Supplemental Table 1. Weighted geometric mean lipid adjusted heptachlor epoxide, oxychlordane, and trans-nonachlor concentration levels among NHANES 1999-2004 male participants, overall and by covariates (n=748).

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| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **Heptachlor Epoxide (ng/g lipid)** | | **Oxychlordane (ng/g lipid)** | | | **Trans-nonachlor (ng/g lipid)** | | |
|  | **GM (95% CI)** | **p-value** | **GM (95% CI)** | **p-value** | **GM (95% CI)** | | **p-value** |
| **Overall** | 6.1 (5.6, 6.7) |  | 12.2 (11.2, 13.2) |  | 18.9 (16.8, 21.3) | |  |
| **Age in years,** 20-39 | 4.9 (4.4, 5.6) | <0.0001 | 7.2 (6.5, 7.9) | <0.0001 | 10.8 (9.3, 12.6) | | <0.0001 |
| 40-59 | 6.1 (5.5, 6.8) | <0.0001 | 14.5 (13.1, 15.9) | <0.0001 | 22.3 (19.2, 26.0) | | <0.0001 |
| 60+ | 9.9 (8.6, 11.5) | ref | 26.9 (24.2, 29.8) | ref | 45.2 (39.7, 51.5) | | ref |
| **Race/ethnicity** |  |  |  |  |  | |  |
| African-American, nH | 4.8 (4.2, 5.6) | 0.15 | 10.4 (8.7, 12.5) | 0.19 | 18.3 (14.6, 23.0) | | 0.05 |
| White, nH | 6.5 (5.8, 7.2) | 0.09 | 13.1 (11.8, 14.4) | <0.0001 | 19.8 (17.1, 22.9) | | 0.001 |
| Hispanic | 5.6 (4.8, 6.5) | ref | 8.9 (7.6, 10.5) | ref | 14.0 (11.7, 16.8) | | ref |
| Other | 5.7 (4.5, 7.2) | 0.89 | 11.7 (8.8, 15.7) | 0.38 | 21.4 (14.7, 31.3) | | 0.05 |
| **Education,** < High school | 6.3 (5.5, 7.4) | 0.99 | 12.5 (10.4, 15.1) | 0.61 | 21.3 (17.4, 26.0) | | 0.65 |
| High school graduate | 6.3 (5.4, 7.3) | 0.94 | 13.0 (11.6, 14.5) | 0.77 | 19.7 (16.7, 23.3) | | 0.89 |
| Some college | 5.8 (5.2, 6.3) | 0.23 | 10.5 (9.4, 11.8) | 0.005 | 16.2 (14.1, 18.7) | | 0.05 |
| ≥ College graduate | 6.3 (5.5, 7.3) | ref | 13.3 (11.5, 15.3) | ref | 20.0 (16.2, 24.7) | | ref |
| **Born in the United States,** Yes | 6.3 (5.8, 6.9) | 0.003 | 12.9 (11.8, 14.0) | 0.0001 | 19.8 (17.7, 22.3) | | 0.01 |
| No | 5.2 (4.7, 5.8) |  | 9.0 (7.6, 10.5) |  | 14.5 (11.3, 18.6) | |  |
| **BMI, kg/m2,** <25 | 4.9 (4.4, 5.4) | <0.0001 | 10.7 (9.6, 11.9) | 0.0004 | 16.8 (14.3, 19.8) | | 0.009 |
| 25 to <30 | 6.0 (5.5, 6.6) | 0.0002 | 12.1 (11.0, 13.2) | 0.08 | 18.4 (16.6, 20.5) | | 0.11 |
| ≥30 | 7.9 (7.0, 8.9) | ref | 13.9 (12.0, 16.0) | ref | 21.9 (17.7, 27.0) | | ref |
| **Triglycerides** ≥ 200 mg/dL, Yes | 6.6 (5.8, 7.5) | 0.15 | 14.5 (12.7, 16.6) | 0.004 | 22.4 (18.7, 26.8) | | 0.03 |
| No | 6.0 (5.5, 6.6) |  | 11.5 (10.5, 12.6) |  | 18.0 (15.8, 20.5) | |  |
| **Total cholesterol** ≥ 200 mg/dL, Yes | 6.0 (5.5, 6.6) | 0.46 | 12.8 (11.8, 13.8) | 0.05 | 20.4 (18.6, 22.5) | | 0.03 |
| No | 6.3 (5.6, 7.0) |  | 11.6 (10.4, 12.9) |  | 17.5 (14.8, 20.7) | |  |
| **Diabetes** | 10.7 (8.5, 13.6) | <0.0001 | 23.8 (20.0, 28.4) | <0.0001 | 40.1 (31.7, 50.7) | | <0.0001 |
| Non-diabetic | 5.9 (5.4, 6.3) |  | 11.5 (10.6, 12.4) |  | 17.7 (15.7, 20.0) | |  |
| **Smoking status,** Never | 5.9 (5.2, 6.6) | ref | 10.5 (9.3, 12.0) | ref | 15.9 (13.4, 19.0) | | ref |
| Former (5+ years) | 7.6 (6.5, 9.0) | 0.02 | 18.4 (16.2, 20.9) | <0.0001 | 29.8 (25.2, 35.1) | | <0.0001 |
| Former (<5 years) | 5.5 (4.6, 6.6) | 0.54 | 9.9 (7.1, 13.7) | 0.69 | 14.6 (9.7, 21.9) | | 0.67 |
| Current (infrequent) | 6.2 (5.0, 7.7) | 0.65 | 9.2 (6.6, 12.9) | 0.42 | 15.5 (10.7, 22.5) | | 0.90 |
| Current (daily) | 5.6 (5.0, 6.4) | 0.57 | 12.0 (10.6, 13.7) | 0.11 | 18.9 (15.6, 22.9) | | 0.10 |
| **Survey year,** 1999-2000 | 7.9 (7.1, 8.8) | <0.0001 | 15.2 (13.5, 17.0) | 0.0008 | 23.3 (20.8, 26.1) | | 0.01 |
| 2001-2002 | 6.6 (5.9, 7.3) | 0.03 | 12.6 (11.1, 14.3) | 0.08 | 19.1 (16.0, 22.9) | | 0.41 |
| 2003-2004 | 5.1 (4.4, 6.0) | ref | 10.6 (9.3, 12.2) | ref | 17.0 (13.7, 21.2) | | ref |

GM=geometric mean; CI=confidence interval; nH=non-Hispanic; Q1: Quartile 1; Q2: Quartile 2; Q3: Quartile 3; Q4: Quartile 4; p-values presented are from 2-sided t-tests from linear models regressing the log transformed lipid adjusted pesticide concentration on the covariate

Supplemental Table 2. Results from stratum-specific multivariable adjusteda models of categorized levels of lipid adjusted heptachlor epoxide and p,p’-DDE exposures and SHBG levels in male NHANES 1999-2004 participants (n=748).

|  |  |
| --- | --- |
| **Serum pesticide concentrations** | **SHBG (nmol/L)** |
| **Heptachlor epoxide**b | **GM (95% CI)** |
| *Males with BMI < 25 (n=224)* |  |
| Quartile 1 (ref) | 33.7 (29.1, 39.1) |
| Quartile 2 | 35.6 (30.7, 41.3) |
| Quartile 3 | 29.6 (24.4, 35.9)d |
| Quartile 4 | 27.4 (20.4, 37.0) |
| p for trend | 0.01 |
| *Males with BMI 25-29.9 (n=310)* |  |
| Quartile 1 (ref) | 30.7 (28.3, 33.3) |
| Quartile 2 | 32.0 (27.7, 36.9) |
| Quartile 3 | 31.6 (28.8, 34.7) |
| Quartile 4 | 31.5 (26.6, 37.4) |
| p for trend | 0.69 |
| *Males with BMI 30-62.99 (n=214)* |  |
| Quartile 1 (ref) | 25.2 (21.0, 30.3) |
| Quartile 2 | 33.0 (27.5, 39.5)d |
| Quartile 3 | 25.7 (22.6, 29.2) |
| Quartile 4 | 26.3 (21.6, 32.1) |
| p for trend | 0.87 |
| **p,p’-DDEc** |  |
| *Males with prevalent diabetes (n=85)* |  |
| Quartile 1 (ref) | 35.1 (24.1, 51.0) |
| Quartile 2 | 30.4 (23.7, 38.9) |
| Quartile 3 | 17.2 (12.5, 23.7)d |
| Quartile 4 | 31.6 (23.0, 43.5) |
| p for trend | 0.46 |
| *Males without prevalent diabetes (n=663)* |  |
| Quartile 1 (ref) | 34.8 (32.3, 37.5) |
| Quartile 2 | 33.6 (31.3, 36.1) |
| Quartile 3 | 33.3 (31.6, 35.2) |
| Quartile 4 | 32.2 (27.2, 38.1) |
| p for trend | 0.41 |

aModel adjusts for age (continuous), body mass index (continuous), race (non-Hispanic white, non-Hispanic African-American, Hispanic, or other), education level (less than high school, high school grad, some college or more), serum lipids (continuous), self-reported smoking history (never, 5+ years since last cigarette, <5 years since last cigarette, infrequent current smoker, daily smoker), and survey cycle

bAdjusted Wald test p-value for cross-product term with BMI=0.03

cAdjusted Wald test p-value for cross-product term with diabetes=0.02

dStatistically significant (p<0.05) compared to Q1