

DRAFT

# NEOsphere Conference

*Shaping the Future of Neonatal Care*

Pre-read | December 2023



# NEOsphere Conference

Shaping the Future of Neonatal Care

Friday, Nov 1<sup>st</sup>, 2024 | Stanford

## Context

The world is undergoing radical technological change. This will profoundly impact the sort of science, technology and care that could affect the outcomes in early childhood care. We have an opportunity to radically rethink the way we deliver early childhood care.

## Summary

A one-day conference hosted by CPQCC at Stanford, providing practitioners, technologists, and policymakers with a unique chance to envision the future of NICU and early childhood care, emphasizing the foundation of a healthy life from birth to the transition home.

## Impact

NEOsphere conference aspires to foster innovation, enhance health outcomes, and provoke a reexamination of care practices. The conference is holding the potential to transform the early childhood care landscape significantly.

### Software

Future Care: Software's Pivotal Role?

### Hardware

Hardware Innovation: Redefine Care Standards

### Workforce

Empower the Future Workforce in Care

### Parents

Partner with Parents: Care's Vital Connection

### Infrastructure

Transform Facilities: Blueprint for Future Care

### Policy

Reimagine Policies for Equitable Healthcare



# Introduction

10.5%

1 in 10 babies (10.5% of live births) are born preterm in the United States.<sup>1</sup>

35.8%

When causes of death related to preterm birth are grouped together, preterm-related causes account for 35.8% of infant deaths in United States.<sup>2</sup>

\$41

The annual societal economic cost (medical, educational, and lost productivity) associated with preterm birth in United States is an estimated \$25.2B.<sup>3</sup>



Health consequences of preterm birth include developmental delays, chronic respiratory problems and vision and hearing impairment. Having a preterm baby impacts families emotionally and financially.

1 March of Dimes Foundation 2023, 2 Callaghan et al., 2006, 3 Zupancic et al, Institute of Medicine Report 2007 adjusted to 2024 USD.

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## Role of NICUs

Neonatal Intensive Care Units (NICUs) provide life-saving interventions such as respiratory support, temperature regulation, and nutrition management for fragile newborns. They have a multidisciplinary team of healthcare professionals, including neonatologists, nurses, respiratory therapists, and nutritionists.

## Role of HRIF

California's High Risk Infant Follow-up (HRIF) Program oversees outpatient "follow-up" of infants requiring additional developmental care after discharge from the NICU through local HRIF clinics. HRIF clinics ensure that high risk infants grow as expected after discharge, meet developmental milestones, and are connected to necessary medical and social support services.



Innovations in NICU and HRIF have a significant impact on newborns and their families by improving medical care and monitoring, leading to better health outcomes and reduced risks for these vulnerable infants.



# CPQCC | California Perinatal Quality Care Collaborative



California Perinatal Quality Care Collaborative (CPQCC) is a statewide network of California's NICUs and High Risk Infant Follow-up (HRIF) clinics housed at the Stanford.



Our mission is to improve the quality and equity of health care delivery for California's most vulnerable infants and their families, from birth and NICU stay to early childhood.



500K  
BIRTHS

CMQCC<sup>1</sup>



17K  
NICU  
ADMITS

CPQCC/CMQCC



140/220  
NICUs/  
BIRTH  
HOSPITALS



7K  
ACUTE  
NEONATAL  
TRANSPORTS

CPeTS<sup>2</sup>



9K  
HIGH-RISK  
INFANTS

HRIF

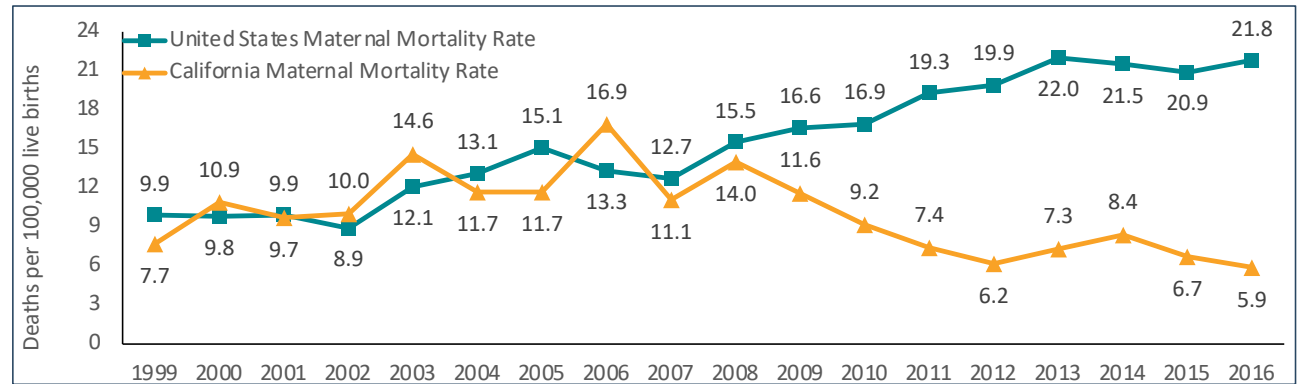
1 California Maternity Quality Care Collaborative, 2 California Perinatal Transport System



# CPQCC/CMQCC Impact



CDC report shows California is the *only state to significantly decrease perinatal mortality* between 2014 to 2016.



15%<sup>1</sup>

lower mortality rate for VLBW infants

9%

more infants discharged without major morbidities<sup>2</sup>

45%

decrease in necrotizing enterocolitis (NEC)

19%

fewer infants with severe intraventricular hemorrhage

36%

fewer infants with severe retinopathy of prematurity (ROP) or ROP

44%

decrease in hospital infections

<sup>1</sup> Lee et al, 2020. CPQCC NICU level improvements between 2008-2017,  
<sup>2</sup> like severe ROP, NEC, CLD, and severe IVH



# HRIF | High Risk Infant Follow-up

## WHAT

HRIF clinics provide follow-up care to all infants born before 32 weeks of gestation, or with a birth weight less than 1500 grams, as well infants with a range of neurologic and/or cardiovascular risk factors.

## WHY

HRIF visits allow an interdisciplinary team to recognize and address special needs, and to refer families to additional resources as needed. Without these visits, special needs often go unidentified.

## WHO

Eligibility for HRIF services begins at birth and lasts up until three years of age. Infants are medically eligible for the HRIF Program according to state guidelines: [Click for more details](#)

## WHEN

Visits most often occur between 4-8 months, 12-16 months, and 18-36 months after birth and include the following: A comprehensive history and physical examination, developmental, hearing, ophthalmologic, family psychosocial and home assessment

## HOW

All CCS<sup>1</sup>-approved NICUs are required to either have their own HRIF clinic or be able to refer infants to an external HRIF clinic. The NICU will identify any infants that are potentially eligible for HRIF and refer them to the appropriate HRIF clinic.

<sup>1</sup> California Children's Services



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# HRIF | Impact of Preterm Birth on Families

“ A correlation between negative conditions at birth (e.g., birth weight and NICU stay) and higher scores in some scales of Impact of Event Scale Revised, Profile of Mood States and Post-Partum Bonding Questionnaire were found.

*Ionio et al., 2016*

“ Women with preterm births are at increased risk of ill-health and negative feelings about their baby in the early months after birth. They make less use of postnatal services and support than other women.

*Henderson et al., 2016*

“ The findings suggest that a premature birth and the child's hospitalization might exert a negative effect on the mothers' emotional state, their perception of parental self-image and, consequently, the early bond with the child.

*Trumello et al., 2018*

“ Interventions to reduce social isolation, lessen financial burden, improve home safety, and increase enrollment in early intervention and Medicaid all have the potential to lessen the impact of preterm birth on parents and families.

*Lakshmanan et al., 2017*

“ Assisting families with both problem-focused and emotion-focused coping has the potential to help the family of a preterm infant regain equilibrium as a family unit. After discharge, the preterm baby's health and quality of life depends on an optimal home environment.

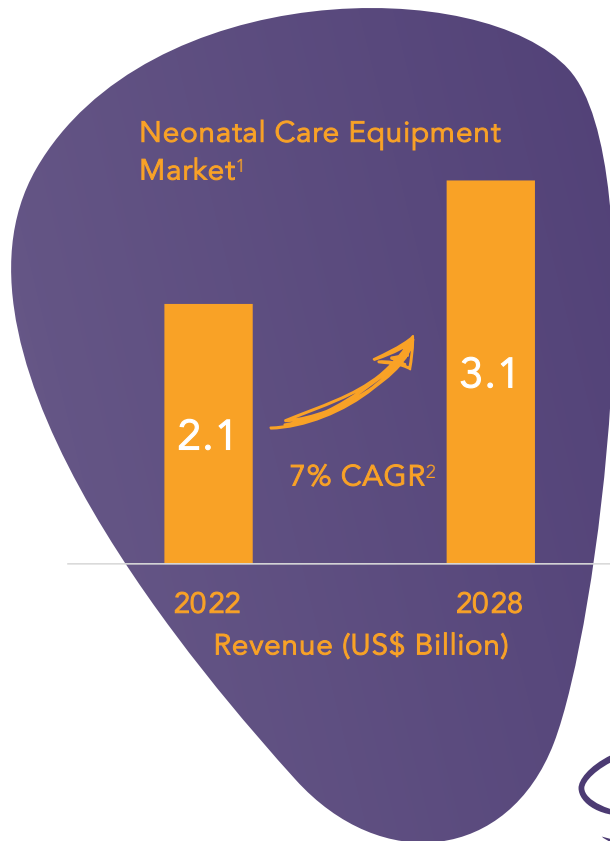
*Howland, 2007*

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“The arrival of a premature baby has a strong impact on the parents' family environment, altering their daily routines and occupations both in hospital and at home. If preterm care programmes take into account these possible occupational imbalances, it will not only meet the needs of the parents but also provide family-centred care.”

*Jiménez-Palomares et al., 2021*

# Market overview



Infant warmers

Neonatal Respiratory Care Devices

Neonatal Diagnostic Imaging Devices

Neonatal Monitoring Devices

Neonatal Phototherapy Equipment

Neonatal Incubators

## GROWTH DRIVERS

Growing Number of Premature and Low Weight Births and Increasing Number of NICU Admissions

## RESTRAINTS

Decreasing Birth Rates and High Prices of Products

## FUTURE TRENDS

Increased R&D and Developments in the Neonatal Care Equipment Market

## OPPORTUNITY

The Rising Awareness About Neonatal Care Equipment  
Breakthrough Technological Solutions

<sup>1</sup> World Market, US Market \$772.51 Million in 2022, <sup>2</sup> Compound annual growth rate



# NEOsphere Conference | Key topics

## Software

*Future Care:  
Software's Pivotal  
Role?*

## Hardware

*Hardware Innovation:  
Redefining Care  
Standards.*

## Workforce

*Empowering the  
Workforce in Care.*

## Parents

*Partnering with  
Parents: Care's Vital  
Connection.*

## Infrastructure

*Transforming  
Facilities: Blueprint  
for Future Care.*

## Policy

*Reimagining Policies  
for Equitable  
Healthcare.*

# Software

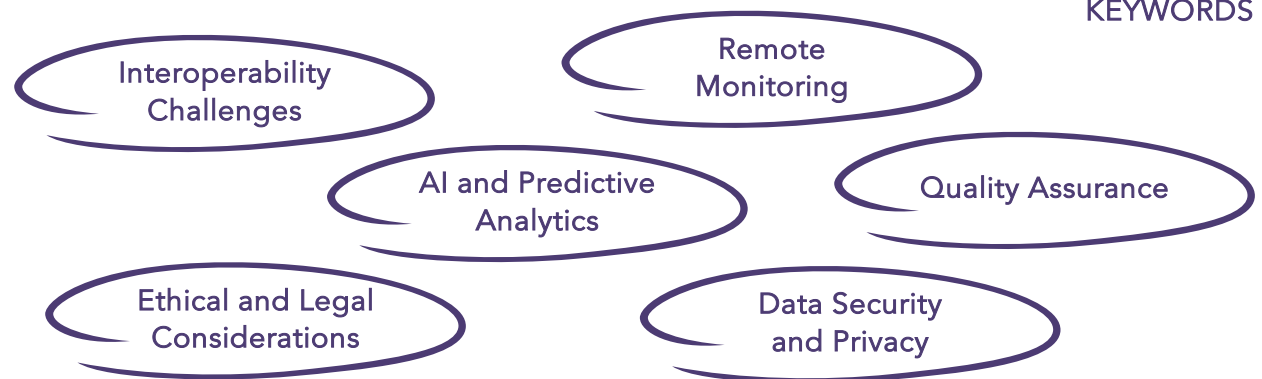
## SITUATION

The modern landscape of software in NICUs and early homecare for newborns showcases advancements yet enduring obstacles. Technological innovations have fostered enhanced data tracking and administration. However, consistent challenges like the compatibility between different software platforms and medical instruments impede fluid data transfer. Upholding data protection and confidentiality is essential when managing delicate patient data.

## POTENTIAL

Envision a realm where AI-driven programs not only track essential health indicators but also forecast health trajectories, fostering anticipatory medical attention. Through intuitive applications, remote observation permits parents to be deeply involved in their child's well-being, instilling a feeling of agency. Moreover, such software can propel the exploration and creation of individualized tailor-made care pathways.

## KEYWORDS



# Hardware

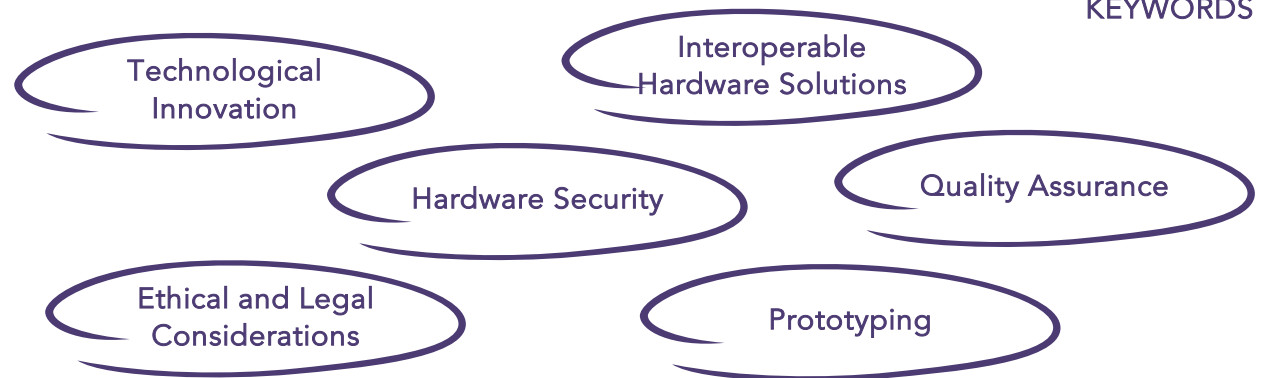
## SITUATION

In the domain of neonatal care hardware, there's a continually evolving array of tools and technologies. Modern innovations have paved the way for enhanced precision in non- or minimally invasive monitoring, reducing risk and elevating neonatal care. However, significant barriers remain to harness the full potential of hardware innovations, including interoperability and non-invasiveness (NICU infants don't have a lot of blood and are prone to infection).

## POTENTIAL

Neonatal care hardware holds significant potential. Modern devices offer accurate monitoring, diagnostics, and tailored treatments for newborns. By integrating these advanced tools, healthcare professionals can make informed decisions in real-time, enhancing the health prospects for neonates. As technological advancements unfold, the promise of equipment in transforming neonatal care stands as a fundamental aspect in safeguarding the health of our youngest patients.

## KEYWORDS



# Workforce

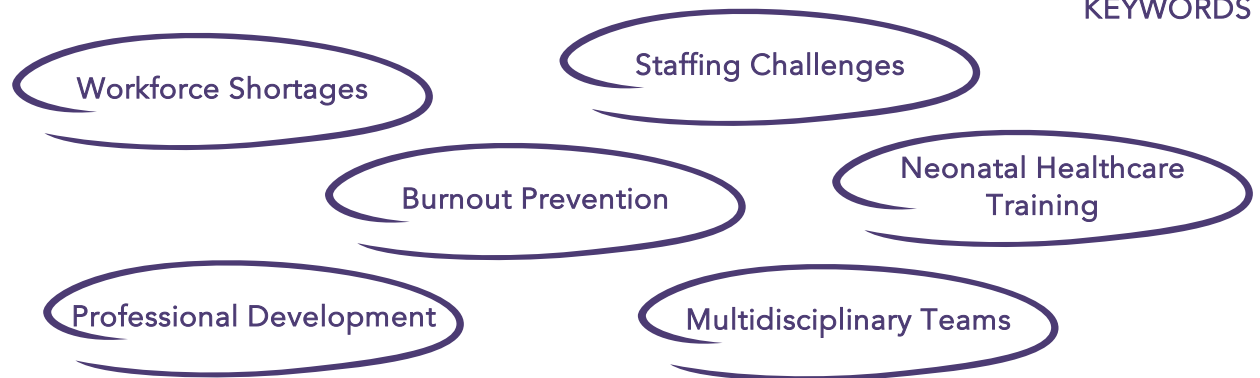
## SITUATION

With the growing complexity of care and increased neonatal admissions, healthcare providers are grappling with challenges in ensuring an adequately staffed workforce. The dedication and expertise of neonatal healthcare professionals remain unparalleled, yet efforts to address workforce shortages and burnout are of paramount importance. As we navigate this landscape, optimizing workforce resources and prioritizing the well-being of those on the frontlines is essential.

## POTENTIAL

The potential to invest further in the neonatal care workforce is a crucial avenue for enhancing patient care and outcomes. By increasing support, training, and resources for neonatal healthcare professionals, we can bolster their ability to provide quality care and meet the rising demand in neonatal services. Technology can assist in reducing workforce clerical demands and allow providers to focus on high-touch value added activities.

## KEYWORDS



# Parents

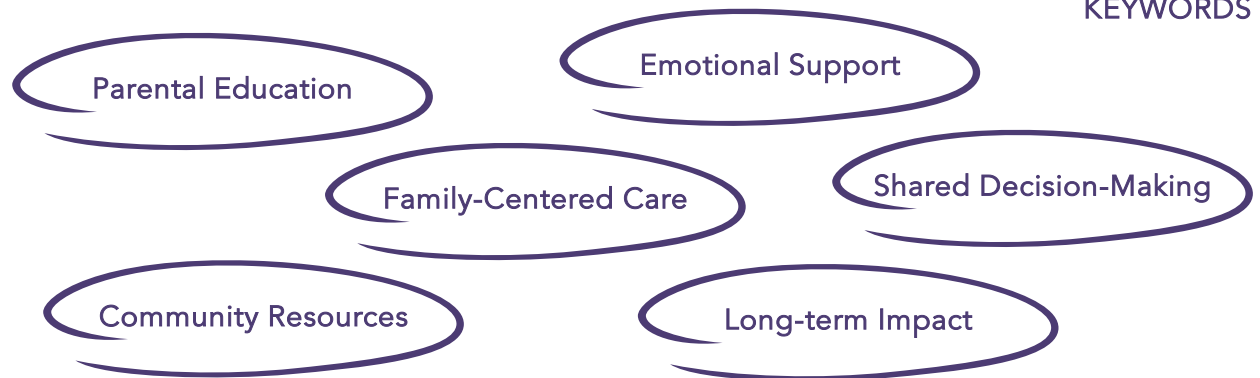
## SITUATION

Parents of premature infants face intense care demands, emotional strain, and financial stress, compounded by their child's uncertain health prospects. Equity in healthcare access is a pressing challenge, with disparities affecting family outcomes during and after the NICU stay. Ensuring all families receive equitable quality care is essential for the fair treatment and optimal start of these vulnerable newborns.

## POTENTIAL

Empowering parents of premature or early-born infants is pivotal for their child's well-being. Providing comprehensive education on neonatal care, involving parents in medical decisions, and offering emotional support can significantly boost their confidence and resilience. Equipping parents with knowledge and connecting them to resources helps them actively participate in their child's care, reduces stress, and enhances the family's overall experience.

## KEYWORDS



# Infrastructure

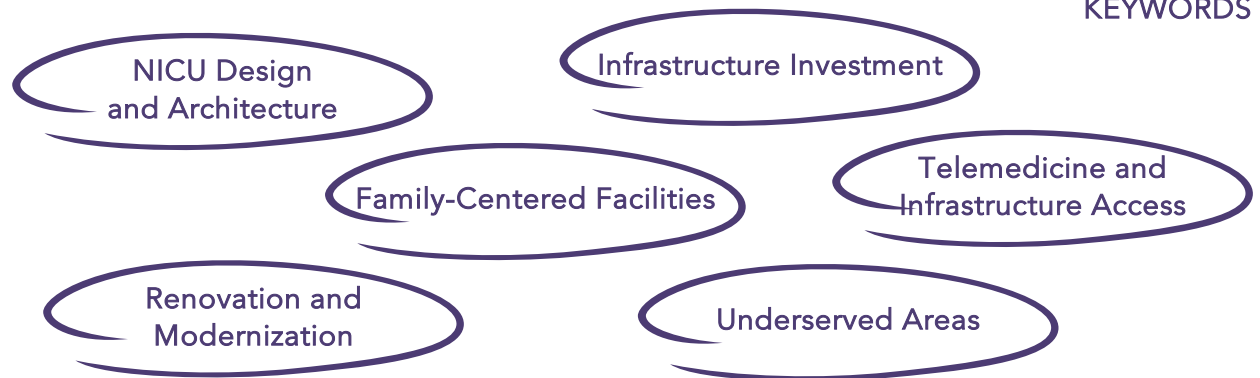
## SITUATION

The current infrastructure in neonatal care is a critical determinant of healthcare outcomes. Leading medical centers boast state-of-the-art NICUs equipped with advanced technology and specialized medical equipment. In contrast, underserved regions often grapple with infrastructure deficiencies, which hinder their ability to deliver high-quality neonatal care.

## POTENTIAL

Investing in the development and modernization of neonatal care units paves the way for healthcare settings that are safe, streamlined, and welcoming for families. These strategically designed spaces empower healthcare professionals to provide top-notch care while also comforting families during potentially trying periods.

## KEYWORDS



# Policy

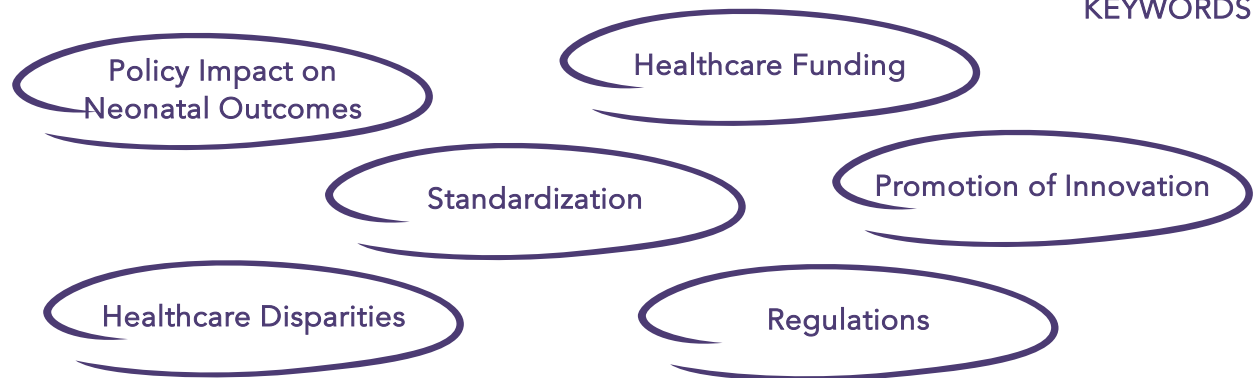
## SITUATION

The landscape of neonatal care is guard-railed by a broad array of policies that cover everything from facility licensure to quality of medical care, data privacy, and family leave. These policies vary by state and represent a patchwork of regulations often not specifically designed for non-NICU populations and families. Given the unique needs of these infants and families, more targeted policies may be needed.

## POTENTIAL

Well-formulated neonatal care policies play a pivotal role in spurring innovations that prioritize the welfare of newborns and their families. By integrating evidence-based practices and promoting national cooperation, we can elevate the standards of neonatal care. Such policies not only encourage advancements in research and technology but also lay the groundwork for strengthening healthcare infrastructure.

## KEYWORDS



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**Nov 1<sup>st</sup>, 2024**





How ChatGPT expects the NICU of the future look like..