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
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

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**