

A world map with a black background and light blue landmasses. The map is centered on the Atlantic Ocean, showing the Americas on the left and Europe, Africa, and Asia on the right.

The Seychelles Child Development Study

Presented by
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Japan Neuropathology



Iraq Dose Response Curve



A world map is shown in the background, with continents in a light blue color against a black background. The map is centered on the Atlantic Ocean.

SCDS Primary Question

- ◆ 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

A world map is shown in the background, with the Seychelles islands highlighted in red. The map is centered on the Indian Ocean, showing the outlines of the continents in a light blue color.

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

A world map is shown in the background, with the Seychelles archipelago highlighted in a light blue color. The rest of the map is in a dark blue color. The title 'Why Seychelles' is written in a large, bold, yellow font at the top center of the slide.

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

A world map is shown in the background, with continents in light blue and oceans in dark blue. The map is centered on the Atlantic Ocean.

Subject at each age

◆ 6.5 mo - 740

◆ 19 mo - 738

◆ 29 mo - 736

◆ 66 mo - 735

◆ 107 mo - 694

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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

◆ Family

- Number of parents in home
- HOME score
- FRS / HELPS

◆ Maternal

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

◆ Other

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

SCDS Main Study Testing



◆ 6.5 mo

- Neurological exam
- DDST
- Visual recognition memory & attention

◆ 19 & 29 mo

- BSID

◆ 66 mo

- MSCA
- W-J
- PLS
- Bender
- CBCL

SCDS Main Study Testing

◆ 107 Mo

– WISC III

– Grooved Pegboard

– Finger Tapping

– CPT

– CVLT

– W-J

– Connors Teacher Rating Scale

- Bruininck-Oseresky

- Trail Making

- WRAML

- CBCL

- BNT

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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

- ◆ Conrad Shamlaye
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- ◆ Octavie Choisy
- ◆ Juliette Ettiene
- ◆ Marie Antoine Payet
- ◆ Paulette Sarah
- ◆ Patricia Charlotte

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- Bernard Mouline
- Mohammed Afif
- Marie Therese Purvis

SCDS Rochester Collaborators

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- ◆ Li-Shan Huang
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