

DEPARTMENT OF HEALTH AND HUMAN SERVICES
NATIONAL INSTITUTES OF HEALTH

***Research Methodologies to Understand Long-term Consequences of
Prenatal Opioid and Other Substance Exposure on
Brain and Behavioral Development***

Neuroscience Center
Conference Rooms 7102A/B
6001 Executive Boulevard, Rockville, Maryland 20852

September 24, 2018
AGENDA

9:00 a.m. Call to Order

Terry Jernigan, Ph.D. (Meeting Chair); University of California, San Diego

9:05 a.m. Charge to the Panel: What are the goals of the study?

- Nora D. Volkow, M.D.; Director, National Institute on Drug Abuse
- Diana Bianchi, M.D.; Director, *Eunice Kennedy Shriver* National Institute of Child Health and Human Development
- Joshua Gordon, M.D., Ph.D.; Director, National Institute of Mental Health

9:30 a.m. Introduction of Expert Panel

9:40 a.m. Session 1: Developmental Effects of Prenatal Substance Exposure

Lead: Michael Charness, M.D.; U.S. Department of Veterans Affairs

- Claire Coles, Ph.D.; Emory University
- Christina Chambers, Ph.D.; University of California, San Diego
- Hendree Jones, Ph.D.; University of North Carolina at Chapel Hill

Topics for discussion:

- Teratogenic effects on neurodevelopment and other outcomes
- Impact and measurement of poly-substance exposure
- Tools available to measure substance exposure, including: timing, patterns of use, dose
- Biospecimens to collect (hair, teeth, placenta, others)
- Biological & physiological measures that predict adverse outcomes later in life
- Developmental Origins of Health and Disease (DOHaD) concept of reprogramming fetal physiology leading to metabolic/chronic diseases later in life

11:10 a.m. Break

11:20 a.m. Session 2: Measurement of Fetal/Neonatal Brain Development and Growth

Lead: William Fifer, Ph.D.; Columbia University

- P. Ellen Grant, M.D.; Harvard Medical School
- Colin Studholme, Ph.D.; University of Washington
- Weili Lin, Ph.D.; University of North Carolina at Chapel Hill

Topics for Discussion:

- Assessment Tools
 - Imaging – structural DTI, rsfMRI, fNIRS, ultrasound
 - EEG with scanning of structural and functional connectivity
 - Maternal abdominal ECG looking at rhythms
 - Wearable devices – biological measures and external stimuli
 - Fingerprinting vs. fixed set of parameters
- Imaging Issues
 - Frequency
 - Optimization of measures for age/stage of pregnancy
 - Signal-to-noise problems
 - Unique infant sensitivities: e.g., noise
 - Image analysis pipelines; data management; standardization and harmonization

12:50 p.m. Break to Distribute Lunches

1:00 p.m. Session 3: Measurement of Pediatric Brain Development

Lead: Deanna Barch, Ph.D.; Washington University in St. Louis

- Sean Deoni, Ph.D.; Brown University
- Linda Chang, M.D.; University of Maryland
- Jay Giedd, M.D.; University of California, San Diego

Topics for Discussion

- Measures
 - T1, T2, DTI, rsfMRI, MRS, QSM, others?
- Imaging Issues
 - Access/ transportation to adequate imaging facilities given participant locations
 - Consistency of imaging modalities vs. changing modalities at different ages
 - Frequency of imaging at different ages; variation by imaging modality?
 - Different states of consciousness during fMRI acquisition across different ages (e.g., sleeping, watching videos).
 - Standardization/harmonization of imaging platforms across sites for different modalities
 - Motion detection and motion correction

2:30 p.m. Break

2:40 p.m. Session 4: Early Childhood Cognitive, Social, Emotional Development Assessments

Lead: Charles A. Nelson, Ph.D.; Harvard Medical School

- Cynthia Rogers, M.D.; Washington University in St. Louis
- Nim Tottenham, Ph.D.; Columbia University
- Clancy Blair, Ph.D.; New York University

Topics for Discussion:

- Domains:
 - Executive Function (working memory, cognitive flexibility, inhibitory control, delay of gratification, processing speed)
 - Social-Emotional (temperament, behavioral inhibition, impulsivity, frustration)
 - Child psychiatric symptoms (from early indicators of risk to symptoms and clinical outcomes)
 - Global Developmental Measures (NNNS, cognitive, language, motor development)
- Types of measures (e.g. maternal report, lab, field, mobile/passive monitoring)
- Caregiver measures
 - Psychosocial and psychiatric assessments
 - Parenting (observation)
 - Home and daycare measures
 - Multi-informant and sensitive to developmental change
- Adversity Exposures
 - Social class, education, stressful life events; exposures to adversity across time
 - Objective quantifiable measure(s) to be used prospectively
- Nutrition
- Biospecimen collection
 - Samples: e.g. blood, stool, saliva, teeth
 - Analyses: stress, immune markers, microbiome, environmental exposures, tobacco exposure, epigenetic, genetic markers
- Timing of assessments: ages, frequency; what's needed to capture trajectories of development and periods of dynamic transition
- Innovation—how much?
- Converging methods in and out of scanner

4:10 p.m. Break/Prepare Summary

4:40 p.m. What are we missing that should be discussed at next meeting?

- Legal and Bioethical Issues
- Recruitment and retention
- Resource issues: Researcher expertise, scanners, and other technologies
- Others?

5:10 p.m. Wrap-up

Terry Jernigan, Ph.D.

5:30 p.m. Adjourn