Supplemental Material for

Prenatal DDT and DDE Exposure and Child IQ in the CHAMACOS Cohort

Fraser W. Gaspar1, Kim G. Harley1,Katherine Kogut1, Jonathan Chevrier2, Ana Maria Mora1,3, Andreas Sjödin4, Brenda Eskenazi1

1 Center for Environmental Research and Children’s Health (CERCH), School of Public Health, University of California at Berkeley, Berkeley, CA, USA.

2 Department of Epidemiology, Biostatistics and Occupational Health, McGill University, Montreal, QC, Canada.

3 Central American Institute for Studies on Toxic Substances (IRET), Universidad Nacional, Heredia, Costa Rica.

4 Division of Laboratory Sciences, National Center for Environmental Health, Centers for Disease Control and Prevention, Atlanta, GA, USA.

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Table S1. Detection and concentrations (ng/g-lipid) of DDT and DDE in maternal serum collected during pregnancy.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **N** | **Mean LODa** **and range** | **Detect.****freq.b (%)** | **GMc**  | **Min** | **5th%** | **25th%** | **Median** | **75th%** | **95th%** | **Max** |
| **Measured**  |  |  |  |  |  |  |  |  |  |  |  |
| DDT | 266 | 1.9 (0.9-3.6) | 99.6 | 21.4 | 0.5 | 4.4 | 7.0 | 11.7 | 34.9 | 297.5 | 34500.0 |
| DDE | 266 | 3.6 (1.6-6.7) | 100.0 | 606.4 | 25.7 | 163.0 | 257.2 | 427.5 | 1165.0 | 4434.8 | 58800.0 |
| **Predictedd**  |  |   |   |   |   |   |   |   |   |   |   |
| DDT | 353 |   |   | 20.2 | 2.4 | 5.3 | 7.8 | 12.4 | 34.2 | 167.1 | 8589.7 |
| DDE | 353 |   |   | 607.3 | 28.2 | 195.6 | 270.0 | 441.4 | 1094.5 | 3316.9 | 23256.1 |
| **CHAM1e**  |  |   |   |   |   |   |   |   |   |   |   |
| DDT | 326 |   |   | 21.3 | 0.5 | 4.7 | 7.2 | 12.5 | 34.9 | 290.5 | 34500.0 |
| DDE | 326 |   |   | 604.5 | 25.7 | 164.0 | 263.2 | 434.5 | 1151.7 | 3890.0 | 58800.0 |
| **CHAM2d**  |  |   |   |   |   |   |   |   |   |   |   |
| DDT | 293 |   |   | 20.1 | 2.4 | 5.3 | 7.7 | 11.9 | 32.8 | 209.8 | 8589.7 |
| DDE | 293 |   |   | 609.6 | 63.2 | 197.6 | 269.0 | 438.5 | 976.8 | 3620.4 | 23256.1 |
| **Alld,e**  |  |   |   |   |   |   |   |   |   |   |   |
| DDT | 619 |   |   | 20.7 | 0.5 | 4.0 | 7.4 | 12.1 | 34.7 | 795.6 | 34500.0 |
| DDE | 619 |   |   | 606.9 | 25.7 | 146.3 | 265.6 | 436.8 | 1124.0 | 7099.1 | 58800.0 |
| a LOD = limit of detection, not available for predicted serum levelsb Detect. Freq. = detection frequencies, not available for predicted blood levelsc GM = geometric mean d Values from single super learner prediction using all CHAM1 observationse Includes both measured and predicted |

Table S2. Change in cognitive scores in children tested at 7 and/or 10.5-Years for each 10-fold increase in prenatal DDT/E exposure using GEE and linear regression models - measured levels only**a.**

|  |  |
| --- | --- |
|  | ***7 and/or 10.5-Years of Age (CHAM1, n=266b)*** |
|  | **DDT** |  | **DDE** |
| **Cognitive test** | **mean (SD)c** | **β (95% CI)d** | ***p*-value** |  | **β (95% CI)** | ***p*-value** |
| WISC-IV scale |  |  |  |  |  |  |
| Working memory | 95.6 (12.5) | -1.3 (-2.9,0.3) | 0.12 |  | -0.8 (-3.1,1.5) | 0.46 |
| Perceptual reasoning | 97.8 (16.0) | 0.3 (-1.7,2.3) | 0.78 |  | 1.1 (-1.7,3.9) | 0.44 |
| Verbal comprehension | 96.2 (18.1) | -0.1 (-2.0,1.8) | 0.91 |  | 0.5 (-2.1,3.1) | 0.69 |
| Processing speed | 102.8 (14.0) | -1.8 (-3.5,-0.1) | 0.04 |  | -2.0 (-4.4,0.4) | 0.10 |
| Full-scale IQ | 97.0 (14.5) | -0.7 (-2.4,1.0) | 0.42 |  | -0.2 (-2.5,2.1) | 0.89 |
|  | ***7-Years of Age (CHAM1, n=256b)*** |
|  | **DDT** |  | **DDE** |
| **Cognitive test** | **mean (SD)** | **β (95% CI)** | ***p*-value** |  | **β (95% CI)** | ***p*-value** |
| WISC-IV scale |  |  |  |  |  |  |
| Working memory | 94.1 (13.7) | -1.5 (-4.3,1.2) | 0.28 |   | -0.7 (-4.4,2.9) | 0.70 |
| Perceptual reasoning | 102.5 (16.2) | -0.4 (-3.4,2.6) | 0.80 |   | -0.3 (-4.2,3.7) | 0.89 |
| Verbal comprehension | 106.8 (16.8) | -1.6 (-4.1,0.9) | 0.21 |   | -2.0 (-5.3,1.4) | 0.26 |
| Processing speed | 108.5 (13.1) | -2.5 (-5.2,0.1) | 0.06 |   | -1.9 (-5.4,1.6) | 0.29 |
| Full-scale IQ | 104.3 (14.2) | -1.7 (-4.5,1.1) | 0.23 |   | -1.6 (-5.3,2.0) | 0.38 |
|  | ***10.5-Years of Age (CHAM1, n=244)*** |
|  | **DDT** |  | **DDE** |
| **Cognitive test** | **mean (SD)** | **β (95% CI)** | ***p*-value** |  | **β (95% CI)** | ***p*-value** |
| WISC-IV scale |  |  |  |  |  |  |
| Working memory | 96.9 (11.0) | -1.1 (-3.1,0.8) | 0.25 |   | -1.3 (-4.0,1.4) | 0.34 |
| Perceptual reasoning | 92.8 (14.2) | 0.7 (-1.9,3.3) | 0.61 |   | 2.0 (-1.5,5.6) | 0.26 |
| Verbal comprehension | 85.0 (11.4) | 0.7 (-1.3,2.7) | 0.49 |   | 1.9 (-0.8,4.7) | 0.16 |
| Processing speed | 97.5 (12.6) | -1.4 (-3.6,0.8) | 0.20 |   | -2.2 (-5.2,0.8) | 0.14 |
| Full-scale IQ | 90.1 (11.0) | -0.3 (-2.2,1.7) | 0.79 |   | 0.4 (-2.3,3.1) | 0.78 |
| a Adjusted for maternal education, age, parity, PPVT scores, CES-D scores, birth country, and years in the U.S prior to delivery; HOME z-score; language of WISC testing; child sex and age at WISC testing; and household poverty.b Depending on WISC index, n ranged from 229-256 for 7-year analysis, and 264-266 for the GEE analysisc Mean and standard deviation (SD) of WISC indexes. For GEE, average for 7 and 10.5-year visits. d β= beta coefficient on regression models, CI= confidence interval |

Table S3. Change in cognitive scores tested at 7 years and/or 10.5 years for each 10-fold increase in prenatal DDT/E exposure using GEE models - stratified by sexa.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ***Boys (n=306 b)*** |  | ***Girls (n=313b)*** |  |  |
|  | **DDT** |  |  |
| **Cognitive test** | **β (95% CI)c** | ***p*-value** |  | **β (95% CI)** | ***p*-value** |  | ***p-value of interaction*** |
| WISC-IV scale |  |  |  |  |  |  |  |
| Working memory | -1.3 (-3.2,0.5) | 0.15 |  | -0.4 (-2.2,1.3) | 0.62 |  | 0.35 |
| Perceptual reasoning | 0.1 (-2.0,2.3) | 0.90 |  | -0.0 (-2.0,1.9) | 0.99 |  | 0.57 |
| Verbal comprehension | -0.2 (-2.0,1.5) | 0.80 |  | 0.5 (-1.5,2.4) | 0.64 |  | 0.50 |
| Processing speed | -0.3 (-2.3,1.6) | 0.72 |  | -2.0 (-3.8,-0.2) | 0.03 |  | 0.21 |
| Full-scale IQ | -0.6 (-2.5,1.2) | 0.51 |  | -0.3 (-2.1,1.5) | 0.76 |  | 0.98 |
|  | **DDE** |  |  |
| WISC-IV scale |  |  |  |  |  |  |  |
| Working memory | -0.5 (-2.6,1.6) | 0.63 |  | -0.2 (-2.3,2.0) | 0.87 |  | 0.56 |
| Perceptual reasoning | 0.7 (-1.8,3.1) | 0.59 |  | -0.2 (-2.6,2.1) | 0.85 |  | 0.42 |
| Verbal comprehension | 0.4 (-1.6,2.3) | 0.71 |  | 0.3 (-2.0,2.7) | 0.77 |  | 0.97 |
| Processing speed | -0.4 (-2.6,1.7) | 0.70 |  | -3.0 (-5.2,-0.9) | 0.01 |  | 0.12 |
| Full-scale IQ | -0.0 (-2.1,2.0) | 0.97 |  | -0.6 (-2.7,1.6) | 0.62 |  | 0.64 |
| a Adjusted for maternal education, age, parity, PPVT scores, CES-D scores, birth country, and years in the U.S prior to delivery; HOME z-score; language of WISC testing; child sex; and household poverty.b Depending on WISC index, n ranged from 305-306 for boys and 311-313 for girls c β= beta coefficient on regression models, CI= confidence interval |

**Table** **S4. Change in cognitive scores tested at 7 years for each 10-fold increase in prenatal DDT/E exposure using linear regression models - stratified by sexa.**

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ***Boys (n=148b)*** |  | ***Girls (n=168b)*** |  |  |
|  | **DDT** |  |  |
| **Cognitive test** | **β (95% CI)c** | ***p*-value** |  | **β (95% CI)** | ***p*-value** |  | ***p-value of interaction*** |
| WISC-IV scale |  |  |  |  |  |  |  |
| Working memory | 0.2 (-2.4,2.9) | 0.86 |  | -1.9 (-4.6,0.8) | 0.16 |  | 0.51 |
| Perceptual reasoning | 1.7 (-1.1,4.5) | 0.24 |  | -1.4 (-4.2,1.4) | 0.32 |  | 0.07 |
| Verbal comprehension | -1.9 (-4.5,0.7) | 0.15 |  | -2.0 (-4.5,0.5) | 0.12 |  | 0.44 |
| Processing speed | -1.4 (-4.2,1.4) | 0.32 |  | -3.4 (-5.9,-1.0) | 0.01 |  | 0.36 |
| Full-scale IQ | -0.5 (-3.2,2.2) | 0.74 |  | -2.6 (-5.2,0.1) | 0.06 |  | 0.40 |
|  | **DDE** |  |  |
| WISC-IV scale |  |  |  |  |  |  |  |
| Working memory | 2.9 (0.1,5.8) | 0.04 |  | -2.7 (-5.9,0.5) | 0.10 |  | 0.01 |
| Perceptual reasoning | 3.0 (-0.2,6.1) | 0.06 |  | -3.0 (-6.3,0.2) | 0.07 |  | <0.01 |
| Verbal comprehension | -0.7 (-3.5,2.1) | 0.63 |  | -3.1 (-6.0,-0.1) | 0.04 |  | 0.57 |
| Processing speed | 1.0 (-2.0,4.1) | 0.50 |  | -4.2 (-7.1,-1.3) | <0.01 |  | 0.02 |
| Full-scale IQ | 1.9 (-1.0,4.8) | 0.21 |  | -4.4 (-7.6,-1.3) | 0.01 |  | <0.01 |
| a Adjusted for maternal education, age, parity, PPVT scores, CES-D scores, birth country, and years in the U.S prior to delivery; HOME z-score; language of WISC testing; child sex; and household poverty.b Depending on WISC index, n ranged from 135-148 for boys and 149-168 for girlsc β= beta coefficient on regression models, CI= confidence interval |

Table S5. Change in cognitive scores tested at 10.5 years for each 10-fold increase in prenatal DDT/E exposure using linear regression models - stratified by sexa.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | ***Boys (n=292)*** |  | ***Girls (n=303b)*** |  |  |
|  | **DDT** |  |  |
| **Cognitive test** | **β (95% CI)c** | ***p*-value** |  | **β (95% CI)** | ***p*-value** |  | ***p-value of interaction*** |
| WISC-IV scale |  |  |  |  |  |  |  |
| Working memory | -1.8 (-3.8,0.1) | 0.06 |  | -0.2 (-2.1,1.8) | 0.86 |  | 0.11 |
| Perceptual reasoning | 0.0 (-2.2,2.2) | 0.97 |  | 0.4 (-1.8,2.7) | 0.70 |  | 0.94 |
| Verbal comprehension | 0.3 (-1.6,2.2) | 0.78 |  | 0.8 (-1.1,2.7) | 0.41 |  | 0.69 |
| Processing speed | -0.3 (-2.3,1.7) | 0.75 |  | -1.4 (-3.4,0.7) | 0.19 |  | 0.45 |
| Full-scale IQ | -0.5 (-2.5,1.4) | 0.58 |  | 0.2 (-1.7,2.0) | 0.87 |  | 0.65 |
|  | **DDE** |  |  |
| WISC-IV scale |  |  |  |  |  |  |  |
| Working memory | -1.9 (-4.1,0.3) | 0.10 |  | 0.5 (-1.8,2.7) | 0.70 |  | 0.03 |
| Perceptual reasoning | 0.1 (-2.4,2.6) | 0.93 |  | 1.3 (-1.3,3.8) | 0.34 |  | 0.68 |
| Verbal comprehension | 1.0 (-1.2,3.2) | 0.37 |  | 1.1 (-1.1,3.3) | 0.33 |  | 0.89 |
| Processing speed | -1.1 (-3.4,1.2) | 0.34 |  | -2.4 (-4.8,-0.0) | 0.05 |  | 0.60 |
| Full-scale IQ | -0.4 (-2.6,1.7) | 0.70 |  | 0.5 (-1.7,2.7) | 0.65 |  | 0.50 |
| a Adjusted for maternal education, age, parity, PPVT scores, CES-D scores, birth country, and years in the U.S prior to delivery; HOME z-score; language of WISC testing; child sex; and household poverty.b Depending on WISC index, n ranged from 302-303 for girlsc β= beta coefficient on regression models, CI= confidence interval |