**Relating Metals Exposure to Birth and Early Childhood Outcomes via the Metabotype of Cord Blood**

Metabolomic Analysis: Untargeted Analytical Resource Core – NMR (RTI)

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**Abstract:**

This study will utilize samples collected from pregnant women in Bangladesh participating in a study aimed at determining the role of arsenic in birth and early childhood health outcomes.  The RTI CHEAR Hub will conduct metabolomics analysis of 200 cord blood serum samples.  Structural equation modelling will be used to conduct a pathway analysis to associate exposure markers with birth weight, weight for gestational age, and mental development indices at age 2.  Maternal arsenic exposure, and other metals exposures, have been associated with adverse birth and early life health outcomes. This investigation will expand beyond associating exposure to health outcomes through understanding how chemical-induced perturbations of the biochemical constituents in cord blood create an exposure of low molecular weight metabolites that makes the fetus vulnerable to the development of adverse health outcomes.

**Sample Description:**

200 cord blood serum samples were shipped to the RTI CHEAR on dry ice and immediately stored at -80 °C after being logged in for analysis.

The data obtained for the NMR metabolomics analysis can be found in the accompanying files:

Procedures: 1. CHEAR Christiani NMR Procedures.docx

Study Design Tables: 2. CHEAR Christiani NMR Study Design Table.xls

Metadata: 3. CHEAR Christiani METADATA.xlsm

Concentration Data: 4. CHEAR Christiani NMR Concentration Data.xlsx

Raw Data: 5. CHEAR Christiani NMR Data.zip

**Notes:**

Full sample preparation and analysis procedures are available in the accompanying document entitled **1. CHEAR Christiani NMR Procedures.**

Descriptions of abbreviations for factors are available in the Variable Dictionary in the accompanying file no. **2. CHEAR Christiani NMR Study Design Table.xls**.

Identifiable metabolites were semi-quantified with Chenomx and available in the attached file: 4**. CHEAR Christiani NMR Concentration Data.xlsx.** Metabolites were fit relative to the internal standard, d6-DSS. Sample ID and factors can be found in the first column and other columns in the spreadsheet contain concentration fit data from the metabolites that were fit to the spectra.

The Sample ID serves as the unique identifier (DRCC ID) of the individual samples and is used as the NMR folder name in the raw NMR data file **5. CHEAR Christiani NMR Raw Data.zip**.