# SUPPLEMENTAL MATERIALS

**Table S1** Percent change (95% confidence interval, 95% CI) in serum concentrations of **follicle-stimulating hormone (FSH)** in relation to a doubling increase in urinary phthalate metabolite concentrations and molar sums of phthalate metabolites, in total population and by menopausal status.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Phthalate metabolites | Total | Stratification by menopausal status | | |
| Premenopausal | Early and late perimenopausal | Postmenopausal |
| Percent change  (95% CI) | Percent change  (95% CI) | Percent change  (95% CI) | Percent change  (95% CI) |
| HMW metabolites |  |  |  |  |
| MBzP | 0.50 (-1.95, 3.01) | -7.44 (-13.68, -0.75)\* | 0.57 (-3.08, 4.37) | 1.38 (-1.65, 4.50) |
| MCOP | 1.27 (-1.28, 3.88) | -6.66 (-13.19, 0.36) | 2.64 (-1.20, 6.64) | -0.86 (-3.72, 2.08) |
| MCNP | -1.02 (-3.34, 1.34) | -3.09 (-9.75, 4.07) | -0.68 (-4.15, 2.90) | -2.61 (-5.12, -0.03)\* |
| MCPP | 2.39 (-0.69, 5.56) | -3.45 (-11.77, 5.64) | 3.54 (-1.03, 8.33) | -1.61 (-5.23, 2.14) |
| MECPP | -1.56 (-3.72, 0.64) | -0.04 (-6.66, 7.05) | -0.85 (-4.05, 2.44) | -1.70 (-4.30, 0.97) |
| MEHHP | -1.71 (-3.71, 0.33) | -0.77 (-6.67, 5.51) | -0.94 (-3.90, 2.10) | -1.24 (-3.73, 1.31) |
| MEHP | -1.57 (-3.52, 0.42) | -1.76 (-7.73, 4.60) | -1.64 (-4.50, 1.32) | -0.54 (-2.89, 1.88) |
| MEOHP | -1.26 (-3.30, 0.84) | -0.36 (-6.48, 6.15) | -1.01 (-4.04, 2.12) | -0.39 (-2.90, 2.19) |
| LMW metabolites |  |  |  |  |
| MEP | 0.70 (-1.11, 2.54) | 1.34 (-3.80, 6.76) | 0.44 (-2.27, 3.22) | 1.41 (-0.70, 3.56) |
| MiBP | 1.05 (-1.68, 3.85) | -2.51 (-9.66, 5.20) | 2.71 (-1.50, 7.09) | -1.09 (-4.09, 2.00) |
| MnBP | 1.50 (-1.33, 4.40) | -3.74 (-11.37, 4.55) | 2.67 (-1.47, 6.99) | -0.28 (-3.71, 3.27) |
| Sum of metabolites |  |  |  |  |
| ∑DEHP | -1.66 (-3.77, 0.50) | -0.72 (-7.10, 6.09) | -1.06 (-4.18, 2.15) | -1.23 (-3.82, 1.44) |
| ∑LMW | 0.87 (-1.25, 3.03) | 0.76 (-5.23, 7.13) | 1.01 (-2.16, 4.29) | 1.00 (-1.48, 3.55) |
| ∑HMW | -1.71 (-4.05, 0.69) | -2.17 (-9.15, 5.34) | -1.23 (-4.68, 2.35) | -1.04 (-3.94, 1.95) |
| ∑Anti-androgenic | -1.75 (-4.30, 0.87) | -2.53 (-10.07, 5.65) | -1.23 (-4.98, 2.66) | -0.91 (-4.11, 2.39) |
| ∑Estrogenic | 0.86 (-1.35, 3.12) | 0.15 (-6.20, 6.94) | 1.01 (-2.30, 4.44) | 0.91 (-1.67, 3.57) |

Models were adjusted for age (time-varying), race/ethnicity, study site, education, smoking status (time-varying), physical activity (time-varying), parity, BMI (time-varying), menopausal status (time-varying), and urinary creatinine (time-varying).

\*P<0.05, \*\*P<0.01, \*\*\*P<0.0001

**Table S2** Percent change (95% confidence interval, 95% CI) in serum concentrations of **sex hormone-binding globulin (SHBG)** in relation to a doubling increase in urinary phthalate metabolite concentrations and molar sums of phthalate metabolites, in total population and by menopausal status.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Phthalate metabolites | Total | Stratification by menopausal status | | |
| Premenopausal | Early and late perimenopausal | Postmenopausal |
| Percent change  (95% CI) | Percent change  (95% CI) | Percent change  (95% CI) | Percent change  (95% CI) |
| HMW metabolites |  |  |  |  |
| MBzP | -0.60 (-2.61, 1.45) | 0.34 (-5.92, 7.03) | -1.35 (-3.96, 1.33) | -0.11 (-4.32, 4.29) |
| MCOP | -1.72 (-3.66, 0.26) | 3.80 (-1.84, 9.77) | -3.02 (-5.54, -0.42)\* | -1.13 (-5.19, 3.12) |
| MCNP | -0.68 (-2.51, 1.17) | 1.82 (-4.82, 8.92) | -1.56 (-3.97, 0.90) | -1.66 (-5.38, 2.20) |
| MCPP | -0.29 (-2.72, 2.20) | 10.57 (2.27, 19.53)\* | -1.04 (-4.19, 2.22) | -1.29 (-6.47, 4.18) |
| MECPP | -0.49 (-2.24, 1.29) | 4.85 (-1.14, 11.19) | -0.40 (-2.67, 1.92) | -1.44 (-5.17, 2.44) |
| MEHHP | -0.39 (-2.01, 1.27) | 4.60 (-0.77, 10.26) | -0.34 (-2.44, 1.81) | -0.39 (-3.96, 3.32) |
| MEHP | -0.31 (-1.91, 1.31) | 5.64 (-0.22, 11.84) | -0.51 (-2.57, 1.60) | 0.13 (-3.26, 3.64) |
| MEOHP | -0.42 (-2.08, 1.26) | 4.33 (-1.14, 10.10) | -0.44 (-2.60, 1.76) | -0.30 (-3.88, 3.42) |
| LMW metabolites |  |  |  |  |
| MEP | 0.67 (-0.82, 2.18) | 2.00 (-2.92, 7.17) | -0.65 (-2.57, 1.32) | 2.80 (-0.26, 5.95) |
| MiBP | 1.68 (-0.57, 3.97) | 5.49 (-1.50, 12.98) | 1.60 (-1.42, 4.73) | 0.57 (-3.84, 5.17) |
| MnBP | 1.41 (-0.93, 3.80) | 2.95 (-4.58, 11.08) | 0.88 (-2.09, 3.95) | 0.97 (-4.03, 6.23) |
| Sum of metabolites |  |  |  |  |
| ∑DEHP | -0.40 (-2.12, 1.34) | 5.27 (-0.57, 11.45) | -0.37 (-2.58, 1.90) | -0.74 (-4.46, 3.13) |
| ∑LMW | 1.09 (-0.65, 2.87) | 2.76 (-3.17, 9.04) | -0.25 (-2.51, 2.06) | 2.82 (-0.79, 6.56) |
| ∑HMW | -0.68 (-2.57, 1.24) | 5.09 (-1.36, 11.96) | -0.91 (-3.36, 1.61) | -1.29 (-5.40, 2.99) |
| ∑Anti-androgenic | -0.13 (-2.21, 1.99) | 5.90 (-1.19, 13.51) | -0.44 (-3.12, 2.32) | -0.88 (-5.42, 3.88) |
| ∑Estrogenic | 0.93 (-0.89, 2.79) | 2.61 (-3.81, 9.44) | -0.60 (-2.95, 1.80) | 2.81 (-0.95, 6.72) |

Models were adjusted for age (time-varying), race/ethnicity, study site, education, smoking status (time-varying), physical activity (time-varying), parity, BMI (time-varying), menopausal status (time-varying), and urinary creatinine (time-varying).

\*P<0.05, \*\*P<0.01, \*\*\*P<0.0001

Diagram

Description automatically generated

**Figure S1** Overall study design flowchart.