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Supplemental Material

Associations of Trimester-Specific Exposure to Bisphenols with Size at Birth: A Chinese Prenatal Cohort Study

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Table S1. The distributions of urinary concentrations of bisphenols in the study population.

	No.	Arithmetic mean (95% CI)	Geometric mean (95% CI)	Percentiles					Interquartile range	No. (%) < LOD
				5 th	25 th	50 th	75 th	95 th		
All women										
Bisphenol A (ng/mL)										
1 st trimester	845	11.24 (3.51, 18.97)	0.78 (0.67, 0.91)	< LOD	0.09	1.26	3.43	23.12	3.34	207 (24.50%)
2 nd trimester	845	7.13 (4.96, 9.31)	0.86 (0.74, 1.00)	< LOD	0.16	1.45	3.76	20.32	3.60	197 (23.31%)
3 rd trimester	845	7.38 (5.03, 9.74)	0.97 (0.84, 1.13)	< LOD	0.28	1.48	4.37	23.20	4.09	181 (21.42%)
All measurements	2535	8.59 (5.80, 11.37)	0.87 (0.79, 0.94)	< LOD	0.19	1.40	3.85	22.06	3.66	585 (23.08%)
Bisphenol F (ng/mL)										
1 st trimester	845	1.51 (1.15, 1.87)	0.62 (0.57, 0.67)	0.10	0.30	0.57	1.31	5.27	1.00	13 (1.54%)
2 nd trimester	845	1.54 (1.29, 1.79)	0.70 (0.64, 0.76)	0.12	0.35	0.69	1.37	4.50	1.02	12 (1.42%)
3 rd trimester	845	1.58 (1.37, 1.80)	0.72 (0.66, 0.78)	0.11	0.36	0.71	1.51	5.83	1.15	18 (2.13%)
All measurements	2535	1.54 (1.38, 1.71)	0.68 (0.65, 0.71)	0.11	0.34	0.65	1.39	5.21	1.05	43 (1.70%)
Bisphenol S (ng/mL)										
1 st trimester	845	3.77 (1.36, 6.18)	0.33 (0.30, 0.38)	< LOD	0.10	0.30	0.95	6.50	0.85	133 (15.74%)
2 nd trimester	845	2.20 (1.25, 3.15)	0.39 (0.35, 0.44)	< LOD	0.14	0.39	1.17	6.98	1.03	114 (13.49%)
3 rd trimester	845	3.87 (1.48, 6.26)	0.46 (0.41, 0.52)	< LOD	0.17	0.43	1.21	8.07	1.04	88 (10.41%)
All measurements	2535	3.28 (2.11, 4.45)	0.39 (0.37, 0.42)	< LOD	0.13	0.38	1.11	7.36	0.97	335 (13.21%)

Abbreviations: No., number; CI, confidence interval; LOD, limit of detection. The LODs were 0.04 ng/mL for bisphenol A, 0.02 ng/mL for bisphenol F, and 0.04 ng/mL for bisphenol S.

Table S2. Person correlation coefficients of urinary concentrations of bisphenols in each trimester.

		Bisphenol A	Bisphenol F	Bisphenol S
1st trimester				
Bisphenol A	r	1.000	0.101	0.113
	<i>P</i>		0.0032	0.0010
Bisphenol F	r		1.000	0.241
	<i>P</i>			< 0.0001
Bisphenol S	r			1.000
2nd trimester				
Bisphenol A	r	1.000	0.158	0.130
	<i>P</i>		< 0.0001	0.0002
Bisphenol F	r		1.000	0.305
	<i>P</i>			< 0.0001
Bisphenol S	r			1.000
3rd trimester				
Bisphenol A	r	1.000	0.130	0.122
	<i>P</i>		0.0002	0.0004
Bisphenol F	r		1.000	0.232
	<i>P</i>			< 0.0001
Bisphenol S	r			1.000
All measurements				
Bisphenol A	r	1.000	0.131	0.124
	<i>P</i>		< 0.0001	< 0.0001
Bisphenol F	r		1.000	0.261
	<i>P</i>			< 0.0001
Bisphenol S	r			1.000

Table S3. Intraclass correlation coefficients and 95% confidence intervals of urinary concentrations of bisphenols and urinary specific gravity during pregnancy.

	ICC (95% CI)
Bisphenol A	
All measurements	0.34 (0.30, 0.39)
1 st and 2 nd trimesters	0.41 (0.36, 0.47)
2 nd and 3 rd trimesters	0.31 (0.26, 0.38)
1 st and 3 rd trimesters	0.30 (0.25, 0.37)
Bisphenol F	
All measurements	0.57 (0.54, 0.61)
1 st and 2 nd trimesters	0.62 (0.58, 0.66)
2 nd and 3 rd trimesters	0.60 (0.55, 0.64)
1 st and 3 rd trimesters	0.51 (0.46, 0.56)
Bisphenol S	
All measurements	0.45 (0.41, 0.49)
1 st and 2 nd trimesters	0.47 (0.41, 0.52)
2 nd and 3 rd trimesters	0.49 (0.44, 0.54)
1 st and 3 rd trimesters	0.38 (0.33, 0.44)

Abbreviations: ICC, intraclass correlation coefficient; CI, confidence interval.

Table S4. Associations of trimester-specific quartiles of urinary bisphenol concentrations and quartiles of average concentrations across different trimesters with size at birth.

	Birth weight (g)		Birth length (cm)		Ponderal index (kg/m ³)	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Urinary concentration of bisphenol A (ng/mL)						
1st trimester						
Q1 (≤ 0.1)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.1 - 1.3)	-2 (-71, 68)	8 (-62, 77)	-0.04 (-0.30, 0.22)	-0.01 (-0.27, 0.25)	0.12 (-0.26, 0.51)	0.15 (-0.24, 0.54)
Q3 (1.3 - 3.4)	-35 (-102, 32)	-23 (-91, 45)	-0.09 (-0.34, 0.15)	-0.07 (-0.32, 0.18)	-0.09 (-0.47, 0.30)	-0.03 (-0.41, 0.35)
Q4 (> 3.4)	-18 (-88, 51)	-5 (-76, 66)	-0.04 (-0.28, 0.21)	-0.01 (-0.26, 0.25)	-0.13 (-0.53, 0.27)	-0.07 (-0.47, 0.32)
P_{trend}^a	0.65	0.88	0.90	0.95	0.32	0.44
2nd trimester						
Q1 (≤ 0.2)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.2 - 1.5)	-11 (-82, 60)	4 (-68, 76)	0.14 (-0.11, 0.39)	0.17 (-0.09, 0.42)	-0.23 (-0.62, 0.16)	-0.16 (-0.56, 0.23)
Q3 (1.5 - 3.8)	-6 (-79, 67)	10 (-64, 85)	0.08 (-0.18, 0.34)	0.11 (-0.15, 0.38)	-0.20 (-0.60, 0.20)	-0.13 (-0.54, 0.27)
Q4 (> 3.8)	-34 (-104, 37)	-15 (-87, 57)	0.04 (-0.22, 0.29)	0.08 (-0.18, 0.34)	-0.33 (-0.72, 0.07)	-0.26 (-0.67, 0.15)
P_{trend}^a	0.33	0.56	0.81	0.97	0.19	0.31
3rd trimester						
Q1 (≤ 0.3)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.3 - 1.5)	-9 (-80, 62)	4 (-68, 76)	0.05 (-0.19, 0.29)	0.07 (-0.17, 0.32)	-0.11 (-0.49, 0.28)	-0.05 (-0.44, 0.35)
Q3 (1.5 - 4.4)	-55 (-128, 17)	-34 (-107, 39)	-0.05 (-0.31, 0.21)	-0.01 (-0.28, 0.26)	-0.31 (-0.70, 0.08)	-0.22 (-0.63, 0.18)
Q4 (> 4.4)	-7 (-74, 60)	6 (-62, 74)	0.15 (-0.09, 0.40)	0.18 (-0.06, 0.43)	-0.23 (-0.61, 0.14)	-0.19 (-0.57, 0.20)
P_{trend}^a	0.97	0.86	0.18	0.14	0.30	0.33
P_w^b	0.78	0.92	0.53	0.51	0.47	0.63
Average						
Q1 (≤ 0.9)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.9 - 2.0)	7 (-64, 77)	12 (-59, 83)	0.14 (-0.12, 0.39)	0.15 (-0.11, 0.40)	-0.19 (-0.58, 0.20)	-0.17 (-0.56, 0.22)
Q3 (2.0 - 4.3)	-56 (-126, 15)	-44 (-115, 28)	-0.04 (-0.29, 0.21)	-0.02 (-0.28, 0.24)	-0.35 (-0.74, 0.04)	-0.30 (-0.69, 0.10)
Q4 (> 4.3)	-4 (-75, 67)	4 (-67, 75)	0.11 (-0.15, 0.36)	0.13 (-0.13, 0.38)	-0.23 (-0.62, 0.16)	-0.21 (-0.60, 0.19)
P_{trend}^a	0.98	0.90	0.59	0.48	0.46	0.47
Urinary concentration of bisphenol F (ng/mL)						
1st trimester						
Q1 (≤ 0.3)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.3 - 0.6)	-37 (-106, 33)	-39 (-109, 31)	-0.11 (-0.36, 0.15)	-0.10 (-0.36, 0.15)	-0.16 (-0.53, 0.21)	-0.20 (-0.56, 0.17)
Q3 (0.6 - 1.3)	-21 (-93, 50)	-23 (-95, 49)	-0.09 (-0.35, 0.16)	-0.08 (-0.34, 0.17)	-0.02 (-0.41, 0.37)	-0.07 (-0.46, 0.32)

Q4 (> 1.3)	-77 (-149, -4)	-56 (-131, 18)	-0.16 (-0.41, 0.09)	-0.10 (-0.37, 0.16)	-0.33 (-0.72, 0.06)	-0.28 (-0.68, 0.12)
P_{trend}^a	0.05	0.18	0.28	0.54	0.11	0.27
2 nd trimester						
Q1 (≤ 0.4)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.4 - 0.7)	20 (-52, 91)	23 (-48, 94)	0.11 (-0.15, 0.37)	0.11 (-0.15, 0.37)	0.05 (-0.35, 0.44)	0.06 (-0.33, 0.46)
Q3 (0.7 - 1.4)	4 (-69, 77)	15 (-60, 89)	0.01 (-0.25, 0.27)	0.01 (-0.25, 0.28)	0.01 (-0.36, 0.38)	0.07 (-0.31, 0.45)
Q4 (> 1.4)	-61 (-131, 9)	-40 (-112, 32)	-0.04 (-0.29, 0.20)	-0.02 (-0.27, 0.23)	-0.37 (-0.75, 0.01)	-0.27 (-0.66, 0.13)
P_{trend}^a	0.02	0.12	0.43	0.74	0.02	0.07
3 rd trimester						
Q1 (≤ 0.4)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.4 - 0.7)	-42 (-111, 27)	-39 (-109, 30)	-0.04 (-0.30, 0.22)	-0.03 (-0.29, 0.23)	-0.24 (-0.62, 0.15)	-0.23 (-0.62, 0.16)
Q3 (0.7 - 1.5)	-65 (-134, 4)	-57 (-127, 13)	0.00 (-0.27, 0.27)	0.03 (-0.25, 0.30)	-0.42 (-0.79, -0.05)	-0.41 (-0.78, -0.04)
Q4 (> 1.5)	-98 (-170, -26)	-84 (-159, -9)	-0.15 (-0.41, 0.11)	-0.10 (-0.37, 0.18)	-0.50 (-0.88, -0.12)	-0.49 (-0.90, -0.09)
P_{trend}^a	0.01	0.03	0.20	0.39	0.03	0.03
P_w^b	0.06	0.20	0.55	0.81	0.09	0.15
Average						
Q1 (≤ 0.4)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.4 - 0.7)	-46 (-117, 26)	-47 (-118, 24)	-0.05 (-0.30, 0.21)	-0.05 (-0.31, 0.21)	-0.27 (-0.66, 0.12)	-0.27 (-0.67, 0.12)
Q3 (0.7 - 1.6)	-4 (-75, 66)	0 (-71, 72)	-0.01 (-0.26, 0.24)	0.01 (-0.25, 0.26)	-0.06 (-0.45, 0.33)	-0.06 (-0.45, 0.34)
Q4 (> 1.6)	-91 (-162, -21)	-71 (-145, 2)	-0.11 (-0.37, 0.14)	-0.05 (-0.31, 0.22)	-0.49 (-0.88, -0.10)	-0.46 (-0.87, -0.05)
P_{trend}^a	0.02	0.07	0.38	0.80	0.02	0.03
Urinary concentration of bisphenol S (ng/mL)						
1 st trimester						
Q1 (≤ 0.1)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.1 - 0.3)	6 (-64, 75)	4 (-67, 74)	0.11 (-0.14, 0.37)	0.11 (-0.16, 0.37)	-0.25 (-0.63, 0.13)	-0.25 (-0.63, 0.13)
Q3 (0.3 - 1.0)	-48 (-114, 19)	-46 (-112, 21)	-0.03 (-0.27, 0.21)	-0.03 (-0.28, 0.21)	-0.37 (-0.76, 0.01)	-0.36 (-0.74, 0.03)
Q4 (> 1.0)	-80 (-144, -16)	-67 (-134, -1)	-0.14 (-0.37, 0.10)	-0.12 (-0.36, 0.12)	-0.44 (-0.83, -0.05)	-0.37 (-0.77, 0.03)
P_{trend}^a	0.01	0.04	0.09	0.15	0.09	0.22
2 nd trimester						
Q1 (≤ 0.1)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.1 - 0.4)	-12 (-77, 53)	-12 (-77, 53)	-0.14 (-0.38, 0.10)	-0.14 (-0.38, 0.10)	0.14 (-0.23, 0.51)	0.14 (-0.23, 0.50)
Q3 (0.4 - 1.2)	-14 (-83, 54)	-10 (-79, 59)	-0.04 (-0.30, 0.22)	-0.04 (-0.30, 0.22)	0.01 (-0.34, 0.37)	0.04 (-0.32, 0.40)
Q4 (> 1.2)	-94 (-160, -28)	-81 (-149, -13)	-0.24 (-0.47, 0.00)	-0.23 (-0.47, 0.00)	-0.25 (-0.64, 0.14)	-0.15 (-0.56, 0.27)
P_{trend}^a	0.003	0.01	0.07	0.09	0.09	0.28
3 rd trimester						

Q1 (≤ 0.2)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.2 - 0.4)	-9 (-82, 65)	-7 (-80, 67)	-0.06 (-0.31, 0.19)	-0.06 (-0.31, 0.20)	-0.03 (-0.43, 0.36)	-0.01 (-0.41, 0.38)
Q3 (0.4 - 1.2)	-43 (-109, 22)	-40 (-105, 26)	-0.08 (-0.32, 0.16)	-0.09 (-0.33, 0.15)	-0.19 (-0.57, 0.19)	-0.15 (-0.53, 0.23)
Q4 (> 1.2)	-61 (-126, 5)	-40 (-107, 27)	-0.24 (-0.48, 0.00)	-0.22 (-0.47, 0.02)	-0.07 (-0.43, 0.29)	0.06 (-0.32, 0.44)
P_{trend}^a	0.09	0.26	0.05	0.08	0.88	0.64
P_w^b	0.01	0.04	0.12	0.16	0.20	0.38
Average						
Q1 (≤ 0.2)	Reference	Reference	Reference	Reference	Reference	Reference
Q2 (0.2 - 0.4)	-51 (-122, 20)	-52 (-123, 19)	-0.12 (-0.38, 0.13)	-0.13 (-0.38, 0.13)	-0.25 (-0.64, 0.15)	-0.25 (-0.64, 0.14)
Q3 (0.4 - 1.2)	-18 (-89, 52)	-12 (-83, 59)	0.01 (-0.24, 0.26)	0.00 (-0.25, 0.26)	-0.14 (-0.53, 0.25)	-0.09 (-0.48, 0.30)
Q4 (> 1.2)	-89 (-160, -18)	-72 (-145, 2)	-0.27 (-0.52, -0.02)	-0.27 (-0.53, 0.00)	-0.25 (-0.64, 0.14)	-0.12 (-0.53, 0.29)
P_{trend}^a	0.03	0.11	0.04	0.05	0.41	0.95

Abbreviations: β , regression coefficient; CI, confidence interval.

^a Trend P -values were estimated by modeling the median value of each quartile.

^b $P_w < 0.05$ indicates that associations were statistically different across trimesters.

Model 1: Adjusted for gestational age at delivery, maternal age at recruitment, parity, pre-pregnancy body mass index, passive smoking during pregnancy, education, folic acid supplementation, and infant sex. Birth length models were additionally adjusted for maternal and paternal height.

Model 2: Adjusted for variables in Model 1 and mutually adjusted for urinary concentrations of bisphenol A, bisphenol F, and bisphenol S.

Table S5. Associations between per interquartile range increase in urinary bisphenol concentrations during pregnancy and size at birth with additional adjustment for pregnancy complications.

	β (95% CI) for birth weight, g		β (95% CI) for birth length, cm		β (95% CI) for ponderal index, kg/m ³	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Urinary concentration of bisphenol A						
1 st trimester	-14 (-45, 18)	-7 (-39, 24)	-0.02 (-0.13, 0.10)	0.00 (-0.12, 0.11)	-0.10 (-0.28, 0.08)	-0.07 (-0.25, 0.11)
2 nd trimester	-13 (-46, 19)	-6 (-39, 27)	0.02 (-0.10, 0.14)	0.03 (-0.09, 0.16)	-0.13 (-0.31, 0.05)	-0.11 (-0.29, 0.08)
3 rd trimester	-13 (-45, 19)	-7 (-39, 26)	0.07 (-0.05, 0.18)	0.08 (-0.03, 0.20)	-0.17 (-0.35, 0.01)	-0.15 (-0.33, 0.04)
P_w^a	0.75	0.96	0.64	0.52	0.23	0.42
Average	-8 (-32, 15)	-4 (-28, 20)	0.03 (-0.05, 0.12)	0.04 (-0.05, 0.13)	-0.12 (-0.25, 0.01)	-0.10 (-0.24, 0.03)
Urinary concentration of bisphenol F						
1 st trimester	-28 (-55, -1)	-21 (-48, 7)	-0.06 (-0.16, 0.04)	-0.05 (-0.15, 0.05)	-0.12 (-0.27, 0.03)	-0.08 (-0.23, 0.07)
2 nd trimester	-27 (-54, 1)	-16 (-45, 13)	-0.03 (-0.14, 0.07)	0.00 (-0.11, 0.11)	-0.14 (-0.29, 0.01)	-0.12 (-0.28, 0.05)
3 rd trimester	-30 (-58, -3)	-26 (-55, 2)	-0.03 (-0.13, 0.08)	-0.02 (-0.12, 0.09)	-0.18 (-0.33, -0.03)	-0.17 (-0.32, -0.01)
P_w^a	0.13	0.29	0.69	0.72	0.13	0.21
Average	-30 (-61, 0)	-22 (-53, 10)	-0.03 (-0.14, 0.07)	-0.01 (-0.12, 0.10)	-0.17 (-0.34, 0.00)	-0.15 (-0.33, 0.02)
Urinary concentration of bisphenol S						
1 st trimester	-37 (-64, -10)	-31 (-59, -4)	-0.06 (-0.16, 0.04)	-0.05 (-0.15, 0.05)	-0.19 (-0.35, -0.02)	-0.16 (-0.33, 0.01)
2 nd trimester	-41 (-69, -12)	-35 (-65, -4)	-0.11 (-0.22, -0.01)	-0.11 (-0.22, 0.00)	-0.09 (-0.26, 0.07)	-0.04 (-0.23, 0.14)
3 rd trimester	-24 (-53, 5)	-17 (-47, 13)	-0.08 (-0.18, 0.02)	-0.09 (-0.19, 0.02)	-0.03 (-0.20, 0.13)	0.03 (-0.14, 0.20)
P_w^a	0.02	0.07	0.21	0.20	0.16	0.22
Average	-33 (-62, -4)	-26 (-56, 5)	-0.09 (-0.20, 0.01)	-0.10 (-0.20, 0.01)	-0.09 (-0.25, 0.07)	-0.03 (-0.19, 0.14)

Abbreviations: β , regression coefficient; CI, confidence interval.

^a $P_w < 0.05$ indicates that associations were statistically different across trimesters.

Model 1: Adjusted for gestational age at delivery, maternal age at recruitment, parity, pre-pregnancy body mass index, passive smoking during pregnancy, education, folic acid supplementation, hypertensive disorders of pregnancy, gestational diabetes mellitus, anemia, and infant sex. Birth length models were additionally adjusted for maternal and paternal height.

Model 2: Adjusted for variables in Model 1 and mutually adjusted for urinary concentrations of bisphenol A, bisphenol F, and bisphenol S.

Table S6. Associations between per interquartile range increase in average concentrations of urinary bisphenols across different trimesters and size at birth, stratified by infant sex, maternal age at recruitment, parity, and pre-pregnancy body mass index.

	No.	Birth weight, g		Birth length, cm		Ponderal index, kg/m ³	
		<i>β</i> (95% CI)	<i>P</i> _{interaction}	<i>β</i> (95% CI)	<i>P</i> _{interaction}	<i>β</i> (95% CI)	<i>P</i> _{interaction}
Urinary concentration of bisphenol A							
Infant sex			0.71		0.46		0.58
Boys	439	-15 (-48, 19)		0.00 (-0.12, 0.12)		-0.10 (-0.28, 0.09)	
Girls	406	-2 (-36, 32)		0.07 (-0.05, 0.19)		-0.15 (-0.34, 0.04)	
Parity			0.11		0.45		0.06
Nulliparous	726	-19 (-44, 7)		0.01 (-0.08, 0.10)		-0.17 (-0.32, -0.03)	
Multiparous	119	29 (-32, 90)		0.09 (-0.13, 0.31)		0.15 (-0.19, 0.48)	
Maternal age at recruitment, years			0.67		0.23		0.07
≤ 27	438	-18 (-51, 15)		0.06 (-0.06, 0.18)		-0.23 (-0.42, -0.05)	
> 27	407	-2 (-37, 33)		-0.02 (-0.14, 0.10)		0.01 (-0.18, 0.20)	
Pre-pregnancy BMI, kg/m ²			1.00		0.58		0.56
< 18.5	156	-16 (-68, 35)		-0.05 (-0.25, 0.16)		-0.12 (-0.39, 0.16)	
18.5 - 23.9	557	-4 (-33, 25)		0.05 (-0.05, 0.15)		-0.09 (-0.25, 0.06)	
≥ 24.0	112	-27 (-105, 51)		0.00 (-0.26, 0.27)		-0.24 (-0.70, 0.22)	
Urinary concentration of bisphenol F							
Infant sex			0.43		0.36		0.80
Boys	439	-40 (-84, 3)		-0.07 (-0.23, 0.09)		-0.19 (-0.43, 0.05)	
Girls	406	-18 (-60, 24)		0.02 (-0.13, 0.17)		-0.15 (-0.38, 0.08)	
Parity			0.70		0.64		0.85
Nulliparous	726	-30 (-62, 2)		-0.04 (-0.15, 0.08)		-0.17 (-0.35, 0.01)	
Multiparous	119	-30 (-115, 55)		0.01 (-0.29, 0.32)		-0.17 (-0.64, 0.30)	
Maternal age at recruitment, years			0.65		0.79		0.25
≤ 27	438	-36 (-75, 3)		-0.02 (-0.16, 0.12)		-0.24 (-0.46, -0.02)	
> 27	407	-23 (-70, 24)		-0.04 (-0.21, 0.12)		-0.06 (-0.32, 0.19)	
Pre-pregnancy BMI, kg/m ²			0.27		0.70		0.39
< 18.5	156	-11 (-69, 46)		0.00 (-0.22, 0.23)		-0.07 (-0.38, 0.23)	
18.5 - 23.9	557	-34 (-73, 5)		-0.04 (-0.18, 0.10)		-0.20 (-0.41, 0.01)	
≥ 24.0	112	-36 (-127, 56)		0.02 (-0.29, 0.33)		-0.19 (-0.73, 0.35)	

Urinary concentration of bisphenol S							
Infant sex			0.15		0.29		0.44
Boys	439	-52 (-92, -12)		-0.15 (-0.30, -0.01)		-0.13 (-0.35, 0.10)	
Girls	406	-12 (-53, 29)		-0.04 (-0.18, 0.11)		-0.02 (-0.24, 0.21)	
Parity			0.55		0.24		0.94
Nulliparous	726	-36 (-67, -5)		-0.12 (-0.23, -0.01)		-0.08 (-0.25, 0.09)	
Multiparous	119	-35 (-113, 43)		-0.05 (-0.33, 0.24)		-0.15 (-0.58, 0.29)	
Maternal age at recruitment, years			0.43		0.22		0.50
≤ 27	438	-22 (-61, 16)		-0.04 (-0.18, 0.10)		-0.12 (-0.34, 0.09)	
> 27	407	-45 (-87, -2)		-0.16 (-0.31, -0.01)		-0.02 (-0.25, 0.22)	
Pre-pregnancy BMI, kg/m²			0.56		0.90		0.55
< 18.5	156	-39 (-103, 26)		-0.10 (-0.36, 0.15)		-0.10 (-0.45, 0.25)	
18.5 - 23.9	557	-32 (-66, 3)		-0.11 (-0.23, 0.01)		-0.05 (-0.24, 0.14)	
≥ 24.0	112	-42 (-144, 59)		-0.07 (-0.42, 0.28)		-0.14 (-0.74, 0.46)	

Abbreviations: β , regression coefficient; CI, confidence interval; BMI, body mass index.

Models were adjusted for gestational age at delivery, maternal age at recruitment, parity, pre-pregnancy body mass index, passive smoking during pregnancy, education, folic acid supplementation, and infant sex. Birth length models were additionally adjusted for maternal and paternal height.

Table S7. Associations between per interquartile range increase in average concentrations of urinary bisphenols across different trimesters and size at birth among term deliveries (n = 825).

	β (95% CI) for birth weight, g		β (95% CI) for birth length, cm		β (95% CI) for ponderal index, kg/m ³	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Urinary concentration of bisphenol A						
1 st trimester	-11 (-43, 20)	-5 (-37, 27)	0.00 (-0.12, 0.11)	0.01 (-0.11, 0.13)	-0.09 (-0.27, 0.09)	-0.06 (-0.24, 0.11)
2 nd trimester	-9 (-42, 23)	-2 (-35, 31)	0.02 (-0.10, 0.14)	0.04 (-0.08, 0.16)	-0.10 (-0.28, 0.08)	-0.08 (-0.26, 0.11)
3 rd trimester	-9 (-41, 23)	-3 (-36, 30)	0.07 (-0.05, 0.18)	0.08 (-0.04, 0.20)	-0.14 (-0.32, 0.03)	-0.12 (-0.30, 0.06)
P_w^a	0.87	0.99	0.69	0.56	0.38	0.60
Average	-7 (-31, 17)	-3 (-27, 21)	0.03 (-0.05, 0.12)	0.04 (-0.04, 0.13)	-0.11 (-0.24, 0.03)	-0.09 (-0.22, 0.04)
Urinary concentration of bisphenol F						
1 st trimester	-30 (-57, -3)	-22 (-50, 6)	-0.06 (-0.16, 0.04)	-0.04 (-0.15, 0.06)	-0.13 (-0.28, 0.02)	-0.09 (-0.25, 0.06)
2 nd trimester	-26 (-53, 1)	-16 (-45, 13)	-0.03 (-0.14, 0.07)	0.00 (-0.11, 0.10)	-0.14 (-0.30, 0.01)	-0.12 (-0.28, 0.04)
3 rd trimester	-31 (-58, -3)	-27 (-55, 1)	-0.03 (-0.13, 0.08)	-0.02 (-0.12, 0.08)	-0.19 (-0.34, -0.04)	-0.18 (-0.34, -0.03)
P_w^a	0.11	0.24	0.72	0.80	0.10	0.15
Average	-33 (-63, -3)	-24 (-56, 7)	-0.04 (-0.14, 0.07)	-0.01 (-0.12, 0.10)	-0.19 (-0.36, -0.02)	-0.18 (-0.35, 0.00)
Urinary concentration of bisphenol S						
1 st trimester	-40 (-67, -14)	-34 (-62, -7)	-0.08 (-0.18, 0.01)	-0.07 (-0.17, 0.03)	-0.18 (-0.34, -0.02)	-0.15 (-0.32, 0.01)
2 nd trimester	-41 (-69, -12)	-35 (-65, -5)	-0.12 (-0.22, -0.01)	-0.12 (-0.23, -0.01)	-0.09 (-0.26, 0.08)	-0.04 (-0.22, 0.14)
3 rd trimester	-22 (-51, 7)	-15 (-45, 15)	-0.08 (-0.18, 0.03)	-0.08 (-0.19, 0.02)	-0.02 (-0.18, 0.14)	0.04 (-0.13, 0.21)
P_w^a	0.01	0.04	0.15	0.16	0.16	0.22
Average	-33 (-62, -4)	-25 (-56, 5)	-0.10 (-0.20, 0.00)	-0.10 (-0.21, 0.00)	-0.08 (-0.24, 0.08)	-0.01 (-0.18, 0.15)

Abbreviations: β , regression coefficient; CI, confidence interval.

^a $P_w < 0.05$ indicates that associations were statistically different across trimesters.

Model 1: Adjusted for gestational age at delivery, maternal age at recruitment, parity, pre-pregnancy body mass index, passive smoking during pregnancy, education, folic acid supplementation, and infant sex. Birth length models were additionally adjusted for maternal and paternal height.

Model 2: Adjusted for variables in Model 1 and mutually adjusted for urinary concentrations of bisphenol A, bisphenol F, and bisphenol S.

Table S8. Associations between per interquartile range increase in average concentrations of urinary bisphenols across different trimesters and size at birth among women without pregnancy complications (n = 724).

	β (95% CI) for birth weight, g		β (95% CI) for birth length, cm		β (95% CI) for ponderal index, kg/m ³	
	Model 1	Model 2	Model 1	Model 2	Model 1	Model 2
Urinary concentration of bisphenol A						
1 st trimester	-19 (-51, 14)	-13 (-45, 20)	-0.01 (-0.12, 0.11)	0.01 (-0.11, 0.13)	-0.13 (-0.32, 0.06)	-0.10 (-0.29, 0.08)
2 nd trimester	-14 (-49, 20)	-7 (-43, 28)	0.01 (-0.12, 0.14)	0.03 (-0.10, 0.16)	-0.13 (-0.33, 0.06)	-0.11 (-0.31, 0.09)
3 rd trimester	-8 (-42, 25)	-1 (-36, 33)	0.08 (-0.04, 0.20)	0.10 (-0.03, 0.22)	-0.16 (-0.35, 0.03)	-0.14 (-0.33, 0.06)
P_w^a	0.69	0.89	0.62	0.49	0.27	0.47
Average	-9 (-34, 16)	-6 (-30, 19)	0.03 (-0.06, 0.12)	0.04 (-0.06, 0.13)	-0.12 (-0.25, 0.02)	-0.11 (-0.24, 0.03)
Urinary concentration of bisphenol F						
1 st trimester	-31 (-60, -2)	-24 (-53, 5)	-0.06 (-0.16, 0.05)	-0.05 (-0.16, 0.06)	-0.15 (-0.31, 0.01)	-0.12 (-0.28, 0.04)
2 nd trimester	-24 (-53, 5)	-15 (-45, 16)	-0.04 (-0.16, 0.07)	-0.02 (-0.14, 0.10)	-0.10 (-0.26, 0.05)	-0.08 (-0.25, 0.09)
3 rd trimester	-34 (-63, -4)	-30 (-60, 0)	-0.05 (-0.16, 0.06)	-0.05 (-0.16, 0.06)	-0.17 (-0.32, -0.01)	-0.15 (-0.31, 0.01)
P_w^a	0.10	0.18	0.73	0.77	0.14	0.27
Average	-32 (-63, -1)	-25 (-58, 7)	-0.05 (-0.16, 0.07)	-0.03 (-0.15, 0.09)	-0.17 (-0.34, 0.00)	-0.15 (-0.33, 0.03)
Urinary concentration of bisphenol S						
1 st trimester	-35 (-64, -6)	-28 (-58, 2)	-0.07 (-0.17, 0.04)	-0.06 (-0.17, 0.05)	-0.17 (-0.34, 0.01)	-0.13 (-0.31, 0.05)
2 nd trimester	-33 (-63, -4)	-27 (-59, 5)	-0.09 (-0.20, 0.02)	-0.08 (-0.20, 0.03)	-0.07 (-0.25, 0.10)	-0.03 (-0.22, 0.16)
3 rd trimester	-24 (-54, 7)	-16 (-47, 16)	-0.07 (-0.18, 0.04)	-0.07 (-0.18, 0.05)	-0.06 (-0.23, 0.11)	-0.01 (-0.18, 0.17)
P_w^a	0.07	0.22	0.44	0.51	0.31	0.54
Average	-28 (-58, 1)	-20 (-51, 11)	-0.08 (-0.19, 0.03)	-0.07 (-0.19, 0.04)	-0.07 (-0.24, 0.09)	-0.02 (-0.19, 0.16)

Abbreviations: β , regression coefficient; CI, confidence interval.

^a $P_w < 0.05$ indicates that associations were statistically different across trimesters.

Model 1: Adjusted for gestational age at delivery, maternal age at recruitment, parity, pre-pregnancy body mass index, passive smoking during pregnancy, education, folic acid supplementation, and infant sex. Birth length models were additionally adjusted for maternal and paternal height.

Model 2: Adjusted for variables in Model 1 and mutually adjusted for urinary concentrations of bisphenol A, bisphenol F, and bisphenol S.

Figure S1. Relative exposure of bisphenols comparing newborns in the 10th percentile of birth weight, birth length, or ponderal index to those in the 90th percentile among term deliveries (n = 825).

Solid lines represent relative exposures of bisphenol A, bisphenol F, or bisphenol S in the 10th percentile of birth weight, birth length, or ponderal index to those in the 90th percentiles. Dotted lines represent pointwise 95% confidence intervals. Models were adjusted for maternal age at recruitment, parity, pre-pregnancy body mass index, passive smoking during pregnancy, education, folic acid supplementation, infant sex, and maternal and paternal height (birth length models only). Abbreviations: BPA, bisphenol A; BPF, bisphenol F; BPS, bisphenol S.

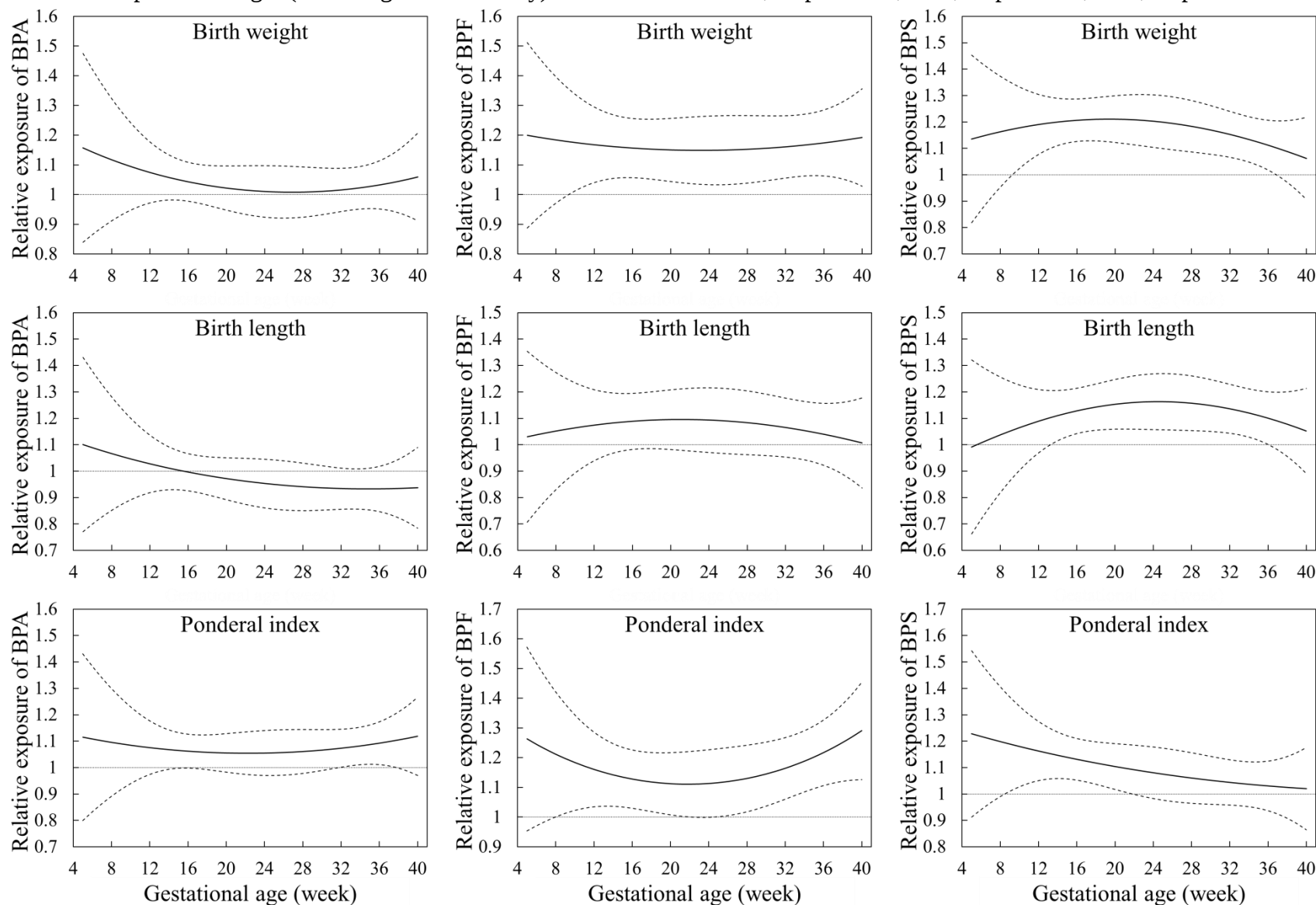


Figure S2. Relative exposure of bisphenols comparing newborns in the 10th percentile of birth weight, birth length, or ponderal index to those in the 90th percentile among women without pregnancy complications (n = 724).

Solid lines represent relative exposures of bisphenol A, bisphenol F, or bisphenol S in the 10th percentile of birth weight, birth length, or ponderal index to those in the 90th percentiles. Dotted lines represent pointwise 95% confidence intervals. Models were adjusted for maternal age at recruitment, parity, pre-pregnancy body mass index, passive smoking during pregnancy, education, folic acid supplementation, infant sex, and maternal and paternal height (birth length models only). Abbreviations: BPA, bisphenol A; BPF, bisphenol F; BPS, bisphenol S.

