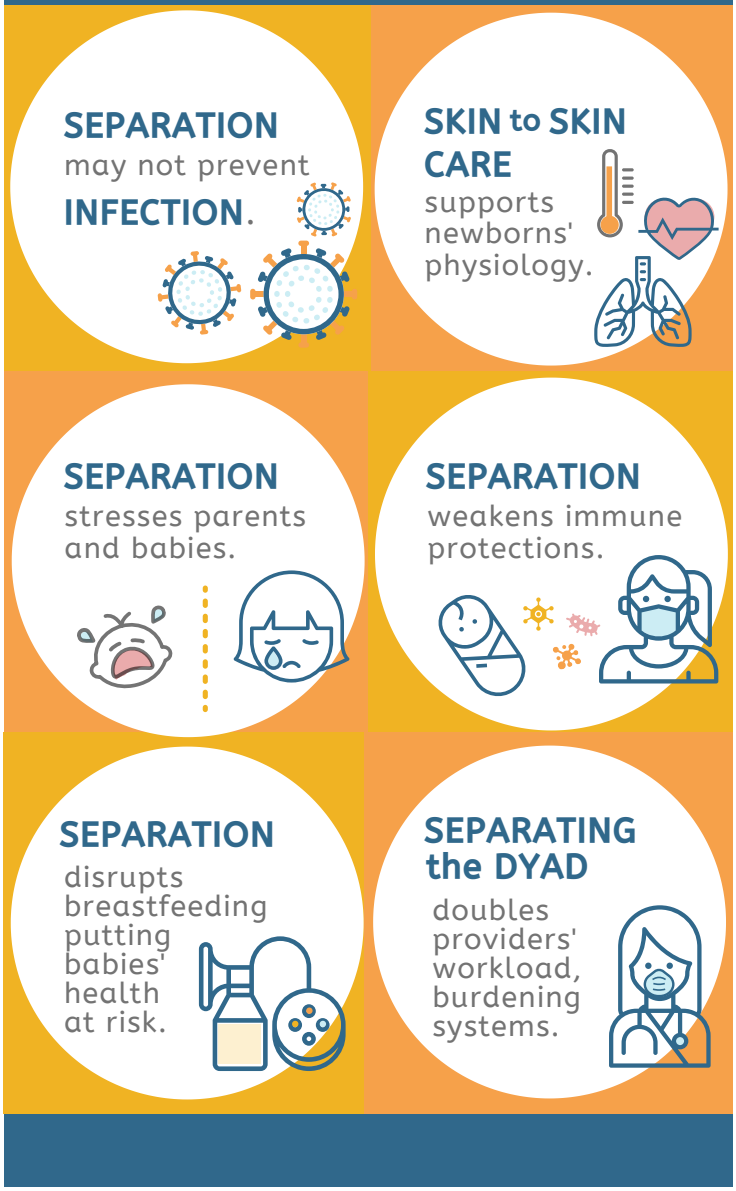
Should Infants Be Separated from Mothers with COVID-19?

FIRST DO NO HARM



BASED ON THE ARTICLE:

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

Pneumoperitoneum in a 5-day-old, 26-week Infant: What is the Diagnosis?

Shabih Manzar, MD, MPH; Faiza Javed, MD

Pneumoperitoneum is a radiological diagnosis (ICD-10-Code K66.8), while necrotizing enterocolitis (NEC)- [ICD-10 Code P77 NEC of newborn, P77.1 Stage 1 NEC in newborn, P77.2 Stage 2 NEC in newborn, P77.3 Stage 3 NEC in newborn, P77.9 NEC in newborn, unspecified)] and spontaneous intestinal perforation (SIP)- ICD-10-Code K63.1, are clinical, radiological, and pathological diagnoses.

"Pneumoperitoneum in this 5-day-old, 26-week infant could be due to SIP or NEC. Based on the Bell staging criteria, the infant could be classified as Bell Stage III (or modified Bell stage IIIB) 1 due to pneumoperitoneum."

Pneumoperitoneum in this 5-day-old, 26-week infant could be due to SIP or NEC. Based on the Bell staging criteria, the infant could be classified as Bell Stage III (or modified Bell stage IIIB) 1 due to pneumoperitoneum. The differentiation is complex and requires direct visualization of the affected bowel and histopathological examination (2). The current data suggest increasing SIP and decreasing NEC among preterm infants (3). For bedside diagnosis of NEC and SIP, two out of three and three out of five rules have been suggested (3).

The infant underwent exploratory laparotomy. After removing 22 cm of the small intestine, a double barrel jejunostomy was done. The pathology showed chronic inflammatory and reparative changes compatible with NEC.

NEC has many definitions. Patel et al. (4) summarized eight definitions of NEC with similarities and differences in clinical signs and radiographic features. They highlighted the importance of a global consensus on defining NEC to improve NEC research and outcomes.

"It remains a dilemma for NICU providers to diagnose and differentiate between SIP and NEC. Although they may mimic each other, the impact is very different."

It remains a dilemma for NICU providers to diagnose and differentiate between SIP and NEC. Although they may mimic each other, the impact is very different. Juhl et al. (2) reported 60% mortality with stage 3 NEC while 18% with SIP. Also, NEC is a quality indicator associated with neuro-developmental outcomes (5-7).

Artificial intelligence might help in the future, but we need more literature and research. Developing clinically valid and relevant AI requires large, high-quality multimodal datasets (8).

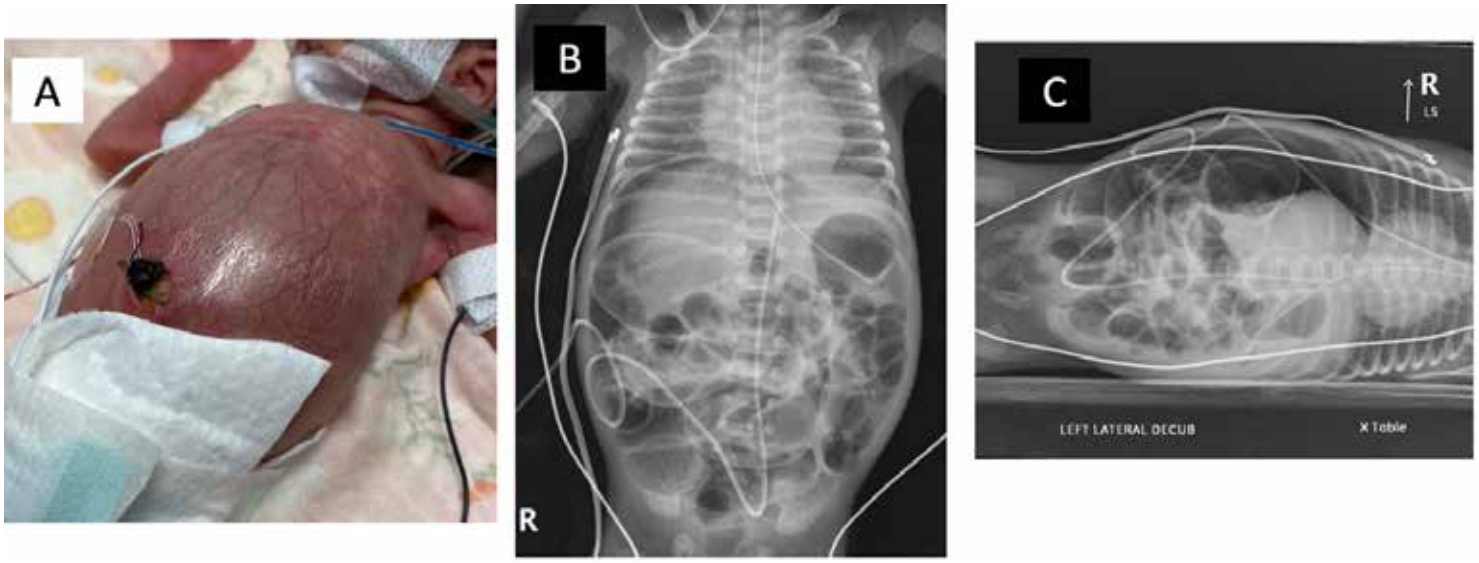


Image 1: Common physical and radiographic findings in NEC

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Improvisation in High-Reliability Organizing (HRO): 1. Red Noise Engagement

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

Abstract:

Red noise produces functions forcing a response from a population. Pink noise creates abrupt catastrophic change that may require resetting or changing learned behaviors at the moment, if not starting over. For some reason, the organized approaches for these situations derive from stable white noise environments. These environments differ significantly in stability versus change, thought, information, precision versus accuracy, error versus correction, decision-making, and problem-solving. Red noise environments limit our ability to design for forcing or abrupt events effectively. These events cannot be deflected, contained, or suppressed. Entering the environment by way of improvisation is a practical approach to engagement. Operational organizations have decades of history of engaging in dangerous contexts.

Introduction:

Descriptions of HRO often come from spectators far from the hazards of High-Reliability *Operations*. When the pragmatics of operations are translated into more abstract normative statements, nuances, fine-tuning, and subtle but essential cues tend to be lost. This results in the incomplete translation of HRO theory into practice.

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Think of a group of experts watching a sports competition between two teams. While the teams compete on the playing field, the experts observe from the stadium's upper level. The experts are unfamiliar with the game, its rules, and its scoring. However, they immerse themselves in debate, identifying the likely rules and figuring out the tactics and strategies used by each team.

One of the authors (DvS) would present this story to HRO educators and consultants who asked him why he continued investigating the mechanisms of HRO. They believed academicians had defined HRO, and we should now develop measurement tools and study its implementation. The author drew upon the difference between knowledge by acquaintance (the players) and knowledge by description (the experts in the upper seating tiers of the stadium). HRO occurs at a granular, local level in a rapidly fluctuating, unsafe environment. For their safety, spectators need to be protected from harm.

"The author drew upon the difference between knowledge by acquaintance (the players) and knowledge by description (the experts in the upper seating tiers of the stadium). HRO occurs at a granular, local level in a rapidly fluctuating, unsafe environment. For their safety, spectators need to be protected from harm."

Another reason for that author's view was his experience with retrograde intubation (1). This technique introduces a needle through the cricothyroid membrane in a cephalad direction. A wire is inserted upward through the nose allowing an endotracheal tube to be passed into the trachea. The key to the success of this technique is that the guide wire is held taut as the endotracheal tube is gently slid down the guide and into the trachea. This minimizes the risks of the endotracheal tube "flipping" out of the larynx.

However, he found that some emergency physicians were unsuccessful with this technique because they did not hold the guide wire taut as they inserted the endotracheal tube. The author identified a pattern by comparing the early literature and later review articles. Earlier published reports of retrograde intubation stressed the need to maintain tension on the wire guide. Later review articles did not mention that. This case illustrates the value of understanding the importance of subtle aspects of the technique (2).

Various operational gaps exist between theory and practice (3), but the most severe gap is between stability and entropy. Stability occurs in relatively closed systems that limit energy flow into the environment. The environment has the necessary buffering capacity to absorb or neutralize energy added to the system, much like white noise counters ambient noise to give a sense of quiet. This is much like the hospital environment where the environment does not intrude, emergencies are local and limited in scope, and responders have prescribed capabilities. These are "white noise" environments (4).

On the other hand, environments may experience energy fluxes with long periods such that events are few and far between. These

wavelengths carry the power to force a response; they are called forcing functions. The longer periods, like the longer frequencies of red light, are called "red noise" (4). A unique pattern occurs at the 1/*f* frequency when an abrupt but rare event occurs. This is called "pink noise" because it has a frequency midway between white and red noise (5).

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The gap between white and red or pink noise becomes serious when principles and practices developed in white noise environments become expectations for red and pink noise environments. The abrupt change caused by pink noise can impair cognition and engagement (6), while forcing functions in the red noise environment are more likely to respond to effective on-scene improvisation.

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It is the red noise environment where rules conflict or compete, or the gaps between rules can lead to severe consequences. Initiative and improvised action bring resolution to these situations. However, this appears to be unconstrained "freelance" behavior to a spectator from a white noise environment. This is particularly true within the culture of healthcare. They miss the importance of the initiative to immediately engage uncertainty and threats, and creativity to improvise solutions to novel problems.

Using white noise thinking and methodology as a lens to understand the unexpected, forcing functions, and abrupt change is fraught with risks and hazards. Classifications and standards developed in white noise environments impair operations during red noise forcing functions or when encountering abrupt pink noise events. Unnoticed causations, missing information, corrupted communication, and other influences are washed out when spectators evaluate the situation from a safe distance (7). Red noise operational interpretations become washed out for management, planning, and conceptual tractability (8). Mistranslating field terms into the business and management science lexicon removes essential concepts and themes developed through experience (9). "Leadership" as an *ex officio* label for executives, administrators, managers, and supervisors washes out the leadership characteristics necessary for liminal events and dangerous contexts (3). Decontextualized white noise operational formats eventually wash out the function of HRO (10).

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We can readily bridge the gap between white and red noise environments. That is not the problem. What has occurred in high-risk operations is the privilege gained by those with expertise in stable, white-noise environments. Lost in the development of HRO studies is improvisation as the engine of High-Reliability Organizing.

White Noise Environments:

Oscillating and fluctuating processes create frequencies of power. In some environments, the spectrum has an equal distribution of all frequencies with constraints on the power variance in all the frequencies. This is a 'white noise environment' with a frequency value f^0, named after the white noise in acoustical systems.

'White noise' is environmental noise with a flat spectrum uniformly spread across all frequencies ($1/f^0$, a constant). There is an equal and independent representation of energy over all frequencies *without* autocorrelation (feedback) and (11, 12).

- The equal distribution of energy means no dominance by any frequency—events become independent.
- Uncorrelated in time and independent of past events means there is no autocorrelation (feedback) of frequencies—events become random.

White noise frequencies, $1/f^0$ (a constant), generate a normal distribution with zero mean and constant variance and is uncorrelated in time (in a time sequence, the value at time *t* is random and independent of the value at time *s*). 'Gaussian' white

noise has a normal distribution of mean 0 and standard deviation 1. This makes statistical analysis and probability calculation possible and the development of reliable models and theories. Environmental elements are fully independent. Variance decreases over time or with increasing data. White noise environments are sensitive to information—more information increases precision.

The predictability of white noise environments informs the normative stance (13) and is the ideal scientific environment. For example, there is no energy exchange with the external environment, while the independence and randomness of elements support statistical analysis and probability predictions.

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Therefore, the presumption of a white noise environment has excellent utility for routine operations, research, scientific advances, support for academic medical care, and communication. Critical for clear thinking and problem-solving, the presumption of white noise gives tractability to an actual world that too quickly appears ambiguous, inconsistent, and disordered.

White Noise Stability

Because all frequencies are represented in white noise, it can cancel minor perturbations like white noise in the sound spectrum. The capacity to buffer interferences creates intrinsic stability. This does not mean that surprises will not occur. Novel properties can emerge from the stochastic resonance that creates environmental noise (14). It is the appearance of stability that masks systemic weaknesses.

A slow change in white noise environments produces a sense of stability— that the system is not changing. White noise environments favor the generalization of a population over periods that extend longer than the life of individuals (15). A person entering a white noise workplace develops a baseline for expectations. The system change is noticed only from entry and remains within the individual's experience. During slow change, one may long for the earlier, 'better' times. This "reset baseline" conceals or obscures change (16).

The stability of a white noise environment permits context-free concepts, theories, and problem-solving. Leadership becomes less critical than executive, administrative, and managerial skills (17), where 'categorical work' creates classifications and rules to work by (18). Classifications (18) and abstractions (19) gain greater significance. Experts develop mastery over distinct bodies of knowledge. Rather than experiential empiricism, theories, beliefs, and experimental empiricism become privileged. The individual accepts the new generalized norms and normative values. There begins a loss of practical wisdom as new abstract beliefs become privileged. Beliefs change, and the culture follows.

Deviation from accepted values is the error measurement for the organization's response. The variance of white noise is almost constant, which allows for more accurate planning.

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Fluctuations in forcing function with exceedingly long periods or infrequent abrupt changes give the appearance of a stable environment if not a stable world. A red noise environment is readily mistranslated as a relatively stable white noise environment. Systemic weaknesses and leadership pathologies become masked.

The novice, though, will be challenged by the constrained stochastic surprises of the white noise environment.

White Noise Thought

Operations in a white noise environment occur independently of the environment. Theories and beliefs are readily incorporated into operations. There is a minimal gap between theory and practice or between belief and the environment.

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Concepts provide the necessary elements for comparison, standardization, and quantification. This use of concepts has become a foundation of modern science (20). The Linnaean system categorizes typologies into taxonomic hierarchies to show relationships. ICD-10 codes create discrete categories out of continuous public health data analysis processes. The categories of evidence-based medicine are intended to reduce waste and medical complications.

In the predictable white noise environment, the return to the previous state, homeostasis, becomes the goal of stability. Resilience describes system recovery to the previous norms. Less experienced personnel have reduced demands. Therefore, they need less supervision (11). Adherence to protocols and algorithms soon usurps initiative, creativity, and independent thought.

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White Noise Information

In the white noise environment, information is similar to Immanuel Kant's idea of concepts—all concepts exist. Because there are no disruptions, information exists, is stable, and is accessible. The Gaussian distribution is information-dependent. Therefore, collecting more information decreases variance. This makes it easier to treat problems as a puzzle (21). After we collect the puzzle pieces, we have the answer—a form of deductive reasoning.

Information is also discrete, excluding middle values. The information does not contradict other information in the same context. The information does not change. Classical logic serves well in the context of a white-noise environment.

However, this has a great influence on arguments. If information cannot contradict other information, and there is no gradation of information, then we can disprove someone's idea by focusing on contradictions and inconsistencies. To disprove one point disproves all. We encounter these individuals as the ones focused on normative values and distracting minutiae.

White Noise Precision and Error

Data in white noise environments form a Gaussian distribution. Collecting more data narrows variance, making white noise systems *information dependent.* Therefore, it is reasonable for those in business management to be "data-driven." Increased data can also reveal the presence of distinct populations, such as in a bimodal distribution or a distribution with 'fat tails.'

Precision is a measure of reduced variance in a Gaussian distribution. The Gaussian distribution can produce normative values capable of error measurement. Defining error as the distance from the desired or expected (normative) value allows us to use error as a measure of precision. Because white noise systems are information-dependent, collecting more data reduces variance and gives more meaning to error measurements. In systems that require or value reductions in variance, such as tightly coupled systems, error as a measure of precision becomes helpful to ensure the smooth functioning of hardware and white noise operations.

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We must measure precision as the *distance from* the desired state *before* operations because we cannot change precision *during* operations. Measures of precision errors during the disruption of operations are not valid due to the fluctuating red noise energy frequencies.

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Error as the distance from the expected outcome is *one* type of error. Increasing precision to adjust our tools or performance in real-time is not practical. Identification of this type of error allows corrections in training, performance, and production processes *before* use in operations.

White Noise Decision making

A convergent, deductive, analytic approach makes sense in white-noise environments. We search for facts and information because they guarantee our deductive hypothesis. The structures we create, and our actions reinforce acceptance of the normative frame and the security they offer.

This linearity and stability, however, impede generating the stochastic resonance that brings stability to dynamic environments (22). Rigid structure and linearity will narrow and increasingly constrain our responses.

Decision aids in a linear, deterministic environment can use protocols, algorithms, and decision trees. Algorithms decompose a more extensive problem into minor problems that can more easily be solved. We complete one action before moving on to the next.

Decision trees identify alternatives and guide decision-making when the necessary information is unavailable (23, 24). They were first introduced for capital investment and then later applied to healthcare.

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Classical logic is central to decision-making in the white noise environment. We stress two well-known laws of classical logic because they may improperly be applied to red or pink noise environments. Some logic can incorporate multiple values, allow contradiction, and include 'indeterminate' truth values.

- *The law of excluded middle*—every proposition is either true or false. There is no gradation.
- *The law of noncontradiction*—the same proposition cannot simultaneously be true and false.

White Noise Problem Solving

White noise environments, despite their stochastic characteristics, follow the Gaussian distribution. Therefore, the Gaussian distribution of white noise environments supports discrete concepts, hierarchical systems, and linear thinking independent of context or the environment. The observer's frame of reference moves outside the flow of events and becomes fixed as Eulerian specificities (25).

"Classification and standardization can solve the problem of information correlation in a white-noise environment. Precision supports distinct classifications, while standardization gives meaning to precision. Precision is reliable in white noise systems as we see repeated or similar actions which produce predictable results. That reliance on precision, such as ICD-10 or DSM codes, leads to loss of information while classifying a situation. "

Classifications act as objects for cooperation and create boundary objects for communication across infrastructure during a disaster (26, 27). Classifications build from data are not a problem in the Gaussian white noise environment, where more data narrows the variance to form a norm.

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The white noise environment contains Herbert Simon's well-structured problem that is amenable to the algorithm (28, 29), solved much like a puzzle with a set number of pieces fitting into a pattern (21). Abstractions and concepts provide the basis for understanding and prediction. With the Gaussian distribution, problems tend to be information-dependent, and error measures the distance from the model or concept. Classical logic and scientific reasoning are used (30).

The environmental stochastic variance that may occur in the white noise environment can appear daunting to the uninitiated. Engaging in these events draws upon the values of initiative-obedience and creativity-conformity. These are opposing sets of cultural values (31). Such situations can be daunting to the uninitiated, leading them to believe they have experienced a reddened environment. Rather than engaging in the situation, they may completely defer to an individual they perceive as having experience or authority.

"...the danger of the white noise environment. Perturbations can create the ecology of fear, which can be perpetuated by leaders who repeat the possibility of harm, leading to subordinates self-policing initiative and creativity. Maintaining decontextualization, as in white noise or decontextualizing red noise environments, makes subordinates susceptible to the charismatic or authoritarian leader. Repeated failure to act creates organizational knowledge that undercuts engagement. Systemic weaknesses then become respected as strengths."

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that undercuts engagement (32). Systemic weaknesses then become respected as strengths.

The Red Noise Environment:

We easily envision an event as something that, once initiated, moves forward, unencumbered by its past. We see it somewhat like Isaac Newton's First Law of Motion, "Every body continues in its state of rest, or uniform motion in a straight line unless it is compelled to change that state by forces impressed upon it." The event continues until something acts upon it, a white noise event.

In an open system, the event acts on the environment just as the environment acts on the event. Autocorrelation develops when past events influence current ones, or a system interacts with others. Autocorrelated events are more susceptible to feedback loops, allowing even minor or mundane noise signals to achieve resonance. In this way, unnoticed occurrences become amplified and consequential.

Autocorrelation creates oscillations in the various frequencies producing varying periods. Oscillations between demands and capabilities create bivalence, even multi-valences. Autocorrelated segments create time series that can branch unexpectedly. Fluctuations and change create new premises and the consequent necessity to change or find new solutions. This is red noise.

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Red noise has zero mean, increasing variance, and is autocorrelated in time by feedback. Elements are *not* independent; relations between elements are mutual or reciprocal; and information and data *increase* variance—a power distribution forms rather than a Gaussian distribution. As power distributions, the non-Gaussian nature of red noise distributions impairs our ability to use classical logic, rigid models, and distinct concepts. More data clouds our conclusions.

Red noise's spectral density creates forcing functions that become ubiquitous, not entirely random except by timing. Forcing functions emerge from known processes within normal variation, differing only in time scale and magnitude.

Red noise events, or residuals, are autocorrelated, meaning there is an increased chance that the event can continue, producing above or below-average conditions that cause environmental disruption (33, 34). Red noise explains the lasting correlation of effects from a single event (12, 35).

The environmental pressure of noise in red environments favors the specialization of a population. *Ecological* change and responses occur within the lifetime of individuals (15). Unique environments in healthcare, such as the ICU, Emergency Department, and operating theater, operate in a red noise spectrum environment.

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The development of autocorrelation, described above, converts white frequencies to red or pink noise—not as a transition but more like a phase change to new properties without a change in composition. We can identify this difference when more data, or collecting data over a more extended time series, do not produce an expected better norm or stochastic model.

Karl Weick (personal communication) described these environments as "a mix of white and red, and that red is the thing to be avoided. Pink is the compenetration of white and red, and the mess sensemaking tries to untangle."

A special relationship occurs at the 'flicker' frequency, the 1/*f* oscillation, where an increased power spectrum at low frequencies produces abrupt, rapid fluctuations and catastrophic failure. This is 'pink noise.' The long periods of red frequencies or the rare flicker events of the pink frequency (1/*f*) can mislead us into believing we operate in a white noise environment.

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Types of Autocorrelation

Time. In a time series, temporal autocorrelation occurs when a previous time interval influences a time interval.

Environment. Spatial autocorrelation describes the patchiness of people or things. That is, values at neighboring points can partly predict the value at any one locality. People and things are neither distributed uniformly nor randomly (36). They are near others for a reason, such as an environmental forcing function or an internal

social process. Spatial autocorrelation can be positive or negative, representing aggregations versus scarcity.

In epidemiology, spatial autocorrelation identifies disease clustering in a general or specific region. Spatial autocorrelation measures the degree of similarity between objects located near each other (37). *As a form of contextualization, spatial autocorrelation heavily influences stress, fear, and threat.*

Spatial autocorrelation can cause the appearance of a 'false' gradient. In a 'true' gradient, neighboring elements are not coordinated, the changes in value deriving from their coordinates. In a false gradient, the change in value across space is caused by autocorrelation from the values and influences of its neighbors. The change in value is not due to its location (36).

Behavior. People, as social and learning organisms, demonstrate behavioral autocorrelation. Autocorrelation within a group creates culture, and the individual acculturates to that group through autocorrelation. Mirror neurons (38, 39) support team formation through autocorrelation. Autocorrelation of human behavior gives the reddened noise that confounds our ability to predict how others will act.

The human mind auto-correlates to the environment, that is, responds to feedback from behaviors, and the environment adjusts performance and creates learning. This is the basis for allostatic growth—strength through change. This mental autocorrelation creates the red and pink noise inherent to human cognition and behaviors.

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Red Noise Instability, Pink Noise Abrupt Change

The frequencies of long-period red noise have significant spectral density; hence they carry greater power. As the power wave arrives, environmental elements and populations respond. Frequencies with the power to force a system or population to respond to the environment are forcing functions.

Forcing functions act on various scales; some occupy our attention while other, low-frequency events, erupt into significant crises. Forcing functions introduce emergent new properties into the system.

In systems dominated by lower frequencies, that is, increased redness, ecological processes predominate. Red noise creates the dangerous gap that forms between theory and practice (40, 41), discrete concepts and continuous perceptions (42, 43), and the academician and operator (7, 13). In these situations, environmental and population variation maintains equilibrium (11).

When the variance continues increasing regardless of the length of the measured time series, the noise spectrum becomes pink, or 1/*f,* noise. As mentioned above, a special relationship occurs at the 'flicker' frequency, the 1/*f* oscillation, where an increased power spectrum at low frequencies produces abrupt, rapid fluctuations and catastrophic failure. Pink noise power decays as the inverse of frequency, causing common and rare environmental events to gain equivalent weight in a pink environment (12). Midway between white and red noise, environmental pressure from pink noise equally favors a balance of generalization and specialization (15).

Red Noise Thought

Upon detecting an acute threat, the amygdala activates the sympathetic-adrenal-medullary (SAM) and hypothalamic-pituitary-adrenal (HPA) axes. The SAM axis initiates the adrenergic "fight-or-flight" response, while the HPA axis releases peripheral adrenal hormones, including cortisol (44). The brain, reacting from bottom-up reflexive and priming processes, prepares the body for survival in the forcing function or amidst abrupt change.

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The brain decreases the influence of executive functions while enhancing motor behaviors and cognition. The amygdala causes the periventricular nucleus of the hypothalamus to secrete corticotropin-releasing factor (CRF). CRF simultaneously stimulates two systems: 1) the HPA axis to inhibit abstract thinking and memory and 2) the locus coeruleus-norepinephrine (LC-NE) system for adaptive thinking and behaviors. The brain is shifting to the adaptive cognitive shift necessary for survival.

Unmodulated, the brain response distorts cognition (situational cognitive distortions) (45).

- Anger
- Frustration
- Avoidance
  - Complete or avoid tasks
  - Focus on inconsequential tasks
  - Addressing easily accomplished tasks first
- Distractive comments
  - Responding to distractions

- Freeze ("attentive freeze")
- Actual cognitive or physical freezing
- Nausea and avoidance
    - Urge to urinate or defecate
- Confusion
- Mental freeze
    - Inability to solve simple problems
    - Failure to recall knowledge
    - Impaired working memory
- Choke (expectations being observed)
- Impaired memory recall/enhanced procedural memory
- Loss of abstract thought when the prefrontal cortex and executive functions are impaired
- Concrete thinking and reasoning due to loss of abstract abilities (amygdala impairs cortex)
- Rules are abstractions, therefore, difficult to recall and use.
- Failure of cognitive strategies: "Even quite mild acute uncontrollable stress can cause a rapid and dramatic loss of prefrontal cognitive abilities" (46).

Red Noise Information

Noise contains information. Using noise as information improves prediction, alters our view of the environment (7, 20, 47), and changes how we think and reason (8, 25, 48, 49). Increased predictability better focuses vigilance, reduces exposure to vulnerability, and mitigates some of the effects on the system that arise from threats (20, 50, 51).

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Our view moves beyond situations within a specific space and time increases the flow of information within the system (52), distinguishes the boundaries of our capabilities, makes early heralds of failure visible, and clarifies covert, compensated system failure (13). We generate and update information, make more effective inferences from imperfect information, and process the evolving consequences of simultaneous acting and *not* acting (53). We begin to think by acting (54-57). A collaborative approach then emerges as a robust flow of safety improvement information consisting of, among other things, information about errors and near misses.

Red Noise Accuracy and Correction

Accuracy is proximity to the desired value or state and will improve with feedback. Accuracy works well for moving targets as it is a process, especially true in reddened noise environments. Through reciprocal feedback, we achieve and maintain accuracy.

Structures exposed to entropic dissipating energy must remain within a specified range for continued operations. Fluctuations in response to forcing functions increase the variance of measurements, indicating changing circumstances, knowledge limits, and performance boundaries. Error, wrongly considered a failure signal (58), has value in the HRO. Though red and pink noise environments are *information insensitive*, they are not feedback insensitive. Engagement generates information through real-time feedback despite rapid changes in human performance or the environment.

Red Noise Decision making

We have no time to vet information or evaluate events in a dynamic situation. We rapidly observe feedback that is *directly associated with immediate action.* That is, we respond to the environment responding to us. Reciprocal decision-making describes how we act, observe the response to our action and how that response guides our next action. We learn what works through action. Decisions linked to action are probes to learn structure, redirect trajectory, create structure, and engage the threat. This is not simple feedback, a component of decision trees and algorithms (8).

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Short feedback loops are more specific to our action and more readily accepted, rightly or wrongly, as causative. To obtain short feedback loops, we must closely approach the environment, even entwining with the environment. Entering the situation shortens feedback loops to improve accuracy.

Long and indirect feedback is disastrous in forcing functions or abrupt change. The time compression inherent to the flux of rapid, dynamic events confounds the real-time use of prolonged or indirect feedback loops.

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

- Negative feedback corrects deviations from our desired state, ensuring safety. Negative feedback marks our boundaries for safe operations.
- Positive feedback builds structure and supports our strength and resilience.

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Red Noise Problem Solving

Loosely coupled, overlapping, and gapping concepts create a confusing environment where the problems are ill-defined (13). Herbert Simon (28) described how we naturally use heuristics to solve ill-structured problems. Heuristics can create biased thinking (59), which can be corrected through error identification (25, 28, 29, 58). Motor cognition (60) corrects errors by acting, making errors visible and correctable (32).

The red noise environment is ecological, therefore, contextual and pragmatic (13). These problems are information-independent. We cannot easily differentiate information from noise. We search instead for clues, as in a mystery, rather than pieces of the puzzle (21). We will be generating structure as we generate information. Red noise has a power-law distribution.

The pink noise environment is also ecological, but the problem is embedded into the environment, making these problems contextual and pragmatic (8). Problem-solving tends toward practical common sense, focusing on consequences and a broad knowledge base (49). Reciprocal feedback decision-making methods, such as Boyd's OODA Loop, provide flexibility (8). Actions through motor cognition (60) generate information by converting uncertainty to certainty (61).

Before his landing on the Hudson River, Capt. Chesley "Sully" Sullenberger had several discussions with one of the authors (DvS) about High Reliability and error management. Sullenberger had learned a helpful approach to capture and manage real-time errors: consider error a ball rolling down a ramp. The ramp has speed bumps that will stop the ball.

Sullenberger continued, "Another part of the idea is that it often requires more than one-speed bump to trap the error finally. If it goes fast enough, the ball may miss some bumps or roll over them. (The taller the bump, the more likely it will trap the ball.) Many speed bumps represent 'defense in depth,' a military concept we also discussed that day. A multilayered defense system is less likely to be penetrated than a single layer."

This is like increasing capture frequencies as the error (the ball) increases its speed. The "error ball and ramp" model that Sullenberger describes is a dynamic organizational design to reduce system failure that also recognizes the operator's real-time efforts to decrease the chance of failure.

Emergence and Self-Organization:

In an open system, nonlinear interactions will entrain local elements unexpectedly. Self-organization creates new structures as the order comes to chaos. During this dynamic, novel properties will emerge to influence the system. Our efforts to engage a self-organizing system will encounter these novel properties. Reliance on standard approaches and plans will misdirect the efforts of operators.

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Emergence of Novel Properties

Emergent properties occur from nonlinear interactions at the local level. Though scientific principles do not change, emergent properties are often novel and may not fit into conventional schemes of description or action. Causation can be nonlinear.

In the flux of events, environment elements interact with each other in nonlinear ways. Entropy drives these local interactions, which help dissipate the energy through self-organization. A hallmark of self-organization is the emergence of novel properties within the system. These are not new principles but rather unexpected and sometimes transient properties. These properties test the capabilities of individuals and the organization and will confound the best plans.

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

- *"Novelty"* comes from the emergence of new properties during the nonlinear interactions of self-organization.

- *Uncertainty* is an inherent principle of linear, time-variant systems, a product of the stochastic frequencies in red noise. (Heisenberg's Uncertainty Principle is an example from quantum mechanics.)
- *Unpredictabilit*y develops from stochastic frequencies and the rate of change in the logistic equation that can develop into deterministic chaos (43).

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

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We generate information through our actions. There is no wrong action, as every action creates a response, and every response changes an element from uncertain to certain. This uncovering of information and the generation of information is Shannon Information (44). Claude Shannon laid the groundwork for the digital revolution by describing signals as having one of two values—"certain" OR "uncertain." Information is the conversion of uncertainty to certainty. Certain carries no information, but changing from uncertain to certain creates information.

Directed Self Organization

Order comes out of chaos through self-organization (45). These systems stabilize and develop order by self-organizing through local, nonlinear feedback. Positive feedback contributes to growth and structure, while negative feedback restricts growth. These oscillatory, self-organizing processes bring stability and order to the environment, but the nonlinear interactions degrade any ability for predictions. Environmental self-organizing processes create stochastic noise that can increase to a level that forces a system or population to respond. The system or population responses to these forcing functions are also self-organizing oscillatory processes with poor predictability of outcomes.

For organizations, personnel and executives will become alert to subtle and nuanced disruptions, early heralds of failure, and covert, compensated states to engage early and more effectively.

Improvisation and learning by doing, components of Pragmatic HRO, generate solutions and reduce damage in unforeseen ways. HRO values and attitudes support personnel in their natural drive to find what works to help people who cannot help themselves. HRO, as the verb form, describes a scale-free network approach that overlays organizations and systems to increase sensitivity to early heralds of failure and increase interventions' effectiveness. While HRO methods move the organization toward a more desirable end-state, it does not increase resources except mental performance.

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A practical domain of engagement recognizes the overlapping and loose coupling of concepts necessary to complete a task, also the pragmatic stance, and illuminates the study of the problems of transferring academic work to organizational practice. Engagement is the act of learning by doing in context, not an outcome of rational deliberation, and cannot be objectified for theory-making (41). Engaged action comes from insight and immediate feedback, with negative feedback marking the safe boundary of performance and positive feedback generating growth. All feedback generates information. "Mistakes" indicate a change in circumstances (62) or interference from the environment (63). However, mistakes are observable and, therefore, correctable (32). Effective responsiveness brings strength through change and allostasis.

The noise process is independent of timescale or magnitude; we need not characterize normal environmental variation differently from catastrophes (2). A disaster is an open system where energy and entropy freely flow.

When a NICU experiences a disaster, the external environment enters the NICU (46), and the isolated system, which constrains the flow of energy and entropy, becomes an open system. Energy and entropy freely flow in or out. Entropic energy, not available for practical work, changes order within the NICU system to disorder. Entropy is not a measure of disorder in the moment, such as scattered, randomized elements. Instead, entropy is a disorder with poor predictability because of an increasing number of possible permutations or futures. The more random the system becomes, the greater the number of possibilities that develop and the more significant the increase in entropy. The forcing function of stochastic environmental energy drives the disaster into the NICU, forcing the NICU to become an open system and increasing the possible permutations the Neonatologist must negotiate.

Self-organizing systems are dynamic, requiring continual interactions. The disaster environment is an open system with a

continual flux of energy and matter. Reactions, therefore, can occur away from their equilibrium state. Structures—termed dissipative structures—emerge through nonlinear kinetics. Patterns then arise from energy dissipation into the environment (47).

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Self-organization creates the oscillations and waveforms that disrupt the environment, forcing responses from populations. Self-organization is also the response of populations to reduce the effect of environmental oscillations. The flow of energy and entropy alter the self-organization of these oscillations. Stochastic environments become stable from the oscillations of self-organization; populations maintain stability through the oscillations of self-organization.

Self-organization can develop through behaviors due to decisions like a termite mound where termites deposit material from local physical cues. "Individual organisms may use simple behavioral rules to generate structures and patterns at the collective level that are relatively more complex than the components and processes from which they emerge" (47). This is from nonlinear amplification and cooperativity, making the results sensitive to the initial state.

Protection from Red and Pink Noise:

The threat of a forcing function or abrupt change can create an ecology of fear (4, 64). That is, the threat causes more harm by its absence than its presence. Individuals can manipulate the ecology of fear for individuals to self-police their behaviors and actions. We see this with liability fears, medical error, and patient harm or safety.

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The ecology of fear can bring in fears with a solid affective component, but they are less likely to occur. A disliked situation can be framed as a shared threat, even if it is not. Repeating descriptions of the harm it may cause soon engenders fear of something or someone we routinely encounter. The majority will voluntarily, if not spontaneously, find the cause and 'fix it.' That is, the majority now assigns the blame (65).

Vigilance in the absence of the predator, a defense cost, sustains the stress response with chronically elevated glucocorticoid levels and reduced reproduction (66, 67). This is the consequence of accepting the ecology of fear in an organization.

Defenses

Defensive measures protect the organization from damage due to direct attacks and also protect routine operations from distractions. Karl Weick (personal communication) once described how his motivation for "sensitivity to operations" came from studies that demonstrated failure when a disruption had distracted the organization from its routine operations. Defensive measures must not detract from operations.

Patterns of defense differ if the risk is unpredictable, uncontrollable, variable, and the costs of defense are high (68).

- Proactive defenses have the most significant effectiveness when risks are predictable and controllable.
- Reactive defenses are more effective and reliable with increasingly unpredictable or uncontrollable risks.

Fixed constitutive defenses, such as spines, become effective when risks are consistently high or defensive costs are low. Risks often vary by location or over time, and defenses carry costs. Inducible antipredator responses allow the selection of antipredator behaviors with variable expression, increased behaviors for elevated risks, and decreased expression as the risk abates (68).

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Inducible antipredator responses allow the selection of antipredator behaviors with variable expression, increased behaviors for elevated risks, and decreased expression as the risk abates [5]. We have an inducible antipredator response—terminate ongoing behaviors (the stress HPA axis) while initiating attention-arousal behaviors (the LC-NE system), which utilizes broad attention networks to sustain practical cognition under stress. This correlates well with Niko Tinbergen's thesis that behavior is the more adaptive approach for animals in adverse or hostile environments.

The Limitations of Design:

Administrators create emergency plans at "the corner of 70th and Fluorescent," a fire department term describing office work where the room temperature is 70° Fahrenheit with fluorescent lighting. However, operations occur in the heat or cold, in the dark, possibly wet, with the dictum, "If you don't have, it doesn't exist." HRO bridges this gap between planning and operations through improvisation.

Nevertheless, it is not that simple. However, the drive for security from structure too readily leads to people creating or conjuring structures through technical designs such as hierarchy and rules. These technological systems "become organized by commands from the outside, as when human intentions lead to the building of structures or machines"—Eugene F. Yates (69). Executives, administrators, leaders, and planners work "from the outside" as technical designers but act as spectators.

Their knowledge develops from descriptions rather than gaining knowledge through acquaintance and experience (70). Information paradoxically becomes more confident with distance (71). This is particularly true for those with limited and underfed experience before advancing to their position or relying heavily on business management or organizational science.

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George Orwell (72), as a local British government official in Burma, describes the effects distance and proximity have on information and the degree of the threat. An elephant was ravaging a village's bazaar. Locals asked him to "please come and do something about it." As he traveled to the village, he found the "story always sounds clear enough at a distance, but the nearer you get to the scene of events, the vaguer it becomes."

Spectating leaders and administrators unable to engage the gap may fear that operator improvisation is a weakness within the system and a point of vulnerability in operations (3). Engagement, the "engine" of HRO, can appear to be unconstrained freelance behavior within the healthcare culture. Physicians and surgeons may deride someone who quickly engages through improvisation as a "freelancer" or a "loose cannon." These are people alleged to lack the control necessary to join with others and conform to medical practice or follow medical direction. What is missed is the importance of immediate engagement with uncertainty and threat. Spectators wittingly or unwittingly disregard local forcing functions of the red noise environment (4).

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Before events of a forcing function become visible, local nonlinear interactions and self-organizing have occurred. "Natural systems become structured by their own internal processes: these are self-organizing systems, and the emergence of order within them is a complex phenomenon"—Eugene F. Yates (69). Improvisation is self-organizing with human intention but from *within* the flow of events (73, 74).

Transition to Red Noise:

The stability and predictability of a white noise environment have great utility for science. Researchers can isolate time segments and control entropy. Elements are generally independent and random. Researchers can change a single variable in this everyday environment of near isolation, and things still work.

We can describe the elements of the white noise environment through statistical analysis. We do not need to be there. Reliable predictions follow probability distributions. We have reliable plans. When in doubt, we increase our certainty by collecting more information and reducing data variance. Administrators become "data-driven."

Plans then have the beauty of an architect's precise drawing. The

ability to achieve precision makes the tight coupling of elements work well. Evidence-based medicine informs and refines protocols for safe and effective healthcare delivery. Error measurement becomes an efficient monitor for the early identification of unsafe deviations.

Do things right, and no one gets hurt. That is the security of the white noise environment. Because the white noise environment can be mastered, experts have allowed it to develop concepts, categories, standards, norms, and what we teach. Reasonable rules and effective protocols, well-worked standards and practices, are all smooth and clean—attractive to the administrator, regulator, and spectator while being easy for a high turnover workforce.

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In the 1990s, the California State EMS Authority created a committee of physicians to develop Uniform Treatment Protocols for paramedics. Membership was chiefly comprised of experienced Emergency Physicians with operational military and firefighting experience. EMS physicians had limited paramedics to strict protocols such that all unresponsive patients received a bolus of dextrose and naloxone in a specific order.

One of the authors (DvS), a committee member, had advocated listing up to five treatments BUT without a numeric or alphabetical notation that suggested a proper order. The basis of his argument was using nalorphine for field treatment of opiate overdose. The respiratory depressant effect of nalorphine would amplify the respiratory depressant of barbiturates in an overdose. Physical exam for pinpoint pupils was mandatory.

The introduction of naloxone, which does not have respiratory depressant effects, made the exam less significant. Paramedics at the time did not stop examining eyes because pupil response could reveal other problems. The author learned through observation and discussion that, by the 1990s, many paramedics and Emergency Physicians routinely gave dextrose and naloxone with less emphasis on physical exams. Committee members recognized the prevalence of this problem. The solution was to list actions for the paramedic to choose the order based on history and physical examination.

The committee continued its business, moving through various physiological systems, diseases, and treatments until the committee reached the cardiac system, when a discussion was developed on whether to develop protocols for California paramedics or follow the Heart Association protocols. After a bit, the author asked committee members, "Have any of you used one Heart Association protocol one time?" After a pause, the physicians gave a unanimous answer—"No." The protocols developed followed a more fundamental approach.

The physicians on the committee came from red noise environments in life, prior careers, and where they practiced Emergency Medicine. They filled in their gaps in knowledge or the gaps between rules by improvisation.

Improvisation Engages Red Noise:

Forcing functions and abrupt change challenge an organization's hierarchy and plans. Organizations operate with tightly coupled systems. The map of the systems then becomes the territory of its operations, constraining and reshaping that territory. If relations among labels on the maps are treated as expectations, the tighter the coupling, the higher the probability of surprise in a crisis.

In a loosely coupled system, maps can be separated from coordinated action more readily. As a result, improvisation, workarounds, and experiments are more common. This description suggests a parallel between intuition and the activity of improvisation. Improvisation also tends to be rapid, non-conscious, and non-sequential. We sense through feedback, and feedback is the start of improvisation. There can be no rules because of the vagueness.

"Forcing functions and abrupt change challenge an organization's hierarchy and plans."

Acceptance is critical for engagement and improvisation. Acceptance is the absence of judgment. Acceptance is also a critical element of comedy improvisation and is the gate for HRO improvisation. When we self-organize under intention, we are improvising. Otherwise, our responses are random at worse and trial-and-error at best, and neither lead to learning. Also, in Dewey's pragmatism, acceptance intercedes between causation and action. Acceptance is *why* you do not need causation.

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Passage through the liminal space is active rather than passive. From the "concept stance," one would expect planning to prepare a person and plans to guide actions. Sean McKay (75) answered the criticism of improvised plans regarding the fire department response to a terrorist shooting. The department moved 14 patients from the triage site in 18 minutes with no deaths. "They didn't improvise a plan. Their plan was improvisation."

In 2017, Karl Weick and one of the authors had a series of emails regarding improvisation.

> "Gilbert Ryle (1979) discussed improvisation as one means to convert knowledge and doubt into adaptive action. He

> argued that virtually all behavior has an ad hoc adroitness akin to improvisation because it mixes a partly fresh contingency with previously learned general lessons. Ryle describes this mixture as paying heed. Improvisation enters in the following way. '(T)o be thinking what he is here and now up against, he must both be trying to adjust himself to just this present once-only situation and, in doing this, be applying lessons already learned. There must be in his response a union of some Ad Hockery with some know-how. If he is not improvising and improvising warily at once, he is not engaging his somewhat trained wits in a partly fresh situation. It is pitting an acquired competence or skill against an unprogrammed opportunity, obstacle, or hazard. It is a bit like putting some new wine into old bottles' (1979, p. 129)."

Engaging is improvising without knowing what will work or what direction is possible.

Conclusion:

"When faced with a void, move forward," Jim Denney, Capt., LAFD, a veteran of two Vietnam combat tours, would tell his crew. An LAFD firefighter, approaching a volatile incident to assist one of the authors (DvS), uttered a powerful version of a pragmatic stance: "I may not know what's happening, but I know what to do."

Engagement describes the above approaches. Engagement is experiencing a situation when the operator does not know what will work. "HRO uniquely shapes the engagement that moves through and out of a liminal period"— Karl Weick (personal communication).

Engagement is the initiation. Denney and the firefighter are creating something from what is immediately around them. This is improvisation. They start *without a plan.*

The best-laid plans of administrators and spectators often go awry. *Go without a plan.* One of the authors (DvS) visited the compound of a Special Group of Special Operations Forces. Talking to a senior noncommissioned officer, the author mentioned the reality of emergency responses—failure *is* an option. The officer considered commissioning shirts for the unit with that phrase. They discussed mission planning on short notice. Sometimes they develop a plan before leaving, sometimes on the way, and often have no plan. On deeper reflection, they realized that "without a plan" had more power. "When you pay attention to the plan, you are ignoring information and become frustrated when the plan does not work"—Chris Flowers, San Bernardino (CA) Police Department, one of the first officers on the scene at a terrorist shooting and a school shooting.

These are not rare occurrences. Human behavior develops from experiences, perceptions, and affective interpretations of any situation. Human behavior is red noise. The presence of a human changes a white noise environment to one of red noise. Despite this, people continue to engineer strategies, plans, protocols, and rules for a white-noise environment.

Encountering reddened noise, people seek information. An LAFD Battalion Chief described the information as a 'hot potato'—"you don't want to hold on to it, so you quickly throw it to someone else." In healthcare, however, the value of information keeps it from being shared. People enter healthcare because a medical condition creates a red noise environment. Their response is the same for anyone encountering red noise. The difference is that the patient and family must enter the healthcare environment—a liminal zone. Queries are often met with "A little *knowledge* is a dangerous thing."

Alexander Pope, in "An Essay on Criticism" (1711), wrote, "A little learning is a dangerous thing." However, Pope wrote with a different purpose than restricting learning. His following lines are:

> Drink deep, or taste not the Pierian spring:
> There shallow draughts intoxicate the brain,
> And drinking largely sobers us again.

Safety comes not from learning 'dangerous' information but from learning, experience, and engagement. Engagement becomes improvisation when the operator has information, knowledge, and support. Repeating tropes about the danger of knowledge and restricting the curious mind created not only the ecology of fear but people who will police themselves, relinquishing their values of initiative and creativity.

Pope's poem continues:

> "In fearless youth, we tempt the heights of Arts,
> While from the bounded level of our mind
> Short views we take, nor see the lengths behind;
> But more advanced, behold with strange surprise
> New distant scenes of endless science rise!"

Pope urges us to climb higher for grander views, extending ourselves into new environments. In this article, we have presented improvisation for operations in the red noise environment. That is like saying improvisation is a tool that could readily be relegated to a toolbox. This metaphor of tools and toolboxes seems favored by those who have never carried one around or worked under a car. We never hear about the function of a tool. Improvisation has a place in red noise environments. Does it have a function?

That is the subject of the next article in the Improvisation Series.

"Safety comes not from learning 'dangerous' information but from learning, experience, and engagement. Engagement becomes improvisation when the operator has information, knowledge, and support. Repeating tropes about the danger of knowledge and restricting the curious mind created not only the ecology of fear but people who will police themselves, relinquishing their values of initiative and creativity. "

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INFANT AND FAMILY-CENTERED DEVELOPMENTAL CARE (IFCDC)

STANDARDS AND SAMPLE RECOMMENDATIONS FOR INFANTS IN THE INTENSIVE CARE UNIT

SYSTEMS THINKING IN COMPLEX ADAPTIVE SYSTEMS

- Are the baby and family central to the mission, values, environment, practice & care delivery of IFCDC in the unit?
- Are the parents of each baby fully integrated into the team and treated as essential partners in decision-making and care of the infant?
- What are the strategies and measurements used to improve and sustain IFCDC in the unit?

POSITIONING & TOUCH FOR THE NEWBORN

- Are the positioning plans therapeutic and individualized, given the care needs and development of the baby?
- Are the positioning and touch guidelines continually reviewed by the team, including the parents, and adapted to meet the changing comfort needs of the baby?

SLEEP AND AROUSAL INTERVENTIONS FOR THE NEWBORN

- Can the team confidently describe the "voice" or behavioral communication of the baby?
- Are the baby's unique patterns of rest, sleep, and activity documented by the team and protected in the plan of care?

SKIN-TO-SKIN CONTACT WITH INTIMATE FAMILY MEMBERS

- Is the practice of skin-to-skin contact supported and adjusted to the comfort needs of each baby, parent, & family member?
- Are the parents & family members supported to interact with the baby to calm, soothe, & connect?

REDUCING AND MANAGING PAIN AND STRESS IN NEWBORNS AND FAMILIES

- Are parents supported to be present and interactive during stressful procedures to provide non-pharmacologic comfort measures for the baby?
- Are there sufficient specialty professionals to support the wellbeing of the team, including parents, families, and staff? Examples include mental health, social, cultural, & spiritual specialists.

MANAGEMENT OF FEEDING, EATING AND NUTRITION DELIVERY

- Are the desires of the m/other central to the feeding plan? Is this consistently reflected in documentation with input of the m/other?
- Does the feeding management plan demonstrate a feeding & nutrition continuum from in-hospital care through the transition to home & home care?

WANT TO KNOW MORE ABOUT THE STANDARDS AND RECOMMENDATIONS?
VISIT: HTTPS://NICUDESIGN.ND.EDU/NICU-CARE-STANDARDS/

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

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

– Christine Theard, M.D.

Post-Traumatic Thriving

The Art, Science, & Stories of Resilience

Randall Bell, Ph.D.

Briefly Legal: The Fetus as Witness

Barry Schifrin, MD and Maureen E Sims, MD

Previously, the fetus was considered the perfect patient: it was silent, complained little, and appeared at the very last moment. With modern technology, including the Ultrasound (US), ContinuousCardiotocography (CTG), and Doppler, we have gained unprecedented access to the fetus's anatomy, growth, behavior, and environment. So much so that with a proper interpreter (the mother), the fetus contributes to its own management and occasionally appears as a witness in allegations of medical negligence.

"With modern technology, including the US, CTG, and Doppler, we have gained unprecedented access to the fetus's anatomy, growth, behavior, and environment. So much so that with a proper interpreter (the mother), the fetus contributes to its own management and occasionally appears as a witness in allegations of medical negligence."

In this communication, we deal with the testimony of the fetus regarding its mother's perception of fetal movement.

A series of articles in the Lancet has called for renewed activities to prevent stillbirths. (1) While there is wide variation in the rates of stillbirth and many stillbirths remain unexplained, increased attention has been drawn to those recognizable antecedents such as fetal growth restriction (FGR), and maternal hypertension, where placental dysfunction may play a role in the adverse outcomes. (1) (2) A systematic review of placental pathology in stillbirths has described abnormalities in up to 65% of cases. (3) Furthermore, about 20 - 40% of stillborn babies are reported to have FGR. (4)

It has long been known that maternal perception of reduced fetal movements (RFM) is associated with late stillbirth, FGR, and other obstetrical problems. (5, 6) (7) (8) Women with RFM are more likely than those with normal FM to have induction of labor, instrumental birth, cesarean section (overall and emergency) and less likely to have a planned C.S. (9)

One study of over 1700 women found that 30% of those who had suffered a stillbirth reported significant reduced retal movement (RFM). (7) Other studies suggest that women frequently perceive RFM 2 days prior to the diagnosis of fetal death. (10) Ultrasound scans obtained before cesarean section in fetuses with RFM have fewer fetal movements than controls and are more likely to have umbilical cord gas measurements indicative of acidemia. (11) Similarly, women delivering within one week of an episode of RFM show differences in placental structure and function reminiscent of those seen in FGR and stillbirth. (12) (13)

"Ultrasound scans obtained before cesarean section in fetuses with RFM have fewer fetal movements than controls and are more likely to have umbilical cord gas measurements indicative of acidemia. (11) Similarly, women delivering within one week of an episode of RFM show differences in placental structure and function reminiscent of those seen in FGR and stillbirth. (12) (13)"

Given the co-association of stillbirth to placental dysfunction and FGR, it seems intuitive that improving the management of women complaining of RFM might reduce the risk of stillbirth and other potentially harmful consequences, including HIE and C.P. Indeed, various national governments and organizations have created initiatives focused on the detection and management of reduced fetal movements (RFM). (14)

The maternal perception of fetal movements remains the most common method of assessing fetal activity. Several characteristics impact the mother's perception of F.M.s, including parity, obesity, smoking, and time of day, along with such obstetrical features as anterior placenta and abnormalities of amniotic fluid volume. Women with a history of previous pregnancy loss, assisted conception, and a medical history of psychiatric illness are more likely to report RFM during pregnancy. (9)

In pregnancies complicated by premature rupture of membranes or oligohydramnios, Sivas reported a normal FM frequency but a

reduced FM speed and amplitude, suggesting that low amniotic fluid levels may restrict fetal movement. (2) A large retrospective cohort study from Israel found a statistically significant association between RFM and oligohydramnios. (3) Similarly, polyhydramnios may make FM more challenging to feel.

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Maternal concern about RFM is a common complaint (6-15%) of pregnant patients in the third trimester. (15), (16) FM counting as a formality was initiated in the 1980s by Sadowski using a "count to 10" strategy. Since then, various initiatives have been introduced covering a broad range of hours to days and number of movements. (9) Irrespective of the methodology, there appears to be no threshold of fetal movements below which perinatal morbidity increases, (5) and several reviews and randomized trials found that FM counting using a formal approach had no discernible effect on perinatal mortality and diminished incentives for formal fetal movement counting. (17), (18), (19), (20) It has also been a repeated observation that, at least in some cases, the fetus was already harmed or dead with no option to prevent the adverse outcome. (18) (21) (22)

"It has been suggested that the failure of these initiatives to reduce perinatal mortality is related to both the unproven benefit of diverse management protocols along with a host of problems with the awareness of the patient, the recommendations of health care providers, if any, and how promptly the patients sought assistance, among other problems. (23)"

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"They recommend that maternity healthcare providers advise pregnant women to be aware of their baby's pattern of movements, observe only for changes in the pattern of their FMs (not only reduced FM), and contact their maternity care provider immediately if they perceive a change in that pattern significantly if FM is reduced or have ceased."

Ultimately, there was no evidence forthcoming that a specific threshold of FM performs better than the qualitative maternal perception of RFMs alone (4), and current guidelines from around the globe (24) assert that it is the maternal perception of decreased (altered) FM that is important. They recommend that maternity healthcare providers advise pregnant women to be aware of their baby's pattern of movements, observe only for changes in the pattern of their FMs (not only reduced FM), and contact their maternity care provider immediately if they perceive a change in that pattern significantly if FM is reduced or have ceased.

"Thus, during prenatal care, there is the need for the pregnant women to understand the importance of becoming familiar with the pattern of normal fetal activity, the importance of prompt recognition of alterations in that pattern, whom to contact if she perceives RFM, and if there is a failure of contact to proceed directly to the hospital for surveillance."

Therefore, the pregnant patient must be provided with an explanation of the importance of self-surveillance To provide reasonable prenatal care and when they should be concerned about an alteration in the FM pattern. Thus, during prenatal care, there is the need for the pregnant women to understand the importance of becoming familiar with the pattern of normal fetal activity, the importance of prompt recognition of alterations in that pattern, whom to contact if she perceives RFM, and if there is a failure of contact to proceed directly to the hospital for surveillance. It is further necessary to ensure that this coherent message is reinforced by

staff (midwives, nurses) during antenatal contact by phone or in person. It is also necessary to elaborate on the testing that will be performed in the hospital or clinic in response to the complaint of RFM.

While giving information to women regarding the importance of surveillance of fetal movement is considered a cornerstone of prenatal care, deficiencies in the delivery and implementation of that care are commonplace, well documented in the literature, and often surfacing in allegations of negligent care in medico-legal cases involving stillbirth and infants with subsequent neurological handicap including cerebral palsy (CP).

"The required testing includes both Cardiotocography (CTG) and ultrasound assessments. (5) The CTG is routinely used to ascertain fetal wellbeing (behavior), the presence of contractions, and any fetal response to contractions. Ultrasound measures fetal growth, activity (not behavior), and the fetal environment, including amniotic fluid volume. Both modalities are required for satisfactory surveillance."

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The features of the CTG to be observed include features of fetal heart rate pattern, including the baseline heart rate (FHR), heart rate variability (FHRV), accelerations, and decelerations. In addition, evaluating the presence, pattern, and fetal response to uterine contractions is also essential for insight into the potential for labor or placental abruption (associated with excessive uterine activity).

FHRV is a significant predictor of fetal wellbeing, especially in SGA pregnancies (25) STV normally increases with advancing gestational age with lower rates of increase in and an increased risk of reduced STV and acidemia in FGR fetuses. (26) (27)

A more nuanced understanding of the role of the CTG focuses on fetal behavior and less on the search for severe compromise which will not be missed and for which the benefits of intervention are limited. (6) (7) These involve the importance of the cyclic, recurrent, coupled accelerations arising out of normal FHRV alternating with periods of quiescence in which FHRV is diminished, and decelerations are absent or widely spread. (27) (26) The association of accelerations with fetal movements has been amply demonstrated in fetuses monitored simultaneously by CTG and ultrasound. (28) It must be emphasized that in antepartum testing, the diminution in FHRV precedes the disappearance of accelerations. Thus, an "intermediate" NST would show accelerations, usually isolated and occurring with fetal movement, but the STV is minimal to absent. Further surveillance or intervention is required.

In those with FGR, the baseline rate is often higher (>150) than the statistical range of FHRs at term, up to 150 bpm. This suggests that autonomic dysregulation (abnormal behavior), as reflected in the control of the FHR, even when not acutely distressed, underlies the observed differences in FHR variation between these groups.

"While late decelerations are typically associated with fetal distress, Schifrin et al. demonstrated, with the use of concurrent real-time ultrasonography, that late decelerations occurring in association with an otherwise normal CTG trace with a stable baseline and moderate variability are strongly suggestive of normal fetal breathing movements (29) and normal outcomes."

While late decelerations are typically associated with fetal distress, Schifrin et al. demonstrated, with the use of concurrent real-time ultrasonography, that late decelerations occurring in association with an otherwise normal CTG trace with a stable baseline and moderate variability are strongly suggestive of normal fetal breathing movements (29) and normal outcomes.

The biophysical profile (BPP), initially conceived by Manning et al. in the 1970s, improves surveillance for high-risk babies. (30, 31) Testing consists of searching for fetal activity (body, breathing, and reflex movements (acute variables related to fetal behavior) and amniotic fluid volume (a static variable related to placental nutrition). At the outset, the NST was incorporated in the BPP but is often used without it. (See below)

Despite its widespread application of the BPP, it only characterizes various fetal activities, not as integrated patterns over time, but simply as present or absent. (30), (32) The appreciation of the organization of fetal state changes (accelerations and FHRV) remains the NST with the concurrent assessment of fetal size (growth) and amniotic fluid volume by ultrasound. These various tests, when combined, give insight into the perfusion of central organs, especially the brain, as reflected in normal behavior, as well as the nutritional function of the placenta (the ability to gain weight and maintain hydration - including a normal volume of amniotic fluid). To the extent that there is an acute problem with the respiratory function of the placenta (the delivery of oxygen), this will be reflected in decelerations on the CTG. (33)

Data from Norway from over 3000 women with RFM underscore the importance of ultrasound assessments of fetal size and amniotic fluid volume in these cases. (34) Ultrasound abnormalities, including oligo- and polyhydramnios, were found in 11.6% of scans and often the only abnormality found. In a large cohort of

987 patients, Crimmins et al. found that all biophysical parameters became abnormal in severely FGR fetuses at 34 weeks gestation and considered them a late feature, with normal findings still seen within a week of stillbirth. (31) Similarly, in a large population of women who presented with RFM, Valentin et al. report a poor concordance between perceived movements and abnormal CTG findings, with 84% found to have reassuring CTGs. (35)

The normal deterioration sequence and the different insights into the fetal condition from the different tests explain this apparent paradox. The antenatal CTG in a reactive NST (as defined here) measures fetal behavior with predictable cyclic changes in FHRV and accelerations. The fetus maintains neurological function in the face of the impaired nutritional function of the placenta (leading to FGR) as measured by fetal growth, amniotic fluid volume, and uterine blood flow. (36) Thus, using only the CTG to evaluate the complaint of RFM is inadequate, and a "normal" reactive test does not explain the patient's complaint. Dismissing the complaint ("your fetus is normal") in the face of a normal CTG without additional surveillance represents substandard care. It also inappropriately permits the patient to regard the RFM as "normal."

"The normal deterioration sequence and the different insights into the fetal condition from the different tests explain this apparent paradox. The antenatal CTG in a reactive NST (as defined here) measures fetal behavior with predictable cyclic changes in FHRV and accelerations. The fetus maintains neurological function in the face of the impaired nutritional function of the placenta (leading to FGR) as measured by fetal growth, amniotic fluid volume, and uterine blood flow (36)."

Absent some catastrophic event, e.g., fetal stroke, RFM perceived by the mother will normally appear prior to FHR changes, perhaps in association with the reduction in amniotic fluid volume and prior to all cessation of movement and in the majority of instances, the fetus at the time of the initial visit with a reactive NST is most likely capable of normal outcome.

The benefits of any approach to managing the complaint of RFM are the wide variation in information provided to women and the views held by clinical staff on the subsequent management of RFM has been presented. (37) (38) Various surveys of clinicians in the U.K., for example, found that most would not routinely refer women with RFM for an ultrasound examination. (39) (40) Similarly, confounding many allegations of negligence, there are delays in reporting RFM to providers (contributory negligence), and there are numerous examples of an inadequate response by many providers. Both circumstances increase the risk of adverse outcome to the child and / or increased risk of allegations of negligence related to those outcomes. (41) (42)

Numerous clinical studies attest to the delay in reporting decreased FM In some cases, contractions were misinterpreted as fetal movements. (10) In a case-control study involving 2374 pregnant women, (8) one study found that 25% of women who reported absent FMs waited more than 24 hours before consulting their provider, while 54% of women with RFMs waited longer than 48 hours. Similar results are available for Japan (43) and Canada (44). It is axiomatic that only prompt reporting of perceived RFM combined with timely intervention, where necessary, will prevent adverse consequences, including stillbirth.

"Why do women perceiving RFMs delay notifying the health care provider? She may have received misleading (RFM is normal at the end of pregnancy or before labor) or no information about F.M. during pregnancy. She may be the victim of incorrect information from family, friends, or the internet (45) (44). Pregnant women may not wish to burden health professionals unnecessarily for fear of appearing excessively worried, being dismissed, or not being believed."

Why do women perceiving RFMs delay notifying the health care provider? She may have received misleading (RFM is normal at the end of pregnancy or before labor) or no information about F.M. during pregnancy. She may be the victim of incorrect information from family, friends, or the internet (45) (44). Pregnant women may not wish to burden health professionals unnecessarily for fear of appearing excessively worried, being dismissed, or not being believed. Ultimately, they may fear their baby has death (46) (47). They may also avoid reporting RFM to forestall interventions such as monitoring, hospitalization, and induction of labor. (45) Perhaps perversely, some clinicians suspect that at least some women falsely report RFM to access surveillance or labor induction. (48)

It is a commonplace allegation in both medico-legal encounters and the medical literature that patients were told that the perceived changes in F.M. are inconsequential and require no surveillance. They may be told that the change in activity represents a normal effect of advanced gestational age, crowding, or impending labor. Too often, they have been offered various methods to stimulate F.M.s such as drinking cold, caffeinated, or citrus drinks, light, and noise or lightly stroking or prodding the abdomen should be tried (45) (47) despite evidence to the contrary that these provocations are of any benefit. (49) Ultimately, 30-60% of women do not recall receiving information about F.M. during pregnancy. (44) (50) (9)

These circumstances lead to errors in these cases, including no testing, the manual palpation of fetal movement, or the patient's

(unverified) reporting of at least some renewed activity (it is the documented pattern of activity deemed important). Other failures include: isolated CTG or BPP testing and failed attention to uterine activity. Similarly, it appears below a reasonable standard of care to discharge the patient with only a reactive NST or a normal biophysical profile (BPP) without obtaining and adequately interpreting the complementary surveillance.

The evidence presented advocates that the fetus has a critical role in its antenatal surveillance and lawsuits alleging obstetrical negligence. His behavior is being assessed, and he is being used as his control. It is also clear that we are currently lacking the technology and the awareness to take full advantage of this important marker of wellbeing. (9)

"The complaint of RFM is not a diagnosis but a symptom derived from the mother's perception of the behavior of the fetus. Given the weight of the available statistics, as used in the courtroom, it is reasonable to assume that with prompt reporting, timely and comprehensive investigation, and appropriate intervention, the complaint of RFM (with an abnormal CTG) represents a previously injured fetus, without a reasonable, current allegation of negligence."

The complaint of RFM is not a diagnosis but a symptom derived from the mother's perception of the behavior of the fetus. Given the weight of the available statistics, as used in the courtroom, it is reasonable to assume that with prompt reporting, timely and comprehensive investigation, and appropriate intervention, the complaint of RFM (with an abnormal CTG) represents a previously injured fetus, without a reasonable, current allegation of negligence. As problems of education, misinformation, delay in response, and inadequate surveillance increase, the forensic issue increasingly becomes the failure to provide a reasonable standard of care and culpability for an adverse outcome. Improving awareness of both patients and health professionals about F.M. and RFM has proven effective in minimizing delays in contacting healthcare professionals. It will doubtless improve outcomes, forestall lawsuits and "break the silence." (47).

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Addendums to Chronic Lung Disease: Prevention is the Cure

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

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

I attended our NICU's annual "Premie Picnic" for the first time in July of this year. After a 2-year hiatus due to Covid-19, it was heartening for those organising the picnic to see the number of attendees there. All appreciated the food, the various activities for the children and shade for the grown-ups. The children were delighted to pet and play with my little Havanese dogs, and the dogs were equally delighted.

Some of our NICU staff responsible for organising were there but also other staff to show support and enjoy a beautiful day in Sunnybrook Park (adjacent to our hospital). Several staff were first-time attendees as well.

Being amongst NICU graduates born at various gestation ages was a powerful reminder of just how good a job we, as a team, do. Amongst the attendees were now 20-year-old former 25-week twins, who are both fine. Thank you very much! Several children born at less than 24 weeks gestation were also present and doing very well. I was glad to have the opportunity to speak with several parents, who expressed their never-ending gratitude—a heartwarming experience.

"Being amongst NICU graduates born at various gestation ages was a powerful reminder of just how good a job we, as a team, do. Amongst the attendees were now 20-year-old former 25-week twins, who are both fine....Several children born at less than 24 weeks gestation were also present and doing very well."

While watching children playing, running, and bouncing in the bouncy castle, I could not help but think back to the column I wrote for NT in March of this year, "Moral Distress In the NICU—Their pain is our pain." It occurred to me that watching these children could alleviate much of the distress and misperceptions common to bedside caregivers. A large contributor to the problem of moral distress in the NICU is the disconnect between the bedside and follow-up. We are often not afforded the opportunity to see the fruits of our labour.

Some parents talked of feelings they had at the thought of coming to the hospital, either for the picnic or the birth of another child, were reminiscent of PTSD. They indicated that these feelings persist years later, long after discharge.

"Some parents talked of feelings they had at the thought of coming to the hospital, either for the picnic or the birth of another child, were reminiscent of PTSD. They indicated that these feelings persist years later, long after discharge."

Many NICUs have rightfully embraced the concept of family-centred care, but despite carrying the banner of family-centred care, the primary focus is on the baby. Once discharged, the family is "out of sight, out of mind." The next stop is the follow-up clinic, which focuses naturally on their child. The centre of the family-centred care circle is planted firmly in the NICU.

I wrote the aforementioned column on moral distress in the NICU from a caregiver's perspective. There is another perspective—the parents'.

Even an exceptionally empathic person can only feel a part of what parents feel as they watch the centre of their universe struggling to survive. Every poke, every intubation, and every procedure can add to the anxiety, fear, and even depression already raging within them. Some have a support network, but many do not. This is especially true of those delivering in a tertiary care centre far from their home and families, single parents, and new immigrants or refugees.

Even with socialised medicine, financial demands can quickly become overwhelming. Parking, alternate accommodations, food, and transportation costs all bleed budgets that may already be reeling from the lack of a paycheque and are in addition to costs

associated with their permanent residence.

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The detrimental effects of stress on mental and physical health are well known. This negative effect extends beyond parents and may lead to problems during their baby's hospital stay and after discharge. I have experienced seeing parents so traumatised by the prospect of all the things that can go wrong and the barrage of statistics that it resulted in detaching from their child. The more unfavourable a baby's prognosis, the more likely this will happen. Fearful of losing their baby, they may try to blunt that hurt by not bonding.

"The detrimental effects of stress on mental and physical health are well known. This negative effect extends beyond parents and may lead to problems during their baby's hospital stay and after discharge."

Unfortunately, the benefits of kangaroo care (KC) are often lost to them because bedside caregivers consider the baby too unstable to do so. While caution is warranted and safety is paramount, every effort should be made to facilitate KC or modified KC as early as possible; and it should be discouraged only in the most severe cases. A parent should be encouraged to hold their baby whenever possible. Losing a child without ever having held them is an anguish no parent should ever suffer.

When parents do bond and make attachments with their baby, it may be dysfunctional. "Vulnerable baby syndrome" is a phenomenon seen in follow-up clinics. It manifests differently, but all represent an abnormal attachment (or lack thereof) between a parent and their child. Parents may be over-protective or over-controlling, make inordinate use of healthcare services if they believe their child is ill, or socially isolate their child for fear of exposure to germs. Parents may socially isolate themselves because they do not trust anyone else to care for the child in their absence (1). These behaviours are detrimental to the child's normal socialisation and development. There is a call to reframe how outcomes are presented to parents that are meaningful to them, not just the medical community (2).

"'Vulnerable baby syndrome' is a phenomenon seen in follow-up clinics. It manifests differently, but all represent an abnormal attachment (or lack thereof) between a parent and their child. Parents may be over-protective or over-controlling, make inordinate use of healthcare services if they believe their child is ill, or socially isolate their child for fear of exposure to germs. Parents may socially isolate themselves because they do not trust anyone else to care for the child in their absence. These behaviours are detrimental to the child's normal socialisation and development."

"Put your mask on first" is the instruction given to aircraft passengers in a loss of cabin pressure emergency. This is because a person is not able to help another if they are incapacitated. We send babies home to be cared for by their parents, but their experiences may hinder that ability in the NICU. We must ensure parents are prepared to provide the best care possible to optimise that care. We must accept that while our primary patients are babies, their well-being hinges upon our providing the support parents need to deal with the trauma of delivering prematurely and the attending course to follow. We need to do better.

Last month's column, "Chronic Lung Disease: Prevention is the cure," discussed a hybrid approach to ventilation with jet ventilation and recruitment maneuvers. Two statements in that piece could be misunderstood and require clarification.

"HFJV is less affected by airway resistance" is true but could be interpreted as jet ventilation *not* being affected by airway resistance, which is false. "Sheer thinning" is a phenomenon usually attributed to non-Newtonian liquids, but the effect is also seen in gas flow (3). Flow velocity is higher in the centre of a tube and slower along the edges due to frictional forces at the interface between the tube and that flowing within it. Because the jet breath travels down the centre of the airway, it does not contact the airway walls. It still faces resistance from the gas in its path.

The second statement is "gas does not flow preferably into areas of higher compliance." At any given pressure, compliant areas will accept more volume than non-compliant ones. That is physics.

""HFJV is less affected by airway resistance" is true but could be interpreted as jet ventilation not being affected by airway resistance, which is false. "Sheer thinning" is a phenomenon ... also seen in gas flow. Flow velocity is higher in the centre of a tube and slower along the edges due to frictional forces at the interface between the tube and that flowing within it. Because the jet breath travels down the centre of the airway, it does not contact the airway walls. It still faces resistance from the gas in its path."

The difference between conventional and jet ventilation is that while compliant areas will accept more volume, that volume does not come from non-compliant areas in jet ventilation. When the jet breath reaches non-compliant areas, it fizzles, dissipating. It does not reverse direction and flow into compliant areas. Conversely, in conventional ventilation, the bulk flow of a breath facing high resistance and low compliance will compress momentarily and then flow into compliant areas during pendelluft. Unlike jet ventilation, excess volume to compliant areas is redirected from areas of lower compliance.

In the end, compliant areas will accept more volume; volume comes from the portion of the jet breath that reaches them.

The take-home message is that HFJV is well suited to meeting the challenges associated with chronic lung disease; prevention is still the cure.

"The second statement is "gas does not flow preferably into areas of higher compliance." At any given pressure, compliant areas will accept more volume than non-compliant ones. That is physics....When the jet breath reaches non-compliant areas, it fizzles, dissipating. It does not reverse direction and flow into compliant areas. In the end, compliant areas will accept more volume; volume comes from the portion of the jet breath that reaches them."

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PAC/LAC offers continuing education for:

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- Licensed Marriage and Family Therapists (LMFT)
- Licensed Professional Clinical Counselors (LPCC)
- Licensed Educational Psychologists (LEP)
- Certified Health Education Specialists (CHES)
- Continuing Respiratory Care Education (CRCE)

www.paclac.org

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

Leadership

Providing guidance to healthcare professionals, hospitals and healthcare systems, stimulating higher levels of excellence and improving outcomes for mothers and babies.

Advocacy

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

Consultation

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

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

In Loving Memory

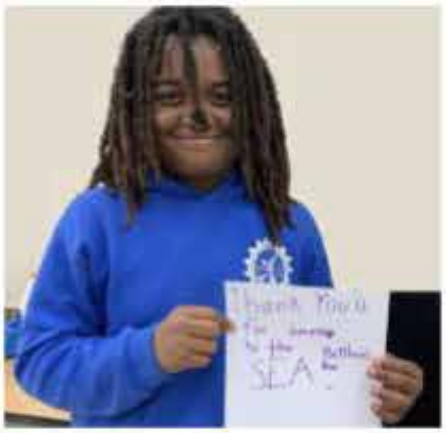
August 9, 1996 - April 3, 2010

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

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

Sponsor a Child in the SEA Program

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



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

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

The Village Son

A Life's Journey

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

Houchang D. Modanlou

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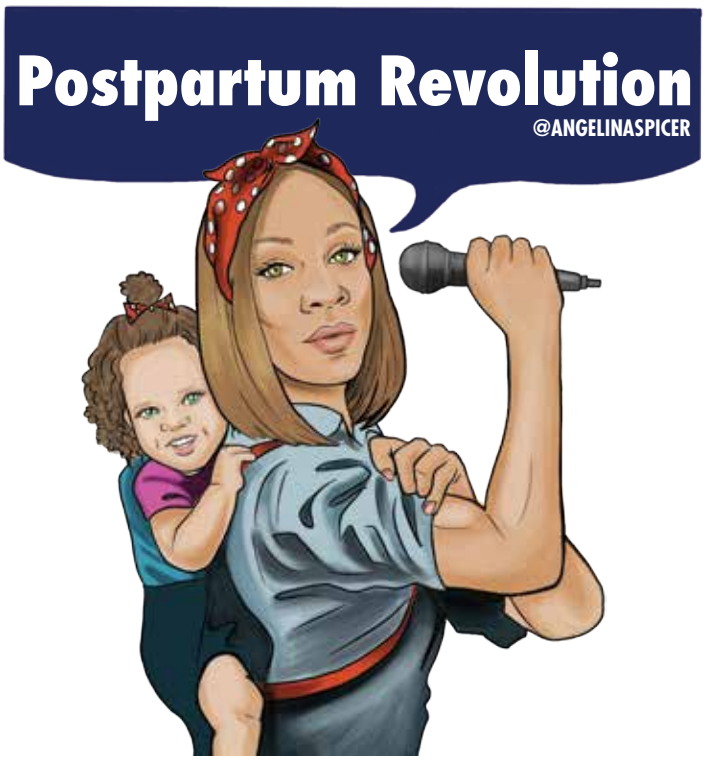


Neonatology Today's Digital Presence

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

COPING WITH COVID-19

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

Provide culturally-informed and respectful care.

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

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

myNICUnetwork.org

and

National Perinatal Association
NICU Parent Network

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

TOP 10

RECOMMENDATIONS FOR THE PSYCHOSOCIAL SUPPORT OF NICU PARENTS

SUPPORT 4 NICU PARENTS

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

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

1 PROMOTE PARTICIPATION

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

Welcome!

2 LEAD IN DEVELOPMENTAL CARE

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

3 FACILITATE PEER SUPPORT

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

4 ADDRESS MENTAL HEALTH

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

5 SCREEN EARLY AND OFTEN

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

6 OFFER PALLIATIVE & BEREAVEMENT CARE

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

7 PLAN FOR THE TRANSITION HOME

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

8 FOLLOW UP

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

9 SUPPORT NICU CARE GIVERS

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

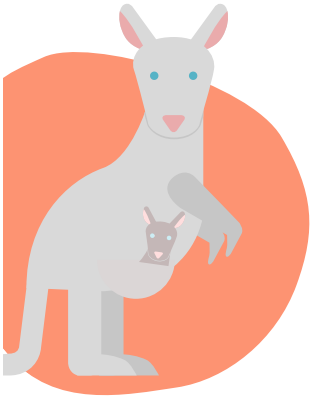
10 HELP US HEAL

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

SUPPORT4NICUPARENTS.ORG

SUPPORTING KANGAROO CARE

SKIN-TO-SKIN CARE DURING COVID-19



GET INFORMED ABOUT THE RISKS + BENEFITS

work with your medical team to create a plan

GET CLEAN

WASH YOUR HANDS, ARMS, and CHEST

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

PUT ON FRESH CLOTHES

change into a clean gown or shirt.

IF COVID-19 + WEAR A MASK

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

National Perinatal Association

nicuparentnetwork.org

NPN NICU PARENT NETWORK

nationalperinatal.org/skin-to-skin

Position available for Neonatal Nurse Pretensioner (NNP)

Excellent practice opportunity for a NNP in an established Los Angeles neonatal practice. The Neonatal Hospitalist Group (NHG) is interviewing for an NNP to join the practice. The practice includes four NICU's in the Burbank and Glendale area. Call is from home with excellent work life balance. If you are interested, please email Robert Gall, MD, at robertgallmd@gmail.com.

Protecting your baby from

Respiratory Viruses:

What parents need to know this RSV and flu season

RSV (Respiratory Syncytial Virus) and flu infections affect the lungs and can cause serious breathing problems for children and babies.

Certain diagnoses can make children and babies more vulnerable for serious complications - including prematurity, chronic lung disease, heart conditions.

You can limit the spread of viruses by wearing a mask, washing your hands with soap & water, and using alcohol-based hand sanitizer.

The fewer germs your baby is exposed to, the less likely they are to get sick. Limit visitors. Avoid crowds. Stay away from sick people.

Immunizations save lives. Stay up-to-date with your family's flu and COVID-19 vaccinations. This helps stop the spread of deadly viruses.

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

National Perinatal Association

www.nationalperinatal.org/rsv

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Once Upon A Preemie Academy

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Continuing Education Partner, paclac.org/continuing-education

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.

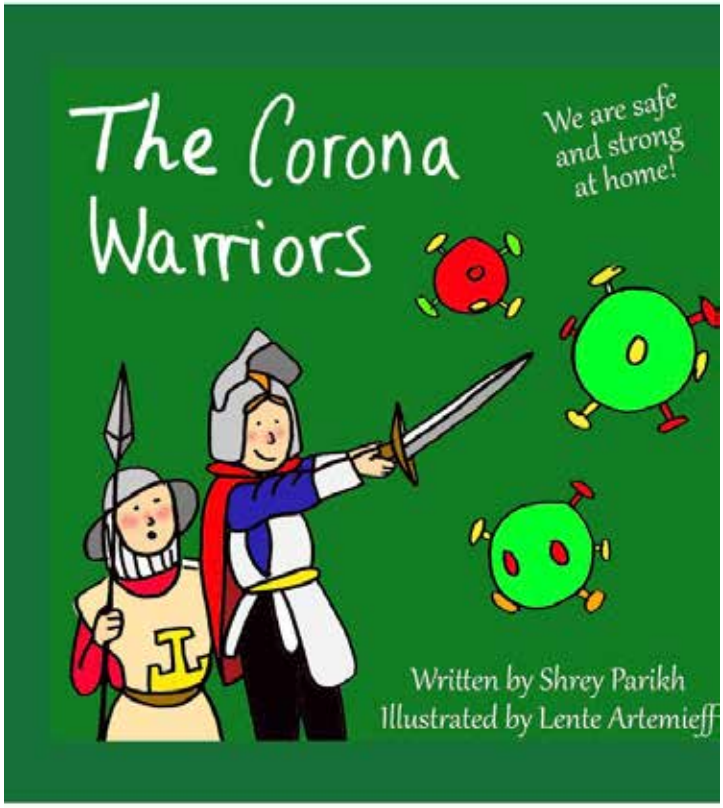
The RSV Research Group from professor Louis Bont, pediatric infectious disease specialist in the University Medical Centre Utrecht, the Netherlands, has recently launched an RSV Mortality Awareness Campaign during the 5th RSV Vaccines for the World Conference in Accra, Ghana.

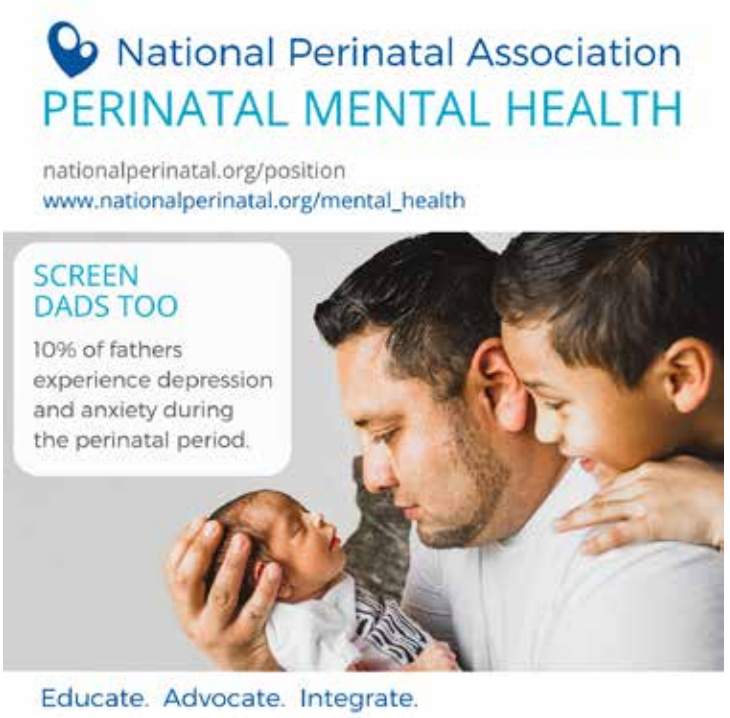
They have produced a personal video entitled "*Why we should all know about RSV*" about Simone van Wyck, a mother who lost her son due to RSV. The video is available at www.rsvgold.com/awareness and can also be watched using the QR code on this page. Please share the video with your colleagues, family,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





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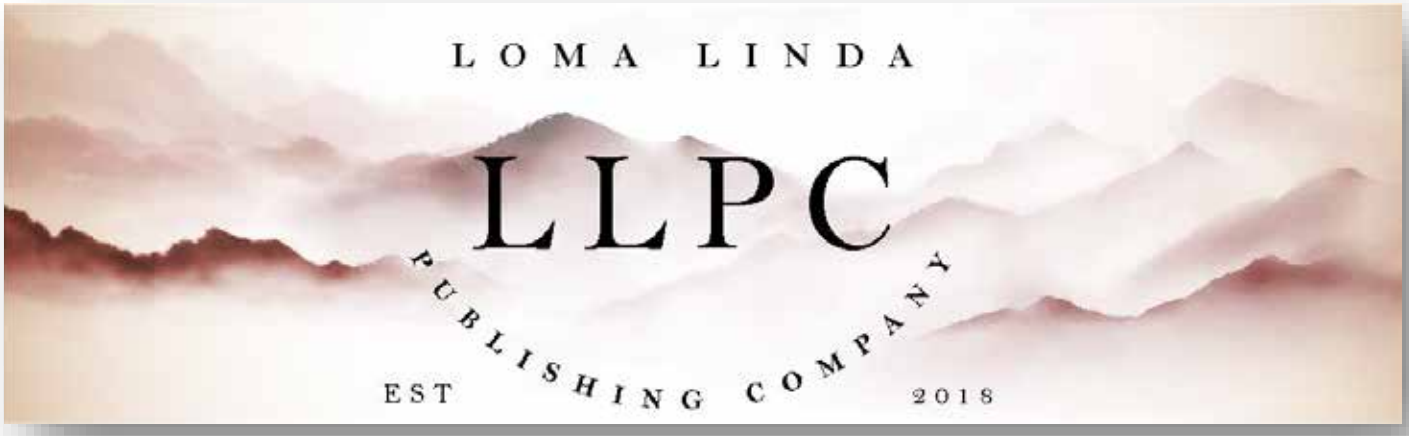

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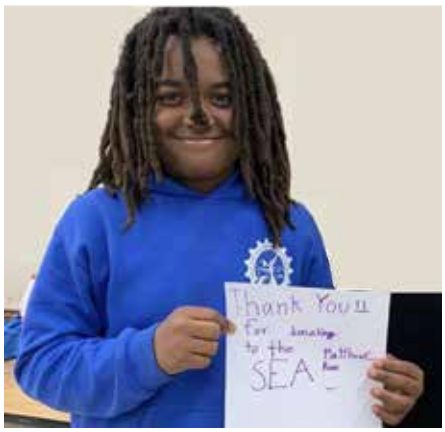

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Peer Reviewed

Gravens by Design: Global Research on Transition to Adulthood after Preterm Birth: Proceedings of the Graven's Conference, Clearwater, FL, March 8-11, 2023

Saroj Saigal, MD, FRCP, FAAP

"There is now a considerable body of research that shows that very preterm (VPT) birth is associated with an increased risk of neurological impairments, cognitive deficits, and behavioral and social problems that last from childhood to adolescence."

There is now a considerable body of research that shows that very preterm (VPT) birth is associated with an increased risk of neurological impairments, cognitive deficits, and behavioral and social problems that last from childhood to adolescence. Until recently, it was unclear whether these problems improved over time or persisted into adult life. In the last two decades, there has been an increasing interest in the outcomes at adulthood, which show that, although some problems have improved over time, newer issues have emerged with a high prevalence of mental health, cardiometabolic, and chronic health problems. (1)

This paper focuses on a broad range of outcomes from the world literature on former VPT/ELBW (very preterm/extremely low birthweight) infants in adulthood compared with full-term (FT) controls. In addition, the personal perspectives of the former preemies in adulthood will be highlighted.

"This paper focuses on a broad range of outcomes from the world literature on former VPT/ELBW (very preterm/extremely low birthweight) infants in adulthood compared with full-term (FT) controls. In addition, the personal perspectives of the former preemies in adulthood will be highlighted."

1. Cognition, Educational Attainment, and Employment:

Several studies have shown that cognitive deficits (2-5) and problems with executive functioning (5,6) persist into adulthood, with an incremental association with lower gestational age. Very preterm adults have lower rates of high school graduation and postsecondary educational attainment than their FT peers in cohort studies (2,7) and population-linked registries (8-10.) However, despite the inclusion of participants with neurological impairments, the McMaster study of extremely low birthweight infants (ELBW<1000g) showed no differences in the total years of education (16.0 vs. 16.7 years) or in postsecondary education at middle-adulthood (30–36 years). (11) The Norwegian population-linked study at ages 19-35 years showed a statistically significant association between gestational age and educational achievement, even after individuals with impairments were excluded, with 67.7% of individuals between 23 and 27 weeks gestation completing high school compared with 75.4% of FT adults, and 25% vs. 35% completing a bachelor's degree. (9) The Bavarian study showed that VLBW (very low birthweight) adults do not outgrow their earlier intellectual deficits, and the IQ was 0.9-1.27 and Executive Function 0.59-1.15 SD below that of controls. High SES can modify the impact of prematurity with a significant positive impact of 1.13 SD. (5) Lately, Individual Participant Data (IPD) meta-analyses from several international consortia: the Adults born Preterm International Collaboration (APIC) and Research on European Children and Adults born Preterm (RECAP), have highlighted several aspects with lower intelligence equivalent to 12 IQ points,(12) and poorer mathematical performance in childhood and adulthood. (13)

" Lately, Individual Participant Data (IPD) meta-analyses from several international consortia: the Adults born Preterm International Collaboration (APIC) and Research on European Children and Adults born Preterm (RECAP), have highlighted several aspects with lower intelligence equivalent to 12 IQ points,(12) and poorer mathematical performance in childhood and adulthood. (13)"

Regarding employment, although no significant differences were observed in the McMaster young adults at age 23 years (48% vs. 57%), at middle adulthood (age 30–36 years), a significant disparity emerged in employment and income in ELBW compared with FT adults. (11) A lower proportion of ELBW adults was employed (80.4% vs. 91.8%, and the net income was $20,000/year lower than FT adults. The association with household income remained after excluding ELBW adults with impairments, with more ELBW adults requiring social assistance (13.8% vs 3.7%). (11) Norwegian extremely preterm (EPT) young adults from the National Registry had lower job-related income (23% vs. 20%, $P < 0.001$), and 1 in 9 persons born <28 weeks' gestation received a disability pension compared with 1 in 59 for those born FT ($P < 0.001$). (9) Scandinavian studies have shown that preterm birth was associated with a stepwise increase in disability, decreased chance of

completing university, and lower net income. However, despite the higher prevalence of disabilities, a significant proportion of young adults born prematurely completed high school were employed and were functioning well in society. (8) It was also reassuring that, as a group, they contributed more to income tax than they received in benefits.

"Many reports have shown that a higher proportion of VLBW and VPT young adults continue to live with their parents compared to FT adults (7,14), which is more so in individuals with disabilities. (11) Compared with FT adults, those born EPT/VPT were less likely to have romantic relationships, cohabitation, and experience sexual intercourse and parenthood. (2,10,11,14) "

2. Social Outcomes, Relationships, and Reproduction:

Many reports have shown that a higher proportion of VLBW and VPT young adults continue to live with their parents compared to FT adults (7,14), which is more so in individuals with disabilities. (11) Compared with FT adults, those born EPT/VPT were less likely to have romantic relationships, cohabitation, and experience sexual intercourse and parenthood. (2,10,11,14) The McMaster study reported that 1 in 5 ELBW adults had never experienced sexual intercourse, and these differences remained even after excluding those with impairments. (11) Furthermore, the likelihood of experiencing romantic partnership, sexuality, and parenthood showed a significant dose-response with a lower probability with decreasing gestational age. (9,11,14,-16) Several studies have shown poorer social relations and fewer friends among prematurely born adults than controls. (7,9,14,17) They also engaged less often in risk-taking behaviors than FT. (2,7,8,11)

Both cohort (2,11) and population-linked registries (9,10,18,19) report reproductive problems among individuals born prematurely. The Norwegian National Birth Registry of 60,354 premature births between 1967–1988 found a dose-response association by degree of prematurity with lower rates of reproduction in both males and females, higher rate of stillbirths (20.8/1000 births in <28 weeks vs. 7.6 FT/1000 births); and recurrent premature offspring in prematurely born women (14% in 22-27 weeks vs. 6.4% in FT). (17) The Swedish population-based registry (1973-83 births) also reported a reduced probability of reproduction in both males and females. (19)

3. Chronic Physical and Mental Health Conditions:

Individuals born prematurely have been reported to experience a high prevalence of adult-onset medical conditions such as hypertension, Type 2 diabetes, and metabolic syndrome in mid-to-late adulthood. (1) Higher blood pressure has been consistently reported in adults born VPT compared to FT controls. In IPD analyses, the mean difference in blood pressure in 1571 adults born VPT versus 777 FT controls was 3.4 mmHg systolic and 2.1 mmHg in diastolic blood pressure. (20) There is also an association between preterm birth and with risk of ischemic heart disease at adulthood. (21) Recent cohort studies have reported a higher prevalence of dysglycemia, insulin resistance, and hepatic fat content in adults born ELBW, which collectively increase cardiometabolic risk. (22-24) The McMaster cohort found differences in body composition, elevated body fat, and reduced lean mass at middle adulthood, which likely contributed to the differences in metabolic health. (23) IPD meta-analysis showed that individuals born preterm were at risk of not reaching their full airway growth potential at adulthood, which places them at higher risk for future chronic obstructive pulmonary disease. (25) There are also adverse effects on the developing kidneys that can retard nephrogenesis. (1)

"Both cohort (2,11) and population-linked registries (9,10,18,19) report reproductive problems among individuals born prematurely. The Norwegian National Birth Registry of 60,354 premature births between 1967–1988 found a dose-response association by degree of prematurity with lower rates of reproduction in both males and females, higher rate of stillbirths (20.8/1000 births in <28 weeks vs. 7.6 FT/1000 births); and recurrent premature offspring in prematurely born women (14% in 22-27 weeks vs. 6.4% in FT). "

Preterm birth increases the risk for psychiatric disorders such as anxiety, inattention, depression, and autistic traits later in life. (26-31) The risk is also higher for psychosis, schizophrenia, and mood disorders. (26-31) There was a stepwise increase in psychiatric hospital admissions with decreasing gestational age. (30) Using clinical interviews, the ELBW survivors exhibited higher rates of anxiety and depression compared with FT controls. (27) This was confirmed in a larger sample by Individual Participant Data meta-analysis, which suggested that individuals born VP/VLBW have higher odds of meeting criteria for certain psychiatric disorders into adulthood than FT controls. (31) IPD analysis of self-reported mental health by VP young adults shows they have higher internalizing problems and more avoidant personality problems. (32) Several studies have also shown that young adults born preterm have a lower tendency for antisocial and risk-taking behaviors, such as smoking and drinking, than term controls. (33-35) Due to their timid personality and behaviors, they are at greater risk for increased bullying, peer victimization, and social exclusion. (36)

4. Health-related quality of life and Personal perspectives:

The Health Utility Index Mark 3 (HUI III) has been widely used in several studies to obtain the perspectives of health-related quality of life (HRQL) of ELBW/VPT. (37-40) When the HRQL was

obtained directly from the McMaster ELBW participants at YA (eliciting their own health status and own preferences using the Standard Gamble (SG) technique), the scores were equivalent to FT (0.85 vs. 0.88), where the scale of 0.00 is equivalent to dead, and 1.00 is perfect health. (41) No differences were observed between ELBW adults with and without impairments. However, in comparing the longitudinal trajectories of the same cohort using the SG perspectives of Ontario parents (*HUI3 community/societal preferences*), the HRQL of ELBW was clinically lower than FT at each of the three-time points. (40) Also, The HRQL of ELBW with impairments was statistically lower at all ages compared to those without neurosensory impairments. Compared with data from other countries that used *HUI3 community preferences*, the HRQL of the McMaster cohort at 30-36 years of age(40) was significantly lower than the Netherlands (37) and the German cohorts (39,) and there was no substantial improvement over time. This may be partly explained by the fact that the McMaster cohort included ELBW births, and the other two cohorts had VLBW participants. Again, using *HUI3 community preferences*, both the EPCURE participants (<26 weeks) and their parents rated their HRQL less favorably than the controls at both adolescence and adulthood, and there was a further decline at older age. (42) IPD meta-analysis of HRQL of over 2100 VLBW/VPT 18-29 years showed a significant difference in the HUI3 multi-attribute utility score of −0.06 (95% CI −0.08, −0.04) in comparison to FT controls, especially concerning physical and cognitive functioning. (43)

"Again, using HUI3 community preferences, both the EPCURE participants (<26 weeks) and their parents rated their HRQL less favorably than the controls at both adolescence and adulthood, and there was a further decline at older age. (42)"

In a newer methodology of 'Narrative Medicine,' (44) 41 ELBW participants in their mid-30s provided candid personal stories about their lives, struggles, and accomplishments and, against all odds, showed remarkable resilience in overcoming their challenges. (45) These letters express a much broader view of their lives than the restricted health-related quality of life studies: Preemie Voices, Press, 2014, accompanied by a video documentary, www.preemievoicesbook.com. (45)

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6. Comments and Limitations

Preterm birth is a chronic, life-long condition. Except for specific brain lesions, early biomedical risk factors play a smaller role, and environmental and social factors exert a greater influence on later outcomes. Subsequently, plasticity, resilience, and recovery come into play, and therefore, the future of premature children must be looked at from a lifespan perspective, as 'recovery' may not be evident until early adulthood.

The VPT/ELBW adult participant cited in the above studies were born in the early post-neonatal care era and did not receive the advanced technology and other 'gentle interventions' offered to the current survivors. Although these data may not be entirely applicable to today's survivors, the findings can guide and design effective strategies to improve the health, social well-being, and psychiatric and cardio-metabolic problems of future vulnerable premature infants. In addition, obtaining the personal perspectives of children and adults born prematurely cannot be over-emphasized. It is now clear that health professionals' perspectives on the outcome of premature infants are often discordant with that of the premature individuals themselves. (46) Finally, it should be reiterated that despite disabilities and significant health issues, a significant majority of EP/VPT showed amazing resilience, placed a high valuation on their quality of life, and enjoyed a fulfilling lifestyle in adulthood. (11,41)

" Based on our current knowledge of the high prevalence of cardiometabolic and mental health problems in adults born VPT, transition to adult physicians should include taking a birth history of prematurity so that preventative measures and anticipatory guidance can be undertaken. (47)"

Although the complex psychosocial needs of parents of extremely preterm infants in the NICU are now recognized, the long-term needs and advice for the future health and development of VPT at adulthood are sorely neglected. Based on our current knowledge of the high prevalence of cardiometabolic and mental health problems in adults born VPT, transition to adult physicians should include taking a birth history of prematurity so that preventative measures and anticipatory guidance can be undertaken. (47)

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The I-Rainbow: A flexible, evidence-based care path for providing developmental care in the NICU

1

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Clinical Associate Professor of Pediatrics
Lucile Packard Children's Hospital Stanford University
Director of Inpatient Infant Neurodevelopmental Care

Pronouns: she/her

Eilish Byrne, MSPT

Physical Therapist, El Camino Hospital
Assistant Professor at the University of Saint Augustine for Health Sciences

Pronouns: she/her

Social Media: A Tool for Connecting with Families

2

Daphna Barbeau, MD

Neonatologist HCA University Hospital
Director, High Risk Infant Follow Up Clinic

Pronouns: she/her

How Mammha is Closing Gaps in Maternal Mental Health Care in NICUs

3

Maureen Fura

CEO & Founder, Mammha
Member of National Coalition for Maternal Mental Health (NCMMH)
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Fragile Infant Forums for Implementation of Standards: Progress and Next Steps

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

" In 2022, Fragile Infant Forums for Implementation of Standards (FIFI-S) was developed to use implementation science related to complex and varied situations in intensive care. The forums are intended to help professionals effectively integrate the IFCDC standards into practice. During this initial year, the FIFI-S faculty developed evidence-based educational forums and disseminated material for implementing systems change."

In July of 2022, the Consensus Panel for Infant and Family-Centered Developmental Care Standards, Competencies, and Best Practices (IFCDC) began to examine how to implement the standards published in 2020 (1) https://nicudesign.nd.edu/nicu-care-standards/. In 2022, Fragile Infant Forums for Implementation of Standards (FIFI-S) was developed to use implementation science related to complex and varied situations in intensive care. The forums are intended to help professionals effectively integrate the IFCDC standards into practice. During this initial year, the FIFI-S faculty developed evidence-based educational forums and disseminated material for implementing systems change. On the cusp of the second year of FIFI-S expansion, the following overview of progress to date and the next steps are described.

"A major goal of the leaders of the IFCDC Forums is to disseminate information regarding the standards using implementation science."

Workshops and presentations held by the FIFI-S leadership group:

A major goal of the leaders of the IFCDC Forums is to disseminate information regarding the standards using implementation science. Many activities have been aggressively pursued in the past year.

In July 2022, a two-day intensive forum focused on Feeding, Eating, and Nutrition Delivery (FEND) standards. Participants were given opportunities to apply and practice using implementation science in real-life clinical situations. One of the FEND Forum results was the development and distribution of a "White Paper" that describes and demonstrates how to effect systems change as it relates to feeding fragile infants. https://nicudesign.nd.edu/assets/491808/fifi_s_white_paper_version_5_10_19_22_jbckjb_final_2022.pdf In January of 2023, an additional Forum provided opportunities for the consensus panel leaders to learn how to support intensive care systems change using implementation science.

"One of the FEND Forum results was the development and distribution of a "White Paper" that describes and demonstrates how to effect systems change as it relates to feeding fragile infants. https://nicudesign.nd.edu/assets/491808/fifi_s_white_paper_version_5_10_19_22_jbckjb_final_2022.pdf "

In March of 2023, the FIFI-S faculty presented a workshop at the Gravens meeting on the "Environment of Care for High-Risk Newborns and their Families," allowing participants to discuss typical opportunities and challenges in implementing the standards in clinical practice. Examples from national and international representatives provided insights into the diversity and cultural challenges of implementing IFCDC standards.

Consensus panel members have presented talks, posters, and other communication to a variety of professional organizations and meetings, including the National Association of Neonatal Nurses

"Neonatology Today (https://www.neonatologytoday.net) supports a monthly column to disseminate information about the IFCDC standards and the use of implementation science. "

(NANN), National Association of Neonatal Therapists (NANT), Family Centered Care Task Force (FCC), Council of International Neonatal Nurses (COINN), National Association of Perinatal Social Workers (NAPSW), National Perinatal Association (NPA), SYNOVA Leadership Forum, and Nationwide Children's Hospital Neonatal/Perinatal Conference.

Professional Publications by FIFI-S leaders:

Neonatology Today (https://www.neonatologytoday.net) supports a monthly column to disseminate information about the IFCDC standards and the use of implementation science. The first of the articles has focused on the major Infant and Family Centered Care model constructs of 1. the M(other) baby relationship as central to all clinical work; 2. Systems Thinking; 3. Environmental Protection; 4. the Infant as Effective Communicator/Interactor; 4. Individualized Care; 5. Neuroprotection of the Developing Brain; and Infant Mental Health.

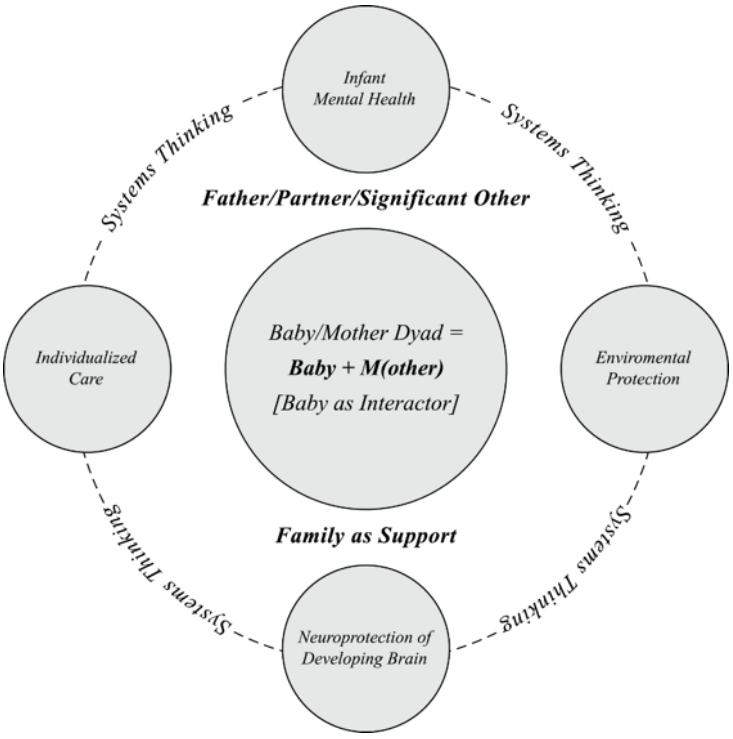

Figure 1, Model of Infant and Family-Centered Care. Used with permission.

Consensus Panel leaders wrote chapters in key Developmental Care books for NICU professionals. (2-4) The IFCDC standards served as a template for all the book topics and chapters, further demonstrating the utility of implementing the standards into all aspects of clinical care. (5, 6)

Dissemination of all publications, white papers, and chapters is via the Developmental Care website and can be accessed from https://nicudesign.nd.edu/nicu-care-standards/ifcdc-list-of-presentations-and-publications/

Next steps for IFCDC and FIFI-S in the upcoming year:

In addition to ongoing presentations at national and international meetings, monthly publications in Neonatology Today will focus on the specific evidence-based standards that include Touch and handling, Skin to Skin with intimate family members, State protection, Baby stress and pain, Family stress and pain, and Diversity issues. Other journal articles will continue to be published, notably articles on the synergistic effects of integrating NICU design and IFCDC standards and how to utilize metrics to evaluate change.

The Gravens meeting in 2024 in Clearwater Beach, Florida, will allow attendees to focus on the science and implementation of three of the major standard domains and will provide opportunities to discuss challenges and successes they have encountered in their clinical implementation experience. The following year, an additional three major standard domains will be presented along with revisions to the current IFCDC standards.

"In the upcoming year, there will be an emphasis on updating the standards to include recent evidence and make the standards more usable and accessible to intensive care professionals."

In the upcoming year, there will be an emphasis on updating the standards to include recent evidence and make the standards more usable and accessible to intensive care professionals. Recommendations for changes have been invited so that representation from those in the field with concerns regarding gaps, publications, necessary adjustments, etc., can be addressed. Forms for making recommendations are found on the following web page: ifcdc_standards_proposal_form_for_revisions_2022_2023. The consensus panel will be taking strides to integrate Diversity, Equity, and Inclusion, Continual Contact between Baby and Mother, Discharge Planning, Infant Mental Health and Advocacy into every standard and/or competency.

Conclusion:

The initial year of FIFI-S has provided a sound foundation for implementing the IFCDC Standards, competencies, and best practices in intensive care. FIFI-S activities included educational forums, seminal papers on implementation science and published articles on clinical practice systems change. The foundation developed during the first year by committed FIFI-S leaders will provide a springboard for disseminating and integrating the standards to optimize baby and family outcomes.

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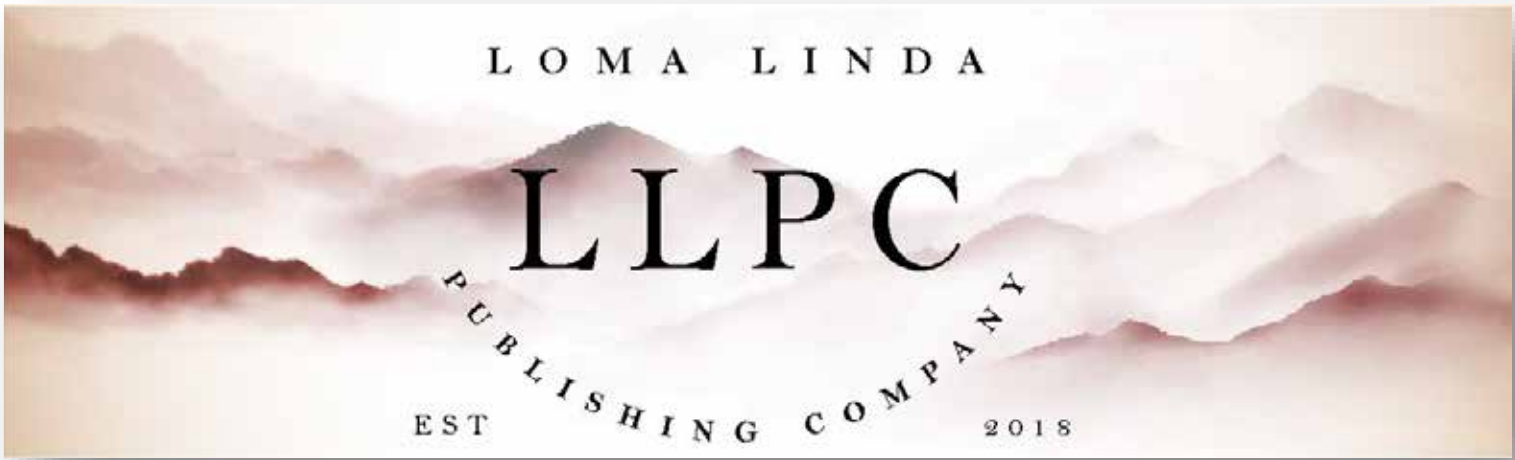

Peer Reviewed

Maternal Immunization: Enhancing Protection for Mothers, Infants, and Future Generations

Viveka Prakash-Zawisza, MD, MS, MBA, Mitchell Goldstein, MD, MBA, CML

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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"Despite ample safety data supporting vaccine use during pregnancy, maternal immunization remains underutilized due to concerns about vaccine safety among healthcare providers and pregnant women, which has resulted in low uptake rates, particularly during the COVID-19 pandemic."

"Maternal immunization is a critical component of prenatal care that offers many benefits to pregnant individuals and their developing fetuses. By reducing the severity and duration of certain illnesses, vaccines safeguard the health of pregnant individuals and protect the fetus from congenital and maternal infections."

Abstract:

Maternal immunization is an essential aspect of prenatal care that reduces the severity and duration of illnesses for pregnant individuals and provides crucial protection to the developing fetus from congenital infections and the adverse effects of maternal infections. Some vaccines even confer immunity to newborns by transferring antibodies via placenta and breastmilk, offering vital protection until the baby's immune system matures. Despite ample safety data supporting vaccine use during pregnancy, maternal immunization remains underutilized due to concerns about vaccine safety among healthcare providers and pregnant women, which has resulted in low uptake rates, particularly during the COVID-19 pandemic. This manuscript explores the history of maternal immunization, the safety considerations of different vaccines, current recommendations, and challenges, and proposes comprehensive strategies to increase vaccine confidence among pregnant individuals to optimize protection for mothers and infants. (1)

Introduction:

Maternal immunization is a critical component of prenatal care that offers many benefits to pregnant individuals and their developing fetuses. By reducing the severity and duration of certain illnesses, vaccines safeguard the health of pregnant individuals and protect the fetus from congenital and maternal infections. Moreover, certain vaccines play a pivotal role in conferring immunity to newborns through the transfer of protective antibodies, thus offering a critical shield until the baby's immune system matures.

"Moreover, certain vaccines play a pivotal role in conferring immunity to newborns through the transfer of protective antibodies, thus offering a critical shield until the baby's immune system matures. "

However, concerns about vaccine safety among healthcare providers and pregnant women have hindered the widespread adoption of maternal immunization, leading to low vaccine uptake rates, particularly during the challenging COVID-19 pandemic. (2) This manuscript delves into the historical context of maternal immunization, the safety considerations surrounding various vaccines, current recommendations, and existing challenges, and proposes comprehensive strategies to bolster vaccine confidence among pregnant individuals, ultimately optimizing protection for mothers and infants.

Historical Perspective:

The history of maternal immunization has evolved, marked by significant changes in policies and regulations. Initially, by FDA guidelines, pregnant women were excluded from drug and vaccine trials, a measure that persisted after the thalidomide tragedy. However, in 1993, the FDA reversed this decision, recognizing the necessity to

gather drug safety data on women of childbearing age. (3) Despite this change, pregnant and lactating women still face underrepresentation in vaccine trials, causing delays in obtaining sufficient safety data during disease outbreaks. Recognizing the importance of maternal immunization and the reversal of exclusionary policies highlight its critical role in prenatal care and disease prevention.

"Despite this change, pregnant and lactating women still face underrepresentation in vaccine trials, causing delays in obtaining sufficient safety data during disease outbreaks. Recognizing the importance of maternal immunization and the reversal of exclusionary policies highlight its critical role in prenatal care and disease prevention."

Safety Considerations and Recommended Vaccines:

Vaccines deemed safe for administration during pregnancy include killed or inactivated virus vaccines, protein subunit vaccines, toxoid-containing vaccines, and conjugate vaccines. (3) Live attenuated virus vaccines are generally avoided due to the theoretical risk of congenital infection and increased miscarriage risk. However, recent data from a meta-analysis have shown no evidence of increased adverse pregnancy outcomes related to live vaccines, except for smallpox vaccines. Nonetheless, ensuring safety for pregnant individuals and their fetuses remains a priority, with ongoing research and vaccine safety monitoring during pregnancy.

Current Recommendations and Challenges:

The universal recommendations for maternal vaccination include tetanus, diphtheria, pertussis (Tdap), influenza, and COVID-19 vaccines when the benefits outweigh the potential risks. (4) Tdap vaccine administration between 27 and 36 weeks of gestation, preferably earlier, optimizes neonatal antibody levels and protects newborns from pertussis and its life-threatening complications. The flu vaccine is safe to administer during any trimester and protects against flu-associated pregnancy complications. The World Health Organization (WHO) recommends COVID-19 vaccination for pregnant women based on individual risk assessment, providing information on risks, benefits, and limitations of safety data. Vaccines for other illnesses, such as hepatitis B, meningococcus, and polio, may be considered individually with thoughtful risk-benefit analysis.

Strategies to Increase Vaccine Confidence:

Low vaccine confidence among pregnant individuals remains a significant barrier to increasing vaccination coverage. Several factors influence vaccine uptake, including awareness, perceived disease severity, vaccine benefits, side effects, previous vaccination history, and recommendations from healthcare professionals. Proactive efforts are needed to enhance vaccine confidence, such as healthcare providers offering vaccines, providing ample information, and addressing concerns raised by pregnant individuals. (5) Multichannel approaches, community education programs, targeted messaging, and improved access to healthcare for marginalized populations are additional strategies to increase vaccine uptake among this vulnerable cohort. (6, 7) Encouragingly, research has shown that proactive and supportive healthcare provider recommendations are pivotal in positively influencing vaccine decisions among pregnant women.

"Despite ample safety data supporting vaccine use during pregnancy, concerns about vaccine safety have led to low vaccine uptake rates worldwide, even during critical times such as the COVID-19 pandemic. By addressing vaccine confidence, providing information, and implementing targeted strategies, healthcare providers can play a pivotal role in optimizing vaccination coverage and safeguarding the health of both mothers and infants."

Conclusion:

Maternal immunization is vital to prenatal care, protecting pregnant individuals and their unborn babies. Despite ample safety data supporting vaccine use during pregnancy, concerns about vaccine safety have led to low vaccine uptake rates worldwide, even during critical times such as the COVID-19 pandemic. By addressing vaccine confidence, providing information, and implementing targeted strategies, healthcare providers can play a pivotal role in optimizing vaccination coverage and safeguarding the health of both mothers and infants. Investing in maternal immunization has the potential to protect current generations and create a healthier future for generations to come, highlighting its significance in public health and disease prevention. Continued efforts to promote and implement maternal immunization will contribute to a safer and healthier world for pregnant individuals, their infants, and future generations. (8)

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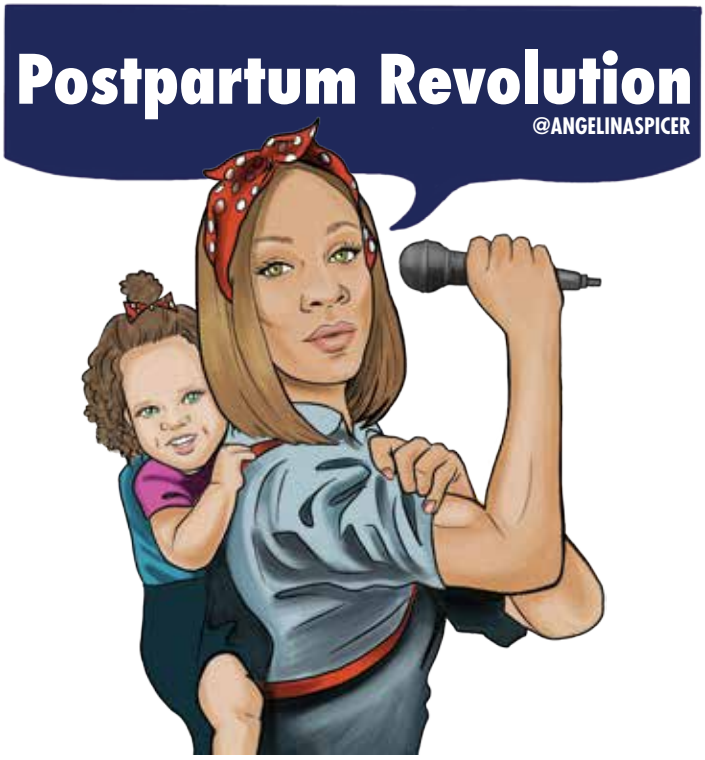
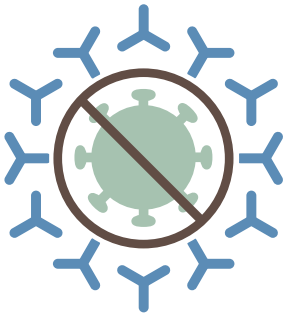


Protecting your baby and family from

Respiratory Viruses:



What parents need to know this RSV and flu season

Like COVID-19, RSV (Respiratory Syncytial Virus) and flu affect the lungs and can cause serious breathing problems for children and babies. Talk to your family about the risks.

Certain diagnoses can make children and babies more vulnerable for serious complications from respiratory viruses - including prematurity, chronic lung disease, and heart conditions.

You can limit the spread of viruses by wearing a mask, washing your hands with soap & water, using an alcohol-based hand sanitizer, and getting vaccinated.

The fewer germs your baby is exposed to, the less likely they are to get sick. Let people know you need their help to stay well. Limit visitors. Avoid crowds. Stay away from sick people.

Immunizations save lives. Stay up-to-date with your family's flu vaccinations and COVID-19 boosters. This helps our community stay safe by stopping the spread of deadly viruses.

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

WE CAN HELP PROTECT EACH OTHER.

National Perinatal Association

www.nationalperinatal.org/rsv

The Gravens Conference: Adult Outcomes

April Laramey

The Gravens Conference
on the Environment of Care for High Risk Newborns

"I spent time in an incubator, going home some months after my birth. Around the time I was six months old, my mother noticed something amiss. I was not holding my head up as an infant should by age."

At the time of my birth in 1978, whether I would survive was touch and go. I was born three months premature to a single mother with three other children. As I stayed in the NICU– a different city than where my mother resided - it was hard for her always to be there. I spent time in an incubator, going home some months after my birth. Around the time I was six months old, my mother noticed something amiss. I was not holding my head up as an infant should by age.

"Leaving the relative shelter of the center to integrate into a mainstream school was difficult for me. I was likely amongst one of the only students with a disability they had ever taught."

It was then that I was diagnosed with cerebral palsy. At that time, for my mother, the condition was unknown. After being assured it would not kill me, my mother set out to address this diagnosis. This led her to a center where they focused on children with disabilities. I attended there from preschool from when I was six months old until I began Kindergarten. I attribute the intervention to helping get me where I am today.

"After being assured it would not kill me, my mother set out to address this diagnosis. This led her to a center where they focused on children with disabilities. I attended there from preschool from when I was six months old until I began Kindergarten. I attribute the intervention to helping get me where I am today."

Leaving the relative shelter of the center to integrate into a mainstream school was difficult for me. I was likely amongst one of the only students with a disability they had ever taught. I recall a series of negative treatments from teachers and peer bullying, particularly after I had two surgeries to improve my walking. As I got older, responses in my relationships with social contacts improved, but it was not until I reached University that I truly came into my own.

"I obtained my Honours Bachelor of Social Science in Criminology in the summer of 2001. While I would never work in the field of criminology directly, my degree allowed me to work for the federal government of Canada."

I obtained my Honours Bachelor of Social Science in Criminology in the summer of 2001. While I would never work in the field of criminology directly, my degree allowed me to work for the federal government of Canada. I have spent the last 24 years working in various areas but mostly concentrated in Equity, Diversity, and Inclusion. I now work as a Senior Policy Analyst in EDI, assisting in developing and interpreting legislation and policies that affect the Public Service of Canada.

"Although I was born very preterm and had a significant disability, I have been able to contribute in significant ways as an adult. I am truly proud of being able to impact policy direction from my own lived experience. It has allowed me to come full circle regarding my disability and make a difference in the workplace."

Although I was born very preterm and had a significant disability, I have been able to contribute in significant ways as an adult. I am truly proud of being able to impact policy direction from my own lived experience. It has allowed me to come full circle regarding my disability and make a difference in the workplace.

Disclosures: *There are no reported disclosures*

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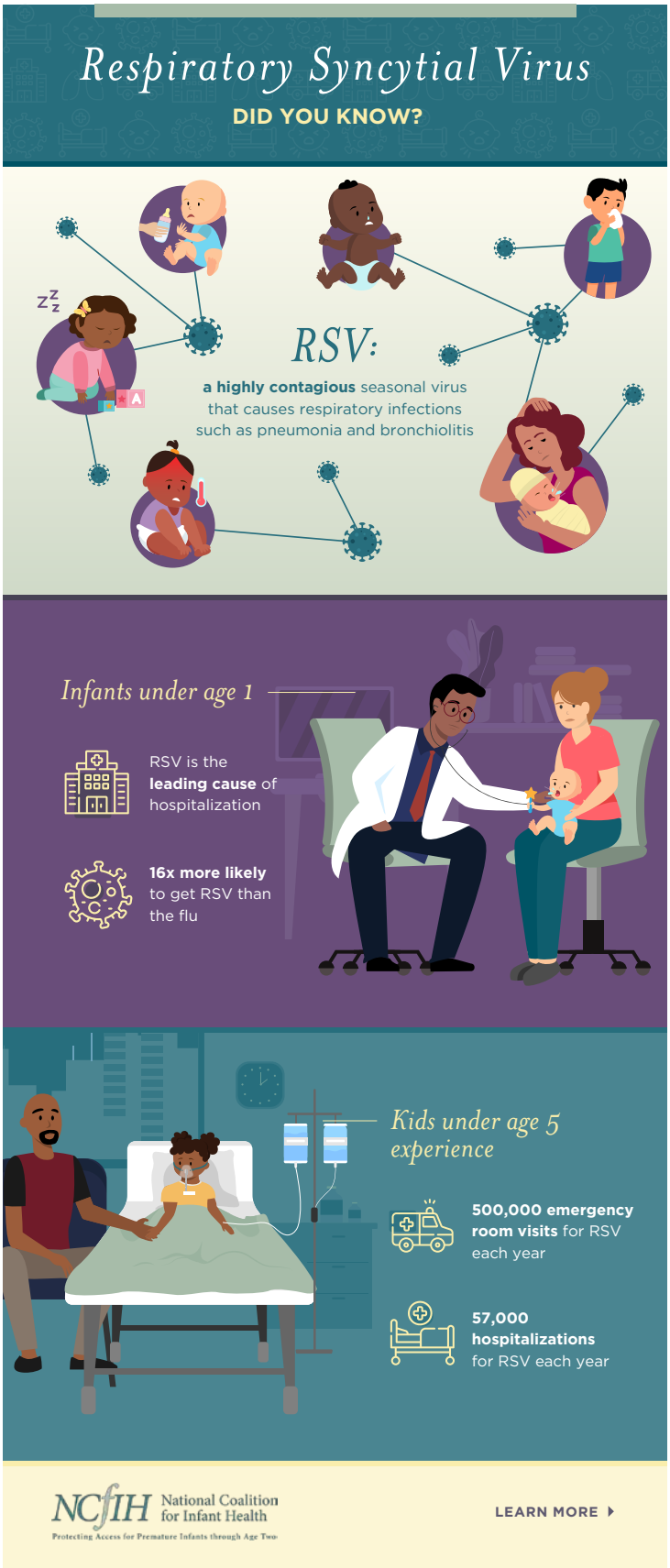
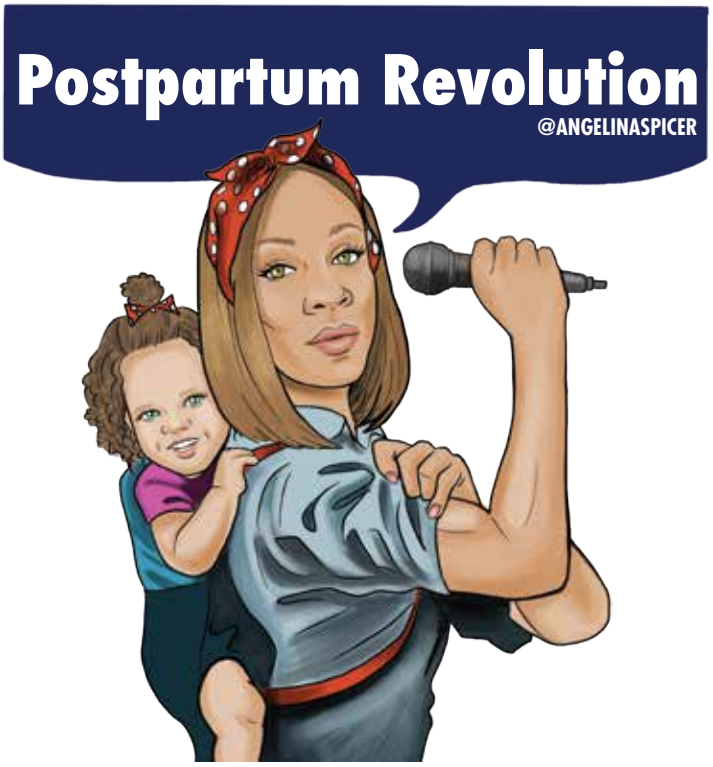


The Gap Baby: An RSV Story



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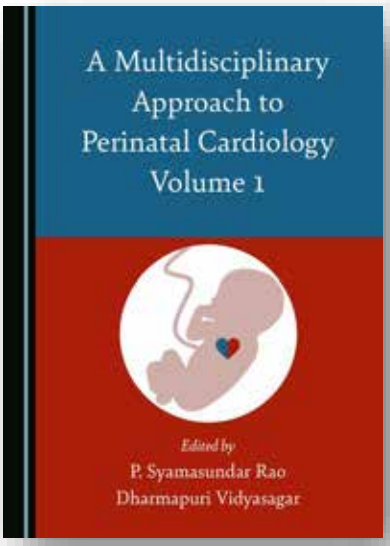
A Multidisciplinary Approach to Perinatal Cardiology *Volume 1*

Edited by P. Syamasundar Rao and Dharmapuri Vidyasagar



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Book Description

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

About the Editors

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

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

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

My NICU Network
My Perinatal Network

National Perinatal Association + NICU Parent Network

Online L&D Staff Education Program

Caring for Pregnant Patients & Their Families:

Providing Psychosocial Support During Pregnancy, Labor and Delivery

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Continuing education credits provided by

pac-lac

About the Program

- **WHO SHOULD TAKE THE PROGRAM?** This program is designed for both office and hospital staff in all disciplines that interact with pregnant patients and their families. A key focus is recognizing risk factors for perinatal mood and anxiety disorders, and mitigating their impact through provision of trauma-informed care.

- **WHY TAKE THE PROGRAM?** Families will benefit when staff have improved skills, through enhanced parental resilience and better mental health, and improved parent-baby bonding leading to better developmental outcomes for babies. Benefits to staff include improved skills in communicating with patients; improved teamwork, engagement and staff morale; reduced burnout, and reduced staff turnover.

- **HOW DOES THE PROGRAM ACHIEVE ITS GOALS?** Program content is representative of best practices, engaging and story-driven, resource-rich, and developed by a unique interprofessional collaboration of obstetric and neonatal professionals and patients. The program presents practical tips and an abundance of clinical information that together provide solutions to the emotional needs of expectant and new parents.

- **HOW WAS THE PROGRAM DEVELOPED?** This program was developed through collaboration among three organizations: a multidisciplinary group of professionals from the National Perinatal Association and Patient + Family Care, and parents from the NICU Parent Network. The six courses represent the different stages of pregnancy (antepartum, intrapartum, postpartum), as well as perinatal mood and anxiety disorders, communication techniques, and staff support.

Program Objectives

- Describe principles of trauma-informed care as standards underlying all communication during provision of maternity care in both inpatient and outpatient settings.
- Identify risk factors, signs, and symptoms of perinatal mood and anxiety disorders; describe treatment options.
- Define ways to support pregnant patients with high-risk conditions during the antepartum period.
- Describe obstetric violence, including ways that providers may contribute to a patient's experience of maternity care as being traumatic; equally describe ways providers can mitigate obstetric trauma.
- Describe the importance of providing psychosocial support to women and their families in times of pregnancy loss and fetal and infant death.
- Define the Fourth Trimester, and identify the key areas for providing psychosocial support to women during the postpartum period.
- Identify signs and symptoms of burnout as well as their ill effects, and describe both individual and systemic methods for reducing burnout in maternity care staff.

Continuing education credits will be provided for physicians, clinic and bedside nurses, social workers, psychologists, and licensed marriage and family therapists. CEUs will be provided by Perinatal Advisory Council: Leadership, Advocacy, and Consultation.

PROGRAM CONTENT

COMMUNICATION SKILLS CEUs offered: 1

Learn principles of trauma-informed care, use of universal precautions, how to support LGBTQ patients, obtaining informed consent, engaging in joint decision-making, delivering bad news, dealing with challenging patients.

Faculty: Amina White, MD, MA, Clinical Associate Professor, Department of OB/Gyn, University of North Carolina, Chapel Hill, NC; Sue Hall, MD, MSW, FAAP, St. John's Regional Medical Center, Oxnard, CA; Karen Saxer, CNM, MSN, University of North Carolina Maternal-Fetal Medicine, UNC Women's Hospital, Chapel Hill, NC; Tracy Pella, Co-Founder & President, Connected Forever, Tecumseh, NE.

PERINATAL MOOD AND ANXIETY DISORDERS CEUs offered: 1

Identify risk factors for and differential diagnosis of PMADs (perinatal mood and anxiety disorders), particularly perinatal depression and/or anxiety and posttraumatic stress syndrome. Learn the adverse effects of maternal depression on infant and child development, and the importance of screening for and treating PMADs.

Faculty: Linda Baker, PsyD, psychologist at Unstuck Therapy, LLC, Denver, CO; Sue Hall, MD, MSW, FAAP, neonatologist at St. John's Regional Medical Center, Oxnard, CA; Angela Davids, Founder of Keep 'Em Cookin', Baltimore, MD; Brittany Boet, Founder of Bryce's NICU Project, San Antonio, TX.

PROVIDING ANTEPARTUM SUPPORT CEUs offered: 1

Identify psychosocial challenges facing high risk OB patients, and define how to provide support for them, whether they are inpatient or outpatient. Recognize when palliative care is a reasonable option to present to pregnant patients and their families.

Faculty: Amina White, MD, MA, Clinical Associate Professor, Department of OB/Gyn, University of North Carolina, Chapel Hill, NC; Sue Hall, MD, MSW, FAAP, neonatologist at St. John's Regional Medical Center, Oxnard, CA; Angela Davids, Founder of Keep 'Em Cookin', Baltimore, MD; Erin Thatcher, BA, Founder and Executive Director of The PPROM Foundation, Denver, CO.

PROVIDING INTRAPARTUM SUPPORT CEUs offered: 1

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

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

PROVIDING POSTPARTUM SUPPORT CEUs offered: 1

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

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

SUPPORTING STAFF AS THEY SUPPORT FAMILIES CEUs offered: 1

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

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

Cost

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

Contact help@myperinatalnetwork.org to learn more.

Faculty

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

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Founder and Executive Director, The PPROM Foundation, Denver, CO.

CANCELLATIONS AND REFUNDS

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

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

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

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

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

KEEPING MOTHERS + INFANTS TOGETHER

Means balancing the risks of...

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

EVIDENCE

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

PARTNERSHIP

What is the best for this unique dyad?

SHARED DECISION-MAKING

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

TRAUMA-INFORMED

Both parents and providers are confronting significant...

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

LONGITUDINAL DATA

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

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

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

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NICU Parent Network

Will Newly Proposed FDA Guidance Discourage Pediatric Drug Development?

Josie Cooper

The Alliance for Patient Access, founded in 2006, is a national network of physicians dedicated to ensuring patient access to approved therapies and appropriate clinical care. AfPA accomplishes this mission by recruiting, training and mobilizing policy-minded physicians to be effective advocates for patient access. AfPA is organized as a non-profit 501(c)(4) corporation and headed by an independent board of di[1]rectors. Its physician leadership is supported by policy advocacy management and public affairs consultants.

In 2012, AfPA established the Institute for Patient Access, a related 501(c)(3) non-profit corporation. The Institute for Patient Access is a physician-led policy research organization dedicated to maintaining the primacy of the physician-patient relationship in the provision of quality health care. In furtherance of its mission, IfPA produces educational materials and programming designed to promote informed discussion about patient access to approved therapies and appropriate clinical care.

Visit alliancefor patientaccess.org *and* instituteforpatientaccess.org *to learn more about each organization.*

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IfPA | Institute for Patient Access

"The U.S. Food and Drug Administration could soon become more selective about which companies receive six months of patent exclusivity in exchange for developing pediatric drugs. "

The U.S. Food and Drug Administration could soon become more selective about which companies receive six months of patent exclusivity in exchange for developing pediatric drugs. If finalized, the guidance could have the unintended consequence of discouraging investment in drugs for infants and children.

The Role of Patent Exclusivity in Pediatric Drug Development

Manufacturers are currently required under the Pediatric Research Equity Act to conduct pediatric studies to receive FDA approval for certain drugs. Those same studies can also make them eligible for six months of patent exclusivity, which they can apply to any drug they manufacture.

"Manufacturers are currently required under the Pediatric Research Equity Act to conduct pediatric studies to receive FDA approval for certain drugs. Those same studies can also make them eligible for six months of patent exclusivity, which they can apply to any drug they manufacture. "

This approach incentivizes companies to develop and invest in drugs for infants and children, which are generally difficult to develop and, therefore, rare.

For decades, physicians often treated infants and children off-label, adjusting the dosage of medications studied and approved for adults rather than children. Policy reforms have helped turn the tide, including offering patent exclusivity and dramatically increasing the number of clinical studies dedicated to pediatrics. As a result, more medications are being developed and approved specifically for infants and children, and new pediatric labels are being added to existing drugs.

"Policy reforms have helped turn the tide, including offering patent exclusivity and dramatically increasing the number of clinical studies dedicated to pediatrics. As a result, more medications are being developed and approved specifically for infants and children, and new pediatric labels are being added to existing drugs."

Proposed Changes

However, new guidance proposed by the Food and Drug Administration would change the rules on exclusivity and pediatric drug development.

Specifically, it would ask manufacturers to conduct additional studies beyond those already required by the Pediatric Research Equity Act to obtain exclusivity. The draft guidance urges manufacturers to take a broader approach by conducting additional studies on children of varying ages. It also directs manufacturers to test multiple indications before sending the drug through the FDA approval process.

"Nevertheless, raising the bar could also impact whether companies attempt to develop much-needed drugs for the pediatric population. Additional research demands additional time, human resources, and investment. Not all manufacturers will be ready or able to dedicate these resources."

Impact on Pediatric Drug Development

The FDA's guidance is well intended. Undoubtedly, generating more research on pediatric drugs would build a body of knowledge that benefits clinicians and patients alike. Nevertheless, raising the bar could also impact whether companies attempt to develop much-needed drugs for the pediatric population. Additional research demands additional time, human resources, and investment. Not all manufacturers will be ready or able to dedicate these resources.

Most physicians and parents would argue that they need more, not fewer, medications developed and approved specifically for infants and children. By making exclusivity, the driving incentive behind pediatric drug development, more challenging, the FDA may unintentionally encourage manufacturers to focus their attention and research dollars elsewhere.

This could leave young patients and their healthcare providers behind.

The proposed guidance was open to public comment through July 17, after which the Food and Drug Administration finalized it.

References:

1. https://www.fda.gov/drugs/information-consumers-and-patients-drugs/drug-research-and-children

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

NT

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Immunizing Yourself Against **COVID-19**

COVID-19 vaccines have been shown to:

- Lessen the severity of symptoms[1]
- Reduce disease transmission[3]
- Reduce risk of mortality[2]
- Make communities healthier and safer[4]

Understanding the Options

COVID-19 vaccines are available for children, adolescents and adults. There are 3 types to choose from.

mRNA VACCINES

New to market, but research has been ongoing since the 1990s.

HOW THEY WORK: **Instruct cells to make COVID-like proteins that trigger the immune system to fight the virus.**

PROTEIN SUBUNIT VACCINES

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

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

VECTOR VACCINES

Used for decades against chickenpox, malaria and tuberculosis.

Use a modified virus, such as a common cold, to teach the body to fight off COVID.

COVID vaccines are recommended for everyone ages 6 months and older, and boosters for everyone ages 5 years and older, if eligible.[5]

Safe and Sound

COVID vaccines have been:

- **Thoroughly tested** through multi-phase trials with tens of thousands of participants[6]
- **Proven safe and effective** for adults as well as children[7]
- **Vetted and approved** by the US FDA and EMA and endorsed by the WHO[8-10]

Get Your Jab

Vaccines are available at your:

- **Doctor's office**
- **Neighborhood pharmacy**
- **Community health center**

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

1. https://www.mayoclinic.org/diseases-conditions/coronavirus/symptoms-causes/syc-20479963
2. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8782520/
3. https://www.nejm.org/doi/full/10.1056/nejmc2107717
4. https://royalsocietypublishing.org/doi/full/10.1098/rsif.2020.0683
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10. http://www.bccdc.ca/Health-Info-Site/Documents/COVID-19_vaccine/WHO-EUA-qualified-covid-vaccines.pdf

GAfPA Global Alliance for Patient Access

NCPA NATIONAL COMMUNITY PHARMACISTS ASSOCIATION

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

Tiriumphs at the 2023 Research and Advocay Summit: Empowering Pediatric Patients

Sabina Schmidt Goldstein-Becerra

iCAN
International Children's Advisory Network

Get involved today and Join the iCAN Parent Council!

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

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

Empowering Pediatric Patients: Success of the 2023 Research and Advocacy Summit

We express our deep appreciation to our esteemed sponsors who made our summit possible, including Jumohealth, Pfizer, LabCorp, Pediatric Trials Network, Advances in Therapeutics and Technology, Georgia Institute of Technology, Everylife Foundation for Rare Diseases, and Global Center for Medical Innovation, among others. Their unwavering support and collaboration played a pivotal role in achieving our mission of empowering every pediatric patient to have a voice in medicine, research, and innovation.

We also thank our sister organization, the International Society for Pediatric Innovation (iSPI), for their invaluable contributions to organizing our annual summit. The event proved to be an incredible experience for the kids, as they had the opportunity to connect with peers from across the globe and actively engage in discussions surrounding the medical field and various career topics.

The summit's success is a testament to the dedication and passion of all involved, and we are truly humbled by the positive impact it has had on young minds aspiring to make a difference in pediatric healthcare. We look forward to continuing this journey and fostering a brighter future for pediatric innovation.

"The summit's success is a testament to the dedication and passion of all involved, and we are truly humbled by the positive impact it has had on young minds aspiring to make a difference in pediatric healthcare. We look forward to continuing this journey and fostering a brighter future for pediatric innovation."

Once again, thank you to our sponsors, partners, and the entire iSPI community for making this summit a resounding success!

Young Minds Shining Bright: Kids Present Research and Engage in Dialogue at the Summit

During the summit, our kids had a fantastic opportunity to showcase the research projects they spearheaded with their respective chapters. The event provided a platform for them to present their findings and engage in meaningful dialogues with fellow participants and experts in the field.

The research presentations showed the kids' hard work, dedication, and passion for creating pediatric change. They confidently discussed their projects, sharing insights, discoveries, and the impact of their work within their communities.

"Witnessing our kids engage in meaningful interactions was truly inspiring, as they showcased their research acumen and demonstrated their ability to articulate complex ideas and advocate for positive change."

Beyond the presentations, the interactive dialogue sessions allowed our young researchers to exchange ideas, seek feedback, and collaborate with others who share their commitment to advancing pediatric healthcare. These discussions nurtured a sense of camaraderie and encouraged young minds to think critically, develop innovative solutions, and further their understanding of the healthcare landscape.

Witnessing our kids engage in meaningful interactions was truly inspiring, as they showcased their research acumen and demonstrated their ability to articulate complex ideas and advocate for positive change.

Inside Look at Pfizer Lab and Immersive Research Activities

At the iCAN summit, our program members were granted an exceptional and rare opportunity to step into the world of pharmaceutical research at Pfizer's lab. The experience proved to be enlightening, offering them firsthand insights into cutting-edge medical research and the chance to make a difference in the fight against diseases.

During their visit, the young participants were challenged with an exciting task: creating a potential cure for a disease within a specified budget and timeframe. This immersive activity not only showcased their creativity and problem-solving skills but also ignited a passion for making advancements in medical science.

Moreover, the program members embarked on a series of informative tours within the Pfizer lab, gaining a glimpse into the fascinating daily work of Pfizer scientists. From witnessing advanced research techniques to understanding the intricacies of drug development, the tours provided invaluable knowledge and inspiration.

"Moreover, the program members embarked on a series of informative tours within the Pfizer lab, gaining a glimpse into the fascinating daily work of Pfizer scientists. From witnessing advanced research techniques to understanding the intricacies of drug development, the tours provided invaluable knowledge and inspiration."

The visit to the Pfizer lab became a highlight of the iCAN summit, leaving a lasting impact on young minds and encouraging them to consider potential careers in medicine and research. Such experiences are crucial in nurturing the next generation of medical innovators and advocates for pediatric healthcare.

Empath Labs Inspires Kids to Innovate for Coping with Treatment

Another highlight of our event was the incredible workshop hosted by Empath Labs, where our young participants were tasked with creating innovative solutions to help kids better cope with medical treatment. The level of creativity and imagination displayed by the kids during this activity was truly astounding.

Among the standout projects was a group that designed a special zebra with various fidget tools to soothe and comfort young patients during their medical procedures. This ingenious creation alleviated stress and anxiety, providing a much-needed source of comfort during challenging times.

Another awe-inspiring innovation from the young minds was the development of machines capable of transforming hospital rooms into different settings worldwide, including immersive simulations of serene ocean environments. This visionary concept allowed young patients to escape the confines of their hospital rooms and embark on virtual journeys to far-off places, providing a unique sense of adventure and relief.

Notably, the kids took their innovations to the next level by showcasing their projects at the prestigious iSPI conference in front of a captivated audience, which included esteemed medical pro-

fessionals. The presentations left everyone in awe as the young innovators demonstrated their creativity and understanding of the real-world impact these innovations could have on pediatric healthcare.

Empath Labs' workshop catalyzed inspiring these young minds to think beyond limitations and envision a brighter future for pediatric patients. The level of enthusiasm and dedication shown by the kids exemplified the potential of the next generation to bring about transformative change in medicine.

Excitement Builds for the iCAN 2024 Summit in Bari, Italy-Sponsorships Needed!

We are thrilled to announce that our much-anticipated 2024 summit will be hosted in Bari, Italy! The excitement among our kids is palpable as they eagerly look forward to this incredible event. However, we need your help to make it an unforgettable experience for all!

"We are thrilled to announce that our much-anticipated 2024 summit will be hosted in Bari, Italy! The excitement among our kids is palpable as they eagerly look forward to this incredible event. However, we need your help to make it an unforgettable experience for all!"

Our annual summit provides invaluable opportunities for our young members, similar to the ones previously offered by Empath Labs and Pfizer. It is a transformative platform for fostering innovation, compassion, and collaboration in pediatric healthcare.

If you believe in the power of education and inspiration, we invite you to participate in this life-changing event. There are two ways you can contribute:

1. Sponsor the 2024 Summit:

By becoming a sponsor, you will play a crucial role in supporting the logistics and organization of the summit. Your generous contribution will enable us to create an impactful and seamless experience for all participants. To sponsor the event, please reach out to sabinaschmidtgoldstein@icanresearch.org.

2. Sponsor a Child to Attend the Summit:

Your sponsorship can directly impact a child's life, providing them with a once-in-a-lifetime opportunity to attend the summit in Bari. Your support will cover their travel, accommodation, and participation fees, allowing them to immerse themselves in a world of learning, inspiration, and empowerment. To sponsor a child, please visit our donation page at https://www.icanresearch.org/donate.

Together, we can shape a brighter future for pediatric healthcare by nurturing the potential of our young members. Your contribution, no matter how big or small, will significantly pave the way for innovative advancements in the field.

Thank you for considering this opportunity to support the next generation of healthcare leaders. We are deeply grateful for your generosity and dedication to our cause. Let's come together in Bari, Italy, and create an unforgettable summit experience to inspire and empower young minds for years to come!

Disclosures: *There are no reported disclosures*

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2023 iCAN SUMMIT

to be held July 10-14th in Southern California

iCAN
International Children's Advisory Network

Learn more:

www.iCANResearch.org

Registration opens March 1st, 2023

iCAN is not responsible or liable for any and all travel arrangements (including but not limited to flights, trains, cars, transport of any kind, accommodations, meals, reservations or other rental / vacation services acquired) by/for participants for any reason. iCAN is not responsible for any attendee medical needs. iCAN advises attendees to purchase travel insurance for the iCAN Summit.

Join Us In-Person for 2023

Kids - Make Your Summer Count!

- Travel to California
- Share your expert voice
- Shape the future of clinical research
- Support new pediatric innovation
- Learn about careers in healthcare
- Engage with global leaders
- Meet friends from around the world
- Make a positive impact in healthcare

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

KEEPING MOTHERS + INFANTS TOGETHER

Means balancing...

EVIDENCE

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

PARTNERSHIP

SHARED DECISION-MAKING

What is the best for this unique dyad?

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

TRAUMA-INFORMED

Both parents and providers are confronting significant...

- FEAR
- GRIEF
- UNCERTAINTY

LONGITUDINAL DATA

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

- MENTAL HEALTH
- POSTPARTUM CARE DELIVERY

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

Partnering for patient-centered care when it matters most.

National Association of Neonatal Nurses
nann.org

National Perinatal Association
nationalperinatal.org

Your Pregnancy and Substance Use

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

Get Prenatal Care

Start early. Go to all your visits. Empower yourself with information so you can make smart decisions. Build relationships with providers who understand Substance Use Disorders (SUDs) and know how to help. Partner with them to reach your goals. But remember, you do not need to be abstinent from substance use to get care. Go now.

Reduce Your Use

There are simple things you can do to limit the harm substances might do.

- Use fewer substances
- Use smaller amounts
- Use less often
- Learn how to use safer

Reducing or quitting smoking is a good place to start. Set your goals, then ask for help.
One of the best things you can do is to stop using alcohol. We know that even small amounts are risky. And when combined with benzos and opioids, alcohol can kill.

Use Medications for Opioid Use Disorder (MOUD) if you are opioid dependent

Methadone and Buprenorphine (Subutex® or Suboxone®) are the "Standard of Care" during pregnancy because they:

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

Take Good Care of Yourself

You deserve a healthy pregnancy & childbirth.

- Eat healthy and take your prenatal vitamins
- Find the right balance of rest and exercise
- Surround yourself with people who care

Your Health Matters

Academy of Perinatal Harm Reduction
www.perinatalharmreduction.org

National Perinatal Association
www.nationalperinatal.org

Education. Anytime, Anywhere.

Academy of Neonatal Care

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

www.AcademyofNeonatalCare.org.

Keeping Your Baby Safe
from respiratory infections

RSV
COVID-19
colds
flu

How to protect your little ones from germs and viruses

This year is an especially dangerous cold and flu season - especially for vulnerable infants and children. Fortunately, there are proven protective measures that we can take to stay healthy.

Here's what you can do...

Wash Your Hands

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

Limit Contact with Others

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

Provide Protective Immunity

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

Take Care of Yourself

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

Get Immunized

Vaccinations save lives. Protecting your baby from COVID-19, flu and pertussis lowers their risks for complications from respiratory infections.

WARNING

Never Put a Mask on Your Baby

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

If you feel sick or are positive for COVID-19

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

We can help protect each other.
www.nationalperinatal.org/rsv

National Perinatal Association

PROTECT YOUR FAMILY FROM
RESPIRATORY VIRUSES

flu | coronavirus | pertussis | RSV

WASH YOUR HANDS
often with soap and warm water.

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

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

USE AN ALCOHOL-BASED HAND SANITIZER.

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

National Perinatal Association

www.nationalperinatal.org

FREE RESOURCES FOR YOUR NICU

Coping During COVID-19

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

BONDING WITH YOUR BABY

HELPING CHILDREN AND FAMILIES COPE

CAREGIVERS NEED CARE TOO

National Network of NICU Psychologists

nationalperinatal.org/psychologists

Respiratory Syncytial Virus:

How you can advocate for babies this RSV season

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

Identify babies at greatest risk

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

Teach families how to protect

their babies from respiratory infections

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

Use your best clinical judgement

when prescribing RSV prophylaxis

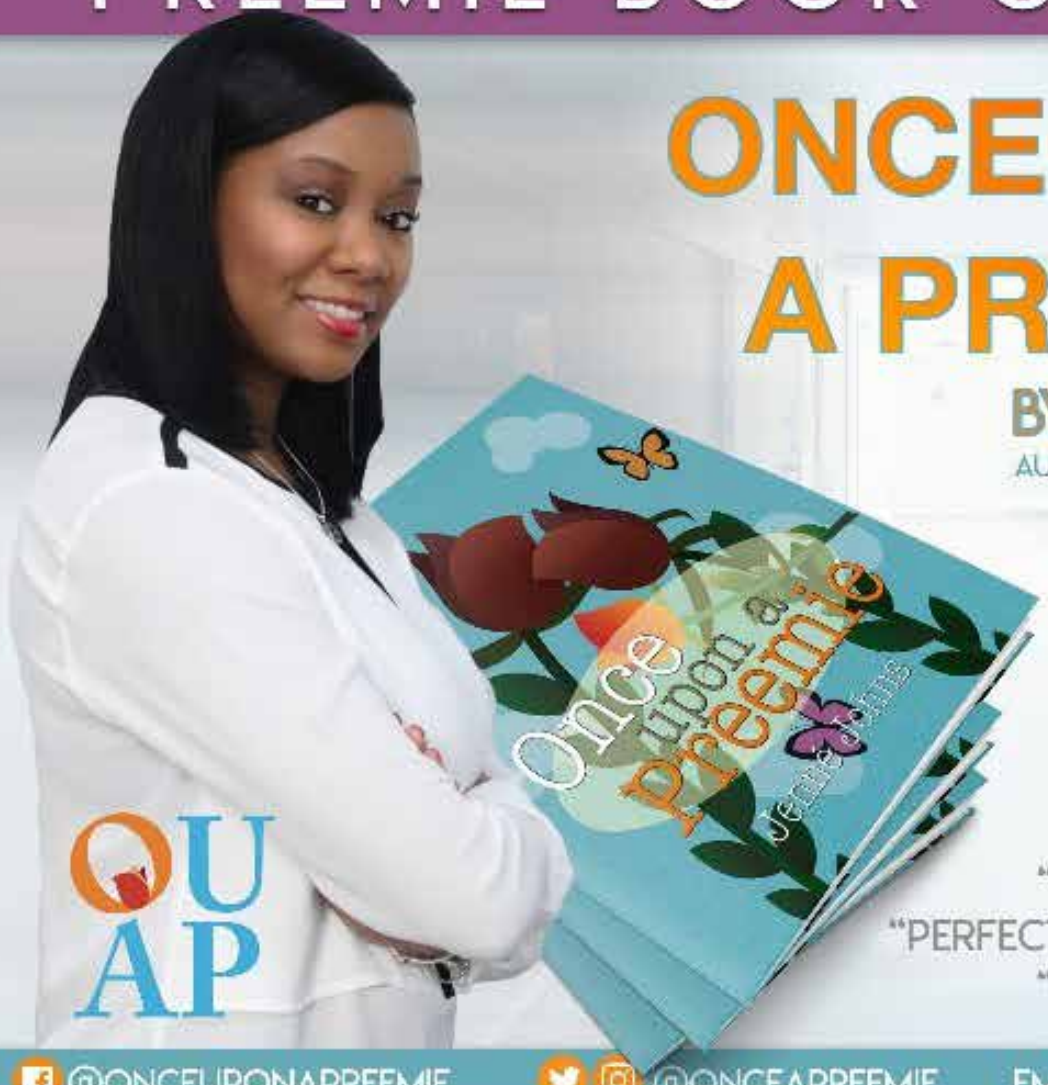
Tell insurers what families need

and provide the supporting evidence

National Perinatal Association

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

PREEMIE BOOK ON SALE



ONCE UPON A PREEMIE

BY JENNÉ JOHNS

AUTHOR | SPEAKER | ADVOCATE

QUAP

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

@ONCEUPONAPREEMIE @ONCEAPREEMIE EMAIL: HI@ONCEUPONAPREEMIE

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

SPEAKING ENGAGEMENTS

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

MEDIA APPEARANCES

Preemie Family

The Joyner Report

PEBBLES of Hope

WDAS 105.3 FM

CBS RADIO

wgts 91.9 Washington, D.C.

MAJIC 102.3 92.7 The Real Sound of the DMV

AVAILABLE FOR $12.99 ON AMAZON OR ONCEUPONAPREEMIE.COM

Still a **Preemie?**

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

But that's not every preemie's story.

Born between 34 and 36 weeks' gestation?

STILL A PREEMIE

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

Jaundice | Feeding issues | Respiratory problems

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

Born preterm at a "normal" weight?

STILL A PREEMIE

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

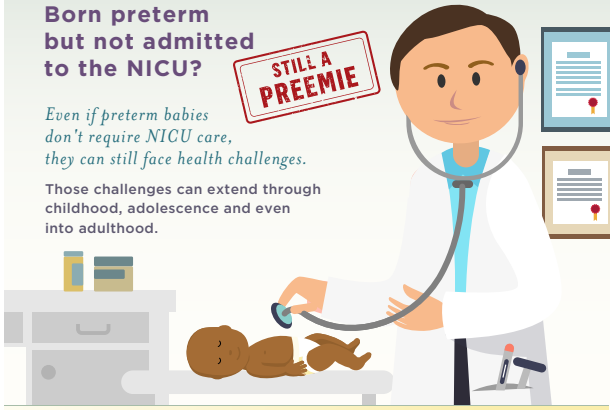
But because some health plans determine coverage based on a preemie's weight, **families of babies that weigh more may face access barriers and unmanageable medical bills.**

Born preterm but not admitted to the NICU?

STILL A PREEMIE

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

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



Some Preemies

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

All Preemies

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

NCfIH National Coalition for Infant Health

Protecting Access for Premature Infants through Age Two

www.infanthealth.org

OPIOIDS and NAS

When reporting on mothers, babies, and substance use

LANGUAGE MATTERS

I am not an addict.

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

I was exposed to opioids.

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

NAS is a temporary and treatable condition.

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

My mother may have a SUD.

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

My potential is limitless.

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

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

National Perinatal Association

FREE Online CE Activity

Nurses: parents trust you.

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

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

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

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

SAFE TO SLEEP®

Compiled and Reviewed by Sandeep Lankireddy, BA, OMS IV

Associations of neighborhood social vulnerability with emergency department visits and readmissions among infants with bronchopulmonary dysplasia

NEWS PROVIDED BY

Journal of Perinatology

by Nelin, T.D., Yang, N., Radack, J. et al.

July 25, 2023

Objectives

To characterize associations of the CDC Social Vulnerability Index (SVI) with medically attended acute respiratory illness among infants with bronchopulmonary dysplasia (BPD).

Study Design

Retrospective cohort of 378 preterm infants with BPD from a single center. Multivariable logistic regression quantified associations of SVI with medically attended acute respiratory illness, defined as emergency department (ED) visits or hospital readmissions within a year after first hospital discharge. Mediation analysis quantified the extent to which differences in SVI may explain known Black-White disparities in medically attended acute respiratory illness.

Results

SVI was associated with medically attended respiratory illness (per SVI standard deviation increment, aOR 1.44, 95% CI: 1.17–1.78). Adjustment for race and ethnicity attenuated the association (aOR 1.27, 95% CI: 0.97–1.64). SVI significantly mediated 31% of the Black-White disparity in ED visits ($p = 0.04$).

Conclusions

SVI was associated with, and may partially explain racial disparities in, medically attended acute respiratory illness among infants with BPD.

NT

Persistent barriers to achieving quality neonatal care in low-resource settings: perspectives from a unique panel of frontline neonatal health experts

NEWS PROVIDED BY

Journal of Global Health Reports

by Eshkeerat Kaur, Michelle Heys, Caroline Crehan, Felicity Fitzgerald, Msandeni Chiume, Ellen Chirwa, Emma Wilson, and Mari Evans

March 24, 2023

Background

Despite increasing rates of facility-based deliveries, neonatal mortality rates remain persistently high in low-resource settings (LRS). This has catalysed international focus on understanding and enabling quality newborn care. We aimed to understand persistent barriers to Quality of Care (QoC) and to identify quality improvement priorities from the perspective of a panel of neonatal experts with first-hand experience of delivering newborn care in low-resource settings (LRS).

Methods

We conducted 13 semi-structured interviews with neonatal health experts via Skype. All interviews were recorded and transcribed verbatim. We adopted an inductive thematic analytical approach. Ethical approvals were not required.

Results

Twenty-two experts were invited to participate, of whom 16 responded and 13 agreed to take part (five neonatologists, six paediatricians and two advanced neonatal nurse practitioners). Participants had a mean of 13 (±7 SD) years working in LRS. Lack of physical resources including basic equipment and infrastructure such as running water, combined with limited human resources, education and specialist neonatal training were cited as key barriers to delivering quality care. In addition, weak leadership at the community, local and national level were thought to hinder progress. Poor communication within clinical teams, limited documen-

tation and lack of standardised and locally appropriate guidelines were also identified as challenges. Digital technologies were perceived to have potential for data capture and enabling standardised care. However, some highlighted that unreliable internet access and possible stigma may hinder implementation.

Conclusion

With less than 10 years to reach the Sustainable Development Goals (SDGs), it is critical to ensure access to quality care for all sick and vulnerable newborns admitted to health facilities. Clinical leaders in low resource settings need to be empowered to define local agendas and advocate for critical resources in order to close the gap between local and global quality of care priorities.

NT

Hemodynamic screening halves risk of death or severe brain bleed in very premature babies

NEWS PROVIDED BY

University of Iowa Stead Family Children's Hospital

July 19, 2023

When neonatologists Patrick McNamara and Regan Giesinger started the hemodynamic screening program at University of Iowa Stead Family Children's Hospital in 2017, they were confident it would increase survival rates and reduce complications for their tiny, fragile patients.

Now, a new study provides scientic validation of just how right they were.

The study, published recently in the American Journal of Respiratory and Critical Care Medicine, shows that when hemodynamic screening was added in the 24 hours after birth to the care of babies born at fewer than 27 weeks of gestation, the combined rate of death or severe brain bleeding fell by half. The addition of hemodynamic screening was also linked to lower incidence of several other complications such as severe lung disease and necrotizing enterocolitis, a serious intestinal disease.

"This work is precedent-setting for neonatology," says McNamara, MD, UI professor of pediatrics and director of the Division of Neonatology. "We have demonstrated for the first time that this new field of neonatal hemodynamics can have a major impact not just on survival but also on long-term quality of life for extremely preterm babies. The reduction in some of the serious health conditions is just spectacular—not only reducing severe brain bleeding but almost eliminating necrotizing enterocolitis, a killer in many premature infants."

Heart and circulation problems are common and deadly in premature babies

Very premature babies are more likely to

survive now than they were 20 years ago, but these infants are still at high risk for severe cardiovascular complications simply because their hearts are not developed enough to function well outside of the womb.

These underdeveloped cardiovascular systems lead to unstable blood flow that may be a root cause of many of the serious complications—such as lung problems, necrotizing enterocolitis, and severe brain hemorrhage—that affect these medically fragile patients.

Between 50-75% of infants who survive severe brain bleeding develop long-term neurological problems, such as intellectual disability, hydrocephalus, and cerebral palsy, that have few effective treatments. Therefore, mitigating the risk of brain injury is a priority for neonatologists.

Using hemodynamic screening to guide treatment plans improves outcomes

Hemodynamics involves using ultrasound to obtain detailed images of the baby's heart, valves, and vessels that allow doctors to assess heart function and blood flow to all parts of the body, including the brain and the lungs. These assessments are performed by hemodynamic specialists—neonatologists who have completed one additional year of structured echocardiography training. This physiologic information acquired on hemodynamics screening can then be used to identify the underlying cardiovascular problem and target treatment precisely.

McNamara and Giesinger had already seen the benefits of a hemodynamics program firsthand; the doctors were both expert neonatologists that had helped make hemodynamics a standard protocol in neonatal intensive care units (NICUs) across Canada. When they arrived at UI Stead Family Children's, where the NICU was already world-renowned for its excellent care and outcomes, they saw an opportunity to assess just how impactful hemodynamics can be at improving survival rates and reducing complications.

Giesinger, McNamara, and their colleagues at the UI Stead Family Children's Hospital followed 423 babies, born before 27 weeks, between January 2010 and December 2017. This control group did not get hemodynamic screening and is representative of the situation at most high-level NICUs currently in the U.S. The team also followed 191 babies, also born before 27 weeks, between October 2018 and April 2022. All these babies received hemodynamic screening within 12 to 18 hours of birth.

The hemodynamic screening group had lower levels of all the adverse events measured: severe brain bleeding, death, death within the first week of life, necrotizing enterocolitis, and severe bronchopulmonary dysplasia.

Overall, introducing the hemodynamic screening program halved the risk of death or severe brain bleed from 29% to 16%. The risk of necrotizing enterocolitis also fell from 6% to 1%. These improvements are even more noteworthy because the proportion of extremely premature babies (born between 22 to 23 weeks), who are most at risk for bad outcomes, was actually higher in the cohort that received hemodynamic screening.

McNamara says it is important to recognize that the study was done in the context of a high-functioning NICU with neonatologists specifically trained in hemodynamics. He believes this high level of standardized teamwork and expertise is necessary to achieve the same results at other centers.

The UI team hopes to play a role in making that happen by training more neonatologists in hemodynamics through a one-year fellowship, which is the first of its kind in the U.S. The fellowship trains doctors to work with very premature babies, acquire images safely and efficiently, understand the physiologic relevance of the images, and understand how to treat heart conditions and circulation problems in infants.

Neonatologist leaves a legacy of care for premature babies

Regan Giesinger died in May, but McNamara believes her efforts and contributions to the field of hemodynamics will leave a lasting legacy.

"Regan Giesinger was absolutely integral in establishing this program five years ago. She was the best sonographer of small babies I have ever seen; she could do a comprehensive study within less than 10 minutes," McNamara says. "This work was so important to her, and her last study has provided landmark findings that will have a huge impact on the care of these tiny babies in the future."

In addition to McNamara and Giesinger, the UI study team included Danielle Rios, Trassanee Chatmethakul, Adrianne Bischoff, Jeremy Sandgren, Alison Cunningham, Madeline Beauchene, Amy Stanford, Jonathan Klein, and Patrick Ten Eyck.

NT

Eat, Sleep, Console Approach or Usual Care for Neonatal Opioid Withdrawal

NEWS PROVIDED BY

New England Journal of Medicine

by Leslie W Young *et al.*

June 22, 2023

Abstract

Background: Although clinicians have traditionally used the Finnegan Neonatal Abstinence Scoring Tool to assess the severity of neonatal opioid withdrawal, a newer function-based approach - the Eat, Sleep, Console care approach - is increasing in use. Whether the new approach can safely reduce the time until infants are medically ready for discharge when it is applied broadly across diverse sites is unknown.

Methods: In this cluster-randomized, controlled trial at 26 U.S. hospitals, we enrolled infants with neonatal opioid withdrawal syndrome who had been born at 36 weeks' gestation or more. At a randomly assigned time, hospitals transitioned from usual care that used the Finnegan tool to the Eat, Sleep, Console approach. During a 3-month transition period, staff members at each hospital were trained to

use the new approach. The primary outcome was the time from birth until medical readiness for discharge as defined by the trial. Composite safety outcomes that were assessed during the first 3 months of postnatal age included in-hospital safety, unscheduled health care visits, and non-accidental trauma or death.

Results: A total of 1305 infants were enrolled. In an intention-to-treat analysis that included 837 infants who met the trial definition for medical readiness for discharge, the number of days from birth until readiness for hospital discharge was 8.2 in the Eat, Sleep, Console group and 14.9 in the usual-care group (adjusted mean difference, 6.7 days; 95% confidence interval [CI], 4.7 to 8.8), for a rate ratio of 0.55 (95% CI, 0.46 to 0.65; P<0.001). The incidence of adverse outcomes was similar in the two groups.

Conclusions: As compared with usual care, use of the Eat, Sleep, Console care approach significantly decreased the number of days until infants with neonatal opioid withdrawal syndrome were medically ready for discharge, without increasing specified adverse outcomes. (Funded by the Helping End Addiction Long-term (HEAL) Initiative of the National Institutes of Health; ESC-NOW ClinicalTrials.gov number, NCT04057820.).

NT

World's First Studies with Bedside Portable MRI in Pediatric ECMO Patients

NEWS PROVIDED BY

Imaging Technology News

April 6, 2023

The neonatology team at Bonn University Hospital (UKB) has conducted the world's first study of children receiving ECMO therapy using the mobile magnetic resonance imaging (MRI). The procedure, known as extracorporeal membrane oxygenation (ECMO), involves oxygenating the blood outside the body. The findings of the successful, innovative study of the first four pediatric ECMO patients using the mobile MRI has now been published in the prestigious journal Critical Care.

Patients who require ECMO therapy beyond a conservative ventilator are critically ill. Reasons may include lung failure, heart failure or infection. Children who require this special procedure can only be treated at a special treatment center such as the Children's ECMO Center of the UKB, where they are closely monitored. Here, both newborns and older children are treated with ECMO therapy.

"It is often necessary in this sensitive group of patients, even during ECMO therapy, to have an MRI of the brain to check the relevant structures in the brain. However, transport to a fixed device is unfortunately not possible," says Prof. Sabir. Last August, a grant from the Bill Gates Foundation enabled him to purchase a mobile MRI, which is being used at the UKB for the first time in Germany to clinically test diagnostics on premature and newborn infants. So far, it has only been used for research purposes in London. The mobile MRI has already been in use at the UKB for more than half a year and represents a groundbreaking further optimization of diagnostics for neonatal patients.

25 children have since been scanned in the mobile MRI at the UKB - the youngest weighed only 450 grams, the oldest was already 10 years old. The mobile MRI was used for routine examinations and for further diagnosis of abnormalities, e.g. after asphyxia (oxygen deficiency at birth). To evaluate the image quality of the mobile low-field MRI, a comparison image was taken in the permanently installed normal-field MRI at the UKB for each of the children examined. "We were more than satisfied with the results. Although the image quality of the mobile MRI is not as high-resolution as that of a fixed device, the image data are ideal for emergency diagnostics and, above all, can be retrieved immediately. Among other things, we were able to detect brain hemorrhages, strokes or acute changes, such as the accumulation of cerebrospinal fluid, in the children examined so far and initiate the appropriate therapies immediately," says Prof. Sabir.

ECMO patients, however, pose a special challenge to the treatment team in connection with MRI diagnostics. "While adults have a tube inserted in the groin area to transport blood during ECMO therapy, children often have access at the neck. The patients have to be moved very carefully and the tube at the neck may only be moved minimally," explains Prof. Sabir. However, reliable diagnostics, for example of brain hemorrhages, is only possible with MRI imaging. The neonatology and pediatric intensive care team was therefore able to demonstrate in four pediatric ECMO patients that imaging using mobile MRI can be performed without any problems.

The patients studied were a newborn, a two-year-old, a nine-year-old and a ten-year-old child. One of the children was diagnosed with a major brain hemorrhage using the mobile MRI and was treated immediately. "The new findings prove that the scan can be performed safely. We obtained meaningful MRI images of the brain without changing the position of the neck cannula and without compromising the children's safety status. This represents an immense success for future MRI examinations of newborns and larger children who can only survive through the use of ECMO therapy," said Prof. Andreas Müller, Director of the Department of Neonatology at UKB.

For more information: https://www.ukbonn.de/

NT

Neonatal stem cells from the heart could treat Crohn's disease- by almost a third

NEWS PROVIDED BY

Ann & Robert H. Lurie Children's Hospital of Chicago

July 28, 2023

Research from Ann & Robert H. Lurie Children's Hospital of Chicago found that direct injection of neonatal mesenchymal stem cells, derived from heart tissue discarded during surgery, reduces intes-

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tinal inflammation and promotes wound healing in a mouse model of Crohn's disease-like ileitis, an illness marked by chronic intestinal inflammation and progressive tissue damage.

The study, published in the journal Advanced Therapeutics, offers a promising new and alternative treatment approach that avoids the pitfalls of current Crohn's disease medications, including diminishing effectiveness, severe side effects and increased risk of gastrointestinal dysfunction.

"Neonatal cardiac-derived mesenchymal stem cells have been used in a clinical trial to repair an injured heart, but this is the first time these potent cells have been studied in an inflammatory intestinal disease model," said senior author Arun Sharma, Ph.D., from Stanley Manne Children's Research Institute at Lurie Children's who is the Director of Pediatric Urological Regenerative Medicine and Surgical Research, and Research Associate Professor of Urology and Biomedical Engineering at Northwestern University Feinberg School of Medicine and the McCormick School of Engineering, Northwestern University.

"Our results are encouraging and definitely provide a new platform to potentially treat aspects of chronic inflammatory bowel diseases."

Dr. Sharma explains that before it would be feasible to use these stem cells clinically to treat Crohn's disease, his team needs to overcome the hurdle of how they are administered. In the current animal model study, the stem cells were injected directly into the inflammatory lesions in the small intestine, which requires surgical procedures.

The next step then is to develop a safe way to inject them into the body through a vein, similar to performing a blood draw in the arm of a patient. More animal studies will be needed before this novel treatment approach can progress to clinical trials.
"Ultimately our goal is to utilize this cell type as treatment, but also as a preventive measure, before signs and symptoms of Crohn's disease develop," said Dr. Sharma. "We also might be able to apply this approach to other inflammatory diseases. The potential is enormous, and we are excited to move forward."

NT

Atypical Systemic Neonatal Herpes Diagnosed Incidentally in Twin Infants

NEWS PROVIDED BY

Pediatrics

by Diana Kim Nguyen, DO; Diana Cabrera Fernandez, MD; John I. Coon, MD; Janak Patel, MD

June 6, 2023

Neonatal herpes simplex virus (HSV) infections are serious infections that usually occur in the first few weeks of life. Infants generally present with mucocutaneous lesions, central nervous system infection, and/or systemic disease. In this case report, we describe a set of twins that had unexpected presentations of neonatal HSV. Twin A was diagnosed incidentally on routine eye exam, and Twin B was diagnosed only because his twin was found to be infected; both infants were still hospitalized and were beyond 1 month of age. These twins exhibited atypical manifestations that diverge from the 3 main categories of neonatal HSV and expand our understanding of the spectrum of disease.

NT

Pilot study using an optical fiber light source to guide nasogastric/orogastric tube insertion in neonates

NEWS PROVIDED BY

Journal of Perinatology

by Jumpei Kuroda and Kaoru Okazaki-March 24, 2023

Among hospitalized infants and children, the frequency of nasogastric tube (NGT) or orogastric tube (OGT) placements is highest in neonatal intensive care units [1]. NGT or OGT placement is a blind procedure. Therefore, it is not known whether the tip is positioned in the stomach after insertion. The NGT/OGT tip position is typically confirmed by methods including ultrasonography, auscultation, the pH of aspirate, and capnography [2]. However, there are concerns about most of these methods and their accuracy in a neonate, even x-ray. Moreover, frequent use of x-ray results in cumulative radiation doses in infants. The New Opportunities for Verification of Enteral tube Location project recommends pH measurement as the best practice for NGT placement verification in children [3]. This group proposed the need for product development to allow for placement verification and reverification in real time for the duration of NGT use [3]. Hirano et al. reported that using a light-emitting diode source and fiber (LED-SF) could confirm NGT tip positioning safely and simply in adults under general anesthesia [4]. LED-SF enabled NGT/OGT insertion into the stomach while viewing a red LED light at the tip of NGT/OGT without the need for a confirmatory x-ray. The specific aim of this study was to determine whether using LED-SF confirmed NGT/OGT tip in the stomach in neonates and to document the safety of this technology.

Methods

The prospective, observational cohort study examined routine NGT/OGT replacements conducted in ten infants at a level III NICU (Supplementary Table 1). Consent to participate was obtained from the subjects' parents. The study protocol was approved by the Institutional Review Board of Tokyo Metropolitan Children's Medical Center [2022b-32]. Informed parental consent was obtained for all patients. The LED-SF consisted of plastic optical fibers capable of lighting the tip as a red LED light. The LED-SF was first inserted into the NGT/OGT. Movement of the LED-SF tip from the NGT/OGT tip was prevented using a slide stopper, which fixed the position of the LED-SF tip at <1 cm from the NGT/OGT tip. NGT and OGT were used in nine and one neonates, respectively. The red light emitted by the LED was visible as it passed through the mouth and throat but was not visible in the esophagus (Fig. 1A). Upon entering the stomach, the LED light illuminated the entire organ (Fig. 1B) but contracted to a red dot with advancement (Fig. 1C). Based on the internal diameter of the NGT/OGT, a 0.5-mm diameter fiber (n = 7) or a 0.75 mm

fiber (n = 3) was selected.

Results

The LED-SF guided NGT/OGT tip to the correct position in the seven neonates and the position required slight adjustment in the three neonates (Supplementary Table 1). In the latter, NGT insertion was inappropriately paused when the LED illuminated the entire stomach (case 8). In the remaining two cases, the GT positioning required an adjustment of 0.5 or 1.0 cm. No adverse or safety events were observed during any procedure. No technical problems were encountered with its use, such as fiber breakage or light source leakage.

Discussion

This is the first report in the literature demonstrating the safe and accurate NGT/OGT insertion using an LED-SF. In this study, the NGT/OGT tip was clearly visible as a red dot in the stomach of preterm or term neonates.

Perforations or misplacement related to the insertion of NGT/OGT in the stomach or esophagus are serious complications with mortality rates of up to 25.8% [5]. If perforation happened, the LED-SF would be expected to light not only the stomach but also the entire abdomen. In particular, esophageal perforation is an important and serious complication with a prevalence of (0.05%) in preterm infants with birth weight <1500 g and/or with gestational age ≤32 weeks. In this study, the insertion method of NGT/OGT was similar to the usual method and would not be expected to increase or decrease the risk of perforation. However, using LED-SF, the red LED light informed that the NGT/OGT tip safely passed the throat and correctly entered into the stomach without an x-ray. This is the strongest advantage. Furthermore, the frequency of x-ray may be less. The small sample size is our study limitation.

Conclusions

We have demonstrated the safety and efficacy of an LED-SF to verify NGT/OGT placement in neonates. This technology gives staff real-time information about the movement of the tube tip during placement. Future studies in a larger cohort are necessary to validate the results derived in this pilot study and to demonstrate the feasibility of widespread use of LED-SF in neonates who require an NGT or OGT.

NT

Comparing the efficacy in reducing brain injury of different neuroprotective agents following neonatal hypoxia-ischemia in newborn rats: a multi-drug randomized controlled screening trialnal case-control study

NEWS PROVIDED BY

Scientific Reports

by Sabir H, Maes E, Zweyer M, Schleehuber Y, Imam FB, Silverman J, White Y, Pang R, Pasca AM, Robertson NJ, Maltepe E, and Bernis ME.

June 10, 2023

Abstract

Intrapartum hypoxia-ischemia leading to neonatal encephalopathy (NE) results in significant neonatal mortality and morbidity worldwide, with > 85% of cases occurring in low- and middle-income countries (LMIC). Therapeutic hypothermia (HT) is currently the only available safe and effective treatment of HIE in high-income countries (HIC); however, it has shown limited safety or efficacy in LMIC. Therefore, other therapies are urgently required. We aimed to compare the treatment effects of putative neuroprotective drug candidates following neonatal hypoxic-ischemic (HI) brain injury in an established P7 rat Vannucci model. We conducted the first multi-drug randomized controlled preclinical screening trial, investigating 25 potential therapeutic agents using a standardized experimental setting in which P7 rat pups were exposed to unilateral HI brain injury. The brains were analysed for unilateral hemispheric brain area loss after 7 days survival. Twenty animal experiments were performed. Eight of the 25 therapeutic agents significantly reduced brain area loss with the strongest treatment effect for Caffeine, Sonic Hedgehog Agonist (SAG) and Allopurinol, followed by Melatonin, Clemastine, ß-Hydroxybutyrate, Omegaven, and Iodide. The probability of efficacy was superior to that of HT for Caffeine, SAG, Allopurinol, Melatonin, Clemastine, ß-hydroxybutyrate, and Omegaven. We provide the results of the first systematic preclinical screening of potential neuroprotective treatments and present alternative single therapies that may be promising treatment options for HT in LMIC.

NT

Prevalence and clonal diversity of carbapenem-resistant Klebsiella pneumoniae causing neonatal infections: A systematic review of 128 articles across 30 countries

NEWS PROVIDED BY

PLOS Medicine

by Ya Hu, Yongqiang Yang, Yu Feng, Qingqing Fang, Chengcheng Wang, Feifei Zhao, Alan McNally, and Zhiyong Zong

June 20, 2023

Abstract

Background

Klebsiella pneumoniae is the most common pathogen causing neonatal infections, leading to high mortality worldwide. Along with increasing antimicrobial use in neonates, carbapenem-resistant *K. pneumoniae* (CRKP) has emerged as a severe challenge for infection control and treatment. However, no comprehensive systematic review is available to describe the global epidemiology of neonatal CRKP infections. We therefore performed a systematic review of available data worldwide and combined a genome-based analysis to address the prevalence, clonal diversity, and carbapenem resistance genes of CRKP causing neonatal infections.

Methods and findings

We performed a systematic review of studies reporting population-based neonatal infections caused by CRKP in combination with a genome-based analysis of all publicly available CRKP genomes with neonatal origins. We searched multiple databases (PubMed, Web of Science, Embase, Ovid MEDLINE, Cochrane, bioRxiv, and medRxiv) to identify studies that have reported data of neonatal CRKP infections up to June 30, 2022. We included studies addressing the prevalence of CRKP infections and colonization in neonates but excluded studies lacking the numbers of neonates, the geographical location, or independent data on Klebsiella or CRKP isolates. We used narrative synthesis for pooling data with JMP statistical software. We identified 8,558 articles and excluding those that did not meet inclusion criteria. We included 128 studies, none of which were preprints, comprising 127,583 neonates in 30 countries including 21 low- and middle-income countries (LMICs) for analysis. We found that bloodstream infection is the most common infection type in reported data. We estimated that the pooled global prevalence of CRKP infections in hospitalized neonates was 0.3% (95% confidence interval [CI], 0.2% to 0.3%). Based on 21 studies reporting patient outcomes, we found that the pooled mortality of neonatal CRKP infections was 22.9% (95% CI, 13.0% to 32.9%). A total of 535 neonatal CRKP genomes were identified from GenBank including Sequence Read Archive, of which 204 were not linked to any publications. We incorporated the 204 genomes with a literature review for understanding the species distribution, clonal diversity, and carbapenemase types. We identified 146 sequence types (STs) for neonatal CRKP strains and found that ST17, ST11, and ST15 were the 3 most common lineages. In particular, ST17 CRKP has been seen in neonates in 8 countries across 4 continents. The vast majority (75.3%) of the 1,592 neonatal CRKP strains available for analyzing carbapenemase have genes encoding metallo-β-lactamases and NDM

(New Delhi metallo-β-lactamase) appeared to be the most common carbapenemase (64.3%). The main limitation of this study is the absence or scarcity of data from North America, South America, and Oceania.

Conclusions

CRKP contributes to a considerable number of neonatal infections and leads to significant neonatal mortality. Neonatal CRKP strains are highly diverse, while ST17 is globally prevalent and merits early detection for treatment and prevention. The dominance of blaNDM carbapenemase genes imposes challenges on therapeutic options in neonates and supports the continued inhibitor-related drug discovery.

NT

Severe Neonatal Interstitial Lung Disease Caused by a Rare Surfactant Protein C Mutation

NEWS PROVIDED BY

American Academy of Pediatrics

by Friederike Terpe, MD; Nicolaus Schwerk, MD; Matthias Griese, PhD; Peter Laenger Florian, MD; Manfred Ballmann, PhD; Cho-Ming Chao, MD, PhD; and Johannes Ehler, MD

May 26, 2023

Childhood interstitial lung disease (chILD) is a collective term for a group of rare lung disorders of heterogeneous origin. Surfactant dysfunction disorders are a cause of chILD with onset during the neonatal period and infancy. Clinical signs of tachypnea and hypoxemia are nonspecific and usually caused by common conditions like lower respiratory tract infections. We report on a full-term male newborn who was readmitted to the hospital at 7 days of age with marked tachypnea and poor feeding during the respiratory syncytial virus season. After exclusion of infection and other, more common congenital disorders, chILD was diagnosed using chest computed tomography and genetic analysis. A likely pathogenic heterozygous variant of SFTPC (c.163C>T, L55F) was detected by whole exome sequencing. The patient received supplemental oxygen and noninvasive respiratory support and was treated with intravenous methylprednisolone pulses and hydroxychloroquine. Despite the treatment, his respiratory situation deteriorated continuously, leading to several hospitalizations and continuous escalation of noninvasive ventilatory support. At 6 months of age, the patient was listed for lung transplant and transplanted successfully aged 7 months.

NT

A Multicenter Collaborative to Improve Postoperative Pain Management in the NICU

NEWS PROVIDED BY

American Academy of Pediatrics

by Roopali Bapat, MD, MSHQS, *et al.*

July 6, 2023

Objectives:

This quality improvement initiative aimed to decrease unrelieved postoperative pain and improve family satisfaction with pain management.

Methods:

NICUs within the Children's Hospitals Neonatal Consortium that care for infants with complex surgical problems participated in this collaborative. Each of these centers formed multidisciplinary teams to develop aims, interventions, and measurement strategies to test in multiple Plan-Do-Study-Act cycles. Centers were encouraged to adopt evidence-based interventions from the Clinical Practice Recommendations, which included pain assessment tools, pain score documentation, nonpharmacologic treatment measures, pain management guidelines, communication of a pain treatment plan, routine discussion of pain scores during team rounds, and parental involvement in pain management. Teams submitted data on a minimum of 10 surgeries per month, spanning from January to July 2019 (baseline), August 2019 to June 2021 (improvement work period), and July 2021 to December 2021 (sustain period).

Results:

The percentage of patients with unrelieved pain in the 24-hour postoperative period decreased by 35% from 19.5% to 12.6%. Family satisfaction with pain management measured on a 3-point Likert scale with positive responses ≥2 increased from 93% to 96%. Compliance with appropriate pain assessment and numeric documentation of postoperative pain scores according to local NICU policy increased from 53% to 66%. The balancing measure of the percentage of patients with any consecutive sedation scores showed a decrease from 20.8% at baseline to 13.3%. All improvements were maintained during the sustain period.

Conclusions:

Standardization of pain management and workflow in the postoperative period across disciplines can improve pain control in infants.

NT

Induction of labour at 39 weeks and adverse outcomes in low-risk pregnancies according to ethnicity, socioeconomic deprivation, and parity: A national cohort study in England

NEWS PROVIDED BY
PLOS Medicine

by Patrick Muller *et al.*

July 20, 2023

Background

Ethnic and socioeconomic inequalities in obstetric outcomes are well established. However, the role of induction of labour (IOL) to reduce these inequalities is controversial, in part due to insufficient evidence. This national cohort study aimed to identify adverse perinatal outcomes associated with IOL with birth at 39 weeks of gestation ("IOL group") compared to expectant management ("expectant management group") according to maternal characteristics in women with low-risk pregnancies.

Methods and findings

All English National Health Service (NHS) hospital births between January 2018 and March 2021 were examined. Using the Hospital Episode Statistics (HES) dataset, maternal and neonatal data (demographic, diagnoses, procedures, labour, and birth details) were linked, with neonatal mortality data from the Office for National Statistics (ONS). Women with a low-risk pregnancy were identified by excluding pregnancies with preexisting comorbidities, previous cesarean section, breech presentation, placenta previa, gestational diabetes, or a baby with congenital abnormalities. Women with premature rupture of membranes, placental abruption, hypertensive disorders of pregnancy, amniotic fluid abnormalities, or antepartum stillbirth were excluded only from the IOL group. Adverse perinatal outcome was defined as stillbirth, neonatal death, or neonatal morbidity, the latter identified using the English composite neonatal outcome indicator (E-NAOI). Binomial regression models estimated risk differences (with 95% confidence intervals (CIs)) between the IOL group and the expectant management group, adjusting for ethnicity, socioeconomic background, maternal age, parity, year of birth, and birthweight centile. Interaction tests examined risk differences according to ethnicity, socioeconomic background, and parity. Of the 1 567 004 women with singleton pregnancies, 501 072 women with low-risk pregnancies and with sufficient data quality were included in the analysis. Approximately 3.3% of births in the IOL group (1 555/47 352) and 3.6% in the expectant management group (16 525/453 720) had an adverse perinatal outcome. After adjustment, a lower risk of adverse perinatal outcomes was found in the IOL group (risk difference −0.28%; 95% CI −0.43%, −0.12%; p = 0.001). This risk difference varied according to socioeconomic background from 0.38% (−0.08%, 0.83%) in the least deprived to −0.48% (−0.76%, −0.20%) in the most deprived national quintile (p-value for interaction = 0.01) and by parity with risk difference of −0.54% (−0.80%, −0.27%) in nulliparous women and −0.15% (−0.35%, 0.04%) in multiparous women (p-value for interaction = 0.02). There was no statistically significant evidence that risk differences varied according to ethnicity (p = 0.19). Key limitations included absence of additional confounding factors such as smoking, BMI, and the indication for induction in the HES datasets, which may mean some higher risk pregnancies were included.

Conclusions

IOL with birth at 39 weeks was associated with a small reduction in the risk of adverse perinatal outcomes, with 360 inductions in low-risk pregnancies needed to avoid 1 adverse outcome. The risk reduction was mainly present in women from more socioeconomically deprived areas and in nulliparous women. There was no significant risk difference found by ethnicity. Increased uptake of IOL at 39 weeks, especially in women from more socioeconomically deprived areas, may help reduce inequalities in adverse perinatal outcomes.

NT

NANT 14

NANT 14 will be held at the Sandestin Golf & Beach Resort, Miramar, FL from April 12 -13, 2024, with the Pre-Conference on April 11, 2024.

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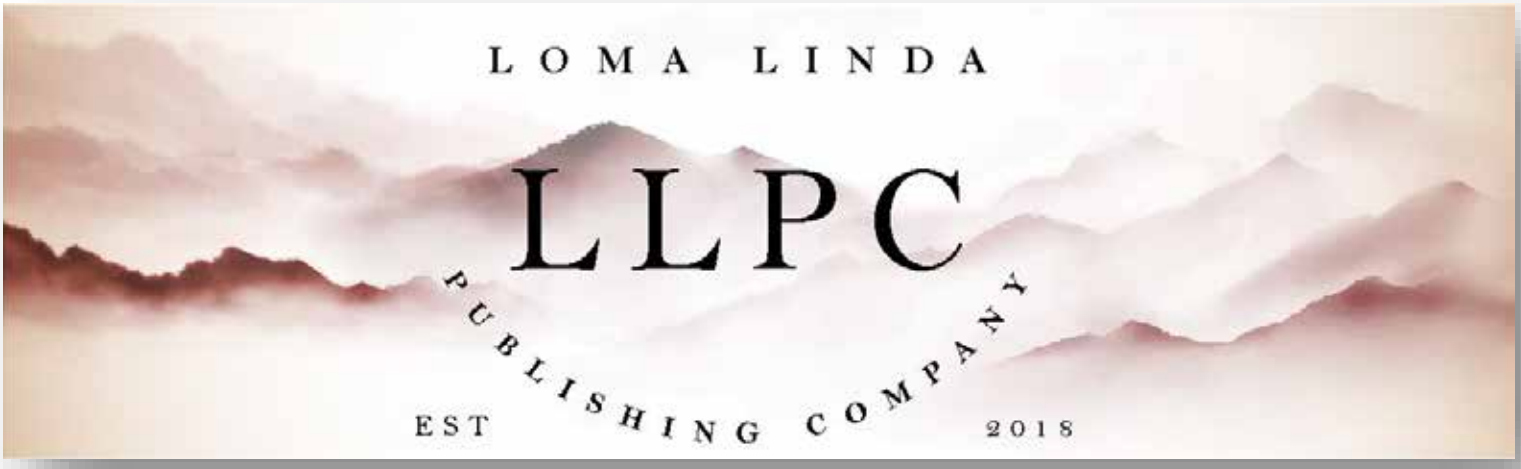

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Genetics Corner: Persistent Hypoglycemia in a Malnourished Infant with Hypertrophic Pyloric Stenosis

Robin Dawn Clark, MD

Case History:

A term male infant was admitted at 40 days of age with non-bloody, non-bilious vomiting, severe dehydration, malnutrition, and hypoglycemia. A genetics consultation was requested because of hypoglycemia that persisted after surgical repair of his hypertrophic pyloric stenosis.

"A term male infant was admitted at 40 days of age with non-bloody, non-bilious vomiting, severe dehydration, malnutrition, and hypoglycemia. A genetics consultation was requested because of hypoglycemia that persisted after surgical repair of his hypertrophic pyloric stenosis."

When examined the day after his pylorotomy, he was a pale, lethargic, and cachectic infant whose buttocks hung in folds. His abdomen was mildly distended, without organomegaly, and with clean surgical wounds. He could not latch onto the nipple while feeding from a bottle. He made minimal eye contact with his mother, who held and fed him. Although irritable, he was calmed by a pacifier. He had mildly increased tone in his lower extremities and crossed his ankles. He had no dysmorphic features.

He was born vaginally at 40 weeks 2 day's gestation to a 30-year-old GBS+ primigravida mother, who was treated with five doses of penicillin prior to delivery. Vaginal delivery was induced for oligohydramnios, detected at 40 weeks gestation. The fetal US at 32 weeks showed an enlarged kidney. Birth weight was 6 lbs. 13 oz. (3.09 kg). Apgar scores were 7 and 9 at 1 and 5 minutes, respectively. He was discharged with his mother. He was followed by his pediatrician for poor weight gain. Mother had stopped breastfeeding and started formula. He had not regained his birth weight.

Four days before admission, he started vomiting with one daily episode of non-bloody, non-bilious emesis. On the day of admission, he had three episodes of emesis, one of which was projectile. On that day, when his grandmother attempted to feed him, he was unresponsive and limp, his eyes were closed, and his color was gray. He was taken to the emergency department of a nearby community hospital, where he was hypothermic (93 degrees F) and bradycardic to 80. He was intubated and resuscitated with a normal saline bolus and continuous 0.45% NaCl IV fluid. A workup for sepsis was initiated, and he was started on gentamicin and ceftriaxone. A lumbar puncture was performed. CSF parameters for glucose, protein, and nucleated cells were normal. Initial glucose was low, 68 mg/dL, and liver function tests elevated—AST and ALT were 126. He was transferred to this tertiary care facility's pediatric intensive care unit.

"Four days before admission, he started vomiting with one daily episode of non-bloody, non-bilious emesis. On the day of admission, he had three episodes of emesis, one of which was projectile. On that day, when his grandmother attempted to feed him, he was unresponsive and limp, his eyes were closed, and his color was gray. He was taken to the emergency department of a nearby community hospital, where he was hypothermic (93 degrees F) and bradycardic to 80."

On admission, his weight was 2.67 kg (0.19 %ile, Z score -2.89), and his weight-for-height percentile was 0.04 %ile (2.76 kg/52 cm, Z score -3.36), consistent with severe acute protein-calorie malnutrition. An abdominal US showed echogenic debris within the left renal pelvis, left proximal ureter, and bladder suggesting a urinary tract infection, central calyceal dilatation of the left kidney, and associated proximal ureterectasis, UTD P2 (Urinary Tract Dilatation intermediate risk). Urinalysis on admission was cloudy with moderate leukocytosis (30 WBCs). All cultures (urine, blood, CSF) were negative, as was a urine drug screen. Herpes simplex PCR was negative. He completed a 7-day course of ceftriaxone for a suspected urinary tract infection as urine culture was collected after initiating antibiotic therapy. An echocardiogram was normal.

"He had persistent hypoglycemia before and for two days following surgery (see Figure). He required IV glucose maintenance with D10 (11 mL/hr) on the second hospital day, rising to D12.5 on hospital day 3. He also received multiple D10 bolus treatments for persistent hypoglycemia. Beta-hydroxybutyrate and lactate values were normal during an episode of hypoglycemia to 46. There was no evidence of ketosis."

He had persistent hypoglycemia before and for two days following surgery (see Figure). He required IV glucose maintenance with D10 (11 mL/hr) on the second hospital day, rising to D12.5 on hospital day 3. He also received multiple D10 bolus treatments for persistent hypoglycemia. Beta-hydroxybutyrate and lactate values were normal during an episode of hypoglycemia to 46. There was no evidence of ketosis. An abdominal ultrasound exam identified pyloric stenosis (15 mm x 4 mm). He had a laparoscopic pylorotomy on his fourth hospital day, after which he was extubated. Intravenous glucose was discontinued on the day after his pylorotomy but was restarted 24 hours later with D12.5 (8 mL/hr) for persistent hypoglycemia. By the second postoperative day, he had resumed full oral feeds without emesis, and his GIR (Glucose Infusion Rate) was 6.17. He was weaned off continuous IV D10 infusion on postoperative day 5. He also had sinus bradycardia (HR 100) with sinus arrhythmia, right axis deviation on ECG, and an elevated Pro-BNP (B-type natriuretic peptide) of 1163. He was discharged on hospital day 9.

"He had a laparoscopic pylorotomy on his fourth hospital day, after which he was extubated. Intravenous glucose was discontinued on the day after his pylorotomy but was restarted 24 hours later with D12.5 (8 mL/hr) for persistent hypoglycemia... He also had sinus bradycardia (HR 100) with sinus arrhythmia, right axis deviation on ECG, and an elevated Pro-BNP (B-type natriuretic peptide) of 1163."

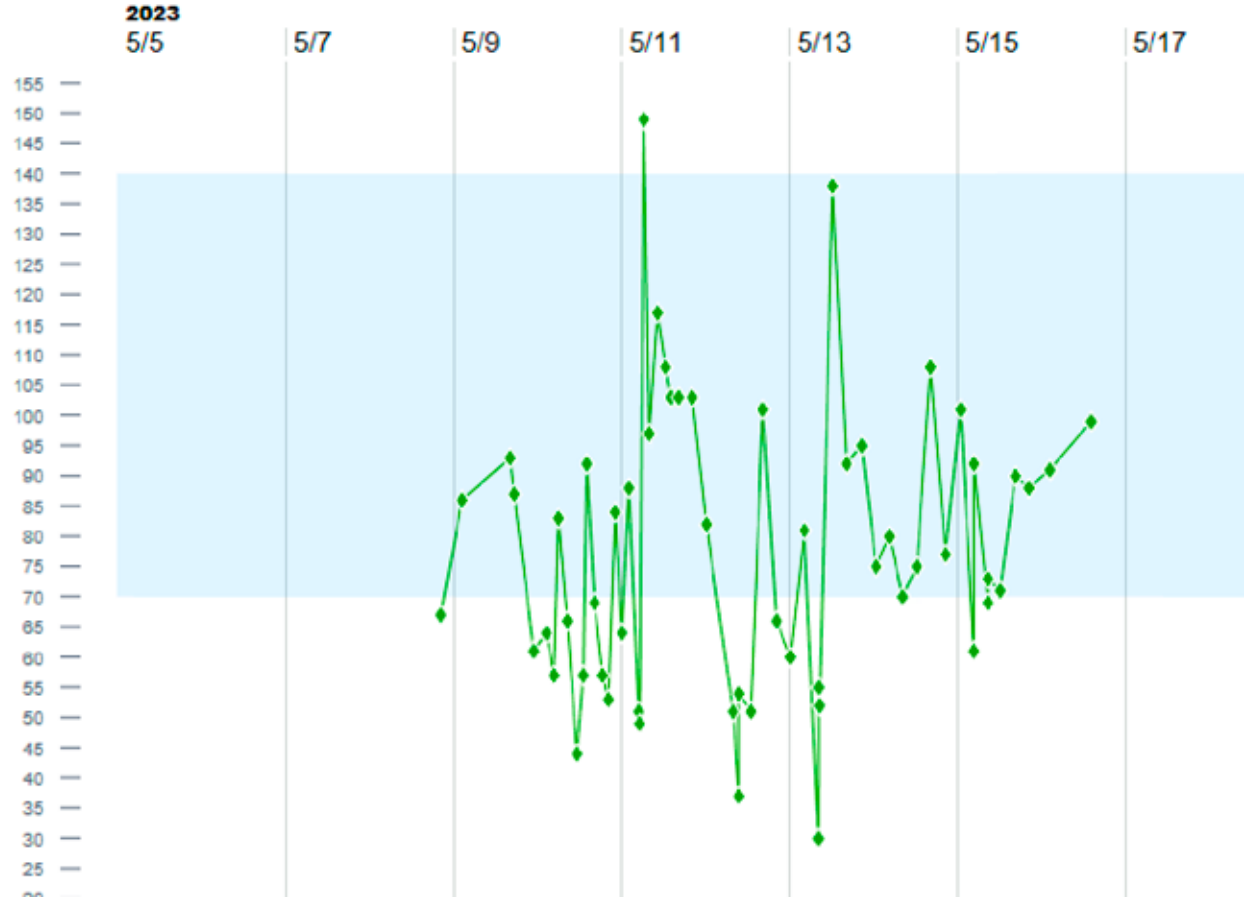

Figure. Glucose values: *Glucose values were low before surgery on 5/11/2023, and hypoglycemia persisted for 48 hours after surgery despite the resumption of oral feedings.*

The family history was not informative. This child was the first offspring of both parents. Mother, age 30 years and 4' 11.5" in height, was adopted and knew little of her family history except that her mother was also 4'11.5" in height and was from Guadalajara, Mexico. The father, age 34, had three siblings, one of whom was a 34-year-old brother with an intellectual disability and autism. The father's family was from Mexico and El Salvador. The family history was negative for other relatives with pyloric stenosis.

"Persistent hypoglycemia has been described in association with malnutrition and pyloric stenosis. Severe malnutrition depletes glycogen stores, which was the cause of this baby's persistent hypoglycemia."

Discussion:

Persistent hypoglycemia has been described in association with malnutrition and pyloric stenosis (1,2). Severe malnutrition depletes glycogen stores, which was the cause of this baby's persistent hypoglycemia. His malnutrition was more severe than typically seen in an infant with pyloric stenosis because he had no reserves; he had not regained his birth weight after delivery. His poor nutritional status had a compound etiology: the first cause was a failure to thrive due to inadequate caloric intake over the first month of life, and the second was repeated emesis from pyloric stenosis over the four days prior to admission. A suspected urinary tract infection may have been an additional factor that brought him to the point of collapse. In this context, a metabolic cause for his hypoglycemia was unlikely, and it became even less likely as his glucose levels stabilized when his nutrition improved a few days after surgery.

"This infant's bradycardia and elevated liver enzymes could also be explained by his severe malnutrition and fluid volume depletion. Dehydration reduces perfusion of the liver, and malnutrition adversely affects liver function. An elevated Pro-BNP value caused by cardiac muscle damage has been reported in patients with anorexia nervosa."

This infant's bradycardia and elevated liver enzymes could also be explained by his severe malnutrition and fluid volume depletion. Dehydration reduces perfusion of the liver, and malnutrition adversely affects liver function. An elevated Pro-BNP value caused by cardiac muscle damage has been reported in patients with anorexia nervosa (3). In many respects, lessons learned from treating patients with anorexia nervosa might also apply to infants with severe malnutrition. In individuals with anorexia with severe bradycardia, the heart rate did not normalize until minimal weight gains were sustained for 3–10 days (4). The resumption of a normal heart rate may be a clinical indicator of cardiac and physiologic recovery. For this reason, waiting to increase from 20 kcal/oz to a more concentrated formula in the face of severe malnutrition may be the wiser course, as a slower recovery may be the safer option, putting less strain on the heart and other vital organs. The danger of increasing metabolic demands on a compromised heart that has lost glycogen reserves and muscle tissue from severe malnutrition is not lost on those of us old enough to remember the death of Karen Carpenter, who died of congestive heart failure after being treated for anorexia (5).

Practical applications:

1. Recognize that persistent hypoglycemia in the context of pyloric stenosis may result from malnutrition and failure to thrive due to glycogen depletion.
2. Look for evidence of cardiac and liver dysfunction in infants with failure to thrive, malnutrition, and those with pyloric stenosis.
3. Consider bradycardia in a malnourished infant a sign of a depleted heart.
4. Infants with severe malnutrition and patients with anorexia may benefit from a similar approach to slow refeeding.

"In individuals with anorexia with severe bradycardia, the heart rate did not normalize until minimal weight gains were sustained for 3–10 days. The resumption of a normal heart rate may be a clinical indicator of cardiac and physiologic recovery. For this reason, waiting to increase from 20 kcal/oz to a more concentrated formula in the face of severe malnutrition may be the wiser course, as a slower recovery may be the safer option, putting less strain on the heart and other vital organs."

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Disclosures: *There are no reported disclosures*

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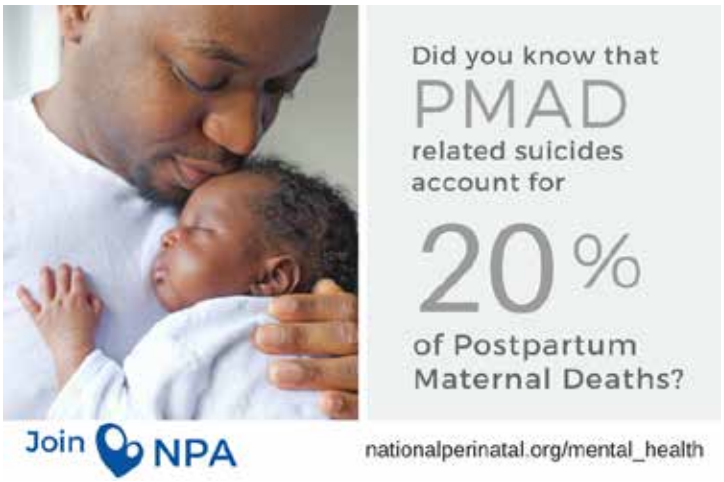
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PMAD
related suicides
account for
20%
of Postpartum
Maternal Deaths?
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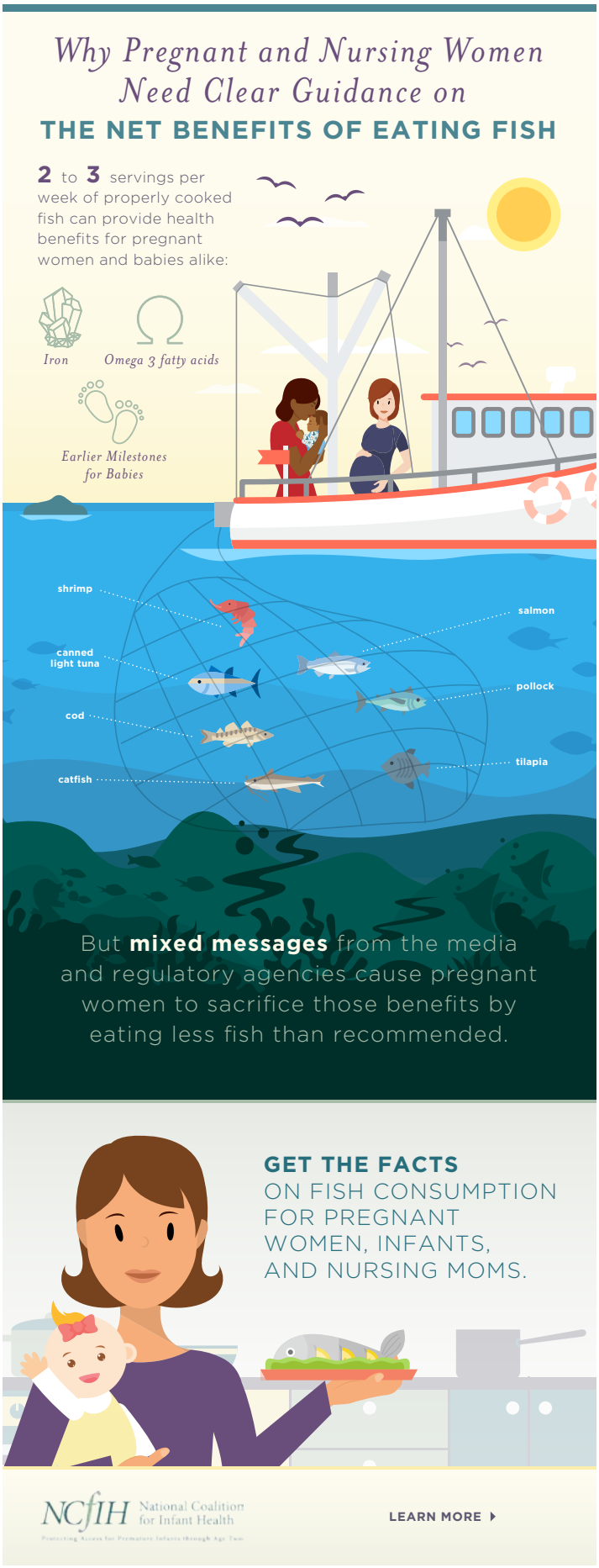
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2 to 3 servings per
week of properly cooked
fish can provide health
benefits for pregnant
women and babies alike:
Iron
Omega 3 fatty acids
Earlier Milestones
for Babies
shrimp
salmon
canned
light tuna
pollock
cod
tilapia
catfish
But mixed messages from the media
and regulatory agencies cause pregnant
women to sacrifice those benefits by
eating less fish than recommended.
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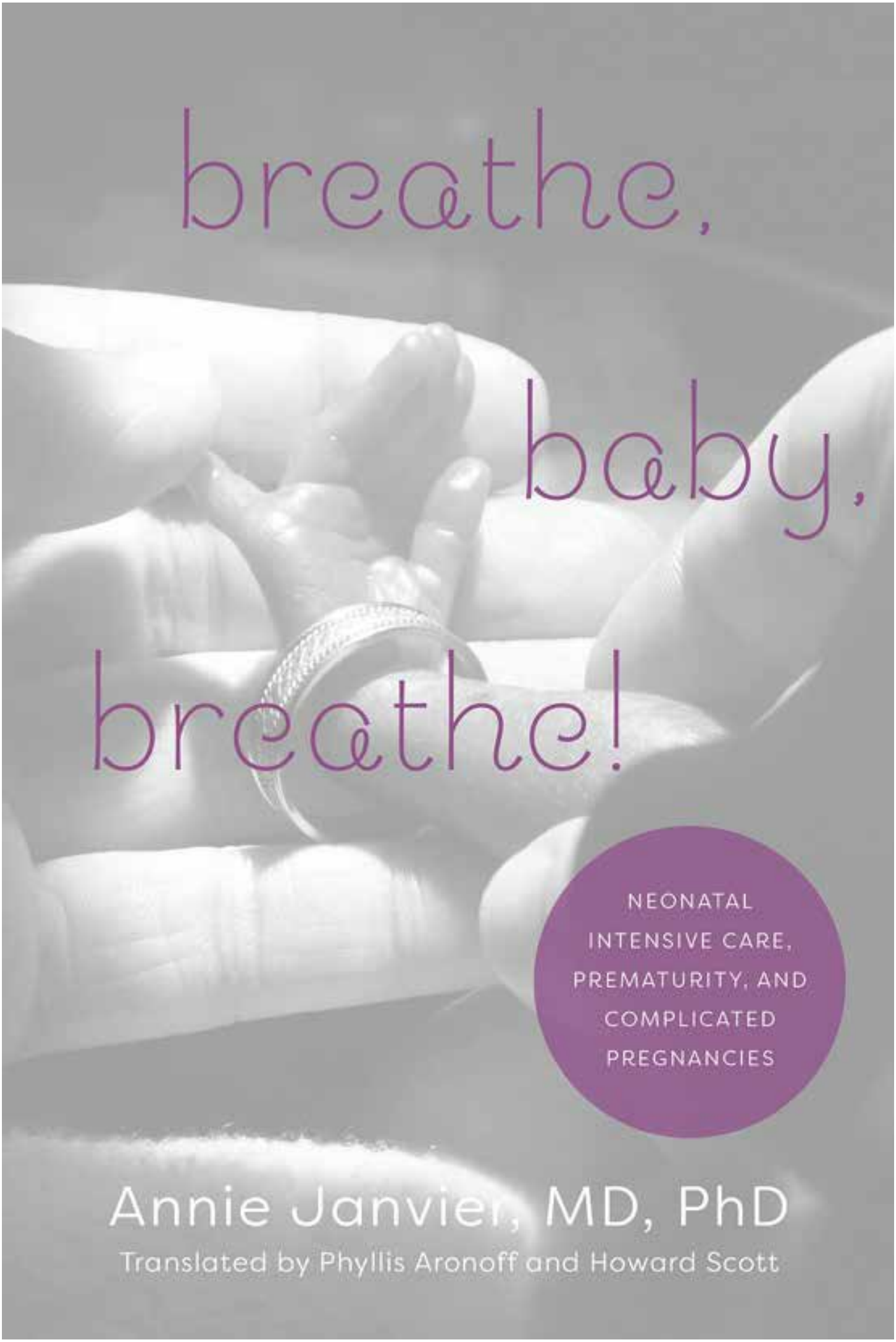
breathe,
baby,
breathe!
NEONATAL INTENSIVE CARE, PREMATURITY, AND COMPLICATED PREGNANCIES
Annie Janvier, MD, PhD
Translated by Phyllis Aronoff and Howard Scott

The Tuskegee Syphilis Study, IRBs, and the Standard of Care

Jay P. Goldsmith, MD

"There are four aspects that a plaintiff must prove in order to be successful in a malpractice claim against a physician. These are often called the 4 "D's": Duty to care, Dereliction of duty, Damages (i.e., injuries), and a Direct Cause between the dereliction and the damages."

There are four aspects that a plaintiff must prove in order to be successful in a malpractice claim against a physician. These are often called the 4 "D's": **D**uty to care, **D**ereliction of duty, **D**amages (i.e., injuries), and a **D**irect Cause between the dereliction and the damages. Dereliction of duty is generally claimed by a plaintiff expert witness who opines that the accused physician did not meet the "standard of care" while providing services to the newborn. The standard of care is usually defined as the care a reasonably prudent physician would provide in the same or similar circumstances. In a subspecialty such as neonatology, the standard of care is often a national standard and not primarily influenced by the local environment in which the care occurred. Moreover, most jurisdictions will only allow a physician in the same subspecialty to opine on the standard of care. Thus, a pediatrician could not give standard of care testimony for or against a neonatologist or obstetrician.

"However, the interpretation of the standard of care is often quite subjective. There is no high or low standard of care, and often many different methods to treat the same patient can all meet the standard of care. Expert witnesses for both plaintiff and defense will cite guidelines published by the American Academy of Pediatrics (AAP) to support their opinions or refer to standard textbooks in the field."

However, the interpretation of the standard of care is often quite subjective. There is no high or low standard of care, and often many different methods to treat the same patient can all meet the standard of care. Expert witnesses for both plaintiff and defense will cite guidelines published by the American Academy of Pediatrics (AAP) to support their opinions or refer to standard textbooks in the field. However, it should be noted that the AAP puts a disclaimer in front of every published guideline and clinical report that states:

> *"The guidance in this report does not indicate an exclusive course of treatment or serve as a standard of medical care. Variations taking into account individual circumstances may be appropriate."*

"An expert will often cite "Up-to-Date" or published studies which support his/her opinion. But "Up-to-Date" is not subject to the same peer review as manuscripts submitted to peer-reviewed journals, and one study does not define a standard of care."

Standard textbooks are often 2-4 years out of date when published, so they must be viewed in that context. An expert will often cite "Up-to-Date" or published studies which support his/her opinion. But "Up-to-Date" is not subject to the same peer review as manuscripts submitted to peer-reviewed journals, and one study does not define a standard of care. Often subsequent studies will not substantiate the findings in the initial study for a variety of reasons. Moreover, the development of Institutional Review Boards (IRBs) after the exposure of the Tuskegee "Study of Untreated Syphilis in the Negro Male" (1) brings another aspect to the standard of care debate.

The Tuskegee Study, conducted by the U.S. Public Health Service between 1932 and 1972, recruited 399 poor and mostly illiterate African American men with known syphilis into a longitudinal and observational study on the progress of the disease. The subjects were promised free medical care, burial insurance, and other incentives, but most could not read and did not understand the consent forms they signed. When penicillin became the standard treatment for syphilis in 1947, the study was continued, and the surviving subjects were not offered antibiotic therapy. In the 1960s, a story was leaked to the press, which led to a national outcry, congressional hearings, and eventually reparations to the surviving subjects and their families. The Congressional hearings which reviewed this unethical study led to the National Research Act of 1974. A commission was created to develop regulations governing human experimentation. The resulting Belmont Report (2) established standards for human experimentation, including

the creation of Institutional Review Boards (IRBs) at each organization doing human research with special consideration for subjects who were poor, illiterate, pregnant, children, and prisoners. The report stated that human experimentation with treatment and control groups must not be approved unless there was true scientific equipoise (i.e., substantial uncertainty) regarding whether the treatment or control groups would benefit most from the study. Thus, it would be against Federal law to conduct a prospective randomized controlled trial of a particular treatment if a standard of care existed regarding the use or non-use of that therapy.

"The report stated that human experimentation with treatment and control groups must not be approved unless there was true scientific equipoise (i.e., substantial uncertainty) regarding whether the treatment or control groups would benefit most from the study. Thus, it would be against Federal law to conduct a prospective randomized controlled trial of a particular treatment if a standard of care existed regarding the use or non-use of that therapy."

Although this principle seems to be helpful for the defense of malpractice actions, such rules may prevent medical advancement when the standard of care is not based on good science. Examples of this effect in neonatology are studies that had difficulty getting US IRB approval due to a mostly historical standard of care and care practices not based on sound science. The practice of intubating all newborns born through meconium was first promulgated in the 1970s, and for his study to challenge this practice, Dr. Thomas Wiswell had to recruit many institutions outside the U.S. to allow vigorous newborns not to be intubated and compare their outcomes to the standard intubation approach. (3) A similar story regarding the use of 100% oxygen to resuscitate depressed newly born infants resulted in the initial studies being performed in Norway, Spain, and India. Because of the findings of these prospective studies, the use of room air to start resuscitation and non-intubation of vigorous meconium-stained newborns have subsequently become routine practice in the U.S. Thus, for the scientific advancement of care for newborns, historical practices which become the standard of care and bad science are worse than no science at all.

In a recent malpractice suit against a neonatologist, the plaintiff claimed that the failure to close a patent ductus arteriosus (PDA) in a 27-week gestation, 900-gram premature male led to periventricular leukomalacia (PVL). Plaintiff's expert neonatologist and cardiologist stated that the "standard of care" was to close a "clinically significant" PDA, first pharmacologically, and if that failed, to refer the patient to the local Level 4 hospital for transcatheter or surgical closure. The defense expert neonatologist argued that numerous IRB-approved studies were ongoing at the time the care was provided regarding the treatment of PDA, including all types of treatment and observation only. Thus, there could not be a standard of care since IRB-approved studies were still trying to determine the best course of management. The defense also presented numerous other potential etiologies for the development of PVL. The case was settled prior to trial. Nonetheless, the principle remains intact. There cannot be a recognized standard of care if human IRB-approved clinical trials are ongoing in which there are treatment and control arms (indicating that an IRB considered there was scientific equipoise regarding the outcome).

"The case was settled prior to trial. Nonetheless, the principle remains intact. There cannot be a recognized standard of care if human IRB-approved clinical trials are ongoing in which there are treatment and control arms (indicating that an IRB considered there was scientific equipoise regarding the outcome). "

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Disclosures: *There are no reported disclosures*

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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.

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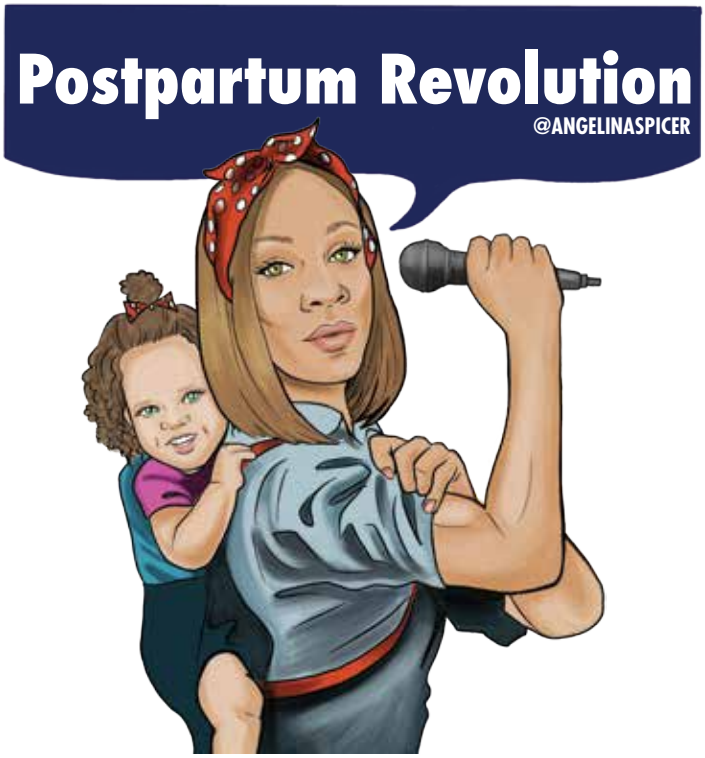

Vaccines and Preventive Monoclonal Antibodies

WHAT'S THE DIFFERENCE?

The Importance of Immunization

Vaccines and preventive monoclonal antibodies are two different types of immunization. While they function differently, they both serve the same purpose: protecting people from serious illnesses and diseases.

Different Technology, Same Protective Value

AfPA

https://www.who.int/news-room/feature-stories/detail/how-do-vaccines-work#:~:text=Vaccines%20contain%20weakened%20or%20inactive,rather%20than%20the%20antigen%20itself.

https://static1.squarespace.com/static/5523fcf7e4b0fef011e668e6/t/62445afd0134140ff954f3f6/1648646910485/NCIIH_Monoclonal+Antibodies+Inclusion+in+the+VFC+Program_Position+Paper_Mar+2022.pdf

VACCINES		PREVENTIVE MONOCLONAL ANTIBODIES
Teach the body to create antibodies that fight off a specific disease.		Introduce antibodies that are ready to ward off disease in the body.
By introducing an inactive piece of a disease or proteins that look like the disease, they trigger an immune response, training the body to create antibodies that defeat the disease.	**How does it work?**	Instead of teaching the body to create antibodies and defenses, they provide antibodies that are readily available.
Both support the immune system's defenses.		
Many vaccines are readily and easily available. The technology behind vaccines has been around for decades.	**What are the benefits?**	Preventive monoclonal antibodies can provide protection for diseases where there isn't an existing vaccine or there isn't an existing vaccine for certain patient groups.
Both protect against disease and provide a public health benefit by decreasing the burden of disease.		
Polio Measles COVID-19 And more	**What can this immunization protect against?**	RSV COVID-19
Both can provide tailored protection from a variety of diseases.		
Yes	**Is it safe?**	Yes

Both vaccines and preventive monoclonal antibodies undergo extensive testing for safety and efficacy.

READ NPA's statement: BLACK LIVES MATTER

The Indirect Impact of **RSV**

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

Susan Hepworth, Suzanne Staebler, DNP, APRN, NNP-BC, FAANP, FAAN, Mitchell Goldstein, MD, MBA, CML

OVERVIEW

RSV impacts not only infants and young children, but also entire families.

The National Coalition for Infant Health and the Alliance for Patient Access sought to examine the multifaceted burden that RSV places on families and to identify potential policy solutions.

Two surveys were conducted, one of parents who had at least one child contract RSV and one of health care providers who treat infants and children with RSV.

Both surveys were conducted with YouGov, a global public opinion and data company. Parents and providers were recruited from a pool of pre-selected respondents to ensure they met the survey's requirements. Participants received an honorarium.

RSV PARENT SURVEY

340 parents who had at least 1 child sick with RSV

67% of parents said their child was hospitalized for RSV

RSV HEALTH CARE PROVIDER SURVEY

175 health care providers across various pediatric and neonatal subspecialties

67% worked in an outpatient facility

33% worked in a hospital

RESULTS

FINANCIAL BURDEN

More than ⅔ of parents said the costs of RSV posed a financial burden or financial crisis.

7% of parents said they were fired as a result of caring for their child with RSV.

32% of parents reported losing potential income while their child had RSV.

EMOTIONAL BURDEN

68% of parents said watching their child suffer affected their mental health.

69% of parents felt guilty that they could not do more to prevent their child's RSV.

When parents found out there was no treatment for RSV, only supportive care:

- **48%** felt angry
- **46%** felt helpless

SOCIAL BURDEN

43% of parents had never heard of RSV before finding out their child was sick.

54% of parents had to rely on family and friends for sibling care, transportation and other responsibilities.

42% of parents said they struggled to care for their other children when one faced RSV.

RESULTS

PARENT EDUCATION & AWARENESS

86% of providers said they include RSV education as part of routine care.

99% of providers agreed that parents need more information about RSV.

TREATMENT CHALLENGES

Nearly ⅓ of providers have been reluctant to test for RSV because no treatment exists.

48% of providers said it was difficult to decide whether to send an infant or child with RSV to the emergency room.

92% agreed that if an immunization were available, it should be added to the Vaccines for Children program's list of pediatric vaccines.

MISCONCEPTIONS

A majority of providers (60%) explained that around 50% or more of the babies they see hospitalized for RSV were born healthy, despite many people thinking severe RSV only impacts premature infants or those with preexisting conditions.

CONCLUSION

Both surveys highlighted that the burden of RSV extends well beyond its physical symptoms.

The virus may lead to:

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

This burden is not experienced by the few. Most infants and children contract RSV by the time they are two, and challenges that accompany RSV may impact anyone who has been affected.

Moving forward, the many burdens of RSV demonstrate the need for:

- **More RSV education**
- **Research and innovation** for preventive interventions
- **Access to prevention and treatment** for all babies and children

The challenges caused by RSV can reach far and wide, and its indirect impacts often leave families struggling.

The Health Wonders of Human Milk

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.

A new study confirms what mothers and doctors have long believed: human milk is the best source of nutrition for infants.

The wholesome sufficiency of "mother's milk" is not just a turn of phrase; it is a biomedical reality. Access to human milk, whether through mothers or donors, can majorly support neonatal health.

Human milk supports health and growth for preterm babies:

In particular, babies born preterm or with health challenges benefit from consuming human milk, whether from their own mother or a screened donor.

"Recent research on infants with congenital heart conditions affirms that a diet rich in human milk can have a life-changing impact on health and development. (1) These babies typically struggle to gain the healthy weight associated with normal growth."

Recent research on infants with congenital heart conditions affirms that a diet rich in human milk can have a life-changing impact on health and development. (1) These babies typically struggle to gain the healthy weight associated with normal growth. Human milk and human milk-derived fortifiers supply nutrients, prebiotics, and immunological components to support infants' growth. It is

also better tolerated than milk products from other mammals.

Babies with congenital heart disease or defects also often undergo surgery before they are released from the hospital. When they receive a diet of exclusively human milk, those infants show improved growth and decreased risk of complications immediately after surgery.

Human milk also offers other benefits:

In addition to providing nutrition and immunological protection, human milk may confer other benefits. Human milk has been shown to protect against diabetes, obesity, asthma, cardiovascular diseases, and autoimmune disorders.

Some cultures even value other "milk therapies," including topical applications to treat everything from pink eye to diaper rash. Scientists have made treatments directly from compounds in human milk, and many alternative and folk remedies show signs of having health benefits.

"A compound as powerful as human milk — available widely, inexpensively, and with minimal side effects – shows great promise. With additional research, scientists and healthcare providers can continue learning about human milk's complex impact and benefits. Increased understanding can, in turn, encourage full use and equal access to the wonder drug produced by the human body."

A compound as powerful as human milk — available widely, inexpensively, and with minimal side effects – shows great promise. With additional research, scientists and healthcare providers can continue learning about human milk's complex impact and benefits. Increased understanding can, in turn, encourage full use and equal access to the wonder drug produced by the human body.

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1. Cynthia L. Blanco, Amy Hair, Lindsey B. Justice, Dantin Roddy, Krista Bonagurio, Patricia K. Williams, Desiree Machado, Bradley S. Marino, Annie Chi, Cheryl Takao, Erin E. Gordon, Amir Ashrafi, Nicole Cacho, Jay D. Pruetz, John M. Costello, David S. Cooper, A Randomized Trial of an Exclusive Human Milk Diet in Neonates with Single Ventricle Physiology, The Journal of Pediatrics, Volume 256, 2023, Pages 105-112.e4, ISSN 0022-3476, https://doi.org/10.1016/j.jpeds.2022.11.043.

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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.

The Signs & Symptoms of RSV

RESPIRATORY SYNCYTIAL VIRUS

Know the Signs & Symptoms of RSV

- Cough
- Runny Nose
- Struggling to Breathe *(breastbone sinks inward when breathing)*
- Difficulty Eating
- Lethargy
- Wheezing

RESPIRATORY SYNCYTIAL VIRUS
is a highly contagious seasonal virus that can lead to hospitalization for some babies and young children.

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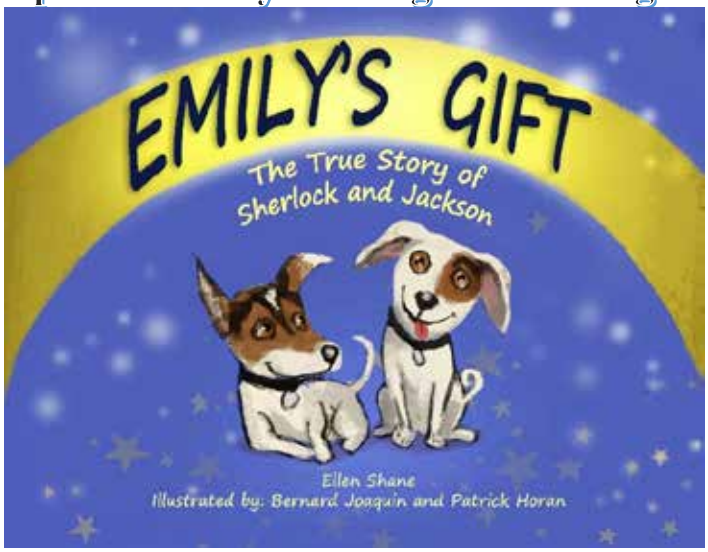

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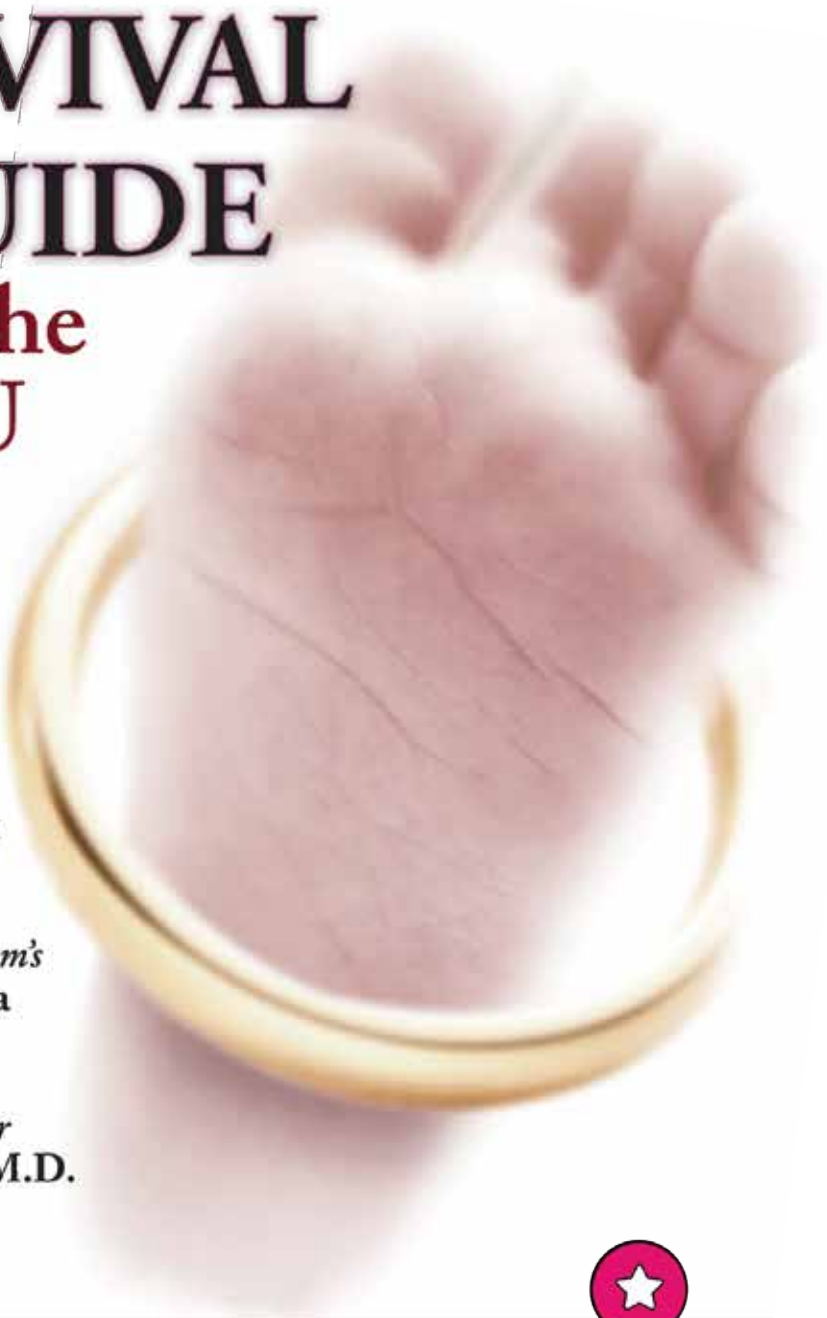

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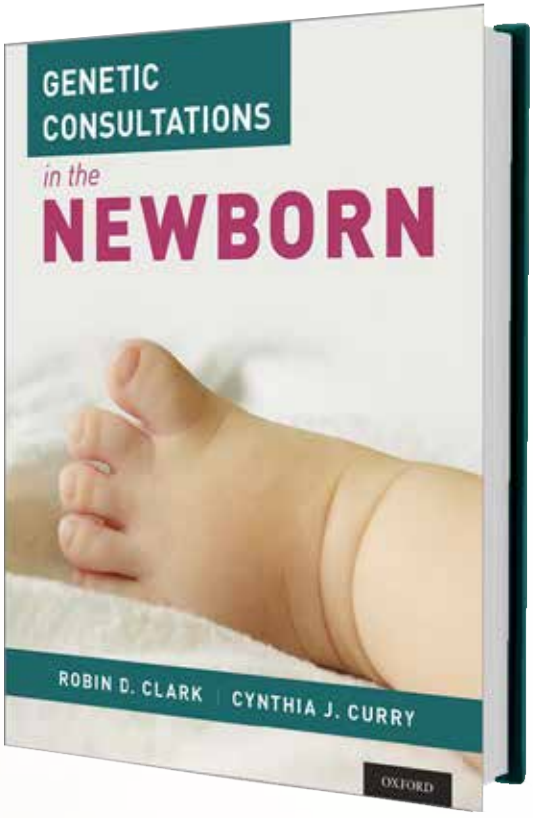

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Clinical Pearl: Surfactant: Potential for an Even Less Invasive Future?

Kellie Barsotti, MD, Melanie Wielicka, MD PhD

Surfactant has remained the mainstay of treatment for neonates with respiratory distress syndrome for over twenty years. The new 2022 European Consensus Guidelines on the Management of Respiratory Distress Syndrome recommends surfactant administration to all infants born at or prior to 30 weeks of gestation intubated for stabilization and all infants, regardless of gestational age managed with non-invasive respiratory support who require a FiO_2 >0.3 on CPAP (continuous positive airway pressure) >6 cm H_20 (1). In hopes of reducing the incidence of bronchopulmonary dysplasia (BPD) with gentle ventilation, an increasing number of centers have started relying on non-invasive modes of respiratory support even in very premature infants (2), leading to an increased interest in non-invasive surfactant administration.

"The new 2022 European Consensus Guidelines on the Management of Respiratory Distress Syndrome recommends surfactant administration to all infants born at or prior to 30 weeks of gestation intubated for stabilization and all infants, regardless of gestational age managed with non-invasive respiratory support who require a FiO_2 >0.3 on CPAP (continuous positive airway pressure) >6 cm H_2O."

Traditionally, surfactant has been primarily administered via an endotracheal (ET) tube and then distributed with invasive positive pressure ventilation, followed by a gradual wean of respiratory support (3). However, alternative methods of surfactant administration have been around for quite some time. INSURE (intubate— surfactant— extubate) as well as LISA (less invasive surfactant administration) or MIST (minimally invasive surfactant treatment) were both described by Verder et al. in 1992 (3,4). The INSURE technique allows for intubation, ET surfactant administration, followed by only brief ventilation and planned, rapid extubation to CPAP. It has been associated with reduced lung injury (1).

"However, alternative methods of surfactant administration have been around for quite some time. INSURE (intubate – surfactant – extubate) as well as LISA (less invasive surfactant administration) or MIST (minimally invasive surfactant treatment) were both described by Verder et al. in 1992."

In contrast, LISA (less invasive surfactant administration) allows surfactant administration via a thin catheter and its distribution via spontaneous breaths and non-invasive CPAP ventilation. Several studies have demonstrated that LISA minimizes the need for mechanical ventilation and is associated with improved outcomes in preterm infants, including decreased BPD incidence at 36 weeks and decreased risk of intraventricular hemorrhage compared to infants receiving surfactant via INSURE. As a result, the 2022 European RDS guidelines recommend using the LISA/MIST technique when possible (1,3).

The largest trial looking at LISA/MIST, the OPTIMIST-A trial, was a multicenter, randomized clinical trial by Dargaville and colleagues that examined the effect of MIST specifically in preterm infants with a gestational age of 25 to 28 weeks who were supported with CPAP and required a fraction of inspired oxygen of 0.30 or greater within six hours of delivery (5). The infants were randomized to the MIST group, or the control group where they received sham treatment. The authors note no significant difference concerning the primary outcome of death or BPD. Regarding secondary outcomes, the MIST group significantly decreased the need for intubation within 72 hours of delivery, mechanical ventilation, CPAP duration, and the rate of pneumothoraces. However, the authors noted that their data suggested an increased mortality risk associated with MIST in the gestational age range of 25-26

"Regarding secondary outcomes, the MIST group significantly decreased the need for intubation within 72 hours of delivery, mechanical ventilation, CPAP duration, and the rate of pneumothoraces. However, the authors noted that their data suggested an increased mortality risk associated with MIST in the gestational age range of 25-26 weeks. "

weeks. Given this, the authors cautioned using MIST within this patient population (5).

However, the findings from this clinical trial require careful interpretation. Firstly, there was a difference in baseline variables between the two groups within the gestational age groups of 25-26 weeks. Infants within the MIST group for this gestational age range had a higher frequency of male sex, multiple births, and no or incomplete exposure to antenatal corticosteroids compared to the control group. This implies that subgroup analyses by gestational age may have been affected by an imbalance in baseline variables which may have contributed to findings favoring the control group at 25-26 weeks gestational age (6]. Additionally, the authors note that the deaths were due to various causes in both groups and had occurred at various points throughout the first months of life.

"However, the findings from this clinical trial require careful interpretation. Firstly, there was a difference in baseline variables between the two groups within the gestational age groups of 25-26 weeks. Infants within the MIST group for this gestational age range had a higher frequency of male sex, multiple births, and no or incomplete exposure to antenatal corticosteroids compared to the control group. This implies that subgroup analyses by gestational age may have been affected by an imbalance in baseline variables which may have contributed to findings favoring the control group at 25-26 weeks gestational age"

Although recommendations still seem to lean towards less invasive surfactant administration, specific characteristics of the ideal technique have yet to be determined. The use of LISA/MIST may help to reduce airway inflammation; however, it still requires instrumentation of the airway, which can be painful for the infant and has the potential to cause a vasovagal reaction. Additionally, there have been concerns that the instillation of surfactant directly into the trachea has led to brief periods of cyanosis and bradycardia associated with decreased cerebral blood flow, with a theoretical risk for intraventricular hemorrhage. However, as previously mentioned, that risk seems to be minimized with LISA (1,3).

These observations have led to a search for an even less invasive mechanism for surfactant delivery. A recent meta-analysis completed by Gaertner and colleagues demonstrated that surfactant nebulization reduced the intubation rate in preterm infants with no difference in mortality outcomes as well as morbidities, including sepsis, air leak, grade 3 and 4 IVH, moderate or severe BPD and NEC (7). In this study, surfactant nebulization was most effective in infants over 28 weeks gestation, using a pneumatically driven nebulizer, and in infants receiving ≥ 200mg/kg of animal-derived surfactant. Given the limitations of standardization amongst the studies included in this meta-analysis, the quality of evidence from this study is limited. However, the initial evidence is promising and calls for further, well-designed trials designed to measure mortality and other relevant secondary outcomes as more and more institutions move towards less invasive surfactant administration.

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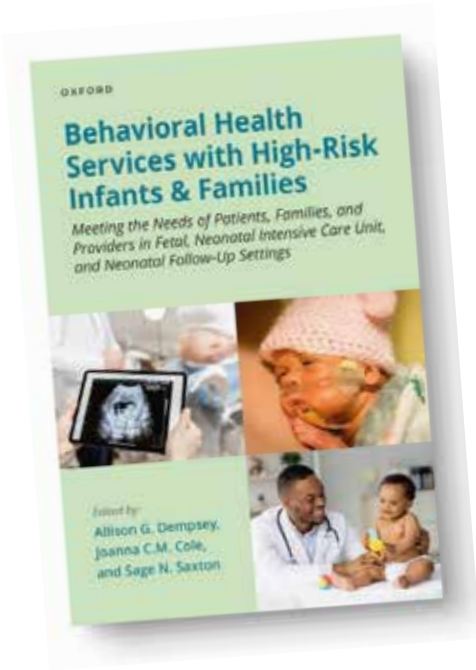

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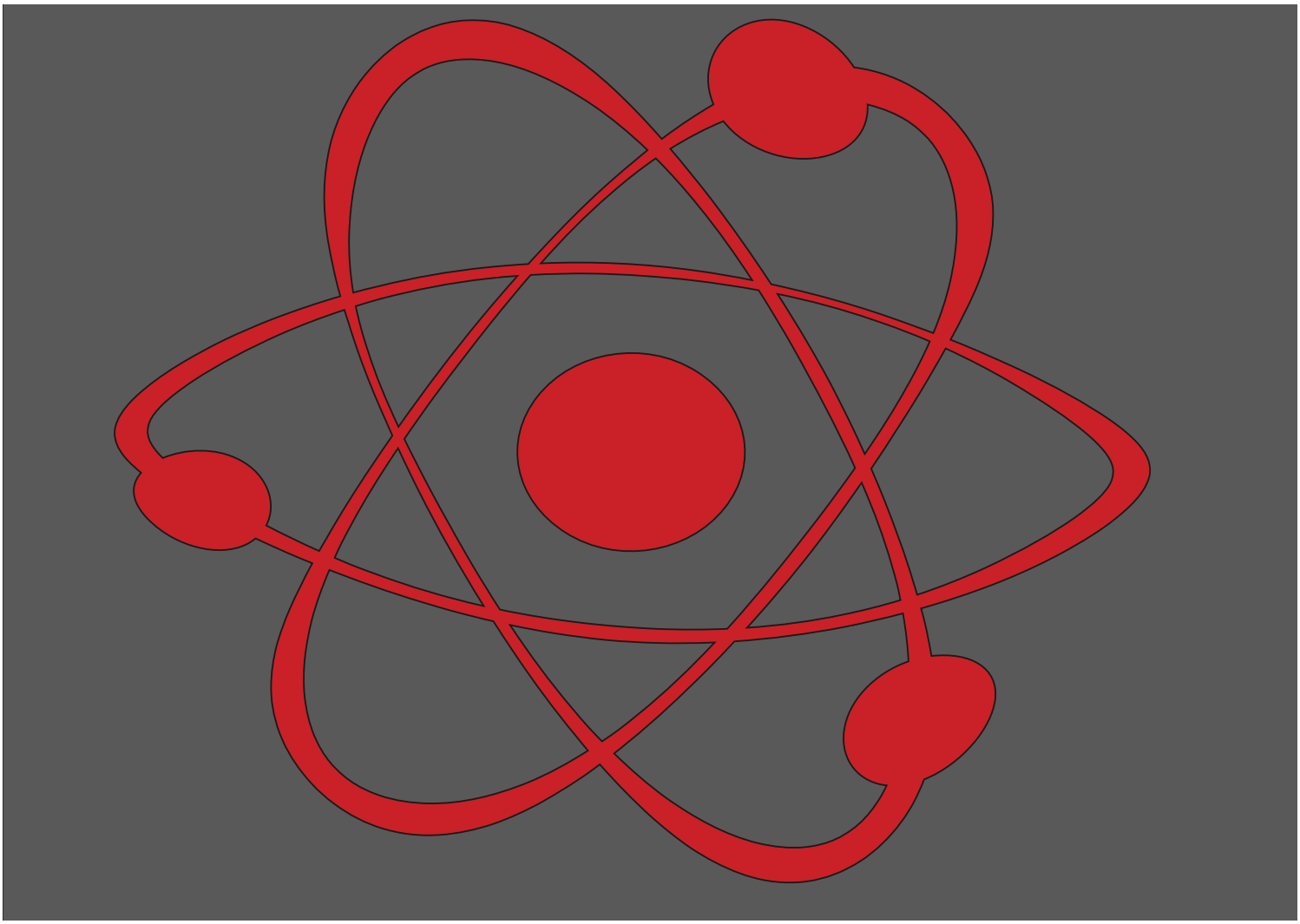

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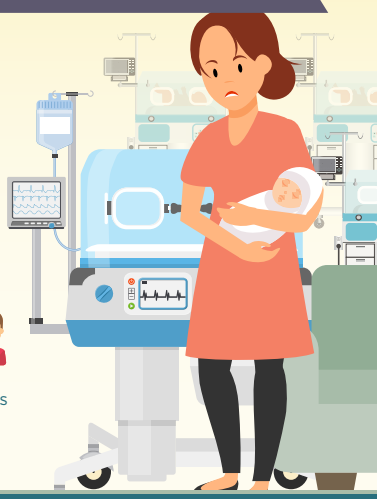
Will your **PRETERM INFANT** *need* **EARLY INTERVENTION** *services?*

Preterm infants are:

2x more likely to have developmental delays

5x more likely to have learning challenges

1 in **3** preterm infants will require support services at school

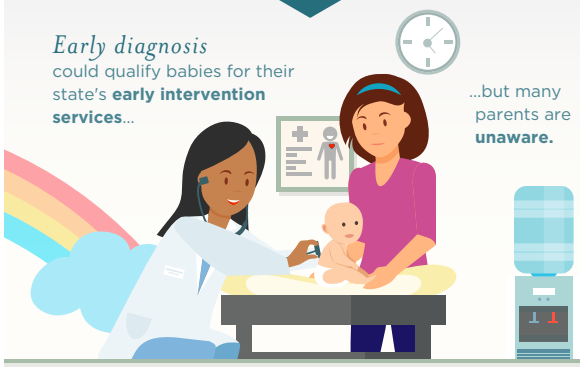


Early intervention can help preterm infants:

- Enhance language and communication skills
- Build more effective learning techniques
- Process social and emotional situations
- Address physical challenges
- Prevent mild difficulties from developing into major problems

Early diagnosis could qualify babies for their state's **early intervention services**...

...but many parents are **unaware.**



NICU staff, nurses, pediatricians and social workers **should talk** with NICU families about the challenges their baby may face.

Awareness, referral & timely enrollment in early intervention programs can help **infants thrive** and grow.

NCFIH National Coalition for Infant Health

Protecting Access for Premature Infants through Age Two

www.infanthealth.org

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

Las nuevas mamás necesitan acceso a la detección y tratamiento para **LA DEPRESIÓN POSPARTO**

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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**

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- Financiar los esfuerzos de despistaje y diagnostico
- Proteger el acceso al tratamiento

LOS HOSPITALES PUEDEN:

- Capacitar a los profesionales de la salud para proporcionar apoyo psicosocial a las familias... **Especialmente aquellas con bebés prematuros, que son 40% más propensas a desarrollar depresión posparto**[3,4]
- Conectar a las mamás con una organización de apoyo

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www.infanthealth.org

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

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The Loma Linda University Health's Clinical Trial Center is actively seeking and recruiting top clinical research coordinator talent.

Our mission is to participate in Jesus Christ's ministry, bringing health, healing, and wholeness to humanity by Creating a supportive faculty practice framework that allows Loma Linda University School of Medicine physicians and surgeons to educate, conduct research, and deliver quality health care with optimum efficiency, deploying a motivated and competent workforce trained in customer service and whole-person care principles and providing safe, seamless and satisfying health care encounters for patients while upholding the highest standards of fiscal integrity and clinical ethics. Our core values are compassion, integrity, humility, excellence, justice, teamwork, and wholeness.

Able to read, write and speak with professional quality; use computer and software programs necessary to the position, e.g., Word, Excel, PowerPoint, Access; operate/troubleshoot basic office equipment required for the position. Able to relate and communicate positively, effectively, and professionally with others; provide leadership; be assertive and consistent in enforcing policies; work calmly and respond courteously when under pressure; lead, supervise, teach, and collaborate; accept direction. Able to communicate effectively in English in person, in writing, and on the telephone; think critically; work independently; perform basic math and statistical functions; manage multiple assignments; compose written material; work well under pressure; problem solve; organize and prioritize workload; recall information with accuracy; pay close attention to detail. Must have documented successful research administration experience focused on managing clinical trials function. Able to distinguish colors as necessary; hear sufficiently for general conversation in person and on the telephone; identify and distinguish various sounds associated with the workplace; see adequately to read computer screens and written documents necessary to the position. Active California Registered Nurse (RN) licensure preferred. Valid Driver's License required at time of hire.

The Clinical Trial Center is actively involved in many multi-center global pediatric trials, which span different Phases of research to advance health care in children. Please reach out to Jaclyn Lopez at 909-558-5830 or JANLopez@llu.edu with further interest. We would love to discuss the exciting research coordinator opportunities at our Clinical Trials Center.

Additional Information

- Organization: Loma Linda University Health Care
- Employee Status: Regular
- Schedule: Full-time
- Shift: Day Job
- Days of Week: Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday

LOMA LINDA UNIVERSITY

Loma Linda University Children's Hospital is hiring Neonatal Nurse Practitioners

Children's Hospital, centrally located in Southern California, has earned Magnet Recognition as part of the American Nurses Credentialing Center's (ANCC) Program.

We are looking for experienced or new graduate Neonatal Nurse Practitioners (NNPs) who are excited to join a cohesive team that practices in a collaborative, fast-paced, high-acuity setting.

- Full-time and part-time positions available
- Level IV, 84-bed Neonatal Intensive Care Unit (NICU)
- Regional referral center encompassing Tiny Baby unit, ECMO, Cardiac ICU, Neuro NICU and Surgical services
- Maternity services and delivery center
- 24/7 coverage by NNP team and Fellows
- Competitive employee benefit packages

*Offering a **sign-on bonus** with relocation reimbursement for full-time, direct applicants who meet requirements.

For more information, please contact:

Karin Colunga, MSN, RN, PNP-BC
Director of Advanced Practice Nursing
kecolunga@llu.edu | 909-558-4486

BEST CHILDREN'S HOSPITALS U.S.News & World Report NEONATOLOGY 2022-23

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For more information, contact:

Melissa LaMarca

+1 (302) 313-9984 or

Melissa.LaMarca@neonatologytoday.net

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Neonatology Today's Policy on Animal and Human Research

Neonatology Today's policies ensure the protection and responsible use of animals and humans in all research articles under consideration. Authors are encouraged to follow the guidelines developed by the National Centre for the Replacement, Refinement & Reduction of Animals in Research (NC3R), International Committee of Medical Journal Editors, and the Guide for the Care and Use of Laboratory Animals and U.S. Public Health Service's Policy on Humane Care and Use of Laboratory Animals (PHS Policy). Authors are expected to demonstrate to their institutional review board or suitable proxy that ethical standards are met. If there is doubt whether research conducted was in accordance with ethical standards, then there must be verification that the institutional review body approved the uncertain aspects. Research not following these policies on participating animal and human subjects may be rejected. Researchers have a moral obligation towards the humane treatment of animals and ethical considerations for humans participating in research and are expected to consider their welfare when designing studies.

https://www.nc3rs.org.uk/arrive-guidelines

http://www.icmje.org

https://olaw.nih.gov/policies-laws/phs-policy.htm

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Neonatology and the Arts

This section focuses on artistic work which is by those with an interest in Neonatology and Perinatology. The topics may be varied, but preference will be given to those works that focus on topics that are related to the fields of Neonatology, Pediatrics, and Perinatology. Contributions may include drawings, paintings, sketches, and other digital renderings. Photographs and video shorts may also be submitted. In order for the work to be considered, you must have the consent of any person whose photograph appears in the submission.

Works that have been published in another format are eligible for consideration as long as the contributor either owns the copyright or has secured copyright release prior to submission.

Logos and trademarks will usually not qualify for publication.

This month we continue to feature artistic works created by our readers on one the next to last page as well as photographs of birds on rear cover.. For this edition, our art was graciously provided by Colleen Kraft, MD. It is a work done by her son Tim. This is "Angel" .Our Bird is resting among yellow roses from my collection.

Mita Shah, MD,
Neonatal Intensive Care Medical Director
Queen of the Valley Campus
Emanate Health, West Covina, CA

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Manuscript Submission: Instructions to Authors

1. Manuscripts are solicited by members of the Editorial Board or may be submitted by readers or other interested parties. Neonatology Today welcomes the submission of all academic manuscripts including randomized control trials, case reports, guidelines, best practice analysis, QI/QA, conference abstracts, and other important works. All content is subject to peer review.

2. All material should be emailed to: LomaLindaPublishingCompany@gmail.com in a Microsoft Word, Open Office, or XML format for the textual material and separate files (tif, eps, jpg, gif, ai, psd, SVG, or pdf) for each figure. Preferred formats are ai, SVG, psd, or pdf. tif and jpg images with sufficient resolution so as not to have visible pixilation for the intended dimension. In general, if acceptable for publication, submissions will be published within 3 months.

3. There is no charge for submission, publication (regardless of number of graphics and charts), use of color, or length. Published content will be freely available after publication. There is no charge for your manuscript to be published. NT does maintain a copyright of your published manuscript.

4. The title page should contain a brief title and full names of all authors, their professional degrees, their institutional affiliations, and any conflict of interest relevant to the manuscript. The principal author should be identified as the first author. Contact information for the principal author including phone number, fax number, e-mail address, and mailing address should be included.

5. A brief biographical sketch (very short paragraph) of the principal author including current position and academic titles as well as fellowship status in professional societies should be included. A picture of the principal (corresponding) author and supporting authors should be submitted if available.

6. An abstract may be submitted.

7. The main text of the article should be written in formal style using correct English. The length may be up to 10,000 words. Abbreviations which are commonplace in neonatology or in the lay literature may be used.

8. References should be included in standard "NLM" format (APA 7th is no longer acceptable). Bibliography Software should be used to facilitate formatting and to ensure that the correct formatting and abbreviations are used for references.

9. Figures should be submitted separately as individual separate electronic files. Numbered figure captions should be included in the main file after the references. Captions should be brief.

10. Only manuscripts that have not been published previously will be considered for publication except under special circumstances. Prior publication must be disclosed on submission. Published articles become the property of the Neonatology Today and may not be published, copied or reproduced elsewhere without permission from Neonatology Today.

11. NT recommends reading Recommendations for the Conduct, Reporting, Editing, and Publication of Scholarly Work in Medical Journals from ICMJE prior to submission if there is any question regarding the appropriateness of a manuscript. NT follows Principles of Transparency and Best Practice in Scholarly Publishing(a joint statement by COPE, DOAJ, WAME, and OASPA). Published articles become the property of the Neonatology Today and may not be published, copied or reproduced elsewhere without permission from Neonatology Today.

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

Please submit your manuscript to: LomaLindaPublishingCompany@gmail.com

NICU Baby's Bill of Rights

1- The Right to Advocacy
My parents know me well. They are my voice and my best advocates. They need to be knowledgeable about my progress, medical records, and prognosis, so they celebrate my achievements and support me when things get challenging.

2- The Right to My Parents' Care
In order to meet my unique needs, my parents need to learn about my developmental needs. Be patient with them and teach them well. Make sure hospital policies and protocols, including visiting hours and rounding, are as inclusive as possible.

3- The Right to Bond with My Family
Bonding is crucial for my sleep and neuroprotection. Encourage my parents to practice skin-to-skin contact as soon as and as often as possible and to read, sing, and talk to me each time they visit.

4- The Right to Neuroprotective Care
Protect me from things that startle, stress, or overwhelm me and my brain. Support things that calm me. Ensure I get as much sleep as possible. My brain is developing for the first time and faster than it ever will again. The way I am cared for today will help my brain when I grow up. Connect me with my parents for the best opportunities to help my brain develop.

5- The Right to be Nourished
Encourage my parents to feed me at the breast or by bottle, whichever way works for us both. Also, let my parents know that donor milk may be an option for me.

6- The Right to Personhood
Address me by my name when possible, communicate with me before touching me, and if I or one of my siblings pass away while in the NICU, continue referring to us as multiples (twin/triplets/quads, and more). It is important to acknowledge our lives.

7- The Right to Confident and Competent Care Giving
The NICU may be a traumatic place for my parents. Ensure that they receive tender loving care, information, education, and as many resources as possible to help educate them about my unique needs, development, diagnoses, and more.

8- The Right to Family-Centered Care
Help me feel that I am a part of my own family. Teach my parents, grandparents, and siblings how to read my cues, how to care for me, and how to meet my needs. Encourage them to participate in or perform my daily care activities, such as bathing and diaper changes.

9- The Right to Healthy and Supported Parents
My parents may be experiencing a range of new and challenging emotions. Be patient, listen to them, and lend your support. Share information with my parents about resources such as peer-to-peer support programs, support groups, and counseling, which can help reduce PMAD, PPD, PTSD, anxiety and depression, and more.

10- The Right to Inclusion and Belonging
Celebrate my family's diversity and mine; including our religion, race, and culture. Ensure that my parents, grandparents, and siblings feel accepted and welcomed in the NICU, and respected and valued in all forms of engagement and communication.

Presented by:

NPN
NICU PARENT NETWORK

NICU Parent Network

Visit nicuparentnetwork.org to identify national, state, and local NICU family support programs.

*** The information provided on the NICU Baby's Bill of Rights does not, and is not intended to, constitute legal or medical advice. Always consult with your NICU care team for all matters concerning the care of your baby.**


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