PROTOCOL SUMMARY

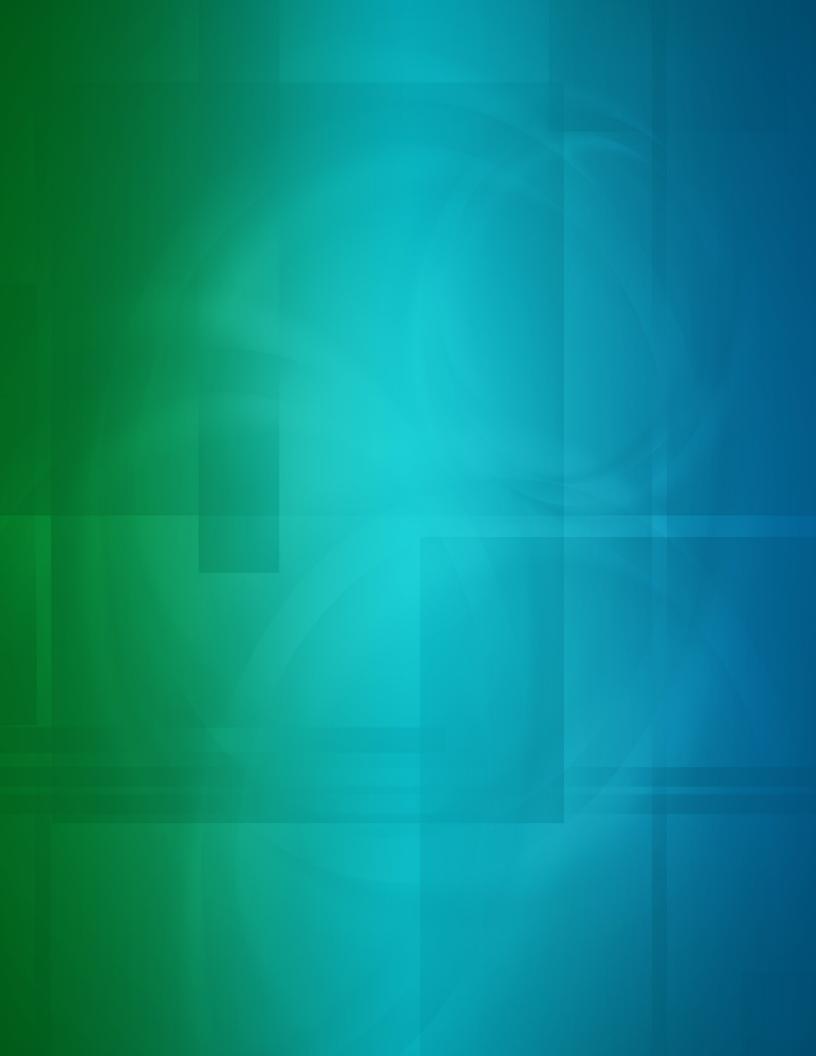
VISIT 3: 3-9 MONTHS



HEALthy Brain and Child Development

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The HEALthy Brain and Child Development Study

The HBCD Study is the largest longitudinal study of early brain and child development in the United States. Knowledge gained from this research will have lasting impacts on future generations of children.

This ambitious project will enroll approximately 7,500 participating families from across the United States and follow them from pregnancy through early childhood. The HBCD Research Consortium consists of the HBCD Consortium Administrative Core (HCAC), the HBCD Data Coordinating Center (HDCC), and 28 recruitment sites across the country (see map).

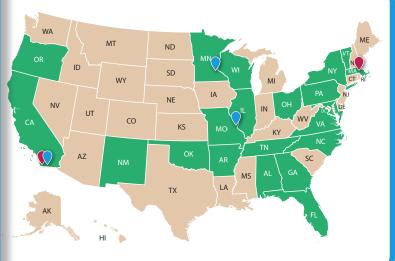
Leading researchers in the fields of child development and neuroscience will work with participating families and their children to understand how the brain develops and how exposure to substances and other environmental, social, and biological factors during pregnancy and after birth impact outcomes.

HBCD Open Science Model

The data generated in the study will be made broadly available to the research community through an open science model and serve as a resource to support numerous additional studies and foster new hypotheses to be explored.

Locations of HBCD Recruitment Sites in the United States





3-9 Months of Age

HBCD Measure	What it Measures	Child (min)	Adult (min)		
Adult Health					
American Psychiatric Association (APA) DSM-5 Level 1	Current mental health symptoms, including depression, anxiety, sleep problems, memory, psychosis, personality functioning, etc.		5		
APA Patient-Reported Outcome Measurement Information System (PROMIS) Level 2	More detailed assessment of current mental health symptoms, including anxiety, depression, anger, sleep disturbances, mania, obsessive-compulsive behaviors, and personality functioning		5		
DSM-5 Severity Scales - Acute Stress or Post-Traumatic Stress Disorder (PTSD)	Severity of acute stress and PTSD symptoms		5		
Edinburgh Postnatal Depression Scale (EPDS)	Symptoms of postnatal depression		3*		
	Substance Use				
Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)	Lifetime and current substance use (last 3 months)		5		
	Biospecimens				
Saliva	Genome-wide association studies (GWAS), Epigenome-wide association studies (EWAS), transcriptomes	10	10*		
Stool	Metabolome, microbiome	15			
Urine	Metabolites and environmental exposures	5			
	Culture & Environment				
Patient-Reported Outcome Measurement Information System (PROMIS) Social Support / Perceived Stress	Availability of social support and perceptions of stress during the past month		4		
Child Health					
Head Circumference, Height, Weight	Child's physical growth	5			
Nutrition					
2-Item Food Insecurity Screen	Household food insecurity		1		
PhenX Breastfeeding Questionnaire	Whether the infant was breastfed, breastfeeding duration, and introduction of solid foods		1		
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^{*}Measure to be completed by the birthing parent only.

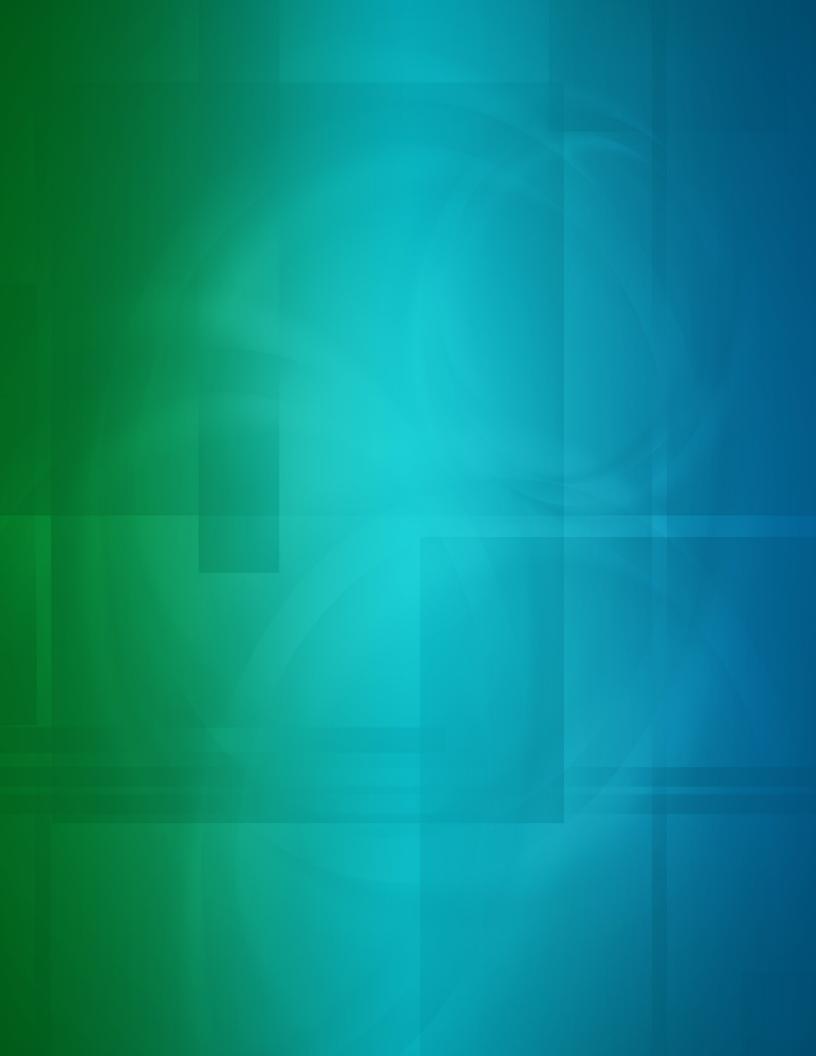
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3-9 Months of Age

HBCD Measure	What it Measures	Child (min)	Adult (min)			
Mobile Technology						
Activity Surveys	Child activity levels and functioning of movement and heart rate sensors, assessed once daily for 72 hours		12			
Heart Rate Sensors	Child heart rate, SpO2, and respiratory rate using LED sensors	72 hours, worn at home	5			
Movement Sensors	Child movement and sleep/wake cycles using sensors with an accelerometer and gyroscope	72 hours, worn at home	5			
	Brain Imaging					
Outside the Scanner	Pre-Scan & Post-Scan Surveys: Sleep information, social behavior, transportation, scheduling, etc.		40			
	Diffusion MRI	13				
	Functional MRI (resting state)	16				
Magnetic Resonance Imaging (MRI)	MR Spectroscopy	10				
	Quantitative MRI	4				
	Structural MRI (T1/T2)	10				
	Brain Activity					
Outside of Electroencephalogram (EEG)	Pre-EEG and Post-EEG Measurements	30				
Electroencephalogram (EEG)	Faces Task	4				
	Mismatch Negativity/Auditory Oddball Task	12				
	Video Resting State	3				
	Visual Evoked Potential Task	1				
	Neurocognition					
National Institutes of Health (NIH) Baby Toolbox	Cognitive and Executive Function (gaze-based and touch-based tasks)	10				
	Language (Mullen receptive, expressive, and observation tasks)	10				
	Memory	10				
Sensory Processing Measure 2 (SPM-2)	Vulnerabilities in the child's sensory systems, including under- and over-reactivity, sensory seeking behaviors, and perception		15			

3-9 Months of Age

HBCD Measure	What it Measures	Child (min)	Adult (min)			
Behavior and Caregiver-Child Interactions						
Early Regulation in Context Assessment (ERICA)	Affect and self-regulation behavior in children and families	45				
ecPROMIS - Caregiver-Child Interactions	Social relationships between the caregiver and child		2			
Family Culture Matters (FCM)	Culturally important differences in the caregiver's socialization goals for the child		10			
Infant Behavior Questionnaire- Revised (IBQ-R)	Child affect and temperament, including surgency, negative affect, effortful control, and inhibition		10			
Multidimensional Assessment Profile Temper Loss Scale (MAP- DB TL)	Child temperament and temper modulation		5			
Total Visit Time (min)		356				





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