**Phthalate Exposure During Pregnancy and Long-Term Weight Gain in Women**

Supplementary material

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| **Supplementary Table 1. Study timeline (n= 178)** |
| **Pregnancy** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| * Cohort 2
 |  |  |  |  |  |  |  |  |  |  |  |  |
| * Cohort 3
 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **1st postpartum year** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| * Cohort 2
 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| * Cohort 3
 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Follow-up 1**  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| * Cohort 2
 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| * Cohort 3
 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| **Follow-up 2** |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| * Cohort 2
 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| * Cohort 3
 |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
|  | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
| Pregnancy visits at 1st, 2nd and 3rd trimester; 1st postpartum year visits at 1st, 3rd, 4th, 7th, and 12th month after delivery; two follow-up visits 7.1±1.13 years and 9.6±1.50 years after the latest first year postpartum visits.  |

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| **Supplementary Table 2. Specific gravity corrected phthalate metabolites (ng/ml)** |
| Phthalate metabolite/group | LOD | % <LOD | **Pregnancy** **(n=178)** | **First trimester** **(n=155)** | **Second trimester** **(n=153)** | **Third trimester** **(n=175)** |
|  |  |  | GM | 95% CI | GM | 95% CI | GM | 95% CI | GM | 95% CI |
| MEHP | 1 | 0.00 | 5.66 | 5.23,6.13 | 5.15 | 4.46,5.94 | 5.36 | 4.68,6.14 | 6.47 | 5.67,7.37 |
| MECPP | 0.2 | 0.00 | 34.55 | 32.25,37.02 | 30.64 | 27.27,34.43 | 34.82 | 30.90,39.24 | 38.18 | 33.84,43.08 |
| MEHHP | 0.1 | 0.00 | 19.34 | 17.80,21.01 | 16.61 | 14.34,19.23 | 18.61 | 16.10,21.51 | 22.89 | 19.94,26.26 |
| MEOHP | 0.1 | 0.00 | 11.20 | 10.31,12.16 | 8.88 | 7.67,10.28 | 11.08 | 9.59,12.80 | 13.87 | 12.12,15.86 |
| MnBP | 0.5 | 0.00 | 59.65 | 53.94,65.96 | 62.60 | 51.80,75.65 | 52.61 | 43.79,63.21 | 63.78 | 54.65,74.43 |
| MiBP | 0.2 | 0.16 | 1.30 | 1.17,1.45 | 1.04 | 0.85,1.27 | 0.90 | 0.74,1.09 | 2.20 | 1.92,2.52 |
| MBzP | 0.2 | 0.32 | 3.48 | 3.16,3.84 | 2.83 | 2.34,3.42 | 2.74 | 2.33,3.23 | 5.17 | 4.50,5.93 |
| MCPP | 0.2 | 0.16 | 1.27 | 1.19,1.36 | 1.24 | 1.08,1.41 | 1.24 | 1.11,1.40 | 1.33 | 1.18,1.50 |
| MEP | 1 | 0.00 | 138.73 | 124.06,155.13 | 143.36 | 116.79,175.98 | 134.26 | 112.51,160.20 | 138.66 | 113.63,169.20 |
| ∑DEHP |  |  | 68.27 | 63.59,73.29 | 59.65 | 52.82,67.36 | 66.47 | 58.54,75.47 | 78.76 | 69.92,88.71 |
| ∑DBP |  |  | 62.10 | 56.24,68.57 | 64.59 | 53.55,77.90 | 54.62 | 45.60,65.42 | 67.11 | 57.67,78.09 |
| LOD: limit of detection, GM: geometric mean, CI: confidence interval. |

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| **Supplementary Table 3. Change in log-transformed SG-corrected phthalates concentrations across pregnancy (n=178)** |
|  | **Second trimester** | **Third trimester** |
| Phthalate metabolite/group | β | 95% CI | *p* value | β | 95% CI | *p* value |
| MEHP | 0.04 | -0.12,0.21 | 0.61 | 0.22 | 0.06,0.38 | 0.01\* |
| MECPP | 0.12 | -0.03,0.28 | 0.12 | 0.21 | 0.06,0.36 | 0.01\* |
| MEHHP | 0.11 | -0.07,0.30 | 0.24 | 0.31 | 0.13,0.49 | 0.001\* |
| MEOHP | 0.22\* | 0.03,0.40 | 0.02\* | 0.43 | 0.26,0.61 | 0.000\* |
| MnBP | -0.17 | -0.38,0.05 | 0.13 | 0.01 | -0.19,0.22 | 0.89 |
| MiBP | -0.12 | -0.32,0.07 | 0.21 | 0.77 | 0.58,0.95 | 0.000\* |
| MBzP | -0.03 | -0.24,0.17 | 0.76 | 0.60 | 0.40,0.79 | 0.000\* |
| MCPP | 0.01 | -0.14,0.16 | 0.88 | 0.07 | -0.07,0.22 | 0.32 |
| MEP | -0.10 | -0.32,0.12 | 0.37 | -0.06 | -0.27,0.15 | 0.60 |
| ∑DEHP  | 0.11 | -0.05,0.27 | 0.20 | 0.27 | 0.11,0.42 | 0.001\* |
| ∑DBP | -0.16 | -0.37,0.05 | 0.134 | 0.03 | -0.17,0.24 | 0.74 |
| \**p*<0.05. SG, specific gravity; CI, confidence interval.Notes: All models were adjusted for specific gravity, using the first trimester as the reference group.  |

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| **Supplementary Table 4. Table 3 (continued): Direct and indirect effects for the Path model (n=178)**  |
|  | **Direct effects** | **Indirect effects** |
| Paths | β | 95% CI | *p* value | β | 95% CI | *p* value |
| **Effect on MBzP** |  |  |  |  |  |  |
| Age | -0.01 | -0.02,0.01 | 0.33 |  |  |  |
| Pregnancy EIa | 0.02 | 0.0001,0.04 | 0.05\* |  |  |  |
| **Effect on MCPP** |  |  |  |  |  |  |
| Age |  |  |  | -0.003 | -0.01,0.01 | 0.65 |
| Pregnancy EIa | 0.005 | -0.005,0.01 | 0.34 |  |  |  |
| Educationb |  |  |  |  |  |  |
| Middle school | 0.45 | 0.17,0.74 | 0.002\* |  |  |  |
| High school | 0.60 | 0.32,0.87 | 0.000\* |  |  |  |
| Undergraduate/graduate school | 0.65 | 0.35,0.95 | 0.000\* |  |  |  |
| **Effect on MEP** |  |  |  |  |  |  |
| Age | 0.01 | -0.01,0.03 | 0.42 | -0.001 | -0.007,0.005 | 0.71 |
| Educationb |  |  |  |  |  |  |
| Middle school | 0.19 | -0.44,0.82 | 0.55 |  |  |  |
| High school | 0.27 | -0.34,0.89 | 0.38 |  |  |  |
| Undergraduate/graduate school | 0.29 | -0.39,0.97 | 0.41 |  |  |  |
| **Effect on ∑DEHP** |  |  |  |  |  |  |
| Age | -0.003 | -0.01,0.01 | 0.57 |  |  |  |
| **Effect on ∑DBP** |  |  |  |  |  |  |
| Age |  |  |  | -0.003 | -0.01,0.01 | 0.58 |
| Educationb |  |  |  |  |  |  |
| Middle school | 0.37 | -0.04,0.77 | 0.07 |  |  |  |
| High school | 0.56 | 0.16,0.95 | 0.01\* |  |  |  |
| Undergraduate/graduate school | 0.51 | 0.08,0.95 | 0.02\* |  |  |  |
| **Effect on parity rate**c |  |  |  |  |  |  |
| Age | -0.004 | -0.01,-0.003 | 0.000\* | -0.0003 | -0.0009,0.0002 | 0.241 |
| Educationb |  |  |  |  |  |  |
|  Middle school | 0.02 | -0.02,0.05 | 0.36 |  |  |  |
| High school | 0.01 | -0.02,0.04 | 0.49 |  |  |  |
| Undergraduate/graduate school | 0.03 | -0.01,0.06 | 0.13 |  |  |  |
| Marital status | 0.03 | 0.004,0.05 | 0.02\* |  |  |  |
| **Effect on postpartum EI** |  |  |  |  |  |  |
| Pregnancy EIa | 0.61 | 0.51,0.71 | 0.000\* |  |  |  |
| **Effect on breastfeeding**d |  |  |  |  |  |  |
| 1-6 months |  |  |  |  |  |  |
| Age | -0.003 | -0.02,0.01 | 0.59 | -0.0004 | -0.003,0.002 | 0.77 |
| Marital status | 0.03 | -0.20,0.27 | 0.77 |  |  |  |
| 7-12 months |  |  |  |  |  |  |
| Age | 0.01 | 0.001,0.02 | 0.04\* | -0.003 | -0.006,0.0004 | 0.09 |
| Marital status | 0.22 | 0.01,0.43 | 0.04\* |  |  |  |
| >12 months |  |  |  |  |  |  |
| Age | -0.01 | -0.02,0.001 | 0.08 | 0.003 | -0.0002,0.006 | 0.06 |
| Marital status | -0.25 | -0.47,-0.04 | 0.02\* |  |  |  |
| **Effect on education**b |  |  |  |  |  |  |
| Middle school |  |  |  |  |  |  |
| Age | -0.001 | -0.01,0.01 | 0.91 |  |  |  |
| High school |  |  |  |  |  |  |
| Age | -0.01 | -0.02,0.003 | 0.15 |  |  |  |
| Undergraduate/graduate school |  |  |  |  |  |  |
| Age | 0.01 | -0.004,0.01 | 0.28 |  |  |  |
| **Effect on marital status**e |  |  |  |  |  |  |
| Age | -0.01 | -0.02,-0.005 | 0.001\* |  |  |  |
| \**p*<0.05. CI: confidence interval, EI: energy intake. Notes:  aThe energy intake unit is 100 kcal. bElementary school is the reference group in education. cThe variable parity rate only includes the number of children the woman had 13.42±1.65 years after the index child. d0 months is the reference group for breastfeeding. eLiving with a partner is the reference group for marital status. |

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| **Supplementary Table 5. Main direct and indirect effects for the path model including the 9 phthalate metabolites (n=178)** |
|  | **Direct effects** | **Indirect effects** |
| Paths | β | 95% CI | *p* value | β | 95% CI | *p* value |
| **Effects on weight change/year**a |  |  |  |  |  |  |
| MEHP | 0.16 | -0.08,0.41 | 0.19 |  |  |  |
| MEOHP | 0.68 | -0.34,1.70 | 0.20 |  |  |  |
| MEHHP | -0.79 | -1.65,0.07 | 0.07 |  |  |  |
| MECCP | -0.071 | -0.60,0.46 | 0.80 |  |  |  |
| MBP | -0.061 | -0.31,0.19 | 0.63 |  |  |  |
| MiBP | 0.19 | 0.03,0.35 | 0.02\* |  |  |  |
| MBzP | -0.27 | -0.47,-0.07 | 0.01\* |  |  |  |
| MCPP | 0.31 | -0.02,0.64 | 0.07 |  |  |  |
| MEP | -0.07 | -0.19,0.06 | 0.29 |  |  |  |
| Age | -0.02 | -0.05,-0.002 | 0.03\* | 0.004 | -0.005,0.014 | 0.38 |
| Educationb |  |  |  |  |  |  |
| Middle school |  |  |  | 0.23 | 0.05,0.42 | 0.02\* |
| High school |  |  |  | 0.25 | 0.04,0.46 | 0.02\* |
| Undergraduate/graduate school |  |  |  | 0.29 | 0.06,0.52 | 0.01\* |
| Parity ratec | 1.28 | -1.06,3.61 | 0.29 |  |  |  |
| Pregnancy EId |  |  |  | 0.01 | -0.003,0.03 | 0.11 |
| Postpartum EId | 0.03 | 0.004,0.05 | 0.02\* |  |  |  |
| Marital statuse | -0.35 | -0.76,0.06 | 0.09 | 0.06 | -0.06,0.18 | 0.31 |
| \**p*<0.05. CI: confidence interval, EI: energy intake. Notes: aThe period considered for the weight change was 7.1±1.2 years (5.2-10.7 years). bElementary school is the reference group in education. cThe variable parity rate only includes the number of children the woman had 13.42±1.65 years after the index child. dThe energy intake unit is 100 kcal. eLiving with a partner is the reference group for marital status. |