

Gravens by Design: Supporting and Enhancing NICU Sensory Experiences (SENSE) program- an evidence-based guideline for daily parent-delivered positive multisensory exposures for infants in the NICU

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Abstract

The Supporting and Enhancing NICU Sensory Experiences (SENSE) program was developed in 2017 to guide parents in providing age-appropriate positive sensory exposures to their preterm infants each day of NICU hospitalization. The development of the guideline followed a systematic process with an integrative review to identify evidence-supported sensory exposures, interviews and focus groups with stakeholders, and a pilot study and a randomized controlled trial. Recently, another integrative review was conducted to identify newly published studies on sensory exposures in the NICU, and a SENSE advisory team was recruited to inform updates to the guideline to ensure that the latest evidence related to sensory exposures in the NICU was incorporated. Daily sensory activities that are supported by evidence are listed in the parent education booklet, allowing parents autonomy in selecting appropriate sensory activities to engage in with their infants as they grow and develop in the NICU, as well as enabling choices of activities to provide for infants with different levels of medical support. The healthcare team regularly monitors infant tolerance and development as described in the SENSE implementation manual. While implementation training is available, the program can be implemented by NICUs following a self-paced review of the implementation materials. The SENSE program implementation aims to optimize the NICU environment to improve infant brain development and parent confidence while facilitating their transition into their parental roles.

Keywords: high-risk infants, parenting, NICU, sensory stimulation, environmental modification, program, premature

“The SENSE program implementation aims to optimize the NICU environment to improve infant brain development and parent confidence while facilitating their transition into their parental roles.”

Introduction:

High-risk infants receiving care in the NICU are exposed to significant stressors, including painful procedures, disruption of expected sensory experiences, and parent-infant separation. (1,2) The time in the NICU is a period of rapid brain development when neural networks rely on sensory exposures to develop optimally(3). Positive sensory exposures and parent-infant interaction are crucial in an environment where stimuli are primarily adverse and can impact attachment and neurodevelopmental progression. (4–6)

“Positive sensory exposures, such as massage, auditory exposure, and skin-to-skin care, have been related to better parent and infant outcomes.”

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Table of Contents	
• Welcome Letter.....	Page 4
• Glossary.....	Page 5
• Chapter 1 - Parenting In The NICU: What You Can Do For Your Baby.....	Pages 6-12
• Chapter 2 - Experiencing The World: Our Body's Senses.....	Pages 13-22
• Chapter 3 - Growing Up in The NICU: Supporting Your Baby's Developing Senses.....	Pages 23-35
• Chapter 4 - How Your Baby Talks To You: Watching Baby's Signals.....	Pages 36-42
• Chapter 5 - Your Time With Your Baby: When To Interact.....	Pages 43-52
• Chapter 6 - Helping Your Baby's Senses: Week-By-Week Sensory Plan.....	Pages 53-72
• Chapter 7 - Helping Your Baby's Senses: A "How-To" Guide.....	Pages 73-94

Figure 1. Parent education materials with table of contents

Sensory Support: 32 Weeks*

*Denotes change from previous week

Here are some things to do with your baby each day this week
(as long as tolerated)

 <p>Touch</p> <p>Give at least 2 hours of positive touch each day by doing one or more of these things:</p> <ul style="list-style-type: none">• Provide a hand hug.• Do kangaroo care (skin-to-skin) for at least 1 hour.• Hold your baby in a blanket for 15 minutes at a time, or longer if your baby's temperature remains stable.• Do massage for up to 15 minutes.	 <p>Hearing</p> <p>Give at least 1 ½ hours of positive sound each day by doing one or more of these things:</p> <ul style="list-style-type: none">• Read, sing, and/or speak to your baby (can be broken up into <u>30 minute</u> periods several times per day).• Play soft music or recorded voice. <p><i>*At the sound of a whisper or quiet conversation.</i></p>	 <p>Smell</p> <p>Provide at least 3 hours per day of parent scent or the smell of breast milk.</p>	 <p>Seeing</p> <ul style="list-style-type: none">• Cycle light to your baby with natural light (or lights on, when there is no natural light) during the day and dim light or darkness at night.• Avoid direct and bright lights.	 <p>Movement & Body Awareness</p> <ul style="list-style-type: none">• Unwrap your baby and allow stretching and free movement for at least 2 minutes prior to a diaper change at least 3 times per day.• Allow your baby to experience being in at least 2 different positions for at least 10 minutes each.• Rock during holding for at least 3 minutes.
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64

Figure 2. Example of weekly sensory guide

infant outcomes. (7,8) The Supporting and Enhancing NICU Sensory Experiences (SENSE) program was developed in response to the need for a guideline or program that defines specific doses and targeted timing of evidence-based sensory exposures across all the days, weeks, or months of hospitalization. The SENSE program guides the clinician and parent in optimizing the early NICU environment. (9)

“Prior to the development of the SENSE program, a literature review revealed that positive sensory exposures in the NICU were done for limited periods that encompassed only a fraction of the infant's time spent in the NICU.”

Properly timed and age-appropriate positive sensory experiences can decrease stress and optimize positive learning experiences during this critical period of brain development. However, the type and timing of sensory exposure must match the level of maturity based on the infant's postmenstrual age (PMA) and should be modified according to individual infant cues. The evidence-based SENSE program was developed to define positive sensory exposures for each PMA. (9) The SENSE program engages the parent in providing appropriate types and amounts of stimulation and is promising as a modality for optimizing neurodevelopment and parent mental health. (10,11) The amounts of sensory stimuli defined in the program are intended to be targets for the minimal amount

of sensory exposure each day of hospitalization. Prior to the development of the SENSE program, a literature review revealed that positive sensory exposures in the NICU were done for limited periods that encompassed only a fraction of the infant's time spent in the NICU. (12) These exposures were also not systematically changed based on what is age-appropriate across PMA and were limited in their applicability to co-occupations of parenting and activities of daily living within the context of the NICU environment. (13) Differences in the use and interpretation of available evidence, parent education, and empowerment in the NICU lead to variability in how different NICUs implement sensory interventions, often reducing their benefit to the most vulnerable infants. (14) The SENSE program is unique because it aims to modify the early sensory environment by applying positive sensory exposures daily during NICU hospitalization.

“The standardized guideline can be initiated immediately after birth and used throughout NICU hospitalization. It identifies specific target amounts of positive tactile, auditory, visual, olfactory, and kinesthetic interventions for the infant.”

Description of the SENSE program:

The SENSE program is a cohesive, evidence-based, parent-de-

Parent Log

Week of _____

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Day of Week	Who did it today? (Check all that apply)	Time in NICU (Check all that apply)	Tactile (Check all that apply)	Auditory (Check all that apply)	Olfactory (Check all that apply)	Visual (Check all that apply)	Movement (Check all that apply)
			*Recommend at least 3 hours per day.	*Recommend at least 3 hours per day.	*Recommend at least 3 hours per day.		*Recommend at least 2 minutes prior to every diaper change. *Recommend tummy time and at least 3 other positions for at least 10 minutes each per day. *Recommend at least 7 minutes per day.
Friday	<input type="checkbox"/> Mom <input type="checkbox"/> Dad <input type="checkbox"/> Non-Binary Parent <input type="checkbox"/> Grandparent <input type="checkbox"/> Sibling <input type="checkbox"/> Other: _____	<input type="checkbox"/> Morning <input type="checkbox"/> Afternoon <input type="checkbox"/> Evening <input type="checkbox"/> Night Total time in NICU: _____ hrs _____ mins	<input type="checkbox"/> Hand Sugs _____ hrs _____ mins <input type="checkbox"/> Kangaroo Care _____ hrs _____ mins <input type="checkbox"/> Blanket Holding _____ hrs _____ mins <input type="checkbox"/> Massage _____ hrs _____ mins Total Time: _____ hrs _____ mins	<input type="checkbox"/> Reading _____ hrs _____ mins <input type="checkbox"/> Singing _____ hrs _____ mins <input type="checkbox"/> Talking _____ hrs _____ mins <input type="checkbox"/> Recorded Voice _____ hrs _____ mins <input type="checkbox"/> Music _____ hrs _____ mins Total Time: _____ hrs _____ mins	<input type="checkbox"/> Scent Cloth _____ hrs _____ mins <input type="checkbox"/> Breast Milk _____ hrs _____ mins Total Time: _____ hrs _____ mins	<input type="checkbox"/> Protected baby's eyes from direct or bright light. <input type="checkbox"/> Cycled light.	How many times did you allow baby to move freely for at least 2 minutes? What positions did baby spend at least 10 minutes in? <input type="checkbox"/> Tummy <input type="checkbox"/> Back <input type="checkbox"/> Left Side <input type="checkbox"/> Right Side <input type="checkbox"/> Kangaroo Care <input type="checkbox"/> Supported sitting (upright position with head/neck support) How many minutes of rocking did baby receive? _____ mins
Saturday	<input type="checkbox"/> Mom <input type="checkbox"/> Dad <input type="checkbox"/> Non-Binary Parent <input type="checkbox"/> Grandparent <input type="checkbox"/> Sibling <input type="checkbox"/> Other: _____	<input type="checkbox"/> Morning <input type="checkbox"/> Afternoon <input type="checkbox"/> Evening <input type="checkbox"/> Night Total time in NICU: _____ hrs _____ mins	<input type="checkbox"/> Hand Sugs _____ hrs _____ mins <input type="checkbox"/> Kangaroo Care _____ hrs _____ mins <input type="checkbox"/> Blanket Holding _____ hrs _____ mins <input type="checkbox"/> Massage _____ hrs _____ mins Total Time: _____ hrs _____ mins	<input type="checkbox"/> Reading _____ hrs _____ mins <input type="checkbox"/> Singing _____ hrs _____ mins <input type="checkbox"/> Talking _____ hrs _____ mins <input type="checkbox"/> Recorded Voice _____ hrs _____ mins <input type="checkbox"/> Music _____ hrs _____ mins Total Time: _____ hrs _____ mins	<input type="checkbox"/> Scent Cloth _____ hrs _____ mins <input type="checkbox"/> Breast Milk _____ hrs _____ mins Total Time: _____ hrs _____ mins	<input type="checkbox"/> Protected baby's eyes from direct or bright light. <input type="checkbox"/> Cycled light.	How many times did you allow baby to move freely for at least 2 minutes? What positions did baby spend at least 10 minutes in? <input type="checkbox"/> Tummy <input type="checkbox"/> Back <input type="checkbox"/> Left Side <input type="checkbox"/> Right Side <input type="checkbox"/> Kangaroo Care <input type="checkbox"/> Supported sitting (upright position with head/neck support) How many minutes of rocking did baby receive? _____ mins
Sunday	<input type="checkbox"/> Mom <input type="checkbox"/> Dad <input type="checkbox"/> Non-Binary Parent <input type="checkbox"/> Grandparent <input type="checkbox"/> Sibling <input type="checkbox"/> Other: _____	<input type="checkbox"/> Morning <input type="checkbox"/> Afternoon <input type="checkbox"/> Evening <input type="checkbox"/> Night Total time in NICU: _____ hrs _____ mins	<input type="checkbox"/> Hand Sugs _____ hrs _____ mins <input type="checkbox"/> Kangaroo Care _____ hrs _____ mins <input type="checkbox"/> Blanket Holding _____ hrs _____ mins <input type="checkbox"/> Massage _____ hrs _____ mins Total Time: _____ hrs _____ mins	<input type="checkbox"/> Reading _____ hrs _____ mins <input type="checkbox"/> Singing _____ hrs _____ mins <input type="checkbox"/> Talking _____ hrs _____ mins <input type="checkbox"/> Recorded Voice _____ hrs _____ mins <input type="checkbox"/> Music _____ hrs _____ mins Total Time: _____ hrs _____ mins	<input type="checkbox"/> Scent Cloth _____ hrs _____ mins <input type="checkbox"/> Breast Milk _____ hrs _____ mins Total Time: _____ hrs _____ mins	<input type="checkbox"/> Protected baby's eyes from direct or bright light. <input type="checkbox"/> Cycled light.	How many times did you allow baby to move freely for at least 2 minutes? What positions did baby spend at least 10 minutes in? <input type="checkbox"/> Tummy <input type="checkbox"/> Back <input type="checkbox"/> Left Side <input type="checkbox"/> Right Side <input type="checkbox"/> Kangaroo Care <input type="checkbox"/> Supported sitting (upright position with head/neck support) How many minutes of rocking did baby receive? _____ mins

Notes:

Figure 3. Example of weekly parent sensory exposure log

livered guideline for consistently applying positive multisensory exposures every day in the NICU. The standardized guideline can be initiated immediately after birth and used throughout NICU hospitalization. It identifies specific target amounts of positive tactile, auditory, visual, olfactory, and kinesthetic interventions for the infant.

“Although specific doses of positive sensory exposures are identified in the SENSE program, the program is designed to be individualized for each infant based on the preferences of the family and/or the medical status/tolerance of the infant.”

As the program is intended to be completed by parents, parent education materials constitute a significant component of the program when possible. These materials can be accessed via a QR code on parents' smartphones or tablets or given to parents as printed booklets. The parent-education booklet has seven chapters (see Figure 1) with educational content on medical terminology, fetal development in the final months of pregnancy, the sensory environment of the NICU, sensory development, reading

infant cues, identifying readiness for sensory exposures, instructions for how to provide different sensory exposures, a week-by-week guide on specific doses and timing of sensory exposures to ensure consistent and developmentally appropriate delivery of positive sensory experiences at each PMA (see figure 2 for an example), and instructions for how to conduct the sensory exposures defined. The web-based materials also have video tutorials to guide parents in specific activities, such as skin-to-skin care and positive touch. Although specific doses of positive sensory exposures are identified in the SENSE program, the program is designed to be individualized for each infant based on the preferences of the family and/or the medical status/tolerance of the infant. Log sheets are available to aid parents, health care professionals, and volunteers in tracking positive sensory exposures provided to the infant to define achievement of the goal amounts or identify opportunities for more positive sensory exposures throughout each day (see Figure 3).

“The SENSE program differs from the standard of care because it defines specific targeted amounts of sensory exposures to be delivered daily during hospitalization.”

The implementation and administration guide is designed to walk

III. Implementation Considerations.

IMPLEMENTATION FLOW DIAGRAM

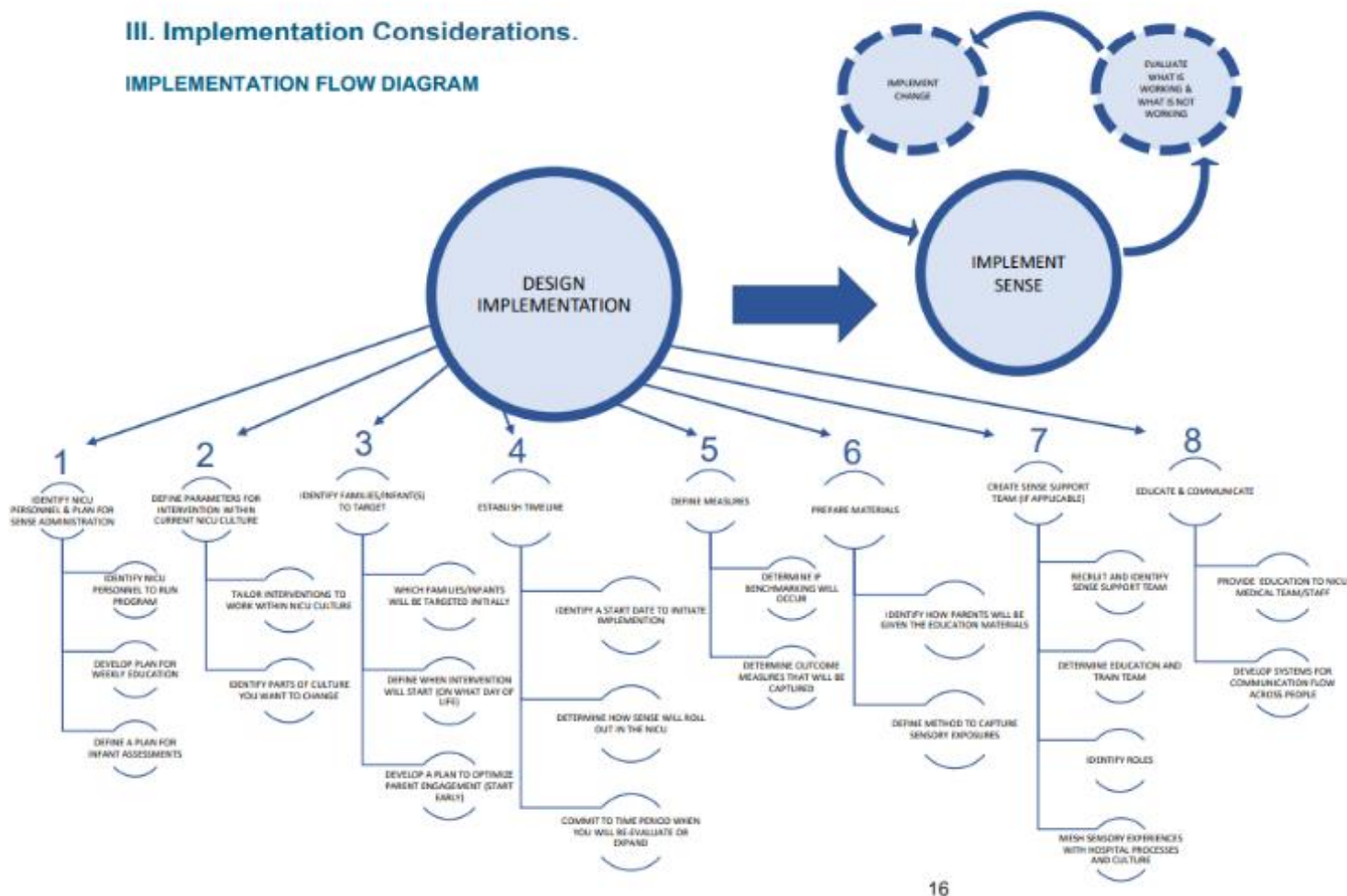


Figure 4. SENSE Implementation Flow Diagram

NICUs through integrating the SENSE program into their units with a diagram and checklist with implementation considerations. This manual also contains the infant assessment intended to aid clinicians in assessing infant tolerance for different sensory exposures at least weekly to recommend appropriate adaptations to the program when necessary. The implementation flow diagram identifies different steps along the continuum to implementation, including the identification of key personnel, considerations regarding the NICU culture, identifying families/infants who will receive the program in the first phase of implementation, establishing a timeline for implementation, developing benchmarking strategies, considerations around the use of a sensory support team, and education and communication with NICU team members (see figure 4).

“A new integrative review and consultation with a SENSE advisory team is planned every five years to ensure the program remains current and applicable based on emerging evidence.”

How does the SENSE program differ from the standard of care?

The SENSE program differs from the standard of care because it defines specific targeted amounts of sensory exposures to be delivered daily during hospitalization. This is in contrast to the standard of care, where a lack of intentionality in delivering positive sensory exposures can lead to days or weeks without positive sensory exposures. In addition, the types, frequency, and duration of appropriate exposures are tailored to the infant's PMA and modified based on medical status and behavioral cues. This ensures that the types and timing of different sensory exposures are appropriate for the maturity level of each infant. The SENSE program is intended to be integrated into the daily flow of the NICU, where multimodal sensory exposures occur in the context of daily care and parent engagement.

Development of the SENSE program:

The SENSE program was developed using a stepwise, rigorous, and scientific process that included defining evidence on sensory exposures with preterm infants, expert opinion, and parent input regarding developmentally appropriate and timed exposures. The initial integrative review included 88 articles on sensory-based NICU interventions applied to preterm infants. (7) Focus groups and interviews followed this review to gather input from multidisciplinary healthcare professionals who helped to define different sensory interventions done in NICUs and critically evaluate the proposed guideline. (9,15) Parents of preterm infants discharged

from the NICU were also interviewed to gather their opinions on the proposed guideline. (16) Following this rigorous development process; a pilot study was conducted with 80 infants (30 infants who received the SENSE program compared to 50 historical controls) to assess the feasibility of implementing the SENSE program in a level IV NICU and evaluating preliminary outcomes. (10) This study highlighted a positive relationship between SENSE programming, parent confidence, and infant neurobehavior. (10) Following the pilot study, a randomized clinical trial compared the effect of SENSE programming to standard of care in preterm infants born less than or equal to 32 weeks gestation, demonstrating on univariate analysis a positive effect on language outcomes at one year of age. (11) The research team continues to follow up with the infants enrolled in the pilot study and randomized controlled trial to monitor longitudinal developmental outcomes via parent report surveys. The program was further evaluated by applying an implementation framework, which found that the program was adopted with good fidelity, with most infants receiving and tolerating the program as defined within a large, Level IV NICU. (17) A second integrative review has since been undertaken to update the SENSE guidelines with input from a SENSE advisory team of multidisciplinary healthcare providers and parents of preterm infants or NICU graduates. (18) A new integrative review and consultation with a SENSE advisory team is planned every five years to ensure the program remains current and applicable based on emerging evidence.

Advantages of the program:

- Descriptive and comprehensive education aimed at informing and engaging parents in providing developmentally appropriate sensory exposures to their infant(s)
- Evidence-based week-by-week sensory interventions that change based on PMA.
- The sensory interventions are designed to be provided by parents, but the medical team and/or volunteers can also be engaged to ensure the sensory needs of each infant are met.
- Sensory exposures can be individualized based on the needs of each NICU (based on concurrent medical factors, parent choice, and infant behavioral signs).
- The written materials available in the SENSE package include a booklet for parents, log sheets to track sensory exposures and a weekly infant assessment. An electronic version of the SENSE program is also available through a QR code. The electronic version has videos that demonstrate the described interventions.
- The SENSE program parent education materials have been translated into Spanish, French, Hindi, Chinese, Korean, Hebrew, and Arabic as of 2023.

“The written materials available in the SENSE package include a booklet for parents, log sheets to track sensory exposures and a weekly infant assessment.”

Ongoing research:

The SENSE program research team is currently conducting an

NIH-funded study that aims to enroll 215 preterm infants and compare parent (mental health, confidence, and stress) and infant outcomes (electrocortical activity, neurobehavior, and developmental outcomes through age 2 years) of those who receive the SENSE program compared to standard of care. In addition, infants will receive amplitude-integrated electroencephalography with an exploration of electrocortical activity concerning positive sensory exposures as a possible mechanism toward improved outcomes.

Resources:

For more information on the SENSE program, please visit <https://chan.usc.edu/nicu/sense>.

References:

1. Pineda R, Neil J, Dierker D, et al. Alterations in brain structure and neurodevelopmental outcome in preterm infants hospitalized in different neonatal intensive care unit environments. *J Pediatr*. 2014;164(1):52-60.e2. doi:10.1016/j.jpeds.2013.08.047
2. Pados BF. Physiology of Stress and Use of Skin-to-Skin Care as a Stress-Reducing Intervention in the NICU. *Nurs Womens Health*. 2019;23(1):59-70. doi:10.1016/j.nwh.2018.11.002
3. Als H, Duffy FH, McAnulty GB, et al. Early Experience Alters Brain Function and Structure. *Pediatrics*. 2004;113(4 I):846-857. doi:10.1542/peds.113.4.846
4. Lean RE, Rogers CE, Paul RA, Gerstein ED. NICU Hospitalization: Long-Term Implications on Parenting and Child Behaviors. *Curr Treat Options Pediatr*. 2018;4(1):49-69. doi:10.1007/s40746-018-0112-5
5. Gerstein ED, Poehlmann-Tynan J, Clark R. Mother-child interactions in the NICU: Relevance and implications for later parenting. *J Pediatr Psychol*. 2015;40(1):33-44. doi:10.1093/jpepsy/jsu064
6. Feldman R, Rosenthal Z, Eidelman AI. Maternal-preterm skin-to-skin contact enhances child physiologic organization and cognitive control across the first 10 years of life. *Biol Psychiatry*. 2014;75(1):56-64. doi:10.1016/j.biopsych.2013.08.012
7. Pineda R, Guth R, Herring A, Reynolds L, Oberle S, Smith J. Enhancing sensory experiences for very preterm infants in the NICU: An integrative review. *J Perinatol*. 2017;37(4):323-332. doi:10.1038/jp.2016.179
8. Cho ES, Kim SJ, Kwon MS, et al. The effects of kangaroo care in the neonatal intensive care unit on the physiological functions of preterm infants, maternal-infant attachment, and maternal stress. *J Pediatr Nurs*. 2016;31(4):430-438. doi:10.1016/j.pedn.2016.02.007
9. Pineda R, Raney M, Smith J. Supporting and enhancing NICU sensory experiences (SENSE): Defining developmentally-appropriate sensory exposures for high-risk infants. *Early Hum Dev*. 2019;133:29-35. doi:10.1016/j.earlhumdev.2019.04.012
10. Pineda R, Wallendorf M, Smith J. A pilot study demonstrating the impact of the supporting and enhancing NICU sensory experiences (SENSE) program on the mother and infant. *Early Hum Dev*. 2020;144(February):105000. doi:10.1016/j.earlhumdev.2020.105000
11. Pineda R, Smith J, Roussin J, Wallendorf M, Kellner P,

Colditz G. Randomized clinical trial investigating the effect of consistent, developmentally-appropriate, and evidence-based multisensory exposures in the NICU. *J Perinatol.* 2021;41(10):2449–2462. doi:10.1038/s41372-021-01078-7

12. Reynolds LC, Duncan MM, Smith GC, et al. Parental presence and holding in the neonatal intensive care unit and associations with early neurobehavior. *J Perinatol.* 2013;33(8):636-641. doi:10.1038/jp.2013.4
13. Richter M, Angell A, Kellner P, Smith J, Pineda R. Infant and parent outcomes related to NICU-based co-occupational engagement. *OTJR Occup Particip Heal.* Published online 2023:1-10. doi:10.1177/15394492231160690
14. Pineda R, Bender J, Hall B, Shabosky L, Annecca A, Smith J. Parent participation in the neonatal intensive care unit: Predictors and relationships to neurobehavior and developmental outcomes. *Early Hum Dev.* 2018;117:32-38. doi:10.1016/j.earlhumdev.2017.12.008
15. Richter M, Smith J, Pineda R. Health care professional perceptions about a proposed NICU intervention: The importance of community and aligning with everyday occupations. *OTJR Occup Particip Heal.* 2022;42:238-247. doi:10.1177/15394492221082051
16. Lisle J, Buma K, Smith J, Richter M, Satpute P, Pineda R. Maternal perceptions about sensory interventions in the neonatal intensive care unit: An exploratory qualitative study. *Front Pediatr.* 2022;10(884329):1-9. doi:10.3389/fped.2022.884329
17. Pineda R, Roussin J, Kwon J, Heiny E, Colditz G, Smith J. Applying the RE-AIM framework to evaluate the implementation of the supporting and enhancing NICU Sensory experiences (SENSE) program. *BMC Pediatr.* 2021;21(1):1-16. doi:10.1186/s12887-021-02594-3
18. Pineda R, Kellner P, Ibrahim C, SENSE Advisory Team Working Group, Smith J. Supporting and Enhancing NICU Sensory Experiences (SENSE), 2nd Edition: An Update on Developmentally Appropriate Interventions for Preterm Infants. *Children.* 2023;10(6):961. doi:10.3390/children10060961

Disclosures: Bobbi Pineda and Joan Smith are authors of the SENSE program. The program user fee is charged 'at cost', and the authors do not directly benefit financially from the distribution of the program.

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Brief Biography of Corresponding Author

Dr. Pineda is an Associate Professor at the University of Southern California. She received her PhD in 2006 from the University of Florida. Her research interests include the study of the early NICU sensory environment, therapy service delivery and programming to improve access, and early oral feeding in preterm infants in the NICU. She has more than 60 peer reviewed publications and presents nationally. Dr. Pineda is a previous co-chair and board member of the Neonatal Therapy Certification Board, which aims to validate the experience and knowledge of those practicing as therapists in the advanced practice area of the NICU. She has personally experienced being the mother of a preterm infant who was in the NICU for 5 weeks and now she aims to support clinical practices in the NICU that are better for babies and families.



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