The Seychelles Child Development Study

Presented by
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Japan Neuropathology
Iraq Dose Response Curve
When mothers and children have a high fish diet are there associations which can be detected between the child’s prenatal mercury exposure and clinical test scores.
Why Seychelles

- High fish diet
- Fish Hg content <0.5 ppm
- Prenatal Hg exposure 1-30 ppm
- Postnatal Hg exposure 1-20 ppm
- Birthrate > 1500/year
- Low infant mortality
Why Seychelles

- Pollution minimal
- 90% of population on Mahe
- Population stable & cooperative
- Cooperative government & Ministry of Health
- Health & Education free & readily accessible
- Easily accessible by air & telecommunications
SCDS Main Study Design

- Prospective
- Longitudinal (testing at 6.5, 19, 29, 66 & 107 mo)
- Double blind
- Enrolled & tested at uniform ages
- Individual testing in a Child Development Center
- Limited to Mahe
SCDS Main Study Cohort

- 779 infants enrolled
  - 39 met exclusion criteria

**Demographics**
- Median maternal hair mercury: 6.9 ppm
- Median gestational age: 39 wks
- Median maternal age: 26 yrs
- Median birth weight: 3.2 Kg
- Median maternal fish meals / week: 12
Subject at each age

- 6.5 mo - 740
- 19 mo - 738
- 29 mo - 736
- 66 mo - 735
- 107 mo - 694
SCDS Main Study
Exclusions

- General (age, expatriate, emigration)
- Maternal (alcoholism, eclampsia, insulin diabetic, attempted suicide)
- Neonatal (low birth weight, seizures, congenital abnormalities, ICH, severe illness)
- Postnatal (meningitis, epilepsy, deafness, head trauma with LOC)
SCDS Main Study Covariates

- **Child**
  - Gender
  - Birth weight
  - Birth order
  - Gestational age
  - Medical history
  - Length of Breastfeeding
  - Age at testing
  - Mercury
  - Hearing

- **Maternal**
  - Age
  - Parity
  - Alcohol use
  - Tobacco use
  - Medical history
  - Education

- **Other**
  - Hollingshead
  - Language spoken in home
  - Caregiver IQ (Ravens / K-Bit)
  - Examiner

- **Family**
  - Number of parents in home
  - HOME score
  - FRS / HELPS
SCDS Main Study Testing

- **6.5 mo**
  - Neurological exam
  - Visual recognition memory & attention

- **19 & 29 mo**
  - BSID

- **66 mo**
  - MSCA
  - W-J
  - PLS
  - CBCL
  - Bender
SCDS Main Study Testing

- 107 Mo
  - WISC III - Bruininck-Oseresky
  - Grooved Pegboard - Trail Making
  - Finger Tapping - WRAML
  - CPT - CBCL
  - CVLT - BNT
  - W-J
  - Connors Teacher Rating Scale
107 mo Testing Domains

- **Cognition & Achievement**
  - WISC III, CVLT, BNT, W-J

- **Motor, Perceptual Motor & Memory**
  - VMI, Bruinincks-Oseretsky, Haptic discrimination, Grooved Pegboard, Trail Making, Finger Tapping, WRAML

- **Attention & Behavior**
  - CPT, CBCL, Connors Teacher Rating Scale
Analysis Plan

- **Primary**
  - Multiple regression with two models
    - full - all covariates
    - reduced - essential covariates
  - Each model examined
    - with and without gender interaction
    - before and after removing statistical outliers
    - for influential points

- Secondary analyses
Results Main Study 6.5 mo

- **DDST-R**
  - No analysis possible, small number of abn or q scores
- **Neurological examination**
  - Overall neuro - no analysis possible, small number of abn
  - DTR’s - no association with Hg
  - Limb tone - no association with Hg
  - association present with gender (M), maternal education, and birth weight
Results Main Study 6.5 mo

- **Visual recognition memory**
  - median score 60% looking time to novel target
  - no association with Hg
  - association present with male gender, + child’s medical history, and not speaking Creole at home

- **Visual attention**
  - median score 37.8 sec
  - no association with Hg
Results Main Study 19 & 29 mo

- **MDI** - mean 19m = 97, 29m = 100
  - no association with Hg

- **PDI** - mean 19m = 126, 29m = 121
  - no association with Hg

- **IBR** (6 items)
  - Only Activity associated with Hg
    - Activity decreased in males as Hg increased
Results Main Study 66 mo

- MSCA - GCI
- PLS - Total score
- W-J
  - Letter word recognition
  - Applied problems
- CBCL – Total T score
- Bender-Gestalt - Errors
  - No adverse associations found
  - Scores influenced by expected covariates
SCDS Seychelles Collaborators

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- Marie Antoine Payet
- Paulette Sarah
- Patricia Charlotte
- Sister Claire
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- Marie Therese Purvis
SCDS Rochester Collaborators

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