



# The Occupational Therapist's Role in Optimizing the NICU Sensory Environment

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# How Are You Doing in Your Sensory Environment?



**\*Take a second to notice the room you are in\***

- What's the first thing you're aware of right now that isn't the screen or people in front?
- Is there any part of your body that feels especially supported—or unsupported?
- What sounds are present in the room, near or far?
- How would you describe the lighting—bright, flat, warm, harsh?
- If the room had a mood, what might that be?

**How much of this environment is predictable?**

# Infants Are Impacted By the World Around Them



- In the womb prior to full term birth
  - All nutrients provided in the environment
  - Timed sensory exposures important for development
- In the loving arms of a parent after full-term birth
  - Positive feeding experiences
  - Supportive positioning and handling
  - Nurturing
- Being in the NICU changes how a baby experiences the world
  - The baby no longer has the protection of the parent's body
  - The baby experiences pain, noise, light, and gravity in the outside world
  - Development continues, but in the midst of intense stimuli
  - **Unpredictable sensations!**



# Being Intentional With the NICU Environment



- Mitigate stress to protect the brain
- Foster parent-child relationships to improve brain health and lay the foundation for all learning
- Ensure positive sensory exposures that will optimize early brain development





# Ways to Reduce Negative Stimuli

- Providing support when painful exposures must happen
  - 2 person cares
- Reducing direct light exposure
- Avoiding loud sounds
- Minimizing sensory exposures that are too intense for the infant to handle
  - Individualizing care



\*Important not to swing the pendulum too far and create sensory deprivation\*

# Fostering Parent Engagement in the NICU



- Parent engagement in the NICU is related to better outcomes!
- Parent engagement should be the hallmark of all interventions!
  - Should be meaningful
- Parents can provide positive sensory exposures through their interactions with their infants



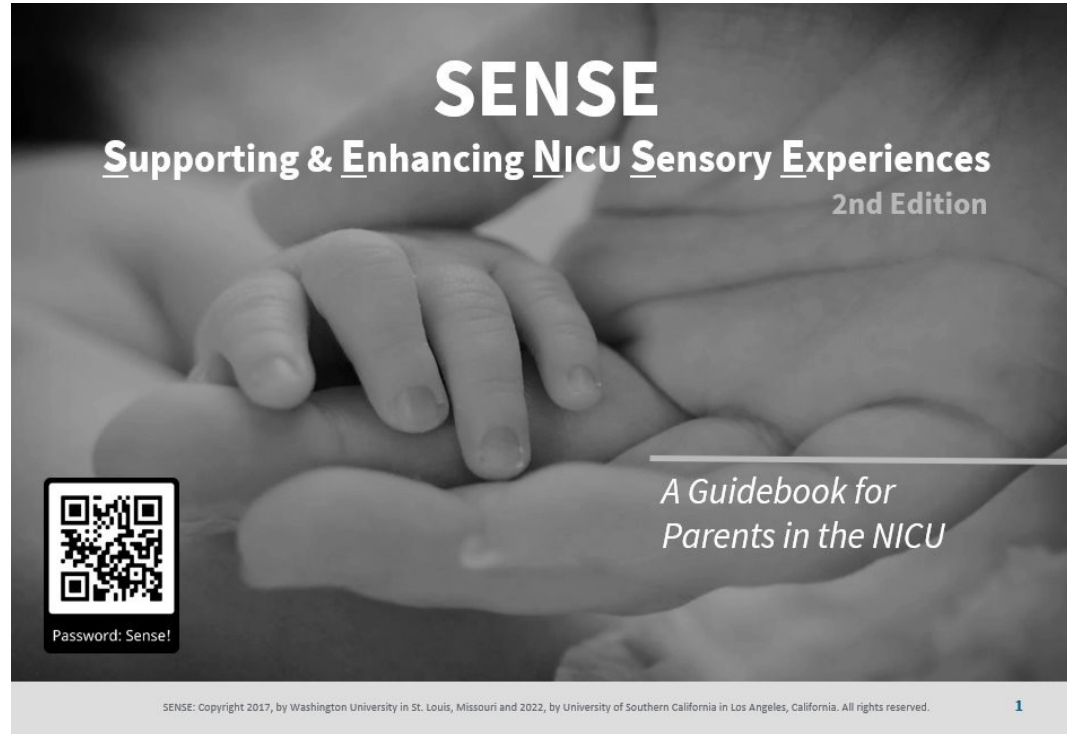
# Ensuring Positive Sensory Exposures



## The Supporting & Enhancing NICU Sensory Experience (SENSE) Program:

- Choice of different tactile, auditory, visual, kinesthetic and olfactory/gustatory experiences for the infant every day of hospitalization in the NICU
- Evidence-based: incorporates what we know to date
- Doses based on postmenstrual age
- Parent-delivered
- Can be tailored to infants with different medical courses
- Incorporated into daily life within the NICU
- Typically overseen by a neonatal therapist who does parent education and assesses each infant's tolerance of the program
- Individualized

# A NICU Intervention Developed by an OT



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Science and Occupational Therapy

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# Systematic and Scientific Process to Develop the SENSE Program



- Define current evidence (1995-2015)
- Get expert opinion
- Get perceptions from parents
- Interdisciplinary focus groups
- Pilot study
- Randomized clinical trial
  
- Updated integrative review (2015-2020)
- Engagement with the SENSE Advisory Task Force
  - Parents and clinicians

## Enhancing sensory experiences for very preterm infants in the NICU: an integrative review

R. Pineda , R. Guth, A. Herring, L. Reynolds, S. Oberle & J. Smith

*Journal of Perinatology* 37, 323–332 (2017) | [Cite this article](#)

## Maternal Perceptions About Sensory Interventions in the Neonatal Intensive Care Unit: An Exploratory Qualitative Study

Julia Liele,<sup>1</sup> Kylie Burns,<sup>2</sup> Joan Smith,<sup>3</sup> Marithea Richter,<sup>1</sup> Pruthi Satouh,<sup>1</sup> and Roberta Pineda<sup>1, 2, 4, 5, \*</sup>

## Health Care Professionals' Perceptions about Sensory-Based Interventions in the NICU

Roberta Pineda, Jessica Roussin, Elizabeth Heiny, Joan Smith

## Health Care Professional Perceptions About a Proposed NICU Intervention: The Importance of Community and Allowing With Everyday Occupations

Marithea Richter,<sup>1</sup> Joan Smith,<sup>2</sup> and Roberta Pineda,<sup>1</sup> [View all authors and affiliations](#)  
Volume 64, Issue 3 | <https://doi.org/10.1177/109449221062051>

## A pilot study demonstrating the impact of the supporting and enhancing NICU sensory experiences (SENSE) program on the mother and infant

Roberta Pineda<sup>a,b,c,d,\*</sup>, Michael Wallendorf<sup>e</sup>, Joan Smith<sup>f</sup>

## Randomized clinical trial investigating the effect of consistent, developmentally-appropriate, and evidence-based multisensory exposures in the NICU

Roberta Pineda , Joan Smith, Jessica Roussin, Michael Wallendorf, Polly Kellner & Graham Colditz

## NICU sensory experiences associated with positive outcomes: an integrative review of evidence from 2015–2020

Roberta Pineda , Polly Kellner, Rebecca Guth, Audrey Gronemeyer & Joan Smith

*Journal of Perinatology* (2023) | [Cite this article](#)

# Evidence for the SENSE Program



- SENSE Program related to:
  - Better neurodevelopmental outcomes
  - Improved parent confidence
  - Improved parent engagement for at-risk populations
  - The earlier the implementation, the more parent participation

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**Randomized clinical trial investigating the effect of consistent, developmentally-appropriate, and evidence-based multisensory exposures in the NICU**

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Journal of Perinatology (2021) | Cite this article

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RESEARCH ARTICLE | ONLINE JANUARY 25 2024

**Organizational Barriers to and Facilitators of the Successful Implementation and Sustainability of the Supporting and Enhancing NICU Sensory Experiences (SENSE) Program**

Roberta Pineda; Polly Kellner; Bethany A. Gruskin; Joan Smith

+ Author & Article Information

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Early Human Development  
Volume 144, May 2020, 105000

**A pilot study demonstrating the impact of the supporting and enhancing NICU sensory experiences (SENSE) program on the mother and infant**

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<https://doi.org/10.1016/j.earlhumdev.2020.105000>

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Pineda et al. *BMC Pediatrics* (2021) 21:137  
<https://doi.org/10.1186/s12887-021-02594-3>

BMC Pediatrics

RESEARCH ARTICLE Open Access

**Applying the RE-AIM framework to evaluate the implementation of the Supporting and Enhancing NICU Sensory Experiences (SENSE) program**

Roberta Pineda<sup>1,2,3\*</sup>, Jessica Roussin<sup>4,5</sup>, Jenny Kwon<sup>4</sup>, Elizabeth Heiny<sup>4,6</sup>, Graham Colditz<sup>2</sup> and Joan Smith<sup>8</sup>

Check for updates

Randomized Controlled Trial > Early Hum Dev. 2021 Dec;163:105486.  
doi: 10.1016/j.earlhumdev.2021.105486. Epub 2021 Oct 14.

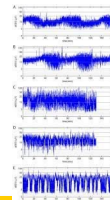
**Socio-demographic factors related to parent engagement in the NICU and the impact of the SENSE program**

Laura Whitehill<sup>1</sup>, Joan Smith<sup>2</sup>, Graham Colditz<sup>3</sup>, Tiffany Le<sup>4</sup>, Polly Kellner<sup>5</sup>, Roberta Pineda<sup>6</sup>

# Current and Future Directions



- Translations: Chinese, Arabic, French, Korean, Turkish, Hindi, Spanish, German
- NIH RO1 funded study: Sensory Optimization of the Hospital Environment (SOOTHE) study
  - RCT-SENSE vs. standard of care
  - Study the immediate impact of sensory exposures on electrocortical activity
  - Have enrolled 160 of 215 babies and their parents
- SENSE Program to be updated every 5 years to reflect the most current evidence
- Training programs
- Investigate implementation across sites



# Beyond the NICU Environment



- Sophisticated repertoire of assessment tools specifically designed for neonates, including prior to full term birth
- Enables early identification
  - Differentiates areas of challenge
  - Provides for understanding early targeted interventions that can optimize outcomes

# Neonatal Therapy



- Growing field for OT, PT, SLP
  - Advanced practice with an available certification to validate experience and knowledge to provide therapy services to high-risk infants in the NICU
- AAP recommends an OT and/or PT as well as an SLP with sufficient neonatal therapy expertise (certification preferred) and dedicated time to the NICU in level III and IV units
- In 2019, there was an average of 1 neonatal therapy FTE for every 17 beds in US-based NICUs
  - Nicudata.com



# 2024 Practice Analysis

- The Neonatal Therapy Certification Board conducts a practice analysis every 5 years to determine the current scope of neonatal therapy
- Quantitative and qualitative analysis
- In 2024, 1095 respondents recruited via mail, email, social media, and conferences
  - 728 different hospitals
- All US states and many different countries represented



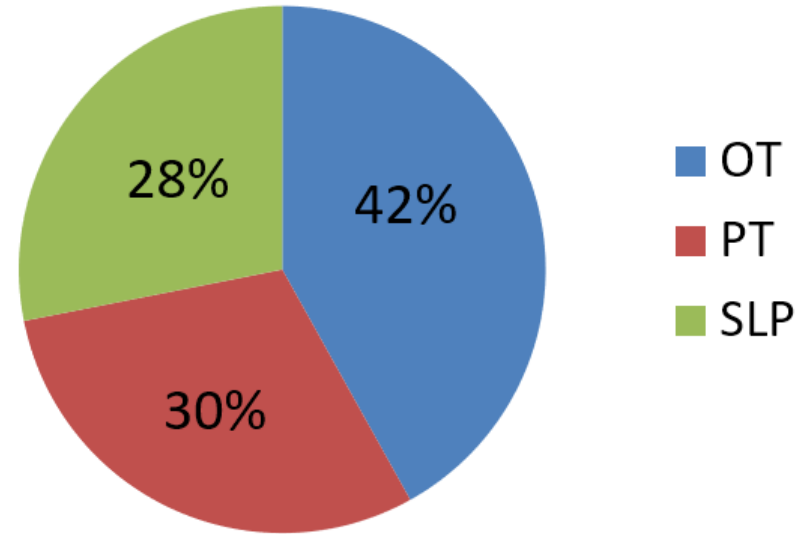
# Countries

- United States
- Australia
- Bhutan
- Canada
- Greece
- India
- Ireland
- Kuwait
- Latvia
- Malta
- Qatar
- Saint Lucia
- Saudi Arabia
- Singapore
- South Africa
- Switzerland
- UAE
- UK and Northern Ireland
- Tanzania
- New Zealand



# Discipline Representation

- **42% OT**
  - **30% PT**
  - **28% SLP**
- 
- **Neonatal therapy disciplines in your NICU**
    - **OT: 765 (94%)**
    - **SLP: 697 (86%)**
    - **PT: 691 (85%)**





# Pathway to Work in the Specialized Area of the NICU



Knowledge acquisition



Competence and training:  
Post-professional training



Mentorship

# Training in Neonatal Therapy



- Knowledge sharing in entry level programming is expanding
  - National Association of Neonatal Therapists now has an education liaison, Jane Cranston, to support education of NICU topics in entry level programs
- Specialized continuing education courses
- National webinars on NICU therapy related content
- Fellowships
- Long distance (using technology) or in-person mentoring
- Mentored work experience

# Becoming a Certified Neonatal Therapist



- To be eligible for certification, you need to meet the following requirements:
  - 3 years as a credentialed/licensed PT, OT, or SLP
  - 3500 hours of clinical experience in the NICU
  - 40 hours of NICU-specific education within the last 3 years
  - Passing score on the Neonatal Therapy Certification Examination, which can be taken at testing centers around the world
  - Currently, there are almost 1500 Certified Neonatal Therapists across the world (including Canada, UAE, Qatar, Singapore, UK, India, South Africa, New Zealand, Switzerland, Ireland, Australia)





# OT's Global Work in the NICU

- OT in the NICU is a growing specialty worldwide due to improved neonatal survival rates and increased recognition of long-term developmental outcomes.
- NICU OT's roles vary across hospitals and cultures, influenced by resources, staffing models, family involvement, and cultural beliefs about infant care and development.
- Evidence-based OT in the NICU is critical to optimize care.
- There is a strong need for international research and collaboration to establish standardized NICU care while allowing for cultural adaptation and context-specific care.



# Keep in Contact

- [Pinedaniculab@gmail.com](mailto:Pinedaniculab@gmail.com)
- Facebook
  - NICU Therapy Lab
  - Supporting and Enhancing NICU Sensory Experiences
- Instagram
  - NICU Therapy Lab