Supplemental Material for

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

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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 levels  b Detect. Freq. = detection frequencies, not available for predicted blood levels  c GM = geometric mean  d Values from single super learner prediction using all CHAM1 observations  e 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 analysis  c 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 girls  c 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 girls  c β= beta coefficient on regression models, CI= confidence interval | | | | | | | |