Exploring the Impact of Prenatal Drug Exposure on Brain Development: Data Collection Framework

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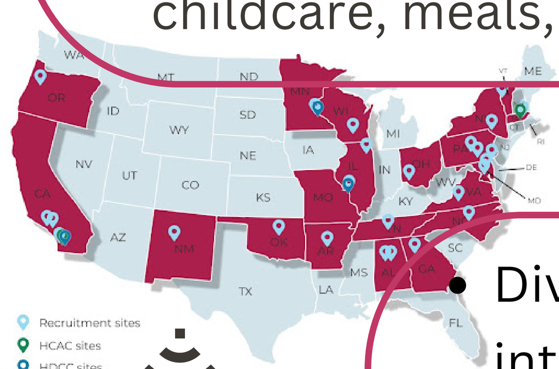
Introduction

The HEALthy Brain and Child Development (HBCD) Study is a large, nationwide longitudinal study that aims to:
1) explore the impacts prenatal drug exposure (PDE)
2) advance knowledge of early brain development.
The study utilizes multiple methods including diverse patient recruitment, biospecimen collection, and MRI scans from 7.500 participants
This poster will explain the framework for data collection that I participated in and why each method plays a critical role.

Patient Recruitment

- HBCD makes conscious efforts to reach diverse sets of populations, build trust, and increase accessibility
- Study Navigators are experts enlisted to help connect with participants facing adversity.
- Intentional efforts toward community engagement include a Community Advisory Board (CAB), addressing the mistrust of research among diverse ethnicities, engaging families who speak different languages, and displaying cultural humility.
- Accommodations are met by providing transportation, childcare, meals, and flexible scheduling.



Biological Data Collection

Biospecimen
- Biospecimens are collected based on what is most efficient and accurate in evaluating neurological development.
- The selected biospecimen have known neurodevelopmental effects, as well as broad detection windows that allow flexibility in data collection.
- Biological data reveals substance use exposure, child nutrition, genetic information, stress regulation of cells, and microbiome factors.

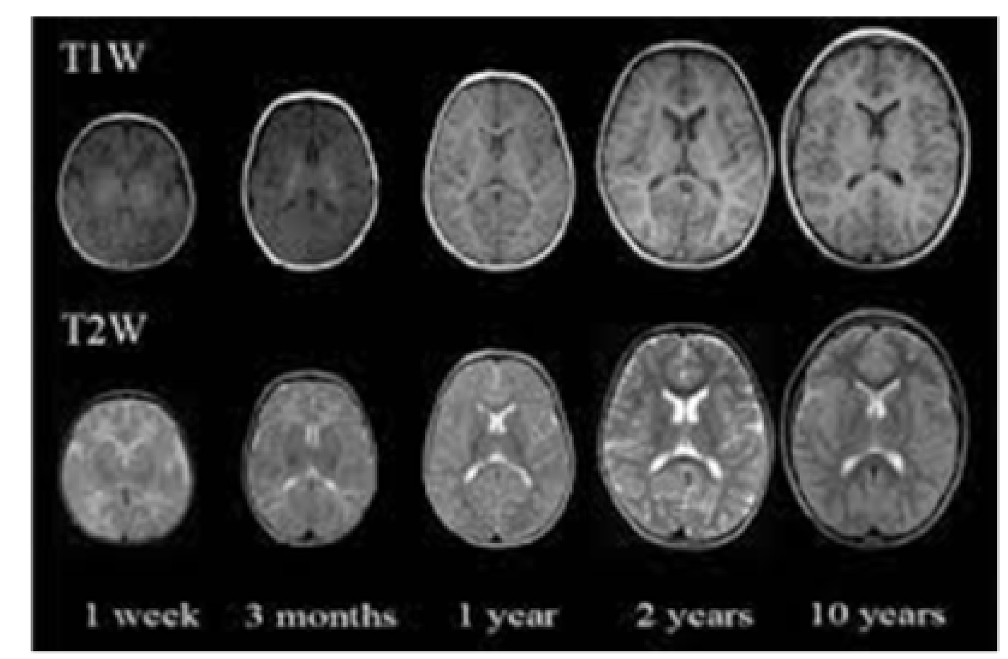
Biosensors
- Axivity A6-measures sleep patterns and movement functions
- GABI Armband-pulse rate and respiration

Participant	Essential Biospecimen	Domains of Interest	Visit V1 Prenatal	V2 0-1 M	V3 3-8 M	V4 9-14 M	V6 15-47 M
Mother	Blood		●				
	Urine		●				
	Saliva		●	●	●	●	●
	Fingernails/Toenails		●	●			
Child	Urine			●	●	●	●
	Saliva			●	●	●	●
	Stool			●	●	●	●

Neurological Data Collection

MRIs
- Magnetic Resonance Imaging(MRI) is a non-invasive neuroimaging method that examines the structural development of the brain.
- Data was collected in reference to growth curves of different brain structures, cortical tissues, spatial mapping, biochemical changes, and overall neurological networks.
- Provides key information by tracking critical windows of infant brain development in comparison to expected trajectories of typical development
- Comfort is ensured through several mechanisms including a trained helper who accompanies the infant in the scanner room.

EEGs
- The Electroencephalogram (EEG) is a non-invasive neuroimaging method that examines the activity of the brain through electrodes on a cap connected to the scalp.
- Provides key information to track brain activity patterns over time and assesses visual, auditory, and facial processing
- Comfort ensured through proper placement; coordinating hairstyles and proper cap sizes with caregivers ahead of time.



Miller et al., 2020

Discussion

- Diverse patient population allows for inclusive data collection, and can factor in intersectionality for future research.
- Neurological data collection helps to track brain structure and cognitive function.
- Analysis of biological data provides critical biological information about the participants.
- The study also collects other data that will contribute to understanding brain development, such as neurocognitive, emotional, and cultural assessments, geospatial data, genetic data, and more.
- HBCD plans to make the data available as an open-source data set that other researchers can access through the NIH. It will start releasing on a rolling basis starting January 2025.
- These data will allow researchers to make large strides in the area of brain development, and lead the way for much needed changes in healthcare and policy.

https://hbcdstudy.org/

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