

HBCD

PROTOCOL SUMMARY

VISIT 4: 9-15 MONTHS



HEALthy Brain and Child Development
Babies · Brains · Bright Futures

HBCDStudy.org

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 over 7,000 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 27 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

Recruitment Sites

- Arkansas Children's Hospital Research Institute
- Boston Children's Hospital | Harvard Medical School
- Cedars-Sinai Medical Center
- Children's Hospital of Los Angeles
- Children's Hospital of Philadelphia
- Cincinnati Children's Hospital
- Emory University
- Johns Hopkins University/Kennedy Krieger Institute
- New York University School of Medicine
- Northwestern University
- Oklahoma State University Center for Health Sciences
- Oregon Health & Science University
- Pennsylvania State University-University Park
- Pennsylvania State University College of Medicine
- University of Alabama at Birmingham
- University of Alabama at Tuscaloosa
- University of Arkansas for Medical Sciences
- University of Maryland
- University of Minnesota
- University of New Mexico
- University of North Carolina Chapel Hill
- University of Vermont
- University of Wisconsin-Madison
- University of California, San Diego
- Vanderbilt University
- Virginia Tech
- Washington University

HCAC

- University of California San Diego
- Boston Children's Hospital | Harvard Medical School

HDCC

- University of California San Diego
- University of Minnesota
- Washington University

9–15 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		4
DSM-5 Severity Scales - Acute Stress or Post-Traumatic Stress Disorder (PTSD)	Severity of acute stress and PTSD symptoms		5
Substance Use			
Alcohol, Smoking and Substance Involvement Screening Test (ASSIST)	Lifetime and current substance use (last 3 months)		3
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	
Social and Environmental Determinants			
Adverse Childhood Experiences (ACEs)	Difficult or potentially traumatic events that occurred during childhood, such as abuse, violence, and exposure to caregivers with mental health conditions		2
Composite Abuse Scale Revised - Short Form (CASR-SF)	Physical or emotional intimate partner violence in the past 12 months		4
Demographics	Race, ethnicity, marital status, sexual orientation, education, income, jobs, and household composition*		20
Patient-Reported Outcome Measurement Information System (PROMIS) Social Support/ Perceived Stress	Availability of social support and perceptions of stress during the past 12 months		4
Residential History for Geocoded Data Linkage	Home, work, or other frequented addresses for linking to external datasets		5
Pediatric Adverse Childhood Experiences and Related Life Events Screener (PEARLS)	Exposure to childhood adversity and other potential risk factors for stress, such as abuse, violence, and food or housing insecurity		2

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9–15 Months of Age

HBCD Measure	What it Measures	Child (min)	Adult (min)
Transitions in Care			
Transitions in Care Screener	Survey to assess whether there were changes in child's main caregiver since the last visit		3
Physical Health			
2-Item Food Insecurity	Household food insecurity		1
Medical History	Child's medication and environmental exposures		10
ScreenQ	Screen-based media use		5
PhenX Breast Feeding Questionnaire	Whether the child was breastfed, breastfeeding duration, and introduction to solid foods		1
ecPROMIS - Physical Activity/ Greenspace	Child's general physical activity and access to greenspace	2	
ecPROMIS - Sleep	Child's sleep patterns	1	
Brief Infant Sleep Questionnaire Short Form (BISQ-SF)	Perceptions of infant sleep, infant sleep quality, bedtime routines and behaviors related to promoting sleep		5
Head Circumference, Height, Weight	Child's physical growth	5	
Medical Record Extraction	Child's diagnoses, vaccinations, developmental screens, medications, hospitalizations, surgeries, laboratory results		10
Vision Screener	Vision and common vision problems	1	
Brain Imaging			
Outside the Scanner	Pre-Scan & Post-Scan Surveys: Sleep information, social behavior, transportation, scheduling, etc.		40
Magnetic Resonance Imaging (MRI)	Diffusion MRI	13	
	Functional MRI (resting state)	16	
	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	

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9–15 Months of Age

HBCD Measure	What it Measures	Child (min)	Adult (min)
Neurocognition and Language			
Bayley Scales of Infant and Toddler Development	Cognitive development, motor development, and communication	75	
MacArthur-Bates Communicative Development Inventory (CDI): Words and Gestures	Early language and communication skills		10
Multilingual Language Development Survey	Assessment of child's exposure to different languages		3
National Institutes of Health (NIH) Baby Toolbox	Cognitive and Executive Function (gaze-based and touch-based tasks)	10	
	Memory	10	
Behavior and Caregiver-Child Interactions			
Confusion, Hubbub and Order Scale (CHAOS)	Features of the home environment, such as disorganization or environmental confusion		5
Family Assessment Device General Functioning (FADGF-12)	Global health and functioning of the family unit, including communication, the emotional climate, and closeness among members of the family		3
Home Observation for Measurement of the Environment in the 21st Century (HOME-21)	Parental responsiveness, discipline practices, exposure to stimulating materials, and enriching family interactions		7
Laboratory Temperament Assessment Battery (Lab-TAB) Behavioral Inhibition Task	Inhibitory behaviors, such as social fear and distress, when the child is faced with a friendly but novel and unknown person		3
Semi-Structured Play Task	Caregiver-child dynamics in a non-stressful environment with age-appropriate toys		5
Total Visit Time (min)			412

**Measure to be completed by the birthing mom only.*



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