Updates on the 3Ts-Newborn implementation trial

The Challenge

As early as nine months of age, infants born into poverty score lower on cognitive development measures than their more affluent peers. This disparity triples by the age of two. Disparities in early language environments are a root cause of the achievement gap. They have been found to negatively impact children's learning trajectories with a cascade of consequences for cognitive and social emotional development as well as school readiness and academic attainment.

Empowering Parents: A Public Health Response

The University of Chicago TMW Center for Early Learning + Public Health (TMW Center) develops and disseminates evidence-based interventions that engage parents, caregivers, practitioners, and policy makers in maximizing children's early language development from birth through three years of age. We target the earliest years to ensure the greatest impact on brain development and create innovative technology-based programs for three tiers of impact: individual low-income families, high-need communities, and the broader public. We use a web-based platform to support our research and interventions to provide easy access, enhance implementation fidelity, and fuel future data-driven scalability.

All TMW Center interventions leverage the **TMW 3Ts – Tune In, Talk More, Take Turns –** which provide parents with easy to remember and easy to enact strategies that can be readily implemented in daily routines. The 3Ts-Newborn intervention leverages the 3Ts in a short-format, one-time educational intervention that is delivered to parents of infants

during a universal touchpoint such as the Universal Newborn Hearing Screening as part of routine postpartum care. This video intervention was developed through rigorous formative testing interviews with healthcare providers, hospital staff, and—of course—parents, especially from underserved populations. Available in both Spanish and English, 3Ts-Newborn provides messaging and strategies specifically for children from birth to one year of age with a focus on preverbal communication and mother-child attachment. It includes video modeling

of parents utilizing both spoken and sign language to demonstrate the importance of language input, no matter the form. These additions and adaptations promote inclusion and will aid the scalability and wide reach of the intervention.

3Ts-Newborn Feasibility and Efficacy

3Ts-Newborn was initially tested in a randomized controlled trial with 427 English- and Spanish-speaking participants of low-, middle-, and high-socioeconomic status (SES) in two hospitals in Chicago in late 2015 and early 2016. Mothers who received 3Ts-Newborn made significant gains in knowledge of infant cognitive and language development over time, with the most significant gains among high- and middle-SES English speakers. Low-SES Spanish-speaking mothers made smaller—yet positive—gains in knowledge, and low-SES English-speaking mothers did not make significant knowledge gains (Suskind et al., 2017[i]). Participants considered watching the video alongside the newborn hearing screening conveniently timed. These findings informed further development and testing of the curriculum, specifically aimed at improving knowledge among low-SES English-speaking mothers.

Beginning in June 2017, the TMW Center partnered with six birthing hospitals in Chicagoland and northern Florida in an implementation trial of 3Ts-Newborn with three goals:

- Test the efficacy of the revised 3Ts-Newborn intervention on impacting parent knowledge of infant cognitive and language development,
- Test the impact of 3Ts-Newborn on promoting parent understanding of the UNHS and the importance of follow-up on failed screenings, and
- Explore the implementation of 3Ts-Newborn through partners in the context of regular care.

Across the six hospitals, just over **5,800** parents were offered participation in the study, and **1,950** completed the full intervention and survey data collection. Across the participating hospitals in Florida (Ascension Sacred Heart Hospital, Baptist Health Care, and West Florida Hospital), **2,467** parents were offered participation by nursing staff and MEDNAX-Pediatrix hearing screening technicians and **1,333** completed the full intervention.
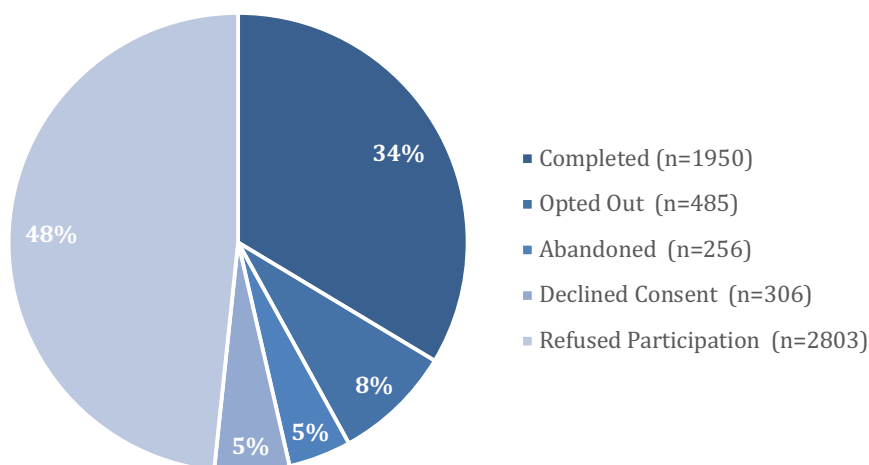
Recruitment across all participating hospitals

- Completed (n=1950)
- Opted Out (n=485)
- Abandoned (n=256)
- Declined Consent (n=306)
- Refused Participation (n=2803)

Figure 1. Includes all participants offered 3Ts-Newborn from 6/3/2017 through 11/6/2019.

We found a significant increase in parent knowledge of child language and cognitive development when comparing parents' scores on the SPEAK survey pre- and post-intervention. The SPEAK (Survey of Parent/Provider Expectations And Knowledge) is an online, self-administered clinical and research tool for assessing parents' expectations and knowledge of early childhood cognitive and language development.

Importantly, these gains are found for parents of *both* low- and high-socioeconomic status, as measured by parent educational attainment.
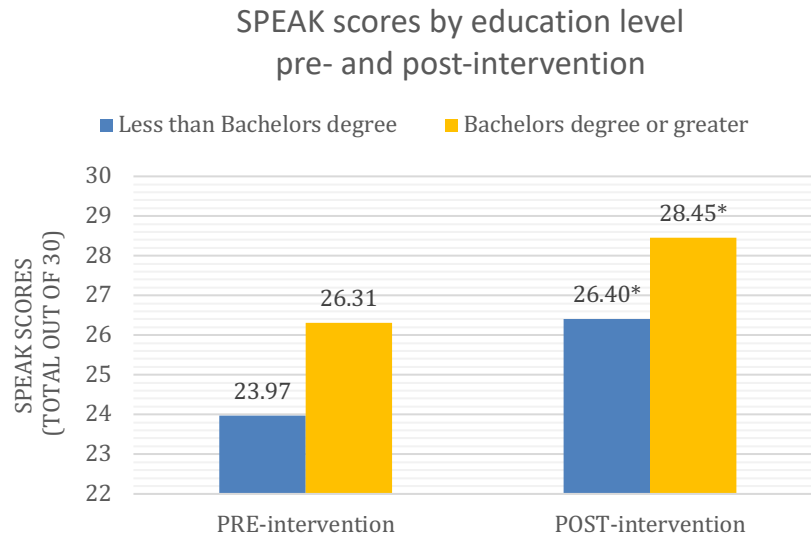
SPEAK scores by education level
pre- and post-intervention

■ Less than Bachelors degree   ■ Bachelors degree or greater

Figure 2. *significant difference in pre- and post-SPEAK scores at p<.000*

True or False:
It's important to talk with your baby even before your baby can say words.

In our effort to increase the efficacy of 3Ts-Newborn for all parents and particularly parents of more disadvantaged backgrounds, we pilot tested the use of brief pop-up questions during the intervention video that were designed to promote attention and engagement. After introducing key concepts of the 3Ts strategies, the video paused and a voiceover then presented a true-false question to reinforce important ideas. No matter the response, parents received constructive feedback to reinforce the correct answer. An example of such a pop-up question is included here. These pop-up questions showed to be effective in increasing the knowledge about infant language and cognitive development of parents of low-socioeconomic status, as shown in the figure below.

True!
Babies understand and can learn from your words long before they themselves can speak. That's why it's important to talk with your baby now.

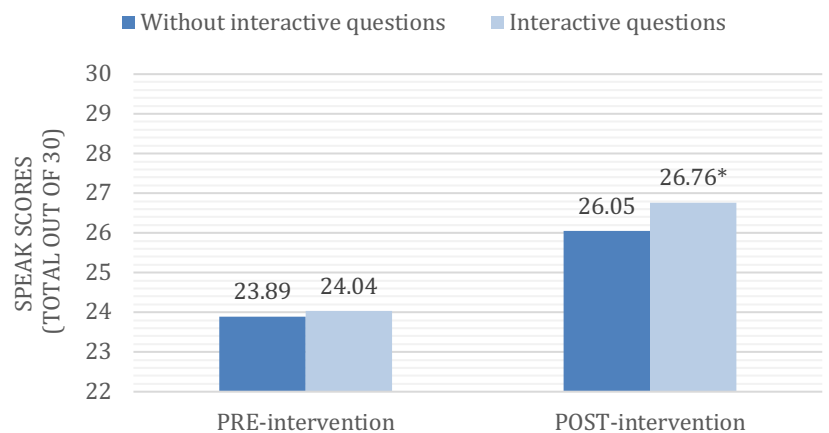SPEAK scores of mothers with less than a bachelors degree pre- and post-intervention

■ Without interactive questions   ■ Interactive questions

Figure 3. *significant difference in gains for pre- and post-SPEAK scores at p=.02*

Of those who agreed to participate in the study, slightly more than half (55%) indicated that a health professional (e.g., a doctor, nurse, midwife) had spoken to them about their infant's language development (Figure 2). Additionally, the majority of participants (88%) recognized the importance of timely follow-up for infants who do not pass the UNHS.
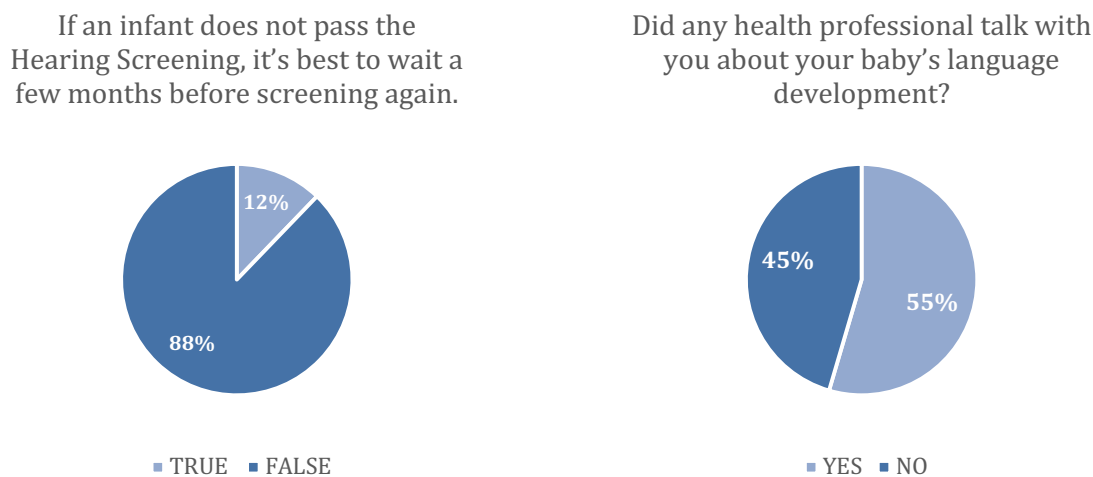
If an infant does not pass the Hearing Screening, it's best to wait a few months before screening again.

Did any health professional talk with you about your baby's language development?

12%

88%

45%

55%

■ TRUE ■ FALSE

■ YES ■ NO

Figure 2. Survey taken post-intervention.

Looking forward

This study was important in validating the efficacy of the improved 3Ts-Newborn intervention in promoting parents' knowledge of infant language and cognitive development, which is known to impact parent-child interaction, a key driver in young children's language development (Suskind et al., 2018[ii]). Crucially, this study has also informed the model for implementing the 3Ts-Newborn intervention in the context of regular care, which is critical in achieving population-level changes in young children's language developmental outcomes. The TMW Center is building upon these learnings in our multi-year community-wide demonstration project in collaboration with the Children's Services Council of Palm Beach County, Florida, in which we will embed the full integrated suite of TMW interventions—beginning with 3Ts-Newborn—within existing health, education, and social service systems to reach a significant portion of the target population. This initiative launched in 2019 with a goal of reaching at least 10,000 families with young children. This work will inform a model for implementing TMW interventions at scale across communities, with a vision of achieving population-level change in young children's developmental outcomes.

Deep thanks

The TMW Center has deep gratitude to Studer Community Institute, MEDNAX-Pediatrix, Advocate Health Care (in particular Christ Medical Center and Lutheran General Hospital), Ascension Sacred Heart Hospital, Baptist Health Care, and West Florida Hospital for their partnership in this project. We give a particularly hearty thanks to the teams of hearing screeners and nurses who incorporated 3Ts-Newborn and this study into their daily hard work. This commitment from all of our partners has furthered our efforts to improve the outcomes of young children.

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[i] Suskind, D. L., Leung, C. Y., Webber, R. J., Hundertmark, A. C., Leffel, K. R., Fuenmayor Rivas, I. E., & Grobman, W. A. (2017). Educating parents about infant language development: A randomized controlled trial. *Clinical Pediatrics*, 0009922817737079

[ii] Suskind, D. L., Leung, C. Y., Hundertmark, A. C., Lander, P.H., Leffel, K. R., Miller, K. (November, 2018). *Impacting low-SES caregiver knowledge, language behaviors, and infant vocabulary skills through a web-based pediatric primary care intervention: A randomized controlled trial.* Oral abstract presented at the American Academy of Pediatrics annual conference, Orlando, FL.