

Supporting Information

TITLE: Urinary Concentrations of Phthalates in Couples Planning Pregnancy and its Association with 8-hydroxy-2'-deoxyguanosine, a Biomarker of Oxidative Stress: the Longitudinal Investigation of Fertility and the Environment (LIFE) Study

AUTHORS: Ying Guo ^a, Jennifer Weck ^b, Rajeswari Sundaram ^b,
Alexandra E. Goldstone ^c, Germaine Buck Louis ^b, and
Kurunthachalam Kannan ^{a,d,1}

ADDRESS: ^a*Wadsworth Center, New York State Department of Health, and Department of Environmental Health Sciences, School of Public Health, State University of New York at Albany, Empire State Plaza, P.O. Box 509, Albany, New York 12201-0509, USA*

^b*Division of Intramural Population Health Research, Eunice Kennedy Shriver National Institute of Child Health & Human Development, 6100 Executive Blvd. Room 7B03 Rockville, MD, United States, 20852, USA*

^c*Department of Environmental & Occupational Health, Milken Institute School of Public Health, George Washington University, Washington, DC, 20052, USA*

^d*Biochemistry Department, Faculty of Science and Experimental Biochemistry Unit, King Fahd Medical Research Center, King Abdulaziz University, P. O. Box 80203 Jeddah 21589, Saudi Arabia*

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TABLE S1. QA/QC Results in the LIFE Study

TABLE S1. The Results of Quality Assurance/Quality Control System

Compound	Method blank (n = 61)	Blank spiked (n = 16)	Matrix spiked (n = 16)	Samples (n = 894)
C ¹³ -mMP	81%	84%	33%	57%
C ¹³ -mEP	83%	86%	26%	56%
C ¹³ -mBP	83%	87%	39%	66%
D ₄ -miBP	83%	84%	32%	67%
C ¹³ -mECPP	85%	91%	45%	68%
C ¹³ -mBzP	82%	83%	33%	52%
C ¹³ -mEHP	67%	69%	53%	57%
mMP	< LOQ	91%	89%	
MEP	0.3 ng/mL	108%	78%	
mCPP	< LOQ	63%	111%	
mBP	0.4 ng/mL	97%	101%	
miBP	0.7 ng/mL	101%	115%	
mECPP	0.1 ng/mL	99%	98%	
mCMHP	< LOQ	77%	64%	
mEHHP	< LOQ	107%	86%	
mEOHP	< LOQ	101%	97%	
mCHP	< LOQ	104%	83%	
mBzP	< LOQ	96%	98%	
mEHP	7.0 ng/mL	119%	118%	
mOP	< LOQ	85%	83%	
mNP	< LOQ	82%	82%	

LOQ = Limits of quantification

TABLE S2. Urinary Concentrations (un-adjusted, ng/mL) of 8-hydroxydeoxyguanosine (8-OHdG) and Phthalate Metabolites by Select Demographic Characteristics (LIFE study)

	8-OHdG			mMP			mEP			mCPP			mBP			miBP			mBzP			Σ ₅ mEHP			total (14 metabolites)			
	5% ^a	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	5%	50%	95%	
Total (n = 894)	0.68	3.29	10.9	ND ^b	0.44	7.31	3.91	73.6	1037	0.21	4.84	37.0	0.77	7.51	45.4	0.35	4.20	23.4	0.25	3.70	28.1	5.38	56.8	752	22.9	240	1841	
Gender																												
Female (n = 454)	0.72	3.38	10.5	ND	0.33	7.34	2.57	65.7	877 ^{**c}	0.13	3.98	29.9 ^{**}	0.71	7.87	45.7	0.28	4.00	23.2	0.24	3.71	28.9	4.04	49.4	644 ^{**}	19.1	213	1472	
Male (n = 440)	0.67	3.17	11.4	ND	0.55	7.30	7.29	87.0	1229	0.31	5.57	48.3	0.89	7.40	45.4	0.42	4.37	23.9	0.27	3.68	27.1	7.47	69.4	1076	33.2	270	2080	
Site																												
Michigan (n = 173)	0.62	3.24	9.60	ND	0.29	5.74 [*]	3.66	63.4	746	ND	4.48	57.7	0.35	7.74	41.4	ND	2.81	16.4 [*]	0.22	4.11	37.7	3.27	68.3	817	18.6	217	1432	
Texas (n = 721)	0.72	3.30	11.4	ND	0.52	7.35	3.75	75.9	1125	0.23	4.88	34.9	1.00	7.50	47.6	0.54	4.68	23.5	0.27	3.67	26.2	6.94	54.9	750	26.6	240	1884	
Body Mass Index																												
< 25.0 (n = 284)	0.71	3.21	10.4	ND	0.33	7.02	2.60	53.5	690 ^{**}	0.18	3.83	29.5 ^{**}	0.69	6.23	42.3 [*]	0.26	3.62	22.5 [*]	0.14	2.86	26.5 ^{**}	3.57	46.6	737 ^{**}	18.8	200	1409 ^{**}	
25.0-29.9 (n = 306)	0.68	3.47	11.8	ND	0.45	8.11	5.50	71.2	1046	0.28	5.12	38.1	0.97	6.83	48.1	0.38	4.29	25.1	0.27	3.66	28.1	5.74	56.7	788	21.4	216	1946	
≥30.0 (n = 305)	0.67	3.07	10.7	ND	0.53	7.24	5.14	109	1514	0.14	5.79	46.4	0.81	8.68	45.2	0.42	4.90	23.9	0.36	4.53	32.9	7.48	72.1	833	30.6	312	1926	
Age																												
≤25 (n = 100)	0.60	2.91	11.0	ND	0.92	6.06	4.28	102	1627	0.32	5.49	34.7	0.83	9.38	58.5	0.53	4.95	22.4	5.51	56.8	465	36.0	255	1724	32.9	239	1893	
26-30(n = 360)	0.72	3.28	11.7	ND	0.39	7.12	2.92	71.5	906	0.32	4.68	40.4	0.88	7.16	46.4	0.42	3.93	23.2	6.63	55.0	811	31.0	234	1961	19.2	228	1797	
31-35(n = 290)	0.70	3.36	10.7	ND	0.32	8.27	4.63	69.5	938	0.14	4.86	38.8	0.69	7.01	46.7	0.26	3.72	23.6	4.22	57.5	1080	18.2	223	1845	8.06	394	2883	
≥ 36 (n = 144)	0.51	2.87	25.2	ND	0.56	6.9	3.08	82.4	912	0.20	4.00	18.5	0.90	8.64	33.3	0.58	4.12	15.8	0.20	3.67	32.1	12.2	55.1	605	45.1	263	1242	
Smoking																												
No (n = 776)	0.68	3.26	10.7	ND	0.46	7.31	3.67	72.6	922	0.23	4.89	39.0	0.77	7.51	44.6	0.37	4.20	23.3	0.25	3.54	27.3	5.85	59.1	782	23.1	237	1783	
Yes (n = 115)	0.70	3.52	13.0	ND	0.38	8.62	3.57	84.4	1670	0.20	4.01	24.8	0.74	7.59	46.9	0.33	4.21	24.3	0.33	3.99	28.1	3.53	48.5	516	21.0	246	2096	
Race																												
White (n = 726)	0.67	3.20	10.8	ND	0.35	6.62 ^{**}	3.18	66.7	882 ^{**}	0.18	4.93	36.9	0.74	7.06	39.1 ^{**}	0.33	3.94	21.5 ^{**}	0.24	3.54	29.0	4.75	58.4	800 [*]	19.4	231	1726	
Black or African America (n = 42)	0.84	3.08	9.36	ND	0.94	10.4	18.5	249	1654	0.29	3.83	21.6	0.79	14.0	132	0.26	7.04	70.0	0.38	6.54	27.3	3.38	70.2	502	30.9	426	1936	
American Indian or Alaska																												
Native (n = 25)	1.01	3.89	19.4	ND	0.79	51.8	4.98	109	3375	0.30	5.14	58.5	0.72	7.88	113	0.64	4.75	38.5	0.20	5.78	305	8.27	49.5	1959	24.6	232	3440	
Asian (n = 18)	1.49	4.93	- ^d	ND	0.67	-	7.85	110	-	0.37	4.46	-	2.89	13.9	-	0.65	7.50	-	0.45	3.16	-	7.61	52.5	-	31.6	264	-	
Native Hawaiian or																												
other Pacific Islander (n = 2)	1.97	3.82	-	ND	0.11	-	75.9	96.1	-	3.95	4.42	-	8.18	15.9	-	3.40	6.65	-	3.23	6.99	-	15.2	41.0	-	150	171	-	
Other (n = 70)	0.68	3.90	11.5	ND	1.10	11.3	13.0	98.1	1825	0.19	5.13	53.6	1.02	8.31	107	0.65	5.78	43.2	0.46	3.54	25.5	13.0	47.7	1031	45.0	242	6118	

^a 5th, 50th and 95th percentile; ^b “ND”, concentrations lower than 0.01 ng/mL; ^c * $p < 0.05$ and ** $p < 0.01$; ^d “-” = not available.

TABLE S3. Correlations between concentrations of 8-OHdG and Urinary Phthalate Metabolites in Couples Planning Pregnancy in Texas and Michigan, 2005-2009, the LIFE Study

	mMP	mEP	mCPP	mBP	miBP	mBzP	mEHP	\sum_5 mEHP	\sum_{14} Phthalate
<i>Female</i>									
Correlation	.138	.161	.017	.107	.077	.102	.120	.111	.196
Sig. (2-tailed)	.004**	.001**	.728	.026*	.106	.034*	.012*	.020*	.000**
<i>Male</i>									
Correlation	.210	.083	.114	.079	.251	.305	.082	.039	.115
Sig. (2-tailed)	.000**	.087	.018*	.102	.000**	.000**	.089	.420	.017*

** . Correlation is significant at the 0.01 level (2-tailed); * . Correlation is significant at the 0.05 level (2-tailed).

TABLE S4. Correlations between concentrations of 8-OHdG and Phthalate Daily Intakes in Couples Planning Pregnancy in Texas and Michigan, 2005-2009, the LIFE Study

	DMP	DEP	DBP	DIBP	BzBP	DEHP1	DEHP2
<i>Female (creatinine adjusted)</i>							
Correlation	-.034	.147	-.007	-.040	-.094	.045	.063
Significance (2-tailed)	.479	.002**	.888	.404	.049*	.351	.188
<i>Male (creatinine adjusted)</i>							
Correlation	.071	.029	.028	.088	.041	-.018	-.024
Significance (2-tailed)	.143	.546	.560	.070	.398	.705	.620
<i>Female (un-adjusted)</i>							
Correlation	.136	.179	.130	.091	.097	.085	.092
Significance (2-tailed)	.005**	.000**	.007**	.059	.044*	.077	.056
<i>Male (un-adjusted)</i>							
Correlation	.227	.081	.073	.242	.311	.009	.029
Significance (2-tailed)	.000**	.095	.134	.000**	.000**	.848	.556

** . Correlation is significant at the 0.01 level (2-tailed); * . Correlation is significant at the 0.05 level (2-tailed).

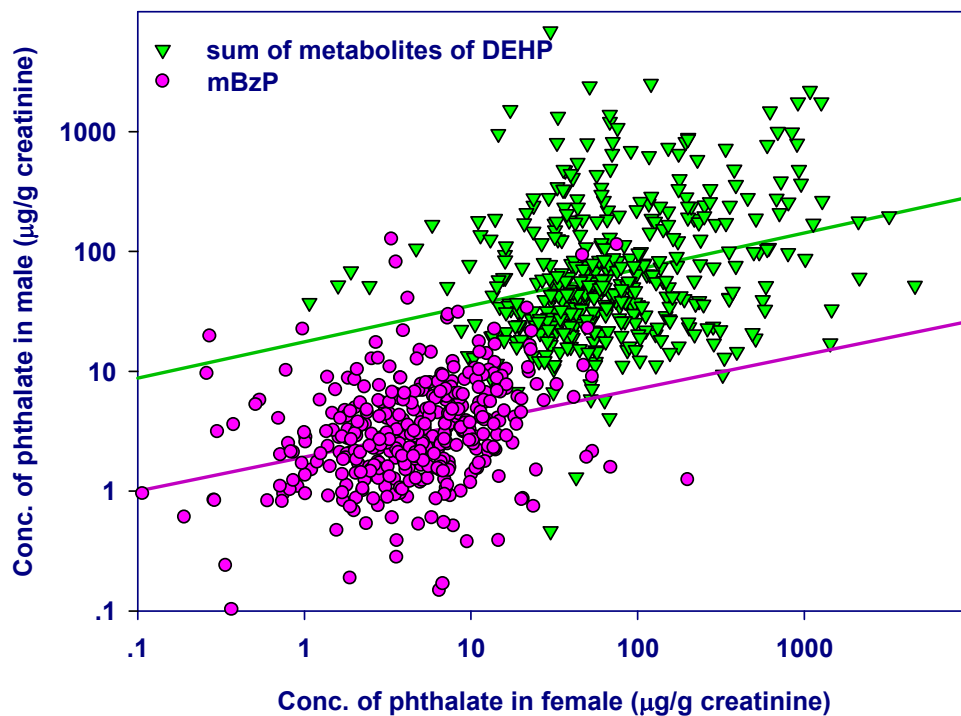


FIGURE S1. Distribution of phthalate metabolite concentrations in urine from paired female and male couples (the respective R value for linear regression model was 0.22 and 0.11 for mBzP and \sum_5 mEHP; the regression equations for mBzP and \sum_5 mEHP are $y = 6.289 + 0.262x$ and $y = 147.4 + 0.086x$, respectively).

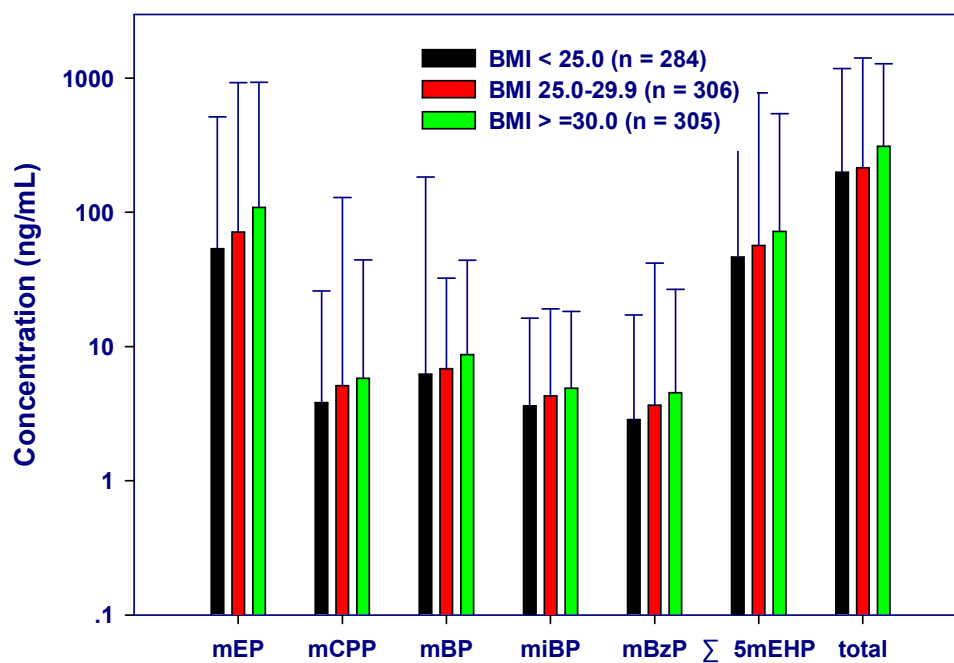


FIGURE S2. Distribution of phthalate concentrations in subgroups with different body mass index, the LIFE study