



Neurodevelopmental Trajectories in Medically Complex Children

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Introduction

- ❖ Pre- and perinatal brain development alterations can lead to developmental delays and neuropsychological deficits; which may contribute to the need for early identification.
- ❖ Developmental growth trajectories can differ based on medical complexity and severity.
- ❖ Some premature/medically complex children may catch up to the anticipated milestones for their chronological age while some might not.
- ❖ Children’s Wisconsin has a two-clinic Neonatal Intensive Care Unit (NICU) follow-up model to optimize care for specific populations:
 - ❖ DREAM Clinic: Children with pre- or perinatal complications directly affecting the brain.
 - ❖ HOPE Clinic: Children with pre- or perinatal complications not directly affecting the brain (e.g., congenital heart disease).
- ❖ Neurodevelopmental outcomes have not been examined for neurologically complex children (DREAM clinic).

Hypothesis:

- ❖ Neurodevelopment, according to scores on all domains of the Bayley-IV, would be persistently delayed over time for medically and neurologically complex children, whereas non-medically complex children would demonstrate developmental catch-up growth more frequently.

Methods

Procedure

- ❖ This study was a retrospective chart review of patient data extracted from the medical records for children seen in the HOPE and DREAM clinic.
- ❖ Neuropsychological assessments were administered by an occupational therapist in the HOPE clinic and a psychometrist in the DREAM clinic.

Participants

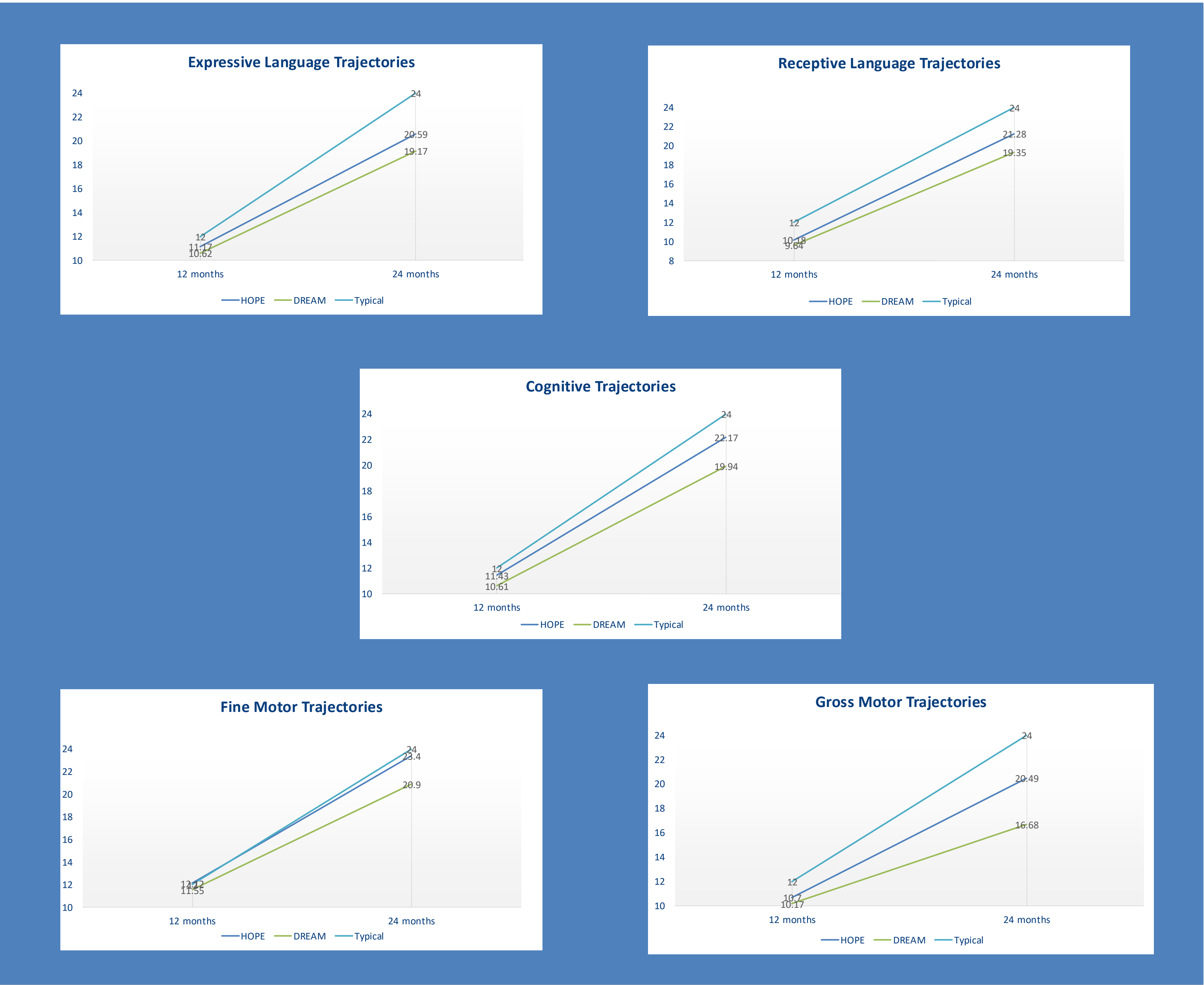
- ❖ 293 children from the HOPE clinic and 121 children from the DREAM clinic who completed at least one subscale of the Bayley-IV at 12 and 24 months
- ❖ Race/Ethnicity: White (64.6%), Black (20.1%), two or more races (5.3%), and Asian (4.2%)
- ❖ More males (56.6%) than females (43.4%)

Data Analysis

- ❖ Neurodevelopmental scores for cognitive, motor, and language functioning on the Bayley-IV
- ❖ Descriptive statistics, one-sample T-tests, and group level comparisons were calculated for standard scores.
- ❖ Developmental progress was calculated to assess growth trajectories.

Results

Bayley-IV Scores	HOPE Clinic Outcomes	DREAM Clinic Outcomes
Cognitive Score (12 months)	91.13	85.97
Cognitive Score (24 months)	88.25	82.67
Language Score (12 months)	90.87	88.25
Language Score (24 months)	85.79	81.61
Motor Score (12 months)	89.16	83.91
Motor Score (24 months)	88.55	79.84



- ❖ For all subscales of the Bayley-IV, children in the DREAM clinic had lower age equivalent scores than children in the HOPE clinic at both 1 and 2 years of age.
- ❖ Children in both the DREAM and HOPE clinics received lower age equivalent scores than expected for typical development.

Results

- ❖ Children in the DREAM clinic had statistically significantly lower mean scores on the cognitive, language, and motor sections of the Bayley-IV than children in the HOPE clinic, at both 1 and 2 years of age.
- ❖ Children in the DREAM clinic had statistically significantly lower mean scores on the cognitive, M (SD) = 3.23 (14.17), language, M (SD) = 6.66 (18.60), and motor M (SD) = 4.05 (10.75), sections of the Bayley-IV at their 2-year visit than at their 1-year visit.
- ❖ Children in the HOPE clinic had statistically significantly lower mean scores on the cognitive, M (SD) = 2.95 (13.05), and language, M (SD) = 5.07 (16.97), sections of the Bayley-IV at their 2-year visit than at their 1-year visit.
- ❖ Developmental trajectories for children in the DREAM clinic were significantly slower than those in the HOPE clinic for gross motor, expressive language, and cognitive trajectories, p 's < .05.

Conclusion & References

- ❖ There is a need for increased support and care for medically and neurologically complex children as their early developmental trajectories suggest increased delays.
- ❖ By identifying which subscales children score poorly on, professionals can identify and target specific intervention for such areas (e.g., gross motor skills).

Carlton, K., Adams, S., Fischer, E., Foy, A., Heffelfinger, A., Jozwik, J., Kim, I., Koop, J., Miller, L., Stibb, S., & Cohen, S. (2023). HOPE and DREAM: A Two-Clinic NICU Follow-up Model. *American Journal of Perinatology*, a-2053-7513. <https://doi.org/10.1055/a-2053-7513>

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