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Supplemental Material

Relation between *in Utero* Arsenic Exposure and Birth Outcomes in a Cohort of Mothers and Their Newborns from New Hampshire

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Table S1. Adjusted parameter estimates (95% confidence interval) for the change in head circumference with each unit increase in natural log transformed maternal 2nd trimester urinary arsenic for all participants and by maternal pre-pregnancy weight status, with additional model adjustment for delivery type or birth weight (N=706).^{a,b}

Outcome	Overall (N=706)	Normal Weight (N=406)	Overweight/Obese (N=300)	P for interaction^c
Head Circumference (cm), also adjusted for delivery mode				
Ln(iAs)	-0.09 (-0.20, 0.01)	-0.13 (-0.27, 0.01)	-0.04 (-0.20, 0.12)	0.42
Ln(MMA)	-0.10 (-0.19, -0.01)*	-0.08 (-0.20, 0.04)	-0.12 (-0.26, 0.02)	0.71
Ln(DMA)	-0.12 (-0.24, 0.01)	-0.15 (-0.31, 0.02)	-0.08 (-0.26, 0.11)	0.58
Ln(tAs)	-0.13 (-0.26, -0.01)*	-0.17 (-0.34, 0.00)	-0.09 (-0.28, 0.10)	0.54
Head Circumference (cm), also adjusted for birth weight				
Ln(iAs)	-0.07 (-0.16, 0.03)	-0.11 (-0.24, 0.01)	0.00 (-0.15, 0.15)	0.252
Ln(MMA)	-0.11 (-0.19, -0.03)**	-0.10 (-0.22, 0.01)	-0.11 (-0.23, 0.02)	0.996
Ln(DMA)	-0.13 (-0.24, -0.02)*	-0.16 (-0.32, 0.00)	-0.07 (-0.24, 0.10)	0.394
Ln(tAs)	-0.13 (-0.25, -0.02)*	-0.18 (-0.33, -0.02)*	-0.08 (-0.25, 0.09)	0.411
Head Circumference (cm), also adjusted for delivery mode and birth weight				
Ln(iAs)	-0.07 (-0.17, 0.02)	-0.12 (-0.26, 0.01)	0.00 (-0.12, 0.13)	0.217
Ln(MMA)	-0.11 (-0.19, -0.03)**	-0.11 (-0.22, 0.01)	-0.10 (-0.20, 0.01)	0.819
Ln(DMA)	-0.13 (-0.24, -0.02)*	-0.18 (-0.34, -0.02)*	-0.06 (-0.20, 0.09)	0.242
Ln(tAs)	-0.13 (-0.25, -0.02)*	-0.19 (-0.35, -0.02)*	-0.07 (-0.21, 0.08)	0.260

^aNormal weight defined as pre-pregnancy BMI 18.5 -24.9 kg/m² and overweight/obese defined as pre-pregnancy BMI ≥ 25kg/m²; 25 underweight mothers (BMI < 18.5 kg/m²) excluded from analysis.

^bResults from a series of regression models fitting head circumference on each arsenic exposure measure (natural log transformed inorganic arsenic (iAs), monomethylarsonic acid (MMA), dimethylarsinic acid (DMA), total arsenic (iAs+MMA+DMA) (tAs));

model adjusted for maternal age (continuous), education level (ordinal with the five categories listed in Table 1 assigned values of 1–5, respectively), and parity (continuous); models for overall sample additionally adjusted for maternal pre-pregnancy weight status (categorical).

^c*P*-value from two-sided Wald's *t*-test testing the significance of a multiplicative term of maternal pre-pregnancy weight status (categorical) and each arsenic exposure in the regression model.

P*<0.05, *P*<0.01

Table S2. Adjusted parameter estimates (95% confidence interval) for the change in birth length or weight percentile with each unit increase in natural log transformed maternal 2nd trimester urinary arsenic for all participants and by maternal pre-pregnancy weight status (N=706).^{a,b}

Outcome/ Maternal Urinary Arsenic Variable	Overall (N=706)	Normal Weight (N=406)	Overweight/Obese (N=300)	P for interaction^c
Birth length percentile				
Ln(iAs)	0.7 (-1.2, 2.6)	0.1 (-2.4, 2.6)	1.5 (-1.5, 4.5)	0.50
Ln(MMA)	1.0 (-0.7, 2.6)	0.4 (-1.8, 2.5)	1.8 (-0.7, 4.4)	0.38
Ln(DMA)	2.1 (-0.1, 4.4)	1.0 (-2.0, 4.0)	3.6 (0.2, 7.0)*	0.26
Ln(tAs)	1.9 (-0.4, 4.2)	0.7 (-2.3, 3.8)	3.5 (0.0, 6.9)	0.24
Birth weight percentile				
Ln(iAs)	-0.3 (-2.0, 1.4)	0.2 (-2, 2.5)	-1.1 (-3.8, 1.6)	0.45
Ln(MMA)	0.3 (-1.2, 1.7)	1.1 (-0.8, 3.0)	-0.9 (-3.1, 1.4)	0.20
Ln(DMA)	0.2 (-1.8, 2.2)	1.3 (-1.3, 4.0)	-1.2 (-4.2, 1.8)	0.22
Ln(tAs)	-0.1 (-2.1, 2.0)	0.9 (-1.8, 3.7)	-1.3 (-4.4, 1.8)	0.29

^aNormal weight defined as pre-pregnancy BMI 18.5 -24.9 kg/m² and overweight/obese defined as pre-pregnancy BMI ≥ 25kg/m²; 25 underweight mothers (BMI < 18.5 kg/m²) excluded from analysis.

^bResults from a series of regression models fitting each birth size outcome on each arsenic exposure measure (natural log transformed inorganic arsenic (iAs), monomethylarsonic acid (MMA), dimethylarsinic acid (DMA), total arsenic (iAs+MMA+DMA) (tAs)); model adjusted for maternal age (continuous), education level (ordinal with the five categories listed in Table 1 assigned values of 1–5, respectively), and parity (continuous); models for overall sample additionally adjusted for maternal pre-pregnancy weight status (categorical).

^cP-value from two-sided Wald's t-test testing the significance of a multiplicative term of maternal pre-pregnancy weight status (categorical) and each arsenic exposure in the regression model.

*P<0.05

Table S3. Adjusted parameter estimates (95% confidence interval) for the change in birth outcomes with each unit increase in natural log transformed maternal 2nd trimester urinary arsenic by infant sex.^a

Outcome/ Maternal Urinary Arsenic Variable	Females (N=357)	Males (N=349)	P for interaction^b
Gestational Age (weeks)^c			
Ln(iAs)	0.11 (-0.03, 0.25)	-0.03 (-0.18, 0.12)	0.17
Ln(MMA)	0.10 (-0.03, 0.22)	0.00 (-0.12, 0.12)	0.29
Ln(DMA)	0.13 (-0.05, 0.30)	0.06 (-0.11, 0.22)	0.55
Ln(tAs)	0.15 (-0.03, 0.33)	0.04 (-0.13, 0.21)	0.37
Head Circumference (cm)^d			
Ln(iAs)	-0.14 (-0.29, 0.00)*	-0.02 (-0.18, 0.13)	0.27
Ln(MMA)	-0.08 (-0.21, 0.05)	-0.13 (-0.25, 0.00)	0.60
Ln(DMA)	-0.08 (-0.26, 0.10)	-0.16 (-0.33, 0.01)	0.52
Ln(tAs)	-0.11 (-0.30, 0.08)	-0.17 (-0.34, 0.01)	0.67
Birth length (cm)^d			
Ln(iAs)	-0.02 (-0.25, 0.20)	0.15 (-0.08, 0.38)	0.30
Ln(MMA)	-0.02 (-0.22, 0.19)	0.21 (0.03, 0.40)*	0.10
Ln(DMA)	0.00 (-0.27, 0.28)	0.41 (0.16, 0.67)**	0.03
Ln(tAs)	-0.01 (-0.29, 0.28)	0.40 (0.13, 0.66)**	0.04
Birth weight (cm)^d			
Ln(iAs)	-28.5 (-68.4, 11.38)	10.4 (-30.89, 51.68)	0.19
Ln(MMA)	-22.5 (-58.19, 13.12)	25.9 (-7.31, 59.12)	0.05
Ln(DMA)	-20.5 (-69.49, 28.59)	24.6 (-21.11, 70.34)	0.19
Ln(tAs)	-27.3 (-77.28, 22.66)	21.2 (-26.10, 68.50)	0.17
Ponderal Index^d			
Ln(iAs)	-0.21 (-0.52, 0.10)	-0.13 (-0.45, 0.18)	0.73

Ln(MMA)	-0.17 (-0.44, 0.11)	-0.13 (-0.38, 0.13)	0.82
Ln(DMA)	-0.18 (-0.56, 0.20)	-0.46 (-0.81, -0.11)	0.28
Ln(tAs)	-0.23 (-0.61, 0.16)	-0.46 (-0.82, -0.10)	0.39

^aResults from a series of regression models fitting each birth outcome on each arsenic exposure measure (natural log transformed inorganic arsenic (iAs), monomethylarsonic acid (MMA), dimethylarsinic acid (DMA), total arsenic (iAs+MMA+DMA) (tAs)).

^b*P*-value from a two-sided Wald's t-test testing the significance of a multiplicative term of infant sex and each arsenic exposure in the regression model.

^cModels for gestational age adjusted for maternal age (continuous), education level (ordinal with the five categories listed in Table 1 assigned values of 1–5, respectively), parity (continuous), and maternal pre-pregnancy weight status (categorical: BMI 18.5 -24.9 kg/m², BMI ≥ 25kg/m²).

^dModels for head circumference, birth length, birth weight, and Ponderal index outcomes adjusted for variable described in footnote c and also for gestational age (continuous).

P*<0.05; *P*<0.01