Supplementary data for

Exposure profile of mercury, lead, cadmium, arsenic, antimony, copper, selenium and zinc in maternal blood, cord blood and placenta: the Tohoku Study of Child Development in Japan

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Supplementary data

Table S1. Results from analytical quality control of toxic and trace elements in whole blood

Elements	Average analytical value (S.D.)	RSD[a] (%)	Our methods	N[b]	Seronorm whole blood level (Lot)	Acceptable range (reference value)
As	13.50 (0.63) ng mL^{-1}	4.6	ICP-MS	30	Level 2 (0503109)	10.6–15.8 (13.2)
Bi	5.04 (0.14) ng mL^{-1}	2.8	ICP-MS	29		4.5–5.7 (5.1)
Cd	6.07 (0.28) ng mL^{-1}	4.6	ICP-MS	29		5.2–6.8 (6.0)
Se	120.1 (7.77) ng mL^{-1}	6.5	ICP-MS	29		103–143 (123)
Sb	30.95 (0.81) ng mL^{-1}	2.6	ICP-MS	29		25.3–32.9 (29.1)
Pb	406.3 (8.03) ng mL^{-1}	2.0	ICP-MS	29		351–435 (393)
Cu	626.8 (27.1) ng mL^{-1}	4.3	ICP-MS	29		623[c]
Zn	5356.7 (255) ng mL^{-1}	4.8	ICP-MS	29		5216[c]
THg	12.8 (0.7) ng g^{-1}	5.5	CVAAS	43	Level 3 (OK0337)	12.3–13.7 (13.0)

As: arsenic, Bi: bismuth, Cd: cadmium, Cu: copper, Pb: lead, Sb: antimony, Se: selenium, THg: total mercury and Zn: zinc,
[a]relative standard deviation, [b]Number of experiments; reference materials were analysed one time per day. [c]Approximate value.

Table S2. Results from external quality control and other analytical reference value of toxic and trace elements in whole blood

	Elements	Analytical value	Acceptable range (reference value)
Seronorm whole blood Level 1	Cd	0.76 ng mL^{-1}	0.68-0.80 (0.74)
	Sn	0.35 ng mL^{-1}	0.29-0.39 (0.34)
	Sb	1.6 ng mL^{-1}	1.5-1.7(1.6)
	Pb	27.3 ng mL^{-1}	26.2-29.0 (27.6)
	Cu	540 ng mL^{-1}	531-597 (564)
	Zn	5357 ng mL^{-1}	5200-5800 (5500)
G-EQUAS	Pb	A: 624.2 ng mL^{-1} B: 266.5 C: 99.8 D: 51.3	A: 563.6-717.4 (640.5) [a] B: 239.2-327.6 (283.4) [a] C: 93.59-126.62 (110.11) [a] D: 45.9-64.84 (55.37) [a]
	Cd	A: 14.1 ng mL^{-1} B: 4.6 C: 1.10 D: 0.40	A: 11.6-16.1 (13.9) [a] B: 3.5-5.4 (4.5) [a] C: 0.77-1.44 (1.11) [a] D:0.23-0.51 (0.37) [a]

G-EQUAS: German External Quality Assessment Scheme, Cd: cadmium, Cu: copper, Sn: tin, Sb: antimony, Pb: lead and Zn: zinc, [a]tolerance range.

Table S3. Spearman's rank correlation coefficients (*rho*) for five elements in maternal blood, cord blood and placenta.

N = 580		Maternal blood							Cord blood							Placenta						
		As	Cd	Cu	Pb	Se	THg	Zn	As	Cd	Cu	Pb	Se	THg	Zn	As	Cd	Cu	Pb	Se	THg	Zn
Maternal blood	As	1.00	0.05	0.16*	0.04	0.21**	0.24**	0.16**	0.21**	0.02	-0.08	-0.04	-0.10*	0.21**	-0.07	0.27**	0.11*	0.04	0.06	0.10*	0.22**	0.03
	Cd		1.00	-0.09*	0.25**	0.16**	0.11**	0.16**	-0.03	0.08	0.15**	0.07	-0.08	-0.01	0.07	-0.01	0.27**	0.11**	-0.02	0.08	0.04	0.08
	Cu			1.00	-0.06	0.14**	-0.01	0.15**	0.15**	0.02	-0.02	-0.11**	-0.03	0.02	-0.07	0.08	-0.01	0.14**	-0.04	-0.10*	0.01	-0.11**
	Pb				1.00	0.14**	0.17**	0.23**	0.08*	0.00	0.13**	0.41**	0.03	0.02	0.07	0.03	0.21**	0.07	0.14**	0.01	0.07	0.06
	Se					1.00	0.28**	0.48**	0.04	-0.01	0.01	0.03	0.26**	0.16**	-0.04	0.03	-0.02	0.06	0.04	0.20**	0.17**	0.05
	THg						1.00	0.20**	0.21**	0.04	0.00	0.08	0.04	0.78**	0.04	0.17**	0.09*	0.06	-0.02	0.01	0.80**	0.02
	Zn							1.00	0.06	0.00	-0.07	-0.07	-0.02	0.05	-0.01	0.01	-0.02	-0.01	0.04	-0.07	0.05	-0.02
Cord blood	As								1.00	-0.05	0.06	0.05	0.13**	0.26**	0.20**	0.57**	0.08	0.02	0.05	-0.11**	0.25**	-0.04
	Cd									1.00	0.11**	0.15**	-0.06	-0.04	0.15**	0.04	0.07	0.02	-0.09*	0.10*	0.05	0.06
	Cu										1.00	0.26**	0.12**	-0.05	0.41**	-0.04	0.02	0.12**	0.01	0.04	0.00	-0.03
	Pb											1.00	0.09*	0.09*	0.25**	0.03	0.22**	0.11**	0.23**	0.03	0.07	0.11**
	Se												1.00	0.21**	0.00	0.00	-0.09*	0.02	0.03	0.27**	0.06	0.04
	THg													1.00	-0.03	0.18**	0.09*	0.06	0.02	0.02	0.85**	-0.02
	Zn			-											1.00	0.04	0.01	0.04	0.02	0.00	0.03	0.02
Placenta	As															1.00	0.21**	0.13**	0.03	0.08	0.23**	0.12**
	Cd																1.00	0.18**	0.13*	0.02	0.08	0.15**
	Cu																	1.00	0.09*	0.28**	0.11*	0.23**
	Pb																		1.00	-0.05	-0.03	0.20**
	Se																			1.00	0.09*	0.43**
	THg																				1.00	0.07
	Zn																					1.00

As: arsenic, Cd: cadmium, Cu: copper, Pb: lead, Se: selenium, THg: total mercury and Zn: zinc, Values are Spearman's rank correlation coefficients (*rho*), $P < 0.01$**, $P < 0.05$*. For the undetected samples of As and Cd, values of one half (1/2) of the limit of detection (LOD) were assigned (N = 580).

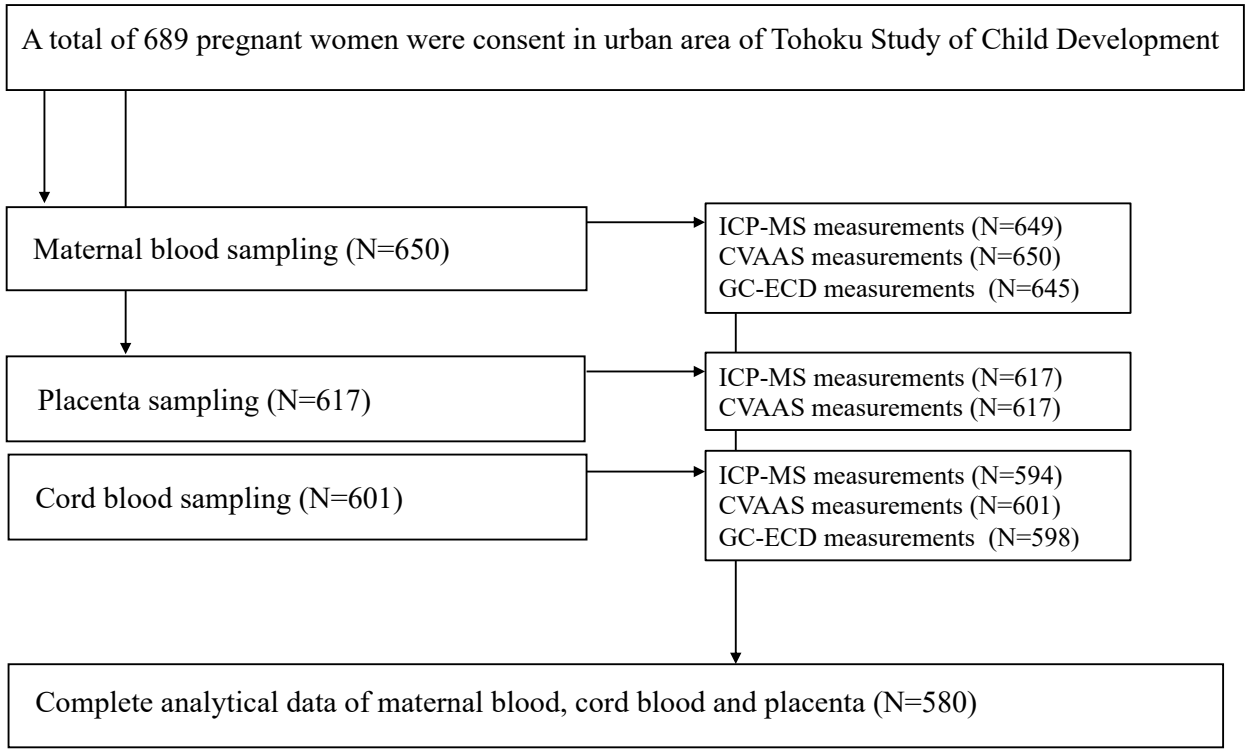

Figure S1. Flow chart of Study participants

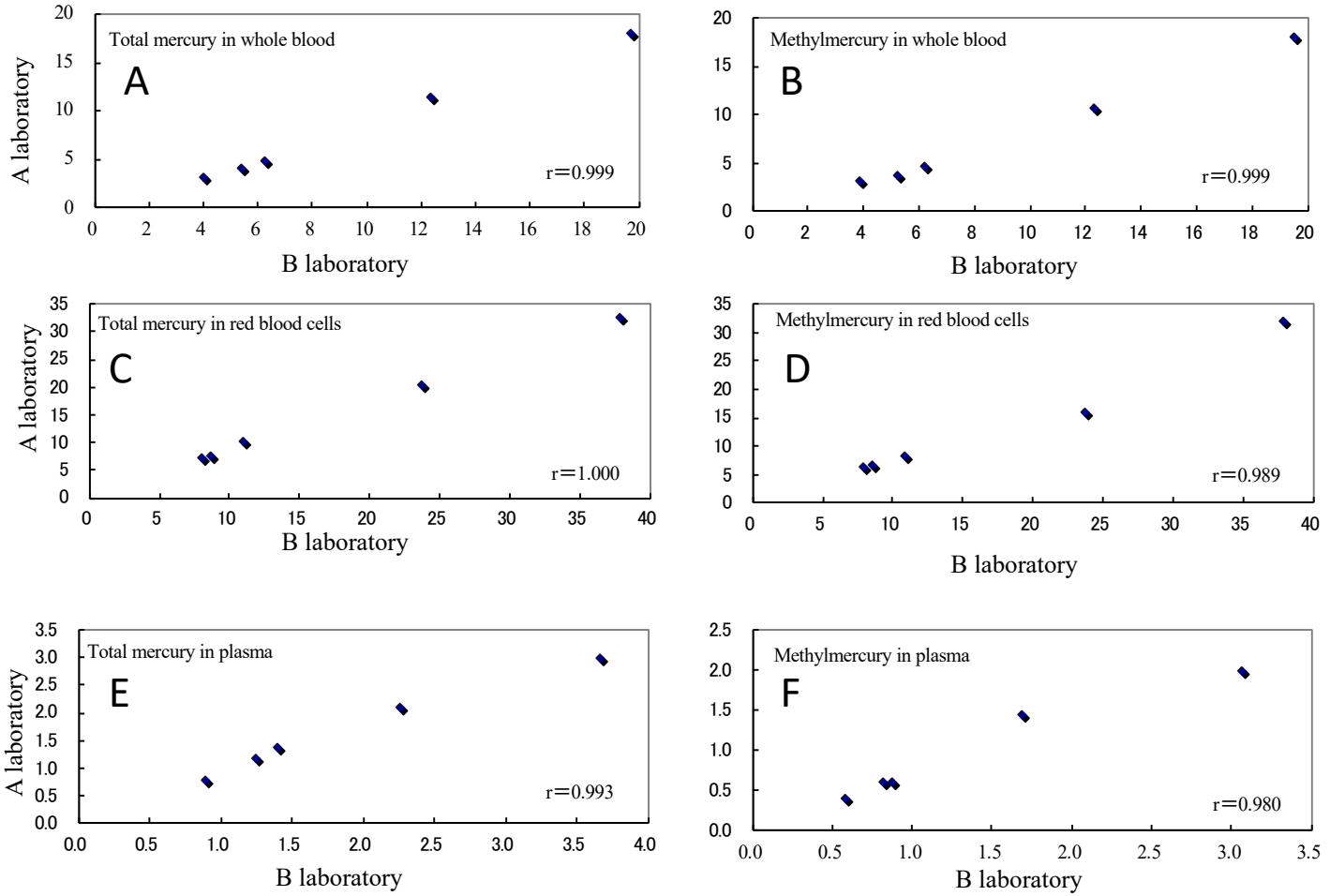

Figure S2. Correlations of blood mercury concentrations between A laboratory (International mercury lab) and B laboratory (IDEA consultant). N=5, Pearson product-moment correlation coefficient (r). A (total mercury in whole blood): Y=0.96x-0.99, B (methylmercury in whole blood): Y=0.97x-1.1, C (total mercury in red blood cells): Y=0.84x+0.48, D (methylmercury in red blood cells): Y=0.82x-0.83, E (total mercury in plasma): Y=0.77x+0.21, F(methylmercury in plasma): Y=0.65x+0.08.