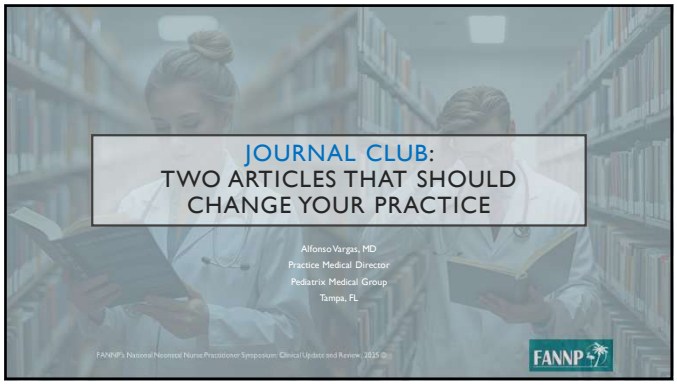
JOURNAL CLUB:
TWO ARTICLES THAT SHOULD CHANGE YOUR PRACTICE
Alfonso Vargas, MD
Practice Medical Director
Pediatrix Medical Group
Tampa, FL
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JOURNAL CLUB:
THREE ARTICLES THAT SHOULD CHANGE YOUR PRACTICE
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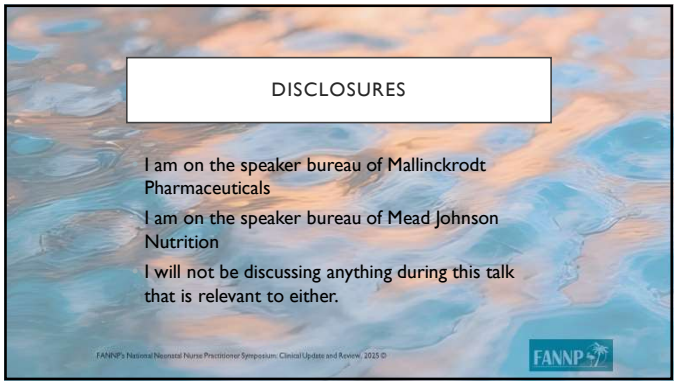
DISCLOSURES
I am on the speaker bureau of Mallinckrodt Pharmaceuticals
I am on the speaker bureau of Mead Johnson Nutrition
I will not be discussing anything during this talk that is relevant to either.
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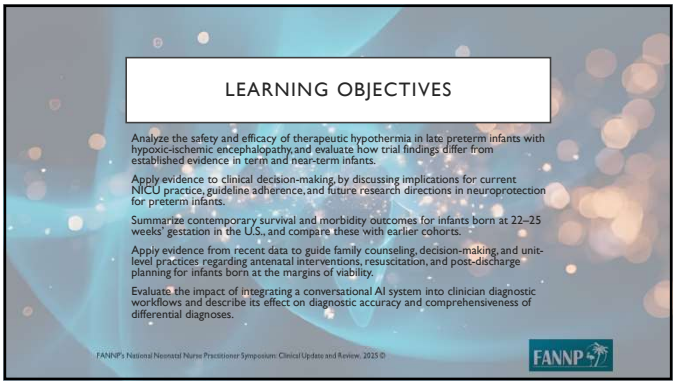
LEARNING OBJECTIVES
Analyze the safety and efficacy of therapeutic hypothermia in late preterm infants with hypoxic-ischemic encephalopathy, and evaluate how trial findings differ from established evidence in term and near-term infants.
Apply evidence to clinical decision-making, by discussing implications for current NICU practice, guideline adherence, and future research directions in neuroprotection for preterm infants.
Summarize contemporary survival and morbidity outcomes for infants born at 22–25 weeks' gestation in the U.S., and compare these with earlier cohorts.
Apply evidence from recent data to guide family counseling, decision-making, and unit-level practices regarding antenatal interventions, resuscitation, and post-discharge planning for infants born at the margins of viability.
Evaluate the impact of integrating a conversational AI system into clinician diagnostic workflows and describe its effect on diagnostic accuracy and comprehensiveness of differential diagnoses.
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ARTICLE I

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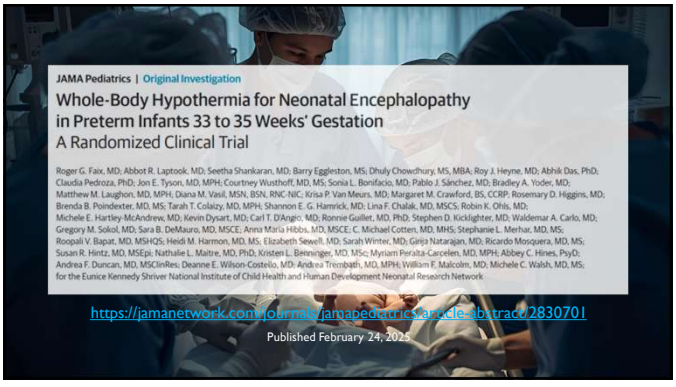
JAMA Pediatrics | Original Investigation
Whole-Body Hypothermia for Neonatal Encephalopathy in Preterm Infants 33 to 35 Weeks' Gestation
A Randomized Clinical Trial
https://jamanetwork.com/journals/jamapediatrics/article-abstract/2830701
Published February 24, 2025

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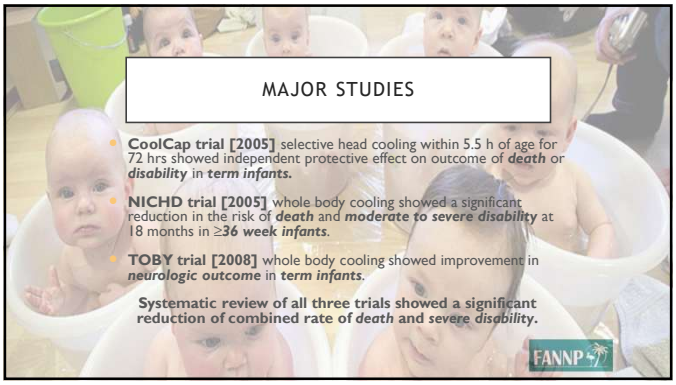

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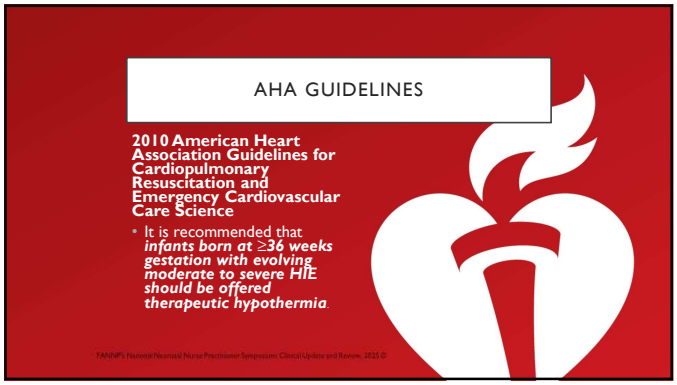

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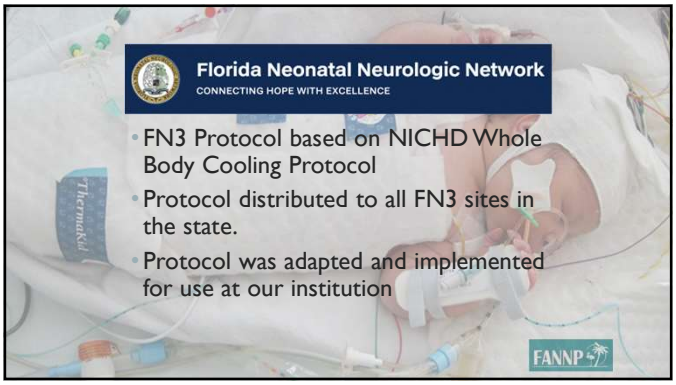

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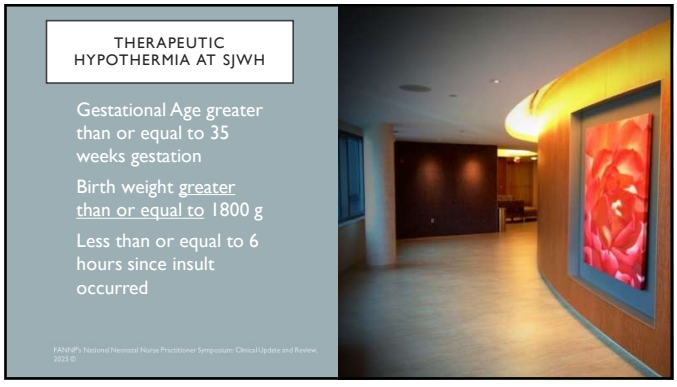

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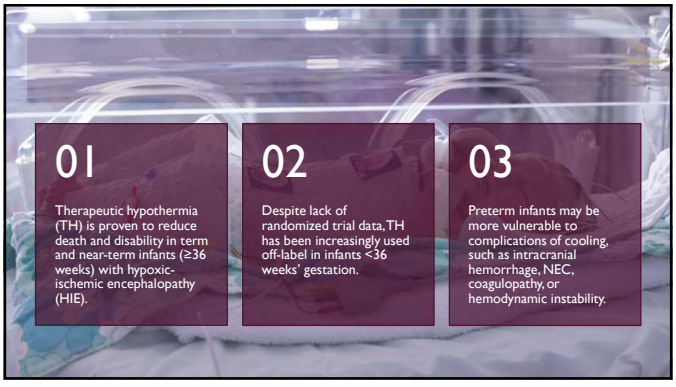

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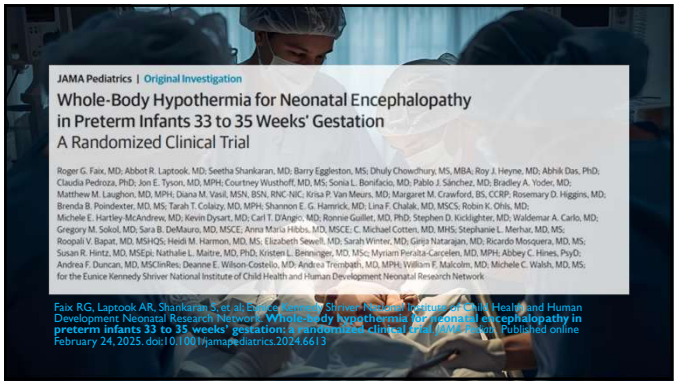

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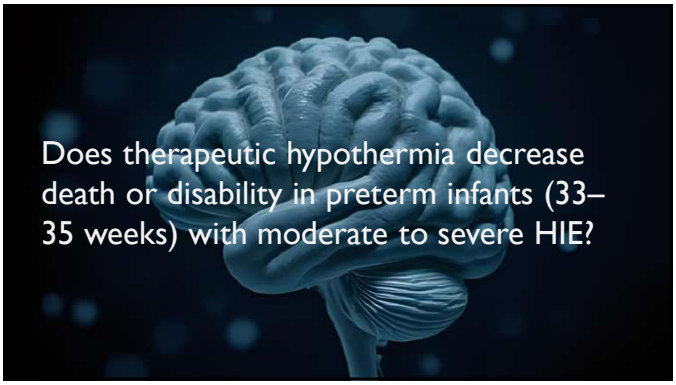

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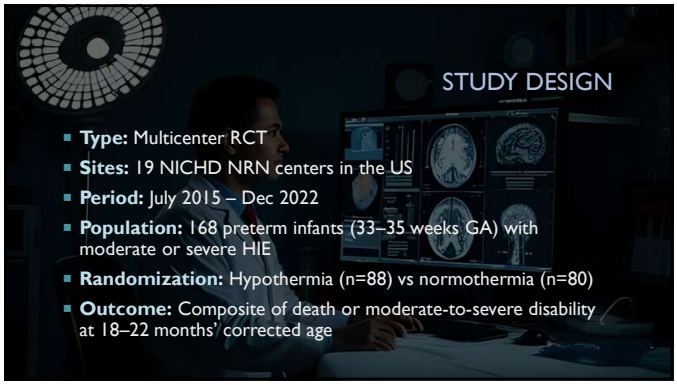

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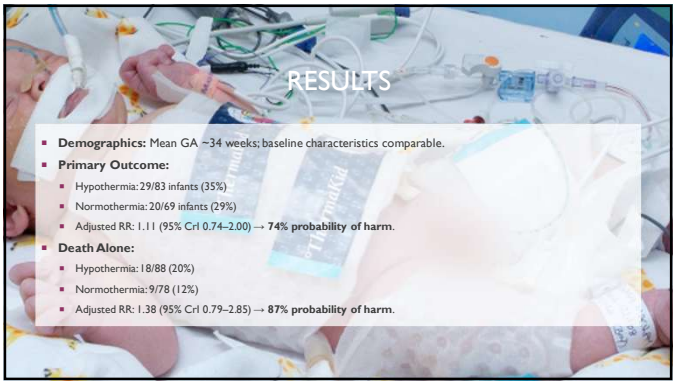

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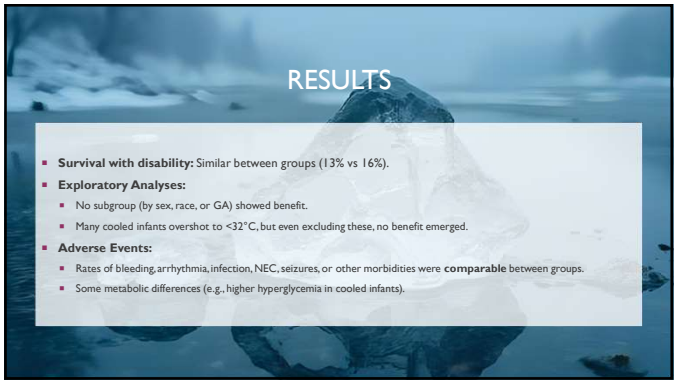

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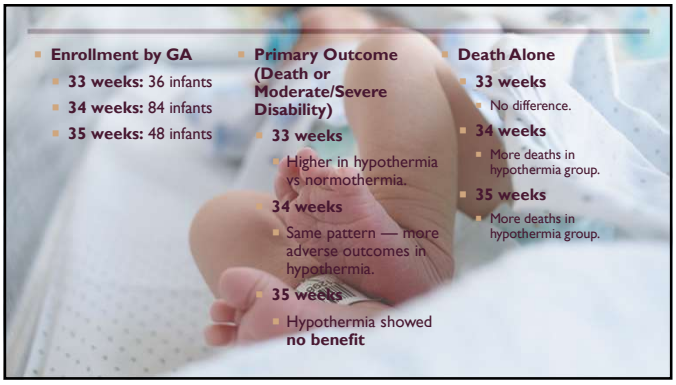

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STRENGTHS

- First large RCT in late preterm infants with HIE
- Multicenter, standardized design with blinded outcome assessors
- Careful measures to avoid hyperthermia in the control group.

21

LIMITATIONS

- Moderate sample size (n=168); limited power to detect small effects.
- Some loss to follow-up (11% normothermia, 6% hypothermia).
- Intervention unblinded to clinicians (though outcome assessors were blinded).
- 47 eligible infants were excluded because clinicians opted for hypothermia outside trial.

22

KEY TAKEAWAY

Across **all GA**, **hypothermia did not reduce disability** and tended to increase mortality. The only exception: at **33 weeks**, mortality was not worse with hypothermia, but disability outcomes still were not improved.

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CONCLUSIONS

01

Hypothermia should not be used for HIE in infants <36 weeks' gestation outside of strict protocols.

02

For 33–35 week infants, cooling may increase mortality without reducing disability.

03

Future research should explore alternative neuroprotective therapies for this vulnerable population.

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PRACTICE IMPLICATIONS

Re-evaluate	hypothermia use in <36 week neonates—current evidence does not support it
Develop	NICU guidelines to align hypothermia eligibility strictly with evidence
Educate	staff and align practice with new risk data to ensure safety
Highlight	importance of stratifying by GA in neuroprotection trials

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www.nature.com/jp Journal of Perinatology

ARTICLE

Therapeutic hypothermia for preterm infants 34–35 weeks gestational age with neonatal encephalopathy

Seh Hyun Kim[1], Hoda El-shibiny[1], Terrie Inder[1,2] and Mohamed El-Dib[1]✉

OBJECTIVE: To evaluate the short-term outcomes and safety of therapeutic hypothermia (TH) for neonatal encephalopathy in preterm infants at 34–35 weeks of gestation.
STUDY DESIGN: A matched retrospective cohort study of 20 preterm infants at 34–35 weeks of gestation and 40 infants at 36 weeks of gestation or more who received TH between the years 2015–2021.
RESULT: Short-term outcomes of preterm infants at 34–35 weeks of gestation who received TH were comparable with infants at 36 weeks or more of gestation who received TH regarding seizures, intraventricular hemorrhage, blood transfusions, subcutaneous fat necrosis, brain injury on magnetic resonance imaging, and mortality. These findings were consistent when short-term outcomes were adjusted for birthweight.
CONCLUSION: TH in preterm infants at 34–35 weeks of gestation is feasible and safe in our study population.

Journal of Perinatology (2024) 44:528–531; https://doi.org/10.1038/s41372-024-01874-x

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28

Survival of Infants Born at 22 to 25 Weeks' Gestation Receiving Care in the NICU: 2020–2022

Edwards EM, Ehret DEY, Soll RF, Horbar JD. **Survival of Infants Born at 22 to 25 Weeks' Gestation Receiving Care in the NICU: 2020–2022.** *Pediatrics.* 2024;154(4):e2024065963. doi:10.1542/peds.2024-065963

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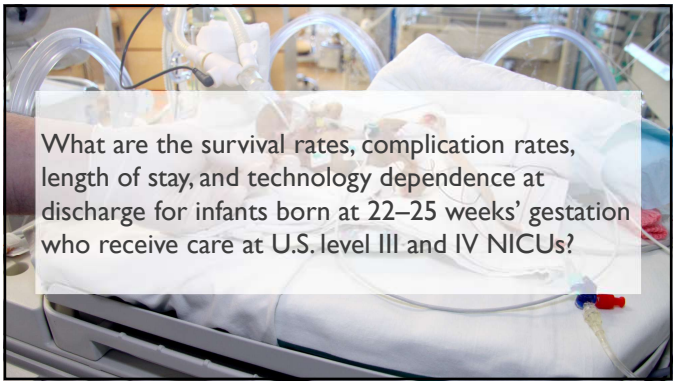

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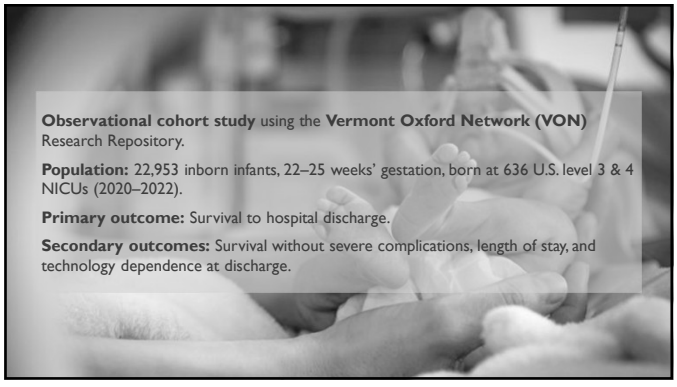

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RESULTS

Active Resuscitation	Overall Survival	Survival If Active Resuscitation
• 22 weeks: 68% (61.6% in 2020 → 73.7% in 2022) • 25 weeks: 99.8%	• 22 weeks: **24.9%** • 23 weeks: **52.8%** • 24 weeks: **71.1%** • 25 weeks: **82.1%**	• 22 weeks: **35.4%** • 23 weeks: **55.1%** • 24 weeks: **71.5%** • 25 weeks: **82.0%**

34

RESULTS

Survival Without Severe Complications	Length of Stay	Technology Dependence at Discharge

• 22 weeks: **6.3%**
• 23 weeks: **14.4%**
• 24 weeks: **26.2%**
• 25 weeks: **40.9–43.2%**
	• 22 weeks: ~160 days
	• 25 weeks: ~110 days
		• Oxygen:
		  • 74% at 22 weeks → 45% at 25 weeks.
		• G Tube:
		  • 13% at 22 weeks → 6% at 25 weeks.
		• Tracheostomy:
		  • 4% at 22 weeks → 1–2% at ≥ 23 weeks.

35

STRENGTHS

- **Large, contemporary cohort**
- **Nationally representative sample**
- **Standardized data collection**
- **Focus on clinically meaningful outcomes**
- **Temporal trends captured**
  - Showed increasing resuscitation at 22 weeks (from 61.6% in 2020 → 73.7% in 2022).

36

LIMITATIONS

- **Restricted to level III/IV NICUs**
- **Observational design**
  - No randomization
  - Causality between interventions (e.g., steroids, magnesium, delivery mode) and outcomes cannot be firmly established.
- **No long-term neurodevelopmental outcomes**
- **Limited detail on decision-making factors**
  - Hospital-level and provider-level variations in resuscitation practices not fully explained.
  - Parental preferences and counseling strategies not captured.
- **Study period included the COVID-19 pandemic**

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KEY TAKEAWAYS

- **Survival at 22 weeks is higher than previously reported**
- **Survival without severe complications remains low at the earliest gestations.**
- **Hospital stay is long and resource-intensive.**
- **Maternal interventions matter.**
  - At 22 weeks, only 41% received both antenatal steroids and magnesium sulfate, compared with ~80% at 25 weeks.
- **Care is shifting toward greater intervention at the margins of viability.**

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WHY FOCUS ON SMALL BABIES?

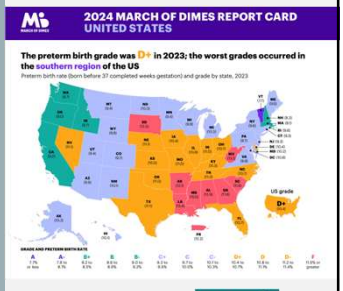
39

PRETERM BIRTH IN THE US

3.6 million births in 2024

Approximately 10% preterm

Extremely preterm infants (<28 wks) contribute disproportionally to both neonatal and infant mortality



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The preterm birth rate was 10.4% in 2023, no change from 2022

Preterm birth rate by year, 2013 to 2023

Source: National Center for Health Statistics, Natality data, 2013-2023; National Center for Health Statistics, US Territories Natality data, 2023.

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Decade	Definition of Periviability	Resuscitation / NICU Practice Trends	Survival at Threshold (22–24 wks)
1970s	Viability cited around 26–28 wks; 'periviable' not yet a standard term.	First RCT of antenatal corticosteroids (1972). No surfactant. Resuscitation inconsistent and center-dependent.	Survival ≤24 wk essentially 0%; survival expected at 26–28 wk in select centers.
1980s	Lower limit ~24–25 wks in tertiary centers.	NRP launched 1987. Surfactant trials late decade. Antenatal steroid use expanding.	23–24 wk survival rare, highly center-specific; 22 wk almost universally non-survivable.
1990s	Emerging 'periviability' concept, usually 23–24 wks.	Surfactant routine by early 1990s. 1994 NIH consensus drives routine antenatal steroids. NRP uptake expands.	NRN data (1993+): survival at 23–24 wk improving, still uncommon at 22 wk.
2000s	Active care considered at 23–24 wks; 22 wk still rarely resuscitated.	CPAP-first strategies emerge; gentle ventilation; thermoregulation bundles.	NRN 2006–2011: median survival ~5% at 22 wk (if treated), higher at 23–24 wk.
2010s	ACOG 2017 defines periviable birth as 20 0/7–25 6/7 wk. Active care often 22–24 wk.	SUPPORT trial (2010) validates CPAP at birth. NRP/ILCOR updates emphasize titrated O_2 and deferred cord clamping.	NRN (2000–2011): deaths 97–98% at 22 wk, ~1% survived without NDI (reflects low treatment rates).
2020s	Many centers now offer active care at 22 wk with shared decision-making.	Active treatment at 22 wk rising nationally. DCC standard. 2020 NRP guidelines emphasize targeted O_2. New RCTs on FiO_2 during DCC.	VON 2020–2022: 22 wk survival 24.9% overall, 35.4% if treated; survival without severe complications 6.3%.

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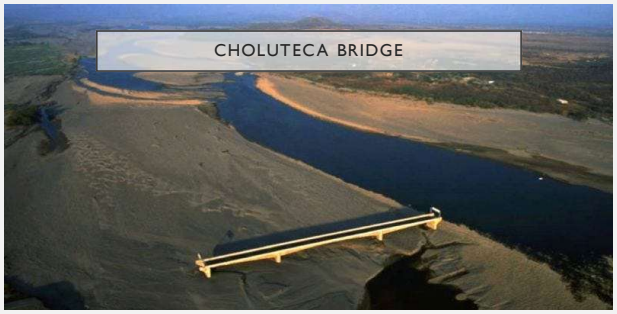

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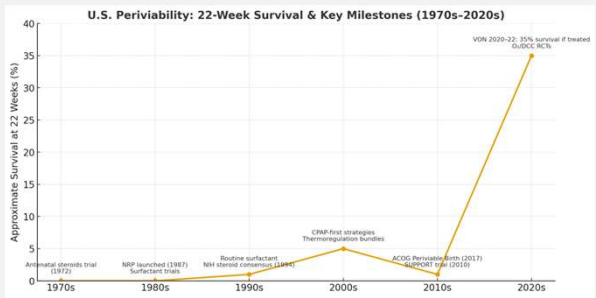

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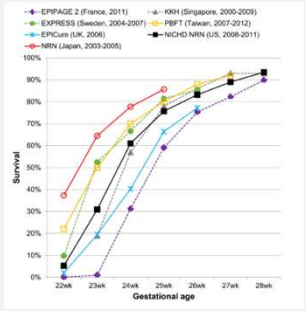
SURVIVAL OF THE ELBW INFANT

PATEL, R., AM J PERINATOL 2016



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Retrospective study from Saitama Medical Center, Japan (2013–2020)

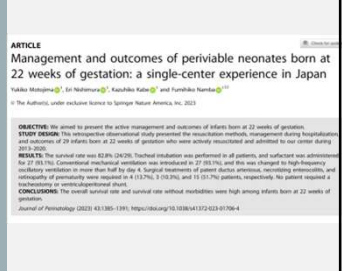
29 neonates born at 22 weeks gestation

Actively resuscitated and admitted to the NICU

Key Findings

Survival: 82.8% (24/29)

No delivery room deaths; all infants received active resuscitation



ARTICLE

Management and outcomes of periviable neonates born at 22 weeks of gestation: a single-center experience in Japan

Yukiko Motojima, Eri Nishimura, Kazuhiko Kabe and Fumihiko Namba

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OBJECTIVE: We aimed to present the active management and outcomes of infants born at 22 weeks of gestation.
STUDY DESIGN: This retrospective observational study presented the resuscitation methods, management during hospitalization, and outcomes of 29 infants born at 22 weeks of gestation who were actively resuscitated and admitted to our center during 2013–2020.
RESULTS: The survival rate was 82.8% (24/29). Tracheal intubation was performed in all patients, and surfactant was administered for 27 (93.1%). Conventional mechanical ventilation was introduced in 27 (93.1%), and this was changed to high-frequency oscillatory ventilation in more than half by day 4. Surgical treatments of patent ductus arteriosus, necrotizing enterocolitis, and retinopathy of prematurity were required in 4 (13.7%), 3 (10.3%), and 15 (51.7%) patients, respectively. No patient required a tracheostomy or ventriculoperitoneal shunt.
CONCLUSIONS: The overall survival rate and survival rate without morbidities were high among infants born at 22 weeks of gestation.

Journal of Perinatology (2023) 43:1385–1391; https://doi.org/10.1038/s41372-023-01706-4

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"After her water broke early, doctors told Fatima Goines to prepare for her newborn's death. Goines was 22 weeks into her pregnancy, just past the halfway mark. Doctors at Methodist Hospital in suburban Minneapolis said ***they couldn't save such a premature baby and that no hospital could***. They told her that once the baby girl was born, Goines could hold her until the infant died.

Goines didn't want to give up. She checked herself out of Methodist Hospital and, on the recommendation of a fellow mom on Facebook, went to a birthing center connected to Children's Minnesota hospital, 7 miles away from Methodist. After Goines gave birth, doctors there immediately intubated the baby to help her breathe and placed her in an incubator.

Me'Lonii is now a ***healthy 4-year-old***, and ***has surpassed all the developmental milestones for her age***. "She's doing wonderfully well," said Dr. Thomas George, who directs the Children's Minnesota neonatal intensive care unit."

Wall Street Journal, 8/7/2024

47

Wall Street Journal, 7/23/2025

- "…would require hospitals to ***disclose publicly whether there is a minimal gestational age at which they offer active care for infants***, rather than comfort measures before their death. While many hospitals require lifesaving measures to be given at 25 weeks' gestational age or above, decisions on whether to attempt to save younger premature infants can vary by hospital or even doctor."

48

https://www.congress.gov/bill/119th-congress/senate-bill/2433/text

- (a) HOSPITAL REQUIREMENT.—Each hospital shall publicly disclose the policy of such hospital regarding the provision of life-saving care to an infant in the case of a premature birth, including—
  - (1) whether there is a minimum gestational age at which life-saving care will be provided to an infant in the case of a premature birth;
  - (2) whether the decision to provide life-saving care to an infant in the case of a premature birth is made on a case-by-case basis; and
  - (3) the process by which the hospital, in the case of a premature birth or expected premature birth, would transfer the infant and mother to the nearest facility with a neonatal intensive care unit that would provide life-saving care to the infant, if the hospital does not have the capacity to provide life-saving care to such infant.
- (b) PRACTITIONER REQUIREMENT.—Each obstetrician, or other health care practitioner who provides obstetric services to patients, shall, at the first prenatal visit of a patient, disclose to the patient the policy of any hospital at which the obstetrician or practitioner has admitting privileges regarding the provision of life-saving care to an infant in the case of a premature birth, including—
  - (1) whether there is a minimum gestational age at which life-saving care will be provided to an infant in the case of a premature birth;
  - (2) whether the decision to provide life-saving care to an infant in the case of a premature birth is made on a case-by-case basis; and
  - (3) the process by which the hospital, in the case of a premature birth or expected premature birth, would arrange for the transfer the infant and mother to the nearest facility with a neonatal intensive care unit that would provide life-saving care to the infant, if the facility in which the practitioner is providing services does not have the capacity to provide life-saving care to such infant.

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SMALL BABY TEAMS

50

EVIDENCE BASED PRACTICE GUIDELINES

- Single center; Ohio State University
- 37 infants <27 wks in first week of life to Small Baby Guideline Group vs 40 controls
- **Survival without BPD and severe IVH was greater in the SBG Group**
- **Length of stay shorter in SBG Group**

51

DEDICATED ELBW TEAMS

Single center 67 bed Level IV NICU

28 weeks or < 1000 grams.

Pre- intervention 117 infants, post 232 infants over 3 year period.

Core team with EB guidelines, and checklists.

Care in a distinct unit by a consistent multidisciplinary SBU team

Decrease in BPD, sepsis, and improved growth.

52

PRACTICE IMPLICATIONS

Counseling Families	Standardization of Care	Quality Improvement & Equity	Policy Considerations
• Provide updated, data-driven survival and morbidity rates. • Stress differences between survival *with* vs. *without* complications. • Discuss prolonged hospitalization, technology needs at discharge, and long-term developmental risks.	• Develop Small Baby Teams. • Align obstetric and neonatal management (antenatal steroids, magnesium sulfate use, delivery planning).	• Focus on shared decision-making, clear communication, and family-integrated care. • Address regional disparities: ensure deliveries occur at level 3/4 NICUs.	• Support risk-appropriate perinatal regionalization to reduce care variability. • Address social determinants of health, parental stress, and financial burdens associated with prolonged NICU stays.

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BOTTOM LINE

Survival for infants born at 22–25 weeks has improved substantially, particularly at high-level NICUs, but survival without severe morbidity remains low—especially at 22–23 weeks. NICUs must balance aggressive care with realistic counseling, structured "small baby" care programs, and ongoing family-centered, equitable approaches to improve both survival and long-term outcomes.

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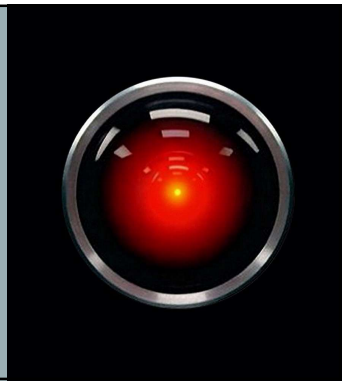
ARTICLE III

55

Artificial Intelligence (AI):
Computer systems designed to perform tasks requiring human-like intelligence (e.g., pattern recognition, reasoning).

Large Language Models (LLMs):
A type of AI trained on massive text datasets. They "predict the next word" in context, which allows them to answer questions, write summaries, and even reason through medical cases.



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Can Large Language Models (LLMs), like the **Articulate Medical Intelligence Explorer (AMIE)**, improve the process of making a **differential diagnosis (DDx)**?

Does AMIE perform better than physicians working alone, and can it *help* physicians make better, more comprehensive differential diagnoses?

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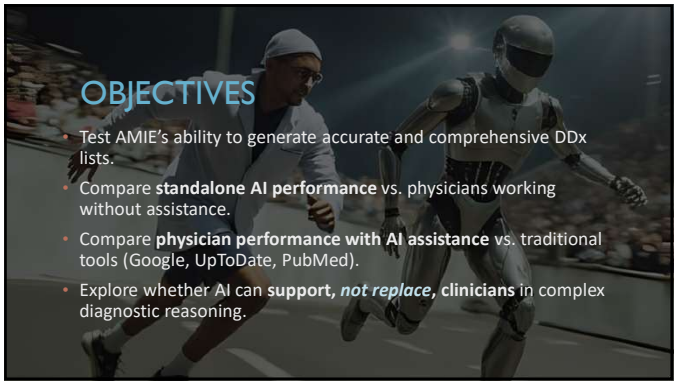

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METHODS

- **Cases:** 302 challenging real-world cases from the *New England Journal of Medicine* Clinicopathological Conferences.
- **Participants:** 20 board-certified internal medicine physicians.
- **Study design:**
  - Physicians first gave an **unassisted DDx**.
  - Then they were randomized to receive help from:
    - **Traditional resources** (search, UpToDate, PubMed).
    - **AMIE (LLM)**, with or without additional searches.

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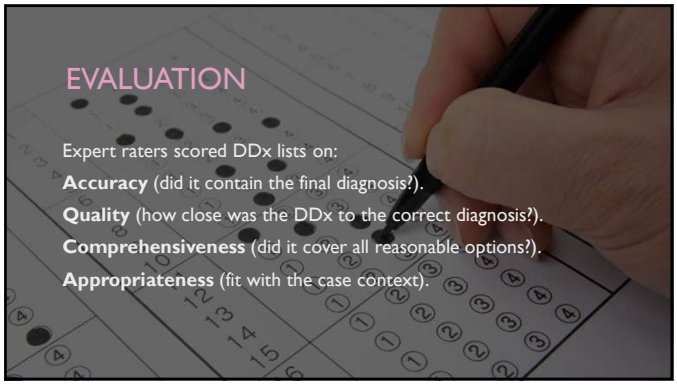

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RESULTS

AMIE alone:
Top-10 accuracy of **59.1%** vs. **33.6%** for unassisted physicians

Physicians assisted by AMIE:
Accuracy improved significantly (top-10 accuracy **51.7%**) compared to physicians with search tools (**44.4%**)

AMIE helped clinicians build **more comprehensive and appropriate DDx lists**.

Efficiency:
Using AMIE took about the same time as search tools (~7 minutes), despite being new to clinicians.

64

WHY I LIKED THIS PAPER

- **Head-to-head design**
  - It directly compares clinician-alone vs. clinician+AI vs. AI-alone.
- **Nuanced findings**
  - Shows that **AI can surpass clinicians in isolation**, but **clinician+AI is best**—emphasizing partnership.
- **Future relevance**
  - It captures the complexity we face: AI as an augmentation tool, not a wholesale replacement.
- **Practical message for providers**
  - The value of AI lies not in replacing us, but in re-shaping workflows to let us practice at the top of our license while AI handles breadth, recall, and pattern-spotting.

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Study	Setting	Who/What Compared	Primary Finding	Limitation
1) AMIE (Nature, 2025)	302 NEJM CPC cases (simulated)	AI alone vs Clinicians vs Clinicians+AI	Clinicians+AI > clinicians alone; AI alone strong	Simulated, text-only; no outcomes
2) LLM RCT (JAMA NO, 2024)	Physician vignettes (randomized)	Physicians w/LLM vs without; LLM-alone benchmark	LLM access didn't boost MD accuracy; LLM-alone highest	Vignettes; short exposure; small N
3) GPT-4 (NEJM AI)	Complex case challenges (text)	GPT-4 vs aggregate physician readers	GPT-4 exceeded nearly all readers	Self-selected benchmark; no real-world data

WHAT OTHER STUDIES ARE OUT THERE?

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IMPLICATIONS FOR HEALTHCARE

Promise:

LLMs can help clinicians broaden their diagnostic thinking, reduce missed possibilities, and support education.

Could be especially valuable in **time-sensitive settings** (NICU, ER) or **resource-limited areas**.

Cautions:

AI may still "hallucinate" or mislead.

AI should be viewed as an ***assistant, not a replacement***.

Human clinical judgment, context, and responsibility remain central.

Future Directions:

Integrating multimodal data

Training clinicians to interact effectively with AI.

Ensuring fairness and avoiding health disparities in AI use.

Exploring educational uses—"upskilling" junior staff with broader DDx thinking.

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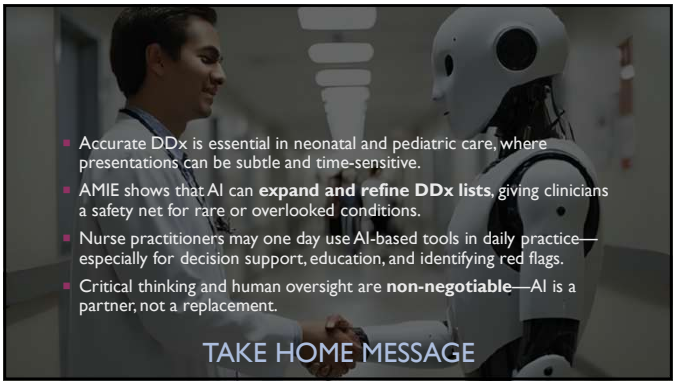

- Accurate DDx is essential in neonatal and pediatric care, where presentations can be subtle and time-sensitive.
- AMIE shows that AI can **expand and refine DDx lists**, giving clinicians a safety net for rare or overlooked conditions.
- Nurse practitioners may one day use AI-based tools in daily practice—especially for decision support, education, and identifying red flags.
- Critical thinking and human oversight are **non-negotiable**—AI is a partner, not a replacement.

TAKE HOME MESSAGE

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