Co-exposure to non-persistent organic chemicals among American pre-school aged children: a pilot study

**Authors:**

Antonia M. Calafata,\*, Xiaoyun Yea, Liza Valentin-Blasinia, Zheng Lia,b, Mary E. Mortensena, Lee-Yang Wonga

Supporting Information

Table S1. Geometric mean and selected percentiles of biomarkers concentrations in urine (in µg/g creatinine) of a convenience sample of American children 3–5 years of age (n=122).a

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Analyte | Abbreviated name | LOD (µg/L) | Detection frequency (%) | Geometric mean  (µg/L) | 25th percentile  (µg/g creatinine) | 50th percentile  (µg/g creatinine) | 75th percentile  (µg/g creatinine) | 95th percentile  (µg/g creatinine) |
| **Parabens** | | | | | | | | |
| Butyl paraben | BPB | 0.1 | 26.3 | \* | <LOD | <LOD | 0.4(0.3, 0.7) | 2.4(1.2,520) |
| Ethyl paraben | EPB | 1 | 32.2 | \* | <LOD | <LOD | 4.7(3.9,7.5) | 66.8(22.9,1382) |
| Methyl paraben | MPB | 1 | 100 | 90.1(48.1-168.8) | 20.1(13.8,26.9) | 83.7(44.3,143) | 400(192,540) | 2179(1437,5185) |
| Propyl paraben | PPB | 0.1 | 99.2 | 9.9(5.1-19.3) | 2.2(1.8,3.2) | 8.1(5.1,11.9) | 32.8(18.2,99.6) | 482(173,724) |
| **Environmental phenols** | | | | | | | | |
| Benzophenone-3 | BP-3 | 0.2 | 100 | 36.8(21.8-62.2) | 13.7(10.9,14.9) | 24.5(17.9,46) | 89.6(61,141) | 602(289,3293) |
| Bisphenol A | BPA | 0.1 | 98.3 | 3(2.1-4.3) | 1.7(1.3,2.1) | 2.8(2.4,3.5) | 5.2(4.2,7) | 30.6(8.8,42.8) |
| Triclosan | TCS | 1 | 78.8 | 10.2(5.6-18.6) | 2.6(2,3.9) | 6.2(4.8,9.1) | 30.1(16.4,53.8) | 272(105,2760) |
| **Phthalates and DINCH** | | | | | | | | |
| Monomethyl phthalate | MMP | 0.5 | 88.1 | 6.7(4.3-10.2) | 3.8(2.7,4.6) | 6.3(5.1,8.7) | 11.9(10.9,15.2) | 38.2(22.7,872) |
| Monoethyl phthalate | MEP | 0.6 | 100 | 42.6(29.7-61) | 22.5(19.1,25.5) | 34.9(29.9,42) | 60.8(47,90.5) | 442(192,2525) |
| Mono-n-butyl phthalate | MnBP | 0.4 | 100 | 22.9(15.7-33.5) | 11.4(9.9,12.4) | 21.8(17.7,29) | 35.5(32.8,48.3) | 147(75.2,803) |
| Mono-isobutyl phthalate | MiBP | 0.2 | 100 | 17.5(12.3-24.8) | 9.7(7.8,10.9) | 17.1(13.4,21) | 31.1(27.1,46.2) | 65.1(58,828) |
| Monobenzyl phthalate | MBzP | 0.3 | 99.2 | 13.7(9.3-20.3) | 7.6(4.4,9) | 13.6(10.3,18) | 29.7(22.2,38.7) | 106(63.2,137) |
| Mono-3-carboxypropyl phthalate | MCPP | 0.2 | 91.5 | 3.9(2.7-5.6) | 1.9(1.5,2.7) | 4(3.4,5) | 7.9(5.9,10.5) | 22.4(14.6,57.1) |
| Mono-2-ethylhexyl phthalate | MEHP | 0.5 | 70.3 | 2.1(1.6-2.9) | <LOD | 1.9(1.5,2.4) | 3.7(3.1,5) | 9.7(7.4,32.9) |
| Mono-2-ethyl-5-hydroxyhexyl phthalate | MEHHP | 0.2 | 100 | 20.3(14.9-27.7) | 12.2(9.9,14) | 18.9(16.4,24) | 33.8(27.8,41.8) | 94.3(71.2,307) |
| Mono-2-ethyl-5-oxohexyl phthalate | MEOHP | 0.2 | 100 | 13.2(9.8-17.8) | 8.2(6.6,9.5) | 12(10.8,14.6) | 20.8(18.5,27.5) | 57.9(44.8,181) |
| Mono-2-ethyl-5-carboxypentyl phthalate | MECPP | 0.2 | 100 | 38.4(29.3-50.4) | 24.3(19.6,27) | 36.7(31,44.7) | 54.3(50.6,73.1) | 143(105,443) |
| Mono-isononyl phthalate | MiNP | 0.5 | 43.2 | \* | <LOD | <LOD | 2.2(1.9,2.6) | 5.4(3.9,74.6) |
| Monocarboxyoctyl phthalate | MCOP | 0.2 | 100 | 26.3(18.7-37.2) | 12.9(10.5,16.1) | 23.1(19,29.4) | 48.7(41.6,71.5) | 147.9(97.6,445) |
| Monocarboxynonyl phthalate | MCNP | 0.2 | 98.3 | 4.5(3.5-5.9) | 2.9(2.5,3.3) | 4.2(3.7,4.8) | 7.1(6.1,8.7) | 15.6(11.5,110) |
| Cyclohexane-1,2-dicarboxylic acid monohydroxy isononyl ester | MHiNCH | 0.4 | 66.1 | 1.8(1.3-2.5) | <LOD | 1.7(1.4,2) | 2.9(2.5,4) | 14.3(6.6,25.4) |
| **Polycyclic aromatic hydrocarbons** | | | | | | | | |
| 1-Hydroxynapthalene | 1-NAP | 0.044 | 99.2 | 1.80(1.28-2.53) | 0.912(0.801,1.1) | 1.63(1.40,1.97) | 2.84(2.45,4.26) | 12.1(6.34,38.5) |
| 2-Hydroxynapthalene | 2-NAP | 0.04 | 100 | 8.22(6.23-10.8) | 4.52(3.39,5.83) | 8.42(6.17,10.0) | 14.7(11.3,18.6) | 31.7(26.5,50.7) |
| 2-Hydroxyfluoreneb | 2-FLU | 10b | 100 | 286(230-356) | 188(163,200) | 270(243,299) | 362(315,458) | 983(613,3937) |
| 3-Hydroxyfluoreneb | 3-FLU | 10b | 99.2 | 135(107-170) | 87(78,102) | 125(108,139) | 181(152,205) | 499(397,1723) |
| 9-Hydroxyfluoreneb | 9-FLU | 10b | 100 | 277(226-340) | 181(162,218) | 274(241,294) | 380(345,477) | 739(652,1468) |
| 1-Hydroxyphenanthreneb | 1-PHEN | 10b | 99.2 | 166(134-205) | 102(93.2,124) | 157(140,176) | 229(202,275) | 460(399,1164) |
| 2-Hydroxyphenanthreneb | 2-PHEN | 10b | 93.3 | 68.9(55.6-85.5) | 46.2(42.2,51.6) | 63.1(56.5,71.3) | 91.5(77.5,110) | 178(134,1176) |
| 3-Hydroxyphenanthreneb | 3-PHEN | 10b | 95.8 | 103(82.3-129) | 67.5(58.4,70.8) | 101(84.4,113) | 149(126,174) | 353(210,840) |
| 4-Hydroxyphenanthreneb | 4-PHEN | 10b | 69.7 | 35.5(28.5-44.3) | 23.7(20.8,26.6) | 31.9(30,37) | 48.4(43,58) | 106(95.3,263) |
| 1-Hydroxypyreneb | 1-PYR | 10b | 100 | 201(160-252) | 119(105,151) | 199(168,235) | 292(251,356) | 612(513,1868) |
| **Herbicides** | | | | | | | | |
| 2,4-Dichlorophenoxyacetic acid | 2,4-D | 0.15 | 61.5 | 0.5(0.4-0.7) | <LOD | 0.5(0.4,0.6) | 0.8(0.7,1.1) | 2(1.3,5.1) |
| 2,4,5-Trichlorophenoxyacetic acid | 2,4,5-T | 0.1 | 0 | \* | <LOD | <LOD | <LOD | <LOD |
| **Insect repellent** | | | | | | | | |
| N,N-diethyl-m-toluamide | DEET | 0.083 | 3.3 | \* | <LOD | <LOD | <LOD | <LOD |
| 3-diethyl-carbamoyl benzoic acid | DCBA | 0.475 | 68 | 5.1(2.4-10.7) | <LOD | 3.4(2.1,4.9) | 13.8(7.8,43.2) | 184(106,11263) |
| N,N-diethyl-3-hydroxymethylbenzamide | DHMB | 0.089 | 9.8 | \* | <LOD | <LOD | <LOD | 0.9(0.7,3.8) |
| **Other pesticides** | | | | | | | | |
| 2,4-dichlorophenol | 2,4-DCP | 0.1 | 96.6 | 1.2(0.8-1.8) | 0.5(0.4,0.6) | 1(0.8,1.2) | 1.9(1.3,2.9) | 20.5(8.8,50.1) |
| 2,5-dichlorophenol | 2,5-DCP | 0.1 | 97.5 | 3.9(2-7.7) | 1.3(1.1,1.5) | 2.2(1.8,3.1) | 8(4.1,12.7) | 559(66.8,2129) |
| **Pyrethroid insecticides** |  |  |  |  |  |  |  |  |
| 3-phenoxybenzoic acid | 3-PBA | 0.1 | 70.5 | 0.9(0.6-1.3) | <LOD | 0.9(0.7,1.2) | 2.1(1.5,2.7) | 6(5,22.6) |
| 4-fluoro-3-phenoxybenzoic | 4-F-3-PBA | 0.1 | 10.7 | \* | <LOD | <LOD | <LOD | 0.6(0.5,1) |
| cis-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid | DBCA | 0.5 | 3.3 | \* | <LOD | <LOD | <LOD | <LOD |
| trans-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid | trans-DCCA | 0.6 | 15.6 | \* | <LOD | <LOD | <LOD | 4.2(3.5,21) |
| **Organophosphate insecticides** | | | | | | | | |
| 3,5,6-trichloropyridinol | TCPy | 0.1 | 89.3 | 1.7(1.2-2.3) | 1(0.8,1.3) | 2(1.5,2.3) | 3.3(2.7,3.9) | 5.7(4.9,12.5) |
| Malathion dicarboxylic acid | MDA | 0.5 | 25.4 | \* | <LOD | <LOD | 1.5(1.2, 1.9) | 3.5(2.8,31.8) |
| 2-isopropyl-4-methyl-6-hydroxypyrimidine (Oxypyrimidine) | IMPY | 0.1 | 18 | \* | <LOD | <LOD | <LOD | 1.3(0.7,2.7) |
| *para*-Nitrophenol | PNP | 0.1 | 95.9 | 1.6(1.2-2.2) | 1.2(1,1.3) | 1.7(1.5,1.9) | 2.4(2.1,3.2) | 4.8(4.7,16.8) |
| Dimethylphosphate | DMP | 0.1 | 60.7 | 3.3(2.1-5.4) | 1.1(0.8,1.5) | 3.7(2.3,4.4) | 8.1(5.9,12.3) | 34.5(22.5,129) |
| Diethylphosphate | DEP | 0.1 | 84.4 | 3.6(2-6.3) | 1.3(0.7,1.8) | 4.8(3.1,6.5) | 10.9(8.2,17.1) | 39.7(26,140) |
| Dimethylthiophosphatec | DMTP | 0.1 | 78.2 | 2.7(1.4-5.3) | 0.5(0.3,1.5) | 3.7(2.1,5) | 9.9(6.5,14.1) | 73(26,654) |
| Diethylthiophosphate | DETP | 0.25 | 39.3 | \* | <LOD | <LOD | 1.8(1.1,2.6) | 5.7(3.9,11.8) |
| Dimethyldithiophosphatec | DMDTP | 0.5 | 19.8 | \* | <LOD | <LOD | <LOD | 5(3.5,87.4) |
| Diethyldithiophosphate | DEDTP | 0.5 | 0 | \* | <LOD | <LOD | <LOD | <LOD |

\*: Not calculated; percentage of results <LOD too high. a95% confidence intervals are shown in parenthesis. bConcentrations are in ng/L. cThree DMTP and one DMDTP results were missing.

Table S2. Geometric mean and selected percentiles of biomarkers concentrations in urine (in µg/L) of a convenience sample of American children 3–5 years of age by sex.a

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Analyte | Sex | Sample size | LOD (µg/L) | Detection frequency (%) | Geometric mean | 25th percentile | 50th percentile | 75th percentile | 95th percentile |
| Butyl paraben | Male | 70 | 0.1 | 21.4 | \* | <LOD | <LOD | <LOD | 0.8 (0.4-2.3) |
| Female | 48 | 33.3 | \* | <LOD | <LOD | 0.2 (<LOD-1.5) | 49.8 (1.5-266) |
| Ethyl paraben | Male | 70 | 1 | 27.1 | \* | <LOD | <LOD | 1.2 (<LOD-3.5) | 7.4 (4.7-139) |
| Female | 48 | 39.6 | \* | <LOD | <LOD | 2.5 (1.2-35.3) | 328 (79.4-634) |
| Methyl paraben | Male | 70 | 1 | 100 | 33.1 (14.2-77.5) | 8.8 (5.2-12.5) | 22.9 (13.3-44.3) | 80.2 (55.2-367) | 1260 (500-2210) |
| Female | 48 | 100 | 55.3 (18.6-164) | 12.5 (4.1-26.1) | 41.6 (26.1-182) | 271 (165-566) | 848 (685-2650) |
| Propyl paraben | Male | 70 | 0.1 | 98.6 | 3.1 (1.4-7.1) | 0.9 (0.4-1.6) | 2.2 (1.7-6.5) | 8.9 (6.9-15.4) | 65.3 (24.7-688) |
| Female | 48 | 100 | 7.6 (2.3-25.1) | 1.5 (0.6-2.4) | 5.15 (2.4-29.8) | 47.2 (18.6-78.9) | 314 (160-404) |
| Benzophenone-3 | Male | 70 | 0.2 | 100 | 12.1 (5.7-25.7) | 3.5 (2.1-6.8) | 12.2 (7.6-18.3) | 31.3 (18.9-53) | 384 (69-1250) |
| Female | 48 | 100 | 26.5 (9.9-70.9) | 7.2 (4-10.4) | 24.3 (10.4-41.7) | 95.1 (37.5-310) | 521 (347-904) |
| Bisphenol A | Male | 70 | 0.1 | 98.6 | 1.4 (0.8-2.4) | 0.6 (0.4-1) | 1.45 (1.1-1.8) | 3.2 (2-5.3) | 9.6 (6.2-13.2) |
| Female | 48 | 97.9 | 1.3 (0.7-2.3) | 0.8 (0.5-0.9) | 1.1 (0.9-2.1) | 2.85 (1.8-4.2) | 5.4 (4.2-12.8) |
| 2,4-dichlorophenol | Male | 70 | 0.1 | 97.1 | 0.6 (0.3-1) | 0.2 (0.2-0.3) | 0.5 (0.3-0.9) | 1.2 (0.9-1.9) | 6.3 (2.1-14.5) |
| Female | 48 | 95.8 | 0.5 (0.2-1.1) | 0.2 (0.1-0.2) | 0.35 (0.2-0.6) | 0.8 (0.6-1.6) | 12.2 (3.2-39.5) |
| 2,5-dichlorophenol | Male | 70 | 0.1 | 95.7 | 1.7 (0.7-4.3) | 0.4 (0.2-0.5) | 1.3 (0.6-1.7) | 4.2 (2-21.8) | 61.3 (39.7-511) |
| Female | 48 | 100 | 1.9 (0.6-5.7) | 0.65 (0.4-0.8) | 1.15 (0.8-1.7) | 3.2 (1.5-18.8) | 142 (27.3-1680) |
| Triclosan | Male | 70 | 1 | 80 | 5.4 (2.3-12.6) | 1.3 (<LOD-2.1) | 3.4 (2.2-7.7) | 22.7 (9.3-39.4) | 211 (51.5-931) |
| Female | 48 | 77.1 | 3.7 (1.4-9.4) | 1.05 (<LOD-1.5) | 2.05 (1.5-4.8) | 8 (4.7-37.8) | 161 (58.6-279) |
| Monomethyl phthalate | Male | 70 | 0.5 | 87.1 | 2.7 (1.4-5) | 0.9 (0.5-1.7) | 3.05 (2-4.2) | 6.6 (4.4-8.1) | 23.8 (10-210) |
| Female | 48 | 89.6 | 3.6 (1.8-7.2) | 2.3 (0.9-3) | 3.7 (3-5.3) | 6.55 (5.3-9.3) | 15 (10.2-415) |
| Monoethyl phthalate | Male | 70 | 0.6 | 100 | 16.9 (10.3-27.7) | 8.5 (5.5-11.2) | 16.4 (11.5-19.2) | 28.8 (21.5-42.9) | 171 (60.2-383) |
| Female | 48 | 100 | 23.4 (10.4-52.5) | 9.4 (6.9-11.3) | 17.6 (11.3-27.2) | 34 (26.2-145) | 559 (176-1396) |
| Mono-n-butyl phthalate | Male | 70 | 0.4 | 100 | 10.3 (5.9-17.9) | 4.4 (3-5.9) | 8.75 (6.5-14.3) | 19.6 (15.7-29.9) | 123 (57.8-344) |
| Female | 48 | 100 | 10.5 (5-22) | 4.2 (2.6-7.2) | 9.7 (7.2-16.3) | 25.8 (15.8-47) | 107 (52.4-235) |
| Mono-isobutyl phthalate | Male | 70 | 0.2 | 100 | 8.1 (4.6-14) | 4.1 (2.8-5.1) | 8 (5.2-10.6) | 15 (11-22.1) | 40.6 (28.4-1517) |
| Female | 48 | 100 | 7.7 (3.8-15.9) | 3.4 (1.5-5.2) | 7.65 (5.2-16.6) | 22.8 (15.4-29.3) | 45.4 (34.5-79.3) |
| Monobenzyl phthalate | Male | 70 | 0.3 | 100 | 5.9 (3.2-10.9) | 2.7 (1.4-3.7) | 5.55 (4.2-10.2) | 15.4 (10.8-21.6) | 45.4 (26.8-125) |
| Female | 48 | 97.9 | 6.8 (3.3-13.9) | 3.55 (1.1-5.5) | 6.85 (5.5-11.4) | 17.6 (11.1-29.8) | 33.8 (30.8-51.3) |
| Mono-3-carboxypropyl phthalate | Male | 70 | 0.2 | 94.3 | 1.9 (1.1-3.3) | 0.8 (0.5-1.1) | 2.05 (1.3-2.9) | 4.3 (3.3-7.4) | 9.5 (7.9-45.9) |
| Female | 48 | 87.5 | 1.6 (0.7-3.7) | 0.9 (<LOD-1.1) | 1.5 (1.1-3.5) | 4.85 (3.3-6.9) | 21.7 (8.3-34.4) |
| Mono-2-ethylhexyl phthalate | Male | 70 | 0.5 | 74.3 | 1 (0.6-1.5) | <LOD | 0.8 (0.7-1.1) | 1.5 (1.2-2.1) | 7.4 (2.5-30.1) |
| Female | 48 | 64.6 | 1 (0.5-1.8) | <LOD | 0.75 (0.6-1.1) | 2.25 (1-4.2) | 7.8 (5.1-26) |
| Mono-2-ethyl-5-hydroxyhexyl phthalate | Male | 70 | 0.2 | 100 | 9.1 (5.4-15.3) | 5.1 (2.6-6.1) | 8.45 (6.8-13.6) | 17.6 (14-25.9) | 51.5 (27.9-236) |
| Female | 48 | 100 | 9.4 (4.8-18.5) | 4.7 (2.5-5.7) | 7.8 (5.7-12.9) | 18.8 (12.8-40.1) | 85.9 (41.6-242) |
| Mono-2-ethyl-5-oxohexyl phthalate | Male | 70 | 0.2 | 100 | 6 (3.6-10.1) | 3 (1.7-4.6) | 6.2 (4.7-8) | 11.5 (8.9-16.1) | 31.6 (17.1-148) |
| Female | 48 | 100 | 5.9 (3-11.6) | 2.95 (1.8-3.8) | 4.7 (3.8-8.8) | 13.1 (8-24.4) | 52.2 (24.8-143) |
| Mono-2-ethyl-5-carboxypentyl phthalate | Male | 70 | 0.2 | 100 | 17.3 (10.6-28.3) | 8.9 (4.7-11.7) | 18.4 (12.8-24.2) | 33.7 (24.5-53.6) | 88.2 (62.6-279) |
| Female | 48 | 100 | 17.6 (9.6-32) | 8.45 (6.1-11.6) | 15.7 (11.6-22.2) | 34.4 (20.7-68.9) | 92.6 (71.9-350) |
| Mono-isononyl phthalate | Male | 70 | 0.5 | 45.7 | \* | <LOD | <LOD | 0.8 (0.6-1.1) | 1.7 (1.3-62.4) |
| Female | 48 | 39.6 | \* | <LOD | <LOD | 0.9 (0.6-2.2) | 7.4 (2.3-16.6) |
| Monocarboxyoctyl phthalate | Male | 70 | 0.2 | 100 | 11.1 (6.2-19.6) | 4.6 (2.5-7.4) | 10.95 (8-16.9) | 27.4 (18.3-41.9) | 56.6 (45-373) |
| Female | 48 | 100 | 13.3 (6.3-28) | 6.05 (2-9.5) | 13.4 (9.5-21) | 38.5 (20.7-54.7) | 116.7 (63.7-243) |
| Monocarboxynonyl phthalate | Male | 70 | 0.2 | 97.1 | 2.1 (1.3-3.6) | 1 (0.7-1.4) | 2.35 (1.5-3) | 4.5 (3.1-6.2) | 10.7 (6.6-57.8) |
| Female | 48 | 100 | 1.9 (1.1-3.4) | 1.1 (0.5-1.4) | 1.75 (1.4-2.8) | 3.3 (2.7-7.6) | 12.6 (8.5-13.3) |
| Cyclohexane-1,2-dicarboxylic acid monohydroxy isononyl ester | Male | 70 | 0.4 | 67.1 | 0.8 (0.5-1.3) | <LOD | 0.8 (0.5-1) | 1.3 (1-3.1) | 4.6 (3.7-11) |
| Female | 48 | 64.6 | 0.8 (0.4-1.6) | <LOD | 0.7 (0.4-1.2) | 1.4 (1.1-3.2) | 13.6 (3.9-17) |
| 1-Hydroxynapthalene | Male | 71 | 0.044 | 98.6 | 0.957 (0.533-1.72) | 0.382 (0.236-0.589) | 1.16 (0.653-1.63) | 2.11 (1.66-3.03) | 6.50 (3.61-23.3) |
| Female | 48 | 100 | 0.650 (0.355-1.19) | 0.343 (0.166-0.455) | 0.634 (0.455-0.810) | 1.38 (0.799-2.54) | 3.58 (2.74-6.19) |
| 2-Hydroxynapthalene | Male | 71 | 0.04 | 100 | 4.13 (2.56-6.67) | 1.83 (1.50-2.68) | 3.79 (2.97-5.91) | 8.17 (6.16-12.2) | 28.4 (13.7-60.2) |
| Female | 48 | 100 | 3.23 (1.91-5.45) | 1.73 (1.04-2.54) | 3.36 (2.54-4.71) | 5.44 (4.60-9.70) | 15.2 (12.8-20.4) |
| 2-Hydroxyfluoreneb | Male | 71 | 10b | 100 | 143 (96.9-212) | 78 (69-97) | 133 (104-200) | 275 (203-407) | 579 (423-834) |
| Female | 48 | 100 | 113 (70.8-180) | 55.5 (46-88) | 127 (88-183) | 215 (166-251) | 311 (251-887) |
| 3-Hydroxyfluoreneb | Male | 71 | 10b | 98.6 | 67.2 (45.6-99.2) | 38 (32-43) | 52 (47-77) | 123 (84-192) | 299 (216-467) |
| Female | 48 | 100 | 53.2 (34.7-81.5) | 30.5 (21-40) | 55 (40-77) | 95 (68-123) | 162 (138-401) |
| 9-Hydroxyfluoreneb | Male | 71 | 10b | 100 | 13 (91-197) | 75 (59-96) | 130 (98-169) | 229 (177-341) | 569 (433-1058) |
| Female | 48 | 100 | 115 (73.7-180) | 60 (42-91) | 119.5 (91-160) | 225 (158-294) | 401 (340-435) |
| 1-Hydroxyphenanthreneb | Male | 71 | 10b | 98.6 | 80.8 (54-121) | 43 (33-55) | 79 (59-111) | 142 (112-181) | 339 (202-878) |
| Female | 48 | 100 | 67.8 (43.3-106) | 41.5 (26-54) | 73 (54-98) | 116 (95-151) | 248 (204-360) |
| 2-Hydroxyphenanthreneb | Male | 71 | 10b | 94.4 | 33 (22.9-47.6) | 19 (17-22) | 32 (25-37) | 54 (39-76) | 136 (103-229) |
| Female | 48 | 91.7 | 29 (19.2-43.8) | 18 (13-22) | 30.5 (22-39) | 47 (39-70) | 89 (73-136) |
| 3-Hydroxyphenanthreneb | Male | 71 | 10b | 97.2 | 50.4 (33.2-76.6) | 27 (21-33) | 48 (34-66) | 91 (68-129) | 257 (157-489) |
| Female | 48 | 93.8 | 41.9 (26.3-66.7) | 21.5 (18-33) | 41.5 (33-64) | 75 (63-103) | 159 (107-204) |
| 4-Hydroxyphenanthreneb | Male | 71 | 10b | 71.8 | 17.2 (12-24.7) | <LOD | 16 (12-23) | 29 (23-33) | 85 (40-165) |
| Female | 48 | 66.7 | 14.7 (10-21.5) | <LOD | 15 (10-18) | 22.5 (18-36) | 57 (36-75) |
| 1-Hydroxypyreneb | Male | 71 | 10b | 100 | 92.8 (60.8-142) | 43 (31-73) | 102 (74-129) | 185 (134-209) | 484 (213-857) |
| Female | 48 | 100 | 89.3 (56.2-142) | 45.5 (30-65) | 87 (65-127) | 160.5 (126-259) | 345 (271-507) |
| 2,4-Dichlorophenoxyacetic acid | Male | 72 | 0.15 | 65.3 | 0.3 (0.2-0.4) | <LOD | 0.265 (0.16-0.33) | 0.48 (0.35-0.83) | 1.79 (0.92-4.25) |
| Female | 50 | 56 | \* | <LOD | 0.17 (<LOD-0.24) | 0.38 (0.23-0.5) | 0.79 (0.58-1.06) |
| 2,4,5-Trichlorophenoxyacetic acid | Male | 72 | 0.1 | 0 | \* | <LOD | <LOD | <LOD | <LOD |
| Female | 50 | 0 | \* | <LOD | <LOD | <LOD | <LOD |
| N,N-diethyl-m-toluamide | Male | 72 | 0.083 | 1.4 | \* | <LOD | <LOD | <LOD | <LOD |
| Female | 50 | 6 | \* | <LOD | <LOD | <LOD | 0.094 (<LOD-4.17) |
| 3-diethyl-carbamoyl benzoic acid | Male | 72 | 0.475 | 69.4 | 2 (0.8-5.3) | <LOD | 0.979 (0.612-2.26) | 6.23 (2.83-24) | 49.4 (36.6-12600) |
| Female | 50 | 66 | 2.9 (0.8-10.9) | <LOD | 1.39 (0.697-5.22) | 11.9 (4.11-45.5) | 481 (47.7-3370) |
| N,N-diethyl-3-hydroxymethylbenzamide | Male | 72 | 0.089 | 8.3 | \* | <LOD | <LOD | <LOD | 0.338 (<LOD-38.6) |
| Female | 50 | 12 | \* | <LOD | <LOD | <LOD | 3.38 (0.29-19.4) |
| 3-phenoxybenzoic acid | Male | 72 | 0.1 | 72.2 | 0.4 (0.2-0.8) | <LOD | 0.41 (0.28-0.6) | 0.975 (0.63-1.51) | 4.1 (2.82-37.5) |
| Female | 50 | 68 | 0.4 (0.2-0.9) | <LOD | 0.54 (0.36-0.77) | 0.85 (0.7-2.51) | 3.72 (3.01-7.75) |
| 4-fluoro-3-phenoxybenzoic | Male | 72 | 0.1 | 12.5 | \* | <LOD | <LOD | <LOD | 0.32 (0.1-0.61) |
| Female | 50 | 8 | \* | <LOD | <LOD | <LOD | 0.21 (<LOD-0.36) |
| cis-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid | Male | 72 | 0.5 | 4.2 | \* | <LOD | <LOD | <LOD | <LOD |
| Female | 50 | 2 | \* | <LOD | <LOD | <LOD | <LOD |
| trans-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid | Male | 72 | 0.6 | 18.1 | \* | <LOD | <LOD | <LOD | 2.66 (1.43-4.08) |
| Female | 50 | 12 | \* | <LOD | <LOD | <LOD | 2.41 (0.69-17.6) |
| 3,5,6-trichloropyridinol | Male | 72 | 0.1 | 87.5 | 0.8 (0.4-1.4) | 0.39 (0.13-0.64) | 0.91 (0.65-1.44) | 2.2 (1.55-2.58) | 4.04 (2.86-10.5) |
| Female | 50 | 92 | 0.7 (0.4-1.4) | 0.46 (0.17-0.58) | 0.87 (0.58-1.22) | 1.61 (1.15-2.9) | 3.84 (3.26-6.8) |
| Malathion dicarboxylic acid | Male | 72 | 0.5 | 27.8 | \* | <LOD | <LOD | 0.515 (<LOD-0.81) | 1.34 (0.85-19.9) |
| Female | 50 | 22 | \* | <LOD | <LOD | <LOD | 0.98 (0.65-1.26) |
| 2-isopropyl-4-methyl-6-hydroxypyrimidine (Oxypyrimidine) | Male | 72 | 0.1 | 23.6 | \* | <LOD | <LOD | <LOD | 0.53 (0.28-1.9) |
| Female | 50 | 10 | \* | <LOD | <LOD | <LOD | 0.22 (<LOD-1.59) |
| *para*-Nitrophenol | Male | 72 | 0.1 | 97.2 | 0.8 (0.5-1.2) | 0.48 (0.26-0.6) | 0.85 (0.62-1.15) | 1.555 (1.22-1.95) | 4.18 (2.41-6.61) |
| Female | 50 | 94 | 0.7 (0.4-1.2) | 0.33 (0.24-0.59) | 0.765 (0.59-1.17) | 1.29 (1.14-1.59) | 3.81 (1.62-10.1) |
| Dimethylphosphate | Male | 72 | 0.1 | 63.9 | 1.8 (0.9-3.9) | 0.354 (0.354-0.354) | 1.76 (0.593-2.71) | 4.62 (3.12-10.2) | 65.9 (20.1-87.3) |
| Female | 50 | 56 | \* | 0.354 (0.354-0.354) | 0.874 (0.354-1.78) | 2.44 (1.74-6.98) | 20.7 (7.35-24.1) |
| Diethylphosphate | Male | 72 | 0.1 | 87.5 | 2 (0.9-4.6) | 0.916 (0.171-1.41) | 2.39 (1.53-4.14) | 8.13 (4.31-13.3) | 26.1 (17.6-43.1) |
| Female | 50 | 80 | 1.3 (0.4-3.7) | 0.428 (<LOD-1.01) | 1.34 (1.01-2.73) | 4.44 (2.47-10.9) | 30.9 (12.3-81.5) |
| Dimethylthiophosphate | Male | 71c | 0.1 | 78.9 | 1.3 (0.5-3.6) | 0.167 (<LOD-1.04) | 1.51 (1.15-2.66) | 5.97 (2.87-10.6) | 44.1 (13.5-409) |
| Female | 48c | 77.1 | 1.1 (0.4-3.5) | 0.205 (<LOD-0.773) | 1.83 (0.773-3.18) | 5.59 (2.72-7.5) | 14.1 (9.69-74) |
| Diethylthiophosphate | Male | 72 | 0.25 | 38.9 | \* | <LOD | <LOD | 0.66 (0.353-1.66) | 5.21 (2.42-10.9) |
| Female | 50 | 40 | \* | <LOD | <LOD | 0.476 (0.343-1.42) | 3.49 (1.7-13.9) |
| Dimethyldithiophosphate | Male | 71c | 0.5 | 19.7 | \* | <LOD | <LOD | <LOD | 4.32 (1.08-54.6) |
| Female | 50 | 20 | \* | <LOD | <LOD | <LOD | 1.65 (0.898-6.95) |
| Diethyldithiophosphate | Male | 72 | 0.5 | 0 | \* | <LOD | <LOD | <LOD | <LOD |
| Female | 50 | 0 | \* | <LOD | <LOD | <LOD | <LOD |

\*: Not calculated; percentage of results <LOD too high. a95% confidence intervals are shown in paranthesis. bConcentrations are in ng/L. cOne DMDTP and three DMTP results were missing because they did not meet laboratory quality control criteria

Table S3. Geometric mean and selected percentiles of biomarkers concentrations in urine (in µg/L) of a convenience sample of American children 3–5 years of age by race/ethnicity.a

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Analyte | Race/ ethnicity | Sample size | LOD (µg/L) | Detection frequency (%) | Geometric mean | 25th percentile | 50th percentile | 75th percentile | 95th percentile |
| Butyl paraben | All Hispanic | 78 | 0.1 | 28.2 | \* | <LOD | <LOD | 0.1 (<LOD-0.4) | 11.9 (0.8-266) |
| NHW & Other | 24 | 25 | \* | <LOD | <LOD | <LOD | 0.7 (0.4-1.4) |
| NHB | 16 | 18.8 | \* | <LOD | <LOD | <LOD | 0.4 (0.4-0.4) |
| Ethyl paraben | All Hispanic | 78 | 1 | 34.6 | \* | <LOD | <LOD | 1.5 (<LOD-6.7) | 79.4 (10.5-634) |
| NHW & Other | 24 | 20.8 | \* | <LOD | <LOD | <LOD | 113 (5.2-139) |
| NHB | 16 | 37.5 | \* | <LOD | <LOD | 1.55 (<LOD-7.4) | 7.4 (2.1-7.4) |
| Methyl paraben | All Hispanic | 78 | 1 | 100 | 41 (18-93.3) | 8.8 (5.7-13.3) | 29.7 (16.8-65.3) | 203 (74.7-466) | 1260 (542-2650) |
| NHW & Other | 24 | 100 | 23.1 (5.1-106) | 4.65 (1.4-16.6) | 22.6 (10.2-42.4) | 54 (25.1-552) | 552 (442-566) |
| NHB | 16 | 100 | 93.5 (15.7-557) | 21.7 (6.4-72.9) | 75.5 (25.5-351) | 331 (78.1-1750) | 1750 (897-1750) |
| Propyl paraben | All Hispanic | 78 | 0.1 | 100 | 4.2 (1.8-9.7) | 1 (0.7-1.7) | 2.55 (1.8-6.6) | 13.8 (7.1-43.7) | 261 (58.1-404) |
| NHW & Other | 24 | 95.8 | 2.5 (0.5-13) | 0.4 (0.2-1.6) | 2.5 (0.4-8.1) | 8.35 (5.5-71.4) | 71.4 (38.7-78.9) |
| NHB | 16 | 100 | 14.2 (2.2-89.9) | 3.65 (1.6-14.5) | 15.0 (4.1-49.5) | 44.4 (15.4-688) | 688 (61.1-688) |
| Benzophenone-3 | All Hispanic | 78 | 0.2 | 100 | 17.9 (8.6-37.3) | 6.4 (4.1-8.7) | 15.2 (10.4-28) | 36.2 (30.9-96.6) | 521 (158-904) |
| NHW & Other | 24 | 100 | 20.6 (4.1-104) | 3.3 (2-9.6) | 13.1 (4-69) | 83.2 (36.3-347) | 347 (310-1250) |
| NHB | 16 | 100 | 8.5 (2.1-34.9) | 2.15 (1.1-8.8) | 9.6 (2.2-20.6) | 20.1 (10.4-112) | 112 (21.9-112) |
| Bisphenol A | All Hispanic | 78 | 0.1 | 98.7 | 1.3 (0.8-2) | 0.6 (0.5-0.8) | 1.2 (1-1.7) | 2.6 (1.8-4.2) | 11.8 (4.5-13.2) |
| NHW & Other | 24 | 95.8 | 1.5 (0.6-3.8) | 0.8 (0.2-1.2) | 1.25 (1-2.7) | 2.75 (1.7-9.6) | 9.6 (6.1-10.3) |
| NHB | 16 | 100 | 1.8 (0.7-5.1) | 0.75 (0.4-1.8) | 1.9 (0.9-4.5) | 3.95 (2-9.1) | 9.1 (5.3-9.1) |
| 2,4-dichlorophenol | All Hispanic | 78 | 0.1 | 96.2 | 0.6 (0.3-1.1) | 0.2 (0.1-0.3) | 0.5 (0.3-0.8) | 1.3 (0.9-2) | 13.3 (3.2-39.5) |
| NHW & Other | 24 | 95.8 | 0.5 (0.2-1.3) | 0.25 (0.1-0.3) | 0.45 (0.3-0.8) | 0.95 (0.5-2.8) | 2.8 (1.6-12.2) |
| NHB | 16 | 100 | 0.4 (0.2-1) | 0.2 (0.1-0.3) | 0.35 (0.2-0.9) | 0.85 (0.4-1.7) | 1.7 (1.1-1.7) |
| 2,5-dichlorophenol | All Hispanic | 78 | 0.1 | 96.2 | 2.1 (0.8-5.5) | 0.5 (0.4-0.8) | 1.3 (0.8-1.7) | 4.2 (1.8-36.2) | 421 (55.8-1680) |
| NHW & Other | 24 | 100 | 1.5 (0.5-4.3) | 0.55 (0.3-0.7) | 1.05 (0.6-3.5) | 3.7 (1.3-9.4) | 9.4 (8.2-43.9) |
| NHB | 16 | 100 | 1.1 (0.3-4.6) | 0.5 (0.2-0.9) | 0.9 (0.5-2.5) | 2.25 (0.9-21.8) | 21.8 (2.8-21.8) |
| Triclosan | All Hispanic | 78 | 1 | 75.6 | 4.6 (2-10.3) | 1 (<LOD-1.5) | 3.35 (1.7-4.8) | 12.6 (6.5-36) | 279 (51.5-931) |
| NHW & Other | 24 | 79.2 | 5.2 (1.1-24.2) | 1.15 (<LOD-2.1) | 3.05 (1.3-11.7) | 23.65 (5.9-211) | 211 (67.1-276) |
| NHB | 16 | 93.8 | 3.9 (1.1-14.1) | 1.75 (<LOD-2.4) | 2.55 (1.9-10.7) | 7.7 (2.7-83.7) | 83.7 (15.4-83.7) |
| Monomethyl phthalate | All Hispanic | 78 | 0.5 | 87.2 | 3.1 (1.7-5.7) | 1.4 (0.7-2.5) | 3.6 (2.7-4.8) | 6.1 (4.9-7.1) | 23.8 (9.2-415) |
| NHW & Other | 24 | 87.5 | 2.2 (0.9-5.7) | 0.95 (<LOD-2.1) | 2.3 (1.1-5.4) | 6.05 (2.5-12) | 12 (10-12.7) |
| NHB | 16 | 93.8 | 4.1 (1-16.3) | 2.2 (<LOD-3.6) | 3.7 (3-8.1) | 7.9 (3.8-44.1) | 44.1 (15-44.1) |
| Monoethyl phthalate | All Hispanic | 78 | 0.6 | 100 | 18.9 (11-32.5) | 8.8 (6.1-11) | 15.6 (12.6-24.2) | 28.8 (25-42.9) | 383 (89.8-1396) |
| NHW & Other | 24 | 100 | 12.2 (6.1-24.3) | 7.75 (3.2-11.2) | 11.5 (8.7-19.5) | 20.5 (16.3-45.4) | 45.4 (34.4-53.6) |
| NHB | 16 | 100 | 42 (9.9-178.7) | 17.3 (4.4-27.2) | 29.1 (18.2-176) | 174 (31-559) | 559 (184-559) |
| Mono-isobutyl phthalate | All Hispanic | 78 | 0.2 | 100 | 8.1 (5-13.3) | 4.5 (2.8-5.2) | 7.9 (5.5-12.6) | 20.1 (13-26.7) | 42.8 (28.4-87.1) |
| NHW & Other | 24 | 100 | 6.6 (2.5-17.8) | 3.1 (1.1-4.8) | 7.55 (3.4-12.9) | 14.2 (9.9-40.6) | 40.6 (28.7-76.6) |
| NHB | 16 | 100 | 9.1 (1.6-51.2) | 3.15 (1.4-7.6) | 8.45 (3.4-16.7) | 15.5 (9.3-1517) | 1517 (17-1517) |
| Mono-n-butyl phthalate | All Hispanic | 78 | 0.4 | 100 | 9.1 (5.4-15.4) | 4.1 (3-5.4) | 8.2 (5.9-11.8) | 19.6 (12.4-29.9) | 83.3 (34.4-235) |
| NHW & Other | 24 | 100 | 13.6 (4.2-43.7) | 6.55 (1.5-8.8) | 12.5 (7.5-24.2) | 29.1 (15.8-150) | 150 (122.5-344) |
| NHB | 16 | 100 | 13.1 (4.5-38.3) | 6.45 (2.9-14) | 14.5 (6.6-24.2) | 20.2 (15-165) | 165 (26.3-165) |
| Monobenzyl phthalate | All Hispanic | 78 | 0.3 | 100 | 6.2 (3.6-10.8) | 2.7 (1.5-4.3) | 6 (4.5-10.9) | 16.2 (11-26.8) | 45.4 (29.7-115) |
| NHW & Other | 24 | 95.8 | 4.7 (1.3-16.8) | 1.3 (0.4-6.6) | 7.3 (3.2-16.6) | 17.2 (8.1-26.6) | 26.6 (23.4-33.4) |
| NHB | 16 | 100 | 9.3 (2.8-30.8) | 4.25 (1.4-7.9) | 8.25 (4.3-25.9) | 19.7 (8.6-125) | 125 (30.8-125) |
| Mono-3-carboxypropyl phthalate | All Hispanic | 78 | 0.2 | 89.7 | 1.6 (0.9-3) | 0.8 (0.4-1) | 1.45 (1.1-2.7) | 4.4 (3.3-6.3) | 21.7 (7.9-45.9) |
| NHW & Other | 24 | 95.8 | 2.4 (0.9-6.6) | 1.1 (0.3-2.5) | 3.15 (1.3-5.8) | 5.9 (3.4-9.5) | 9.5 (8-24) |
| NHB | 16 | 93.8 | 1.6 (0.5-4.8) | 0.75 (<LOD-1.8) | 2 (0.8-2.9) | 2.9 (2.2-15.8) | 15.8 (3.4-15.8) |
| Mono-2-ethylhexyl phthalate | All Hispanic | 78 | 0.5 | 67.9 | 0.9 (0.6-1.4) | <LOD | 0.75 (0.6-0.9) | 1.4 (1-2.6) | 7.8 (3.7-30.1) |
| NHW & Other | 24 | 79.2 | 1.1 (0.5-2.4) | 0.6 (<LOD-0.8) | 1 (0.6-1.9) | 1.9 (1.1-7.4) | 7.4 (4.2-10.1) |
| NHB | 16 | 68.8 | 1.1 (<LOD-3.4) | <LOD | 1.05 (<LOD-2.4) | 2.25 (1.3-17.8) | 17.8 (2.5-17.8) |
| Mono-2-ethyl-5-hydroxyhexyl phthalate | All Hispanic | 78 | 0.2 | 100 | 8.7 (5.3-14.3) | 5.1 (2.8-5.8) | 7.8 (6.2-9.6) | 15.8 (11.3-27.1) | 85.9 (33.1-242) |
| NHW & Other | 24 | 100 | 8.9 (3.2-25.1) | 4.25 (1.2-9.7) | 11.25 (5.7-17.6) | 19.8 (13.6-40.1) | 40.1 (28.3-122) |
| NHB | 16 | 100 | 12.7 (4.2-38.5) | 5.7 (2.8-9.6) | 11.8 (6.1-25.5) | 23.8 (14-167) | 167 (37.1-167) |
| Mono-2-ethyl-5-oxohexyl phthalate | All Hispanic | 78 | 0.2 | 100 | 5.6 (3.4-9.3) | 2.8 (1.7-3.8) | 5 (4.1-7) | 10.8 (7.7-16) | 52.2 (23.9-148) |
| NHW & Other | 24 | 100 | 6 (2.3-15.7) | 3 (0.7-6.1) | 7.9 (4.6-11.5) | 12.4 (8.8-24.4) | 24.4 (21.3-71) |
| NHB | 16 | 100 | 8.1 (2.8-23.4) | 3.65 (1.9-7.2) | 7.25 (3.8-17.1) | 15.7 (7.3-97.3) | 97.3 (22.3-97.3) |
| Mono-2-ethyl-5-carboxypentyl phthalate | All Hispanic | 78 | 0.2 | 100 | 16.2 (10.1-25.9) | 8.3 (6.1-9.5) | 15.2 (11.6-21.5) | 28.3 (22.2-46.1) | 92.6 (63.6-350) |
| NHW & Other | 24 | 100 | 17.7 (7.4-42.5) | 9.25 (3.4-17.6) | 20.9 (12.2-33.7) | 34.1 (24.2-67.2) | 67.2 (63.5-184) |
| NHB | 16 | 100 | 24.2 (8.8-66.7) | 11.3 (6.2-19.4) | 21.4 (13.3-53.6) | 50.8 (23.4-230) | 230 (64.4-230) |
| Monoisononyl phthalate | All Hispanic | 78 | 0.5 | 38.5 | \* | <LOD | <LOD | 0.9 (0.6-1.3) | 4.8 (1.7-16.6) |
| NHW & Other | 24 | 50 | \* | <LOD | <LOD | 0.9 (0.6-2.2) | 2.2 (1.4-62.4) |
| NHB | 16 | 56.3 | \* | <LOD | 0.5 (<LOD-0.7) | 0.65 (0.5-7.5) | 7.5 (0.8-7.5) |
| Monocarboxyoctyl phthalate | All Hispanic | 78 | 0.2 | 100 | 11.6 (6.6-20.1) | 5.3 (2.6-7.5) | 11.0 (8.2-16.9) | 27.4 (19.6-49.2) | 73.4 (52.9-243) |
| NHW & Other | 24 | 100 | 12.6 (3.8-42) | 2.85 (1.8-9.3) | 15.4 (3.3-36.9) | 39.5 (18-82.6) | 82.6 (63.7-373) |
| NHB | 16 | 100 | 12.9 (4.7-35.4) | 6.4 (2.2-11.2) | 11.3 (6.7-22.6) | 21.7 (11.4-143) | 143 (33.2-143) |
| Monocarboxynonyl phthalate | All Hispanic | 78 | 0.2 | 97.4 | 1.9 (1.2-3.1) | 1 (0.7-1.4) | 1.8 (1.4-2.7) | 4.4 (2.8-5.7) | 12.6 (6.2-57.8) |
| NHW & Other | 24 | 100 | 2.2 (0.9-5.5) | 0.9 (0.4-2.7) | 2.95 (1.2-4.9) | 4.9 (3.2-10.7) | 10.7 (7.6-13.8) |
| NHB | 16 | 100 | 2.6 (1-6.4) | 1.4 (0.9-1.9) | 2.05 (1.5-4.1) | 3.6 (2.2-21) | 21 (8.6-21) |
| Cyclohexane-1,2-dicarboxylic acid monohydroxy isononyl ester | All Hispanic | 78 | 0.4 | 60.3 | 0.7 (0.4-1.2) | <LOD | 0.5 (<LOD-0.9) | 1.2 (1-3) | 8.8 (3.7-16.3) |
| NHW & Other | 24 | 66.7 | 0.9 (0.4-2.1) | <LOD | 1 (<LOD-1.4) | 1.5 (1-3.8) | 3.8 (2.8-17) |
| NHB | 16 | 93.8 | 1.3 (0.4-3.8) | 0.7 (<LOD-0.9) | 0.9 (0.7-2.8) | 2.4 (0.9-11) | 11 (3.1-11) |
| 1-Hydroxynapthalene | All Hispanic | 78 | 0.044 | 98.7 | 0.645 (0.389-1.07) | 0.297 (0.184-0.397) | 0.634 (0.431-0.839) | 1.51 (1.06-2.03) | 3.58 (2.42-23.3) |
| NHW & Other | 24 | 100 | 1.32 (0.425-4.09) | 0.412 (0.153-1.27) | 1.52 (0.510-2.96) | 3.75 (2.18-10.3) | 10.3 (6.50-18.3) |
| NHB | 17 | 100 | 1.25 (0.537-2.91) | 0.653 (0.231-1.10) | 1.39 (0.653-2.11) | 2.11 (1.63-6.19) | 6.19 (2.53-6.19) |
| 2-Hydroxynapthalene | All Hispanic | 78 | 0.04 | 100 | 4.01 (2.58-6.23) | 1.77 (1.35-2.75) | 4.05 (3.13-5.36) | 6.94 (5.77-12.2) | 20.5 (14.4-60.2) |
| NHW & Other | 24 | 100 | 3.05 (1.22-7.61) | 1.64 (0.469-2.73) | 3.19 (2.09-4.60) | 6.29 (3.37-16.2) | 16.2 (15.8-33.8) |
| NHB | 17 | 100 | 3.64 (1.65-8.05) | 2.02 (0.875-3.01) | 3.66 (2.02-6.86) | 6.86 (3.90-12.3) | 12.3 (9.32-12.3) |
| 2-Hydroxyfluoreneb | All Hispanic | 78 | 10b | 100 | 56.3 (40.8-77.7) | 35 (29-42) | 51.5 (44-66) | 94 (68-123) | 246 (131-401) |
| NHW & Other | 24 | 95.8 | 60 (26-138) | 31 (15-39) | 54 (34-138) | 145 (60-294) | 294 (216-467) |
| NHB | 17 | 100 | 91.9 (42.6-198) | 52 (29-84) | 93 (52-138) | 138 (99-445) | 445 (192-445) |
| 3-Hydroxyfluoreneb | All Hispanic | 78 | 10b | 100 | 126 (87.5-182) | 74 (56-86) | 123 (90-162) | 214 (183-311) | 528 (346-887) |
| NHW & Other | 24 | 100 | 114 (51.8-249) | 50.5 (29-89) | 116 (70-236) | 243 (145-444) | 444 (293-834) |
| NHB | 17 | 100 | 182 (93.8-354) | 116 (55-157) | 202 (116-251) | 251 (217-579) | 579 (419-579) |
| 9-Hydroxyfluoreneb | All Hispanic | 78 | 10b | 100 | 118 (84.2-165) | 70 (51-87) | 110 (96-144) | 187 (153-254) | 435 (296-1058) |
| NHW & Other | 24 | 100 | 109 (49.5-239) | 51.5 (24-92) | 103 (63-264) | 265 (117-474) | 474 (400-480) |
| NHB | 17 | 100 | 209 (107-408) | 153 (55-201) | 218 (153-341) | 341 (221-582) | 582 (433-582) |
| 1-Hydroxyphenanthreneb | All Hispanic | 78 | 10b | 100 | 74 (51.5-107) | 43 (27-54) | 78 (56-104) | 133 (106-160) | 315 (181-878) |
| NHW & Other | 24 | 95.8 | 65 (30.6-139) | 36.5 (17-62) | 69.5 (43-118) | 121 (79-256) | 256 (229-339) |
| NHB | 17 | 100 | 99.6 (45.4-219) | 55 (29-76) | 84 (55-147) | 147 (101-563) | 563 (248-563) |
| 2-Hydroxyphenanthreneb | All Hispanic | 78 | 10b | 92.3 | 28.8 (21-39.4) | 18 (16-21) | 29.5 (22-35) | 46 (37-62) | 89 (69-158) |
| NHW & Other | 24 | 91.7 | 29.6 (15.4-57) | 18.5 (<LOD-24) | 25.5 (20-39) | 44 (34-110) | 110 (106-136) |
| NHB | 17 | 100 | 50.5 (22.3-114) | 25 (17-38) | 43 (25-103) | 103 (45-229) | 229 (136-229) |
| 3-Hydroxyphenanthreneb | All Hispanic | 78 | 10b | 96.2 | 41.2 (28.5-59.6) | 23 (18-28) | 39.5 (32-57) | 76 (60-93) | 166 (101-489) |
| NHW & Other | 24 | 91.7 | 46.2 (21.9-97.3) | 26.5 (<LOD-41) | 49 (32-89) | 90 (57-173) | 173 (157-203) |
| NHB | 17 | 100 | 85.1 (38.8-187) | 51 (23-68) | 85 (51-159) | 159 (98-315) | 315 (202-315) |
| 4-Hydroxyphenanthreneb | All Hispanic | 78 | 10b | 66.7 | 14.9 (11.1-20.1) | <LOD | 15 (12-17) | 23 (18-30) | 49 (33-88) |
| NHW & Other | 24 | 62.5 | 13.1 (<LOD-21.9) | <LOD | 11 (<LOD-22) | 23 (12-33) | 33 (29-57) |
| NHB | 17 | 94.1 | 31.6 (13.9-72) | 21 (<LOD-31) | 31 (21-56) | 56 (33-165) | 165 (72-165) |
| 1-Hydroxypyreneb | All Hispanic | 78 | 10b | 100 | 88.2 (61.2-127) | 46 (32-65) | 86.5 (73-117) | 149 (125-198) | 430 (217-857) |
| NHW & Other | 24 | 100 | 85.7 (39-188) | 42.5 (16-101) | 111 (54-187) | 190 (129-271) | 271 (259-355) |
| NHB | 17 | 100 | 117 (45.3-304) | 74 (31-95) | 103 (74-199) | 199 (109-821) | 821 (237-821) |
| 2,4-Dichlorophenoxyacetic acid | All Hispanic | 79 | 0.15 | 63.3 | 0.2 (0.2-0.3) | <LOD | 0.21 (0.16-0.28) | 0.35 (0.29-0.45) | 1.54 (0.68-2.26) |
| NHW & Other | 26 | 57.7 | \* | <LOD | 0.21 (<LOD-0.51) | 0.58 (0.4-1.06) | 1.06 (0.84-4.25) |
| NHB | 17 | 58.8 | \* | <LOD | 0.27 (<LOD-0.53) | 0.53 (0.33-1.3) | 1.3 (0.92-1.3) |
| 2,4,5-Trichlorophenoxyacetic acid | All Hispanic | 79 | 0.1 | 0 | \* | <LOD | <LOD | <LOD | <LOD |
| NHW & Other | 26 | 0 | \* | <LOD | <LOD | <LOD | <LOD |
| NHB | 17 | 0 | \* | <LOD | <LOD | <LOD | <LOD |
| N,N-diethyl-m-toluamide | All Hispanic | 79 | 0.08 | 3.8 | \* | <LOD | <LOD | <LOD | <LOD |
| NHW & Other | 26 | 3.8 | \* | <LOD | <LOD | <LOD | <LOD |
| NHB | 17 | 0 | \* | <LOD | <LOD | <LOD | <LOD |
| 3-diethyl-carbamoyl benzoic acid | All Hispanic | 79 | 0.48 | 62 | 2.1 (0.7-5.7) | <LOD | 0.896 (0.482-1.45) | 5.23 (2.21-32) | 70.7 (45.5-12600) |
| NHW & Other | 26 | 73.1 | 2.9 (0.6-14) | <LOD | 2.63 (0.51-7.09) | 9.2 (4.86-57.8) | 57.8 (49.4-481) |
| NHB | 17 | 88.2 | 3.1 (<LOD-24.1) | 0.746 (<LOD-1.23) | 2.26 (0.746-10.2) | 10.2 (2.86-753) | 753 (14.8-753) |
| N,N-diethyl-3-hydroxymethyl-benzamide | All Hispanic | 79 | 0.09 | 8.9 | \* | <LOD | <LOD | <LOD | 0.43 (<LOD-38.6) |
| NHW & Other | 26 | 11.5 | \* | <LOD | <LOD | <LOD | 0.399 (0.109-3.38) |
| NHB | 17 | 11.8 | \* | <LOD | <LOD | <LOD | 3.88 (<LOD-3.88) |
| 3-phenoxybenzoic acid | All Hispanic | 79 | 0.1 | 68.4 | 0.4 (0.2-0.7) | <LOD | 0.39 (0.28-0.58) | 0.79 (0.59-1.14) | 4.26 (2.82-37.5) |
| NHW & Other | 26 | 69.2 | 0.4 (0.1-1.1) | <LOD | 0.505 (<LOD-0.94) | 1.04 (0.72-3.36) | 3.36 (2.51-3.72) |
| NHB | 17 | 82.4 | 0.7 (0.2-2.6) | 0.41 (<LOD-0.63) | 0.7 (0.41-1.34) | 1.34 (0.85-4.39) | 4.39 (3.66-4.39) |
| 4-fluoro-3-phenoxybenzoic | All Hispanic | 79 | 0.1 | 13.9 | \* | <LOD | <LOD | <LOD | 0.36 (0.16-0.61) |
| NHW & Other | 26 | 3.8 | \* | <LOD | <LOD | <LOD | <LOD |
| NHB | 17 | 5.9 | \* | <LOD | <LOD | <LOD | 0.32 (<LOD-0.32) |
| cis-3-(2,2-dibromovinyl)-2,2-dimethylcyclopropane carboxylic acid | All Hispanic | 79 | 0.5 | 3.8 | \* | <LOD | <LOD | <LOD | <LOD |
| NHW & Other | 26 | 0 | \* | <LOD | <LOD | <LOD | <LOD |
| NHB | 17 | 5.9 | \* | <LOD | <LOD | <LOD | 0.67 (<LOD-0.67) |
| trans-3-(2,2-Dichlorovinyl)-2,2-dimethylcyclopropane carboxylic acid | All Hispanic | 79 | 0.6 | 11.4 | \* | <LOD | <LOD | <LOD | 2.81 (0.64-17.6) |
| NHW & Other | 26 | 19.2 | \* | <LOD | <LOD | <LOD | 2.52 (2.41-3.26) |
| NHB | 17 | 29.4 | \* | <LOD | <LOD | 1.28 (<LOD-2.66) | 2.66 (2.09-2.66) |
| **Organophosphate insecticides** | | | | | | | | | |
| 3,5,6-trichloropyridinol | All Hispanic | 79 | 0.1 | 86.1 | 0.6 (0.4-1.1) | 0.21 (0.13-0.5) | 0.69 (0.52-0.99) | 1.61 (1.11-2.24) | 3.15 (2.41-7.55) |
| NHW & Other | 26 | 96.2 | 1.3 (0.6-3.1) | 0.67 (0.2-1.03) | 1.38 (0.83-2.56) | 3.26 (1.6-5.59) | 5.59 (3.99-10.5) |
| NHB | 17 | 94.1 | 0.9 (0.3-3.3) | 0.46 (<LOD-0.78) | 1.31 (0.46-2.58) | 2.58 (1.37-6.46) | 6.46 (2.86-6.46) |
| Malathion dicarboxylic acid | All Hispanic | 79 | 0.5 | 21.5 | \* | <LOD | <LOD | <LOD | 0.98 (0.65-19.9) |
| NHW & Other | 26 | 34.6 | \* | <LOD | <LOD | 0.59 (<LOD-1.26) | 1.26 (0.85-1.34) |
| NHB | 17 | 29.4 | \* | <LOD | <LOD | 0.51 (<LOD-2.68) | 2.68 (1.03-2.68) |
| 2-isopropyl-4-methyl-6-hydroxypyrimidine (Oxypyrimidine) | All Hispanic | 79 | 0.1 | 12.7 | \* | <LOD | <LOD | <LOD | 0.29 (0.12-1.9) |
| NHW & Other | 26 | 23.1 | \* | <LOD | <LOD | <LOD | 1.22 (0.35-1.53) |
| NHB | 17 | 35.3 | \* | <LOD | <LOD | 0.2 (<LOD-1.59) | 1.59 (0.53-1.59) |
| *para*-Nitrophenol | All Hispanic | 79 | 0.1 | 96.2 | 0.8 (0.5-1.1) | 0.46 (0.3-0.6) | 0.77 (0.61-1.14) | 1.35 (1.19-1.62) | 3.46 (1.95-10.1) |
| NHW & Other | 26 | 96.2 | 0.7 (0.3-1.6) | 0.31 (0.18-0.53) | 0.815 (0.37-1.38) | 1.39 (1.17-4.66) | 4.66 (2.41-5.39) |
| NHB | 17 | 94.1 | 0.8 (0.3-2.4) | 0.48 (<LOD-0.71) | 0.74 (0.48-1.63) | 1.63 (1.03-4.23) | 4.23 (2.81-4.23) |
| Dimethylphosphate | All Hispanic | 79 | 0.1 | 59.5 | \* | 0.354 (0.354-0.354) | 1.05 (0.354-2.21) | 3.68 (2.44-7.35) | 65.9 (10.2-87.3) |
| NHW & Other | 26 | 50 | \* | 0.354 (0.354-0.354) | 0.613 (0.354-1.94) | 2.68 (1.37-20.7) | 20.7 (6.98-23.9) |
| NHB | 17 | 82.4 | 2.9 (0.6-13.6) | 1.24 (0.354-1.99) | 2.05 (1.24-13.4) | 13.4 (2.27-31.5) | 31.5 (20.1-31.5) |
| Diethylphosphate | All Hispanic | 79 | 0.1 | 79.7 | 1.3 (0.6-3) | 0.372 (<LOD-0.963) | 1.58 (1-2.73) | 4.8 (3.1-8.48) | 24.2 (13.3-81.5) |
| NHW & Other | 26 | 88.5 | 2.7 (0.7-11) | 1.14 (<LOD-1.78) | 3.46 (1.16-7.9) | 9.53 (4.19-30.9) | 30.9 (21.5-43.1) |
| NHB | 17 | 100 | 2.3 (0.4-15.1) | 1.06 (0.167-1.41) | 1.81 (1.06-10.9) | 10.9 (2.36-81.3) | 81.3 (17-81.3) |
| Dimethylthiophosphate | All Hispanic | 77c | 0.1 | 77.9 | 1 (0.4-2.5) | 0.174 (<LOD-0.637) | 1.33 (0.773-2.05) | 4.1 (2.63-6.79) | 19.1 (8.44-409) |
| NHW & Other | 25c | 72 | 1 (0.2-4.8) | <LOD | 1.55 (0.194-3.18) | 3.54 (1.97-9.78) | 9.78 (9.62-74) |
| NHB | 17 | 88.2 | 4.4 (0.5-39.7) | 2.1 (<LOD-3.87) | 4.47 (2.1-23.2) | 23.2 (8.62-74.6) | 74.6 (54.2-74.6) |
| Diethylthiophosphate | All Hispanic | 79 | 0.25 | 31.6 | \* | <LOD | <LOD | 0.44 (<LOD-0.972) | 3.91 (1.7-5.66) |
| NHW & Other | 26 | 50 | \* | <LOD | 0.259 (<LOD-0.979) | 1.13 (0.423-10.9) | 10.9 (1.87-13.9) |
| NHB | 17 | 58.8 | \* | <LOD | 0.343 (<LOD-1.51) | 1.51 (0.419-6.37) | 6.37 (2.48-6.37) |
| Dimethyldithiophosphate | All Hispanic | 78c | 0.5 | 12.8 | \* | <LOD | <LOD | <LOD | 1.65 (0.785-54.6) |
| NHW & Other | 26 | 11.5 | \* | <LOD | <LOD | <LOD | 1.34 (1.08-6.95) |
| NHB | 17 | 64.7 | 1 (<LOD-3) | <LOD | 0.613 (<LOD-2.42) | 2.42 (0.787-9.02) | 9.02 (4.32-9.02) |
| Diethyldithiophosphate | All Hispanic | 79 | 0.5 | 0 | \* | <LOD | <LOD | <LOD | <LOD |
| NHW & Other | 26 | 0 | \* | <LOD | <LOD | <LOD | <LOD |
| NHB | 17 | 0 | \* | <LOD | <LOD | <LOD | <LOD |

\*: Not calculated; percentage of results <LOD too high. a95% confidence intervals are shown in parenthesis. bConcentrations are in ng/L. cThree DMTP and one DMDTP results were missing.

Table S4. Rotated component matrix in principal components analysis and total variance explained (creatinine-corrected concentrations)a

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Abbreviated name | Component | Factor loading | | | | | | |
| PC 1 | PC 2 | PC 3 | PC 4 | PC 5 | PC 6 | PC 7 |
| Eigenvalue | 8.32 | 4.60 | 2.37 | 1.95 | 1.61 | 1.36 | 1.06 |
| Total variance (%) | 32.2 | 17.8 | 9.18 | 7.54 | 6.25 | 5.28 | 4.11 |
| Cumulative (%) | 32.2 | 50.1 | 59.3 | 66.8 | 73.1 | 78.3 | 82.5 |
|  | | | | | |  |  |
| 2-PHE | 2-Hydroxyphenanthrene | **0.90** | 0.03 | 0.03 | 0.05 | 0.03 | 0.07 | 0.12 |
| 3-PHE | 3-Hydroxyphenanthrene | **0.91** | 0.13 | 0.08 | 0.11 | 0.11 | 0.06 | 0.04 |
| 2-FLU | 2-Hydroxyfluorene | **0.89** | 0.10 | 0.08 | -0.10 | 0.21 | 0.06 | -0.08 |
| 1-PHE | 1-Hydroxyphenanthrene | **0.89** | 0.08 | 0.05 | 0.18 | 0.12 | -0.02 | 0.07 |
| 3-FLU | 3-Hydroxyfluorene | **0.85** | 0.12 | 0.11 | -0.08 | 0.15 | -0.01 | -0.13 |
| 4-PHE | 4-Hydroxyphenanthrene | **0.78** | -0.03 | 0.26 | 0.18 | -0.06 | 0.03 | 0.06 |
| 9-FLU | 9-Hydroxyfluorene | **0.72** | -0.11 | 0.25 | 0.20 | -0.08 | 0.01 | 0.32 |
| 1-PYR | 1-Hydroxypyrene | **0.65** | 0.18 | 0.16 | 0.37 | 0.27 | 0.03 | -0.06 |
| 2-NAP | 2-Hydroxynapthalene | 0.31 | 0.04 | -0.16 | 0.02 | 0.24 | 0.23 | -0.15 |
| MEP | Monoethyl phthalate | 0.25 | 0.15 | 0.03 | 0.31 | 0.07 | 0.26 | -0.02 |
| MEHHP | Mono-2-ethyl-5-hydroxyhexyl phthalate | 0.06 | **0.95** | 0.00 | 0.23 | -0.02 | 0.04 | 0.00 |
| MEOHP | Mono-2-ethyl-5-oxohexyl phthalate | 0.06 | **0.95** | 0.01 | 0.21 | -0.02 | 0.03 | -0.02 |
| MECPP | Mono-2-ethyl-5-carboxypentyl phthalate | 0.04 | **0.92** | 0.08 | 0.13 | 0.04 | 0.06 | 0.03 |
| MEHP | Mono-2-ethylhexyl phthalate | 0.08 | **0.82** | 0.06 | 0.05 | -0.02 | 0.13 | 0.02 |
| MiBP | Mono-isobutyl phthalate | 0.16 | 0.46 | -0.18 | **0.57** | 0.07 | -0.08 | -0.29 |
| MBP | Mono-n-butyl phthalate | 0.14 | 0.43 | -0.12 | **0.58** | -0.05 | -0.08 | -0.09 |
| MCOP | Monocarboxyoctyl phthalate | -0.18 | 0.40 | 0.42 | 0.27 | 0.36 | -0.03 | 0.23 |
| MCPP | Mono-3-carboxypropyl phthalate | -0.03 | 0.40 | 0.39 | 0.37 | 0.37 | -0.21 | 0.15 |
| MHiNCH | Cyclohexane-1,2-dicarboxylic acid monohydroxy isononyl ester | 0.18 | 0.37 | 0.07 | 0.24 | 0.10 | 0.17 | 0.00 |
| DMTP | Dimethyl thiophosphate | 0.15 | 0.03 | **0.73** | -0.02 | -0.03 | 0.06 | 0.03 |
| DMP | Dimethylphosphate | 0.24 | 0.01 | **0.69** | -0.08 | -0.15 | -0.01 | 0.20 |
| p-NP | *para*-Nitrophenol | 0.02 | 0.04 | 0.40 | 0.26 | -0.07 | -0.10 | 0.00 |
| DEP | Diethylphosphate | 0.02 | -0.10 | 0.32 | 0.02 | 0.01 | 0.05 | -0.08 |
| 2,4-D | 2,4-Dichlorophenoxy acetic acid | 0.16 | -0.04 | 0.31 | 0.11 | 0.23 | 0.05 | 0.12 |
| 1-NAP | 1-Hydroxynapthalene | 0.18 | 0.08 | 0.39 | 0.03 | 0.11 | -0.04 | -0.26 |
| MCNP | Monocarboxynonyl phthalate | 0.07 | 0.29 | 0.48 | 0.11 | 0.37 | -0.05 | 0.11 |
| MMP | Monomethyl phthalate | 0.02 | 0.19 | 0.30 | -0.05 | 0.07 | 0.17 | -0.07 |
| TCPy | 3,5,6-trichloropyridinol | -0.01 | 0.16 | 0.23 | 0.11 | 0.20 | 0.01 | 0.14 |
| MBzP | Monobenzyl phthalate | -0.02 | 0.15 | 0.09 | **0.56** | -0.04 | 0.11 | -0.12 |
| 3-PBA | 3-phenoxybenzoic acid | 0.18 | 0.15 | 0.06 | **0.56** | 0.00 | -0.11 | 0.22 |
| BP-3 | Benzophenone-3 | 0.01 | 0.02 | 0.09 | 0.41 | 0.13 | 0.16 | 0.05 |
| DCBA | 3-diethyl-carbamoyl benzoic acid | 0.26 | -0.02 | 0.01 | 0.29 | 0.20 | 0.28 | 0.27 |
| BPA | Bisphenol A | 0.16 | 0.13 | 0.12 | 0.29 | 0.20 | 0.13 | 0.06 |
| 2,5-DCP | 2,5-dichlorophenol | 0.26 | -0.09 | 0.02 | 0.06 | **0.80** | 0.10 | -0.03 |
| 2,4-DCP | 2,4-dichlorophenol | 0.33 | 0.00 | -0.06 | -0.02 | **0.69** | 0.07 | 0.40 |
| PPB | Propyl paraben | 0.05 | 0.14 | -0.01 | 0.13 | -0.01 | **0.85** | -0.03 |
| MPB | Methyl paraben | 0.02 | 0.05 | 0.09 | 0.03 | 0.08 | **0.86** | 0.09 |
| TCS | Triclosan | 0.09 | 0.03 | 0.00 | -0.04 | 0.18 | 0.02 | **0.78** |

aFactor loadings are bolded if > 0.50. Only analytes detected in at least 60% of samples were included in the PCA.