

A Tiered Approach to Infant Habilitation: Addressing Neurodevelopmental Outcomes in Neonatal Opioid Withdrawal Syndrome (NOWS)



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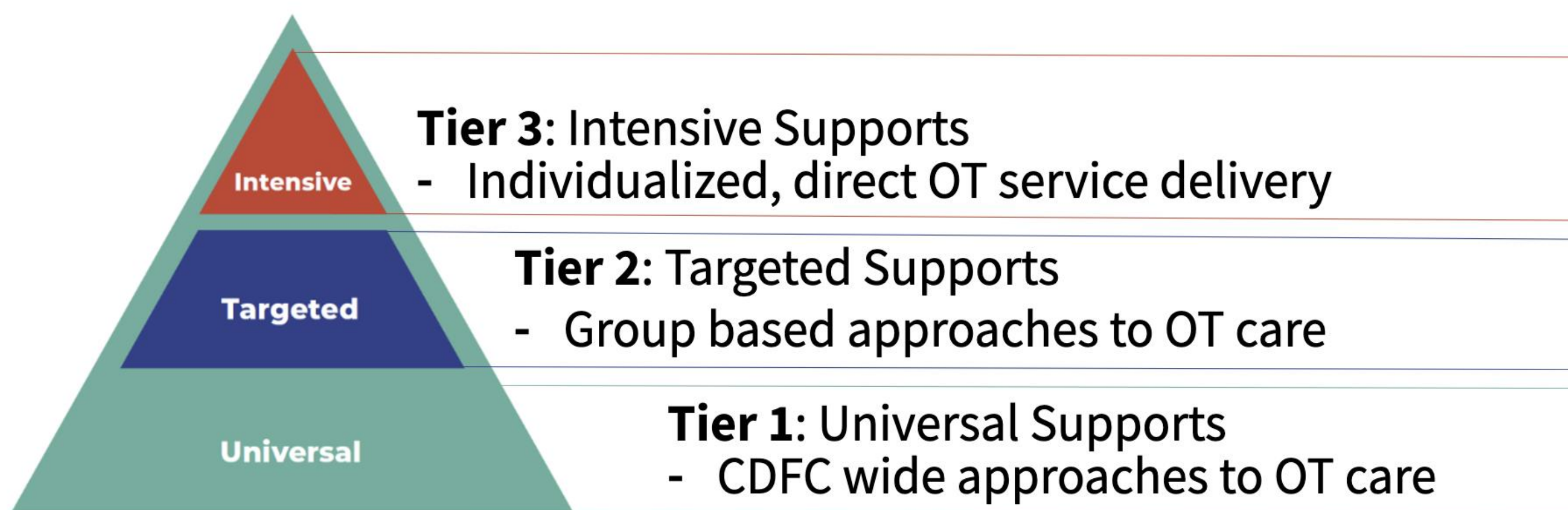
Introduction

The Occupational Therapy (OT) Program at the Cynthia Day Family Center (CDFC) is an integrated, tiered model of infant habilitation embedded within a family-centered residential substance recovery setting in Nashua, New Hampshire. Designed to address the complex and intersecting needs of maternal-infant dyads affected by prenatal opioid exposure, the program delivers developmentally focused, non-pharmacological occupational therapy services across multiple levels of support, including direct one-to-one intervention, consultative services as needed, and broader programmatic outreach. This tiered approach allows for individualized, responsive care during critical periods of early neurodevelopment while promoting accessibility and continuity of support across the family-centered substance recovery setting.

Program Methods

Occupational therapy is uniquely positioned to support infant habilitation and parental skill-building for infants with Neonatal Opioid Withdrawal Syndrome (NOWS) because it addresses early development through a relationship-based, regulation-focused, and caregiver-embedded lens. OT targets the foundational neurobehavioral, sensory, motor, and environmental factors that shape infant participation while simultaneously coaching caregivers to become confident, responsive co-regulators within daily routines. Through this dual focus on infant function and caregiver competence, OT directly addresses the core developmental vulnerabilities associated with NOWS, including:

- Supports nervous system regulation
- Addresses feeding and oral-motor challenges
- Facilitates motor development and postural control
- Implements sensory-informed care strategies
- Builds foundations for cognitive engagement
- Strengthens caregiver-infant co-regulation



Children photographed were enrolled in the OT program at CDFC, with informed consent provided by their legal guardians for educational purposes

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Results

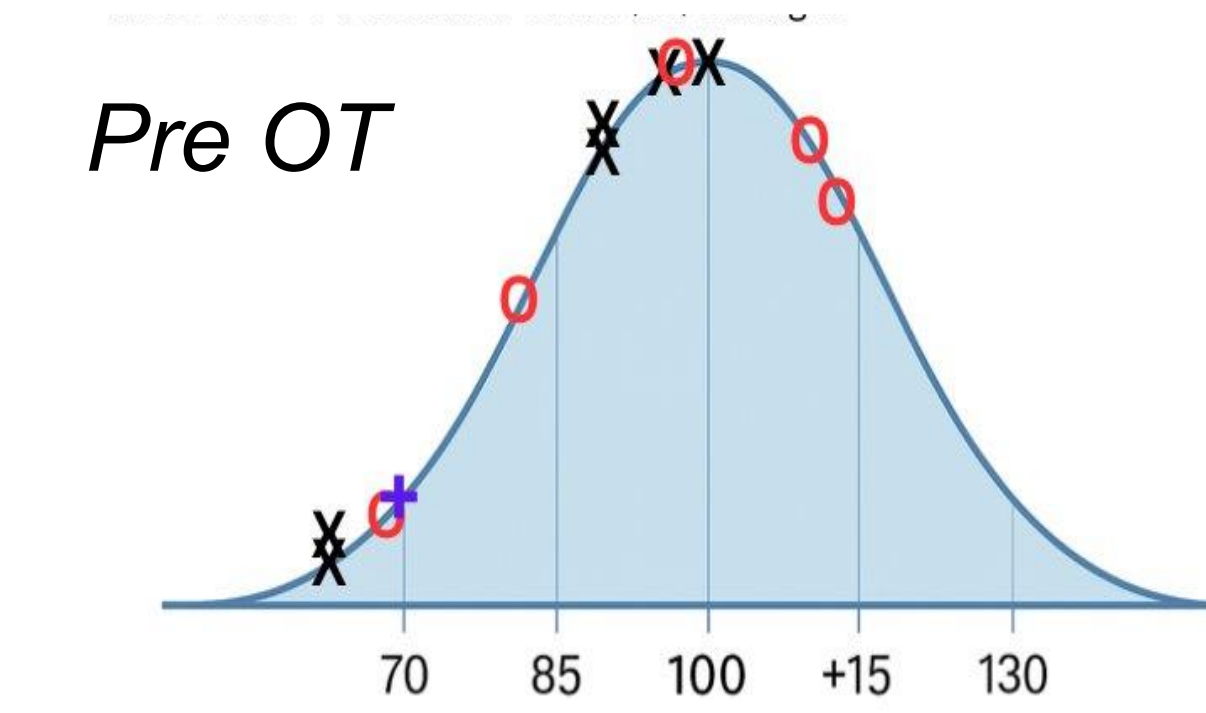
Results from the tiered approach to infant habilitation were analyzed using the Institute for Healthcare Improvement (IHI) Model for Improvement as the guiding framework. This model structured data analysis across outcome, process, and balancing measures to systematically evaluate program effectiveness, implementation fidelity, and unintended impacts. The table below highlights these measures and illustrates how the IHI framework was applied to assess program outcomes and guide ongoing quality improvement efforts.

Measure Type	Measure	Definition	Data Source / Method of Collection	Frequency of Collection	Goal
Outcome	Child developmental progress	% of developmental milestones met	Bayley-4 assessment documented pre/post OT	Baseline and discharge	At least 70% of children in OT program demonstrate improvement to 2 areas of development
Outcome	Caregiver Self-efficacy in child-rearing	Self-reported feelings around child-rearing skills, child-rearing confidence, and maternal psychosocial wellbeing	Self-reported survey	Halfway through OT and at discharge from OT	Self-reports of increased feelings of efficacy from baseline to discharge in at least 20% of maternal program participants
Process	Delivery of caregiver education	% of caregivers receiving education addressing developmental strategies, soothing techniques, and child-rearing practices	OT session documentation using documentation templates	Weekly sessions	100% of mothers receive education with at least 95% of mothers demonstrating understanding of education using the teach back method
Process	Intervention fidelity	Planned OT sessions carried out and following structured tiered OT program business plan	OT session documentation using documentation templates	Weekly sessions	100% fidelity
Process	Referral attendance	% of mother-child dyad who attend first OT evaluation following referral from CDFC providers	Referral log, session schedule attendance, and scheduling records	Weekly sessions	95% of mother-child dyads referred to the OT program attend initial evaluation
Balancing	Infant stress	The following cues noted during weekly sessions: irritability, crying, withdrawal symptoms	OT clinical observation during OT sessions documented in session templates.	Weekly sessions	Pediatric program participants demonstrate limited signs of stress (2 signs or less) throughout session duration
Balancing	Burden and stress of missed OT program appointments	% of miss/canceled visits per dyad	Scheduling records	Weekly sessions	Maternal-child dyad participants will attend at least 85% of scheduled and referred OT program appointments by time of patient discharge

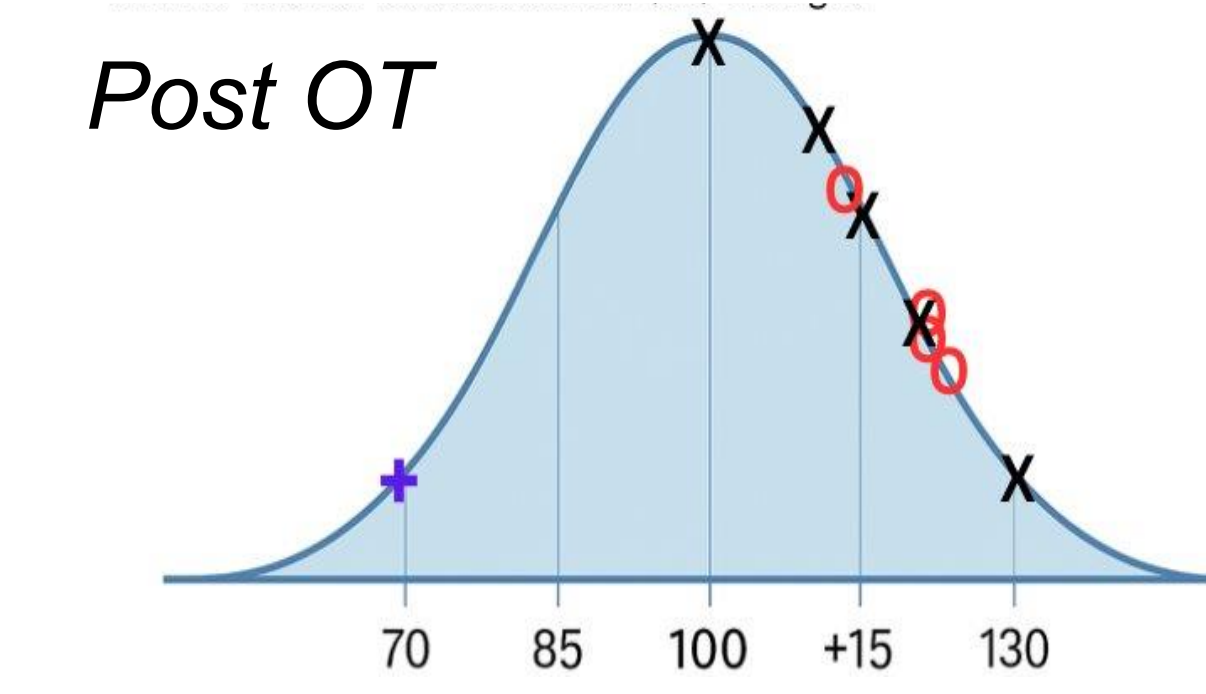
Outcome: Caregivers' Perceptions of Child Rearing Self Efficacy Post OT Programming

I feel confident in the ability to care for my baby	100% strongly agree
I know what to do when my baby is upset	100% strongly agree
I feel capable of meeting my baby's daily needs	100% strongly agree
I feel capable of handling unexpected parenting challenges	100% strongly agree
I recognize when my baby is overstimulated	100% strongly agree
I feel proud of my role as a mother	100% strongly agree
I trust my instincts when caring for my baby	100% strongly agree

Outcome: Changes in Bayley-4 Standard Scores Pre/Post OT



Child	Cognition SS	Motor SS	Language SS
L	90	N/A	70
O	65	79	N/A
K	65	69	N/A
E	95	96	N/A
T	100	113	N/A
C	90	106	N/A



Child	Cognition SS	Motor SS	Language SS
L	100	N/A	70
O	120	124	N/A
K	115	121	N/A
E	110	113	N/A
T	130	121	N/A
C	N/A	N/A	N/A

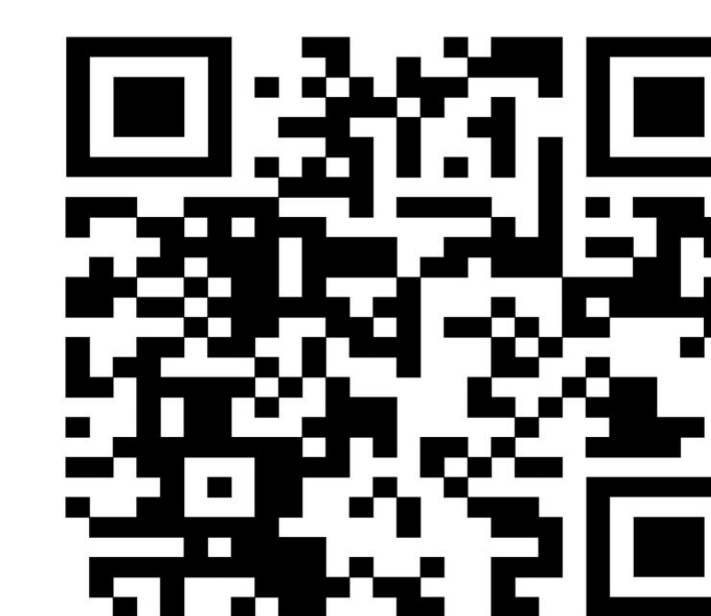
Process: OT Program Data Metrics

Process Measure	Observed Value
Number of residents at CDFC at capstone start	28 Women
Number of children at CDFC living alongside biological mother at capstone start	21 Children
Number of those children referred to OT program throughout capstone duration	12 Children
Number of OT evaluations scheduled and conducted following referral	6 Evaluations
Number of children picked up for 1:1 ongoing OT services following evaluation	6 Children
Number of referred children picked up for consultative OT services	5 Children
Number of attended OT sessions throughout capstone duration between consultative and 1:1 OT sessions	47 sessions
Number of missed OT appointments throughout program duration	3 Missed Appointments

Discussion

Overall, this capstone project highlights the value of a tiered occupational therapy approach to infant habilitation within a family-centered residential setting serving infants with NOWS. Findings suggest that structured, developmentally responsive OT supports, caregiver education, and coaching may positively influence infant regulatory capacities while enhancing caregiver confidence and perceived self-efficacy. The integration of tiered strategies allowed services to be individualized while maintaining program feasibility and consistency. While results are limited by sample size and duration, outcomes support the role of occupational therapy in addressing the complex neurodevelopmental needs associated with NOWS.

References



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