Supporting Information: HAIR MERCURY ISOTOPES, A NONINVASIVE BIOMARKER FOR DIETARY METHYLMERCURY EXPOSURE AND BIOLOGICAL UPTAKE

Sarah E. Rothenberg[1,*], Susan A. Korrick[2,3], Donald Harrington[4], Sally W. Thurston[4,5], Sarah E. Janssen[6], Michael T. Tate[6], YanFen Nong[7], Hua Nong[7], Jihong Liu[8], Chuan Hong[9]; Fengxiu Ouyang[10]

[1]College of Health, Oregon State University, Corvallis, OR, USA, 97331

[2]Channing Division of Network Medicine, Department of Medicine, Brigham and Women's Hospital and Harvard Medical School, Boston, MA, USA, 02115

[3]Department of Environmental Health, Harvard T.H. Chan School of Public Health, Boston, MA, USA, 02115.

[4]Department of Biostatistics and Computational Biology, University of Rochester Medical Center, Rochester NY 14642

[5]Department of Environmental Medicine, University of Rochester Medical Center, Rochester NY 14642

[6]U.S. Geological Survey Upper Midwest Water Science Center, Madison, WI, USA, 53726

[7]Maternal and Child Health Hospital, Daxin County, China

[8]Department of Epidemiology & Biostatistics, Arnold School of Public Health, University of South Carolina, Columbia, SC, 29208

[9]Department of Environmental Health Sciences, Arnold School of Public Health, University of South Carolina, Columbia, SC, 29208

[10]Ministry of Education and Shanghai Key Laboratory of Children's Environmental Health, Xinhua Hospital, Shanghai Jiao Tong University School of Medicine, Shanghai, China.

Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government. The survey described in this information product was organized and implemented by the study team during the enrollment period and was not conducted on behalf of the U.S. Geological Survey.

TABLE OF CONTENTS

DETAILED METHODS

Cohort enrollment. The study was located in Daxin county, Guangxi province, China. In 2010, the population of Daxin county was 359,800, including ~50,000 residents living in the town of Daxin, and the remaining residents (rice farmers) living in rural villages.[1]

Eligible mothers were in good general health, resided in Daxin county during the previous 3 months, and planned to remain in Daxin for at least 12 months. Between May 2013-March 2014, there were a total of 1261 births at the Maternal and Child Health Hospital in Daxin county, including 574 (46%) mothers living outside Daxin and thus ineligible, 228 (18%) mothers with infectious disease (e.g., Hepatitis B) and thus ineligible, 51 (11%) eligible mothers who refused to participate, and 408 (32%) eligible mothers, who enrolled in the study. Ten enrolled mothers were subsequently excluded because mothers lived outside Daxin county (n=3), gave birth to twins (n=1), or data collection was incomplete (n=6), resulting in a final analysis cohort of 398 mothers.

We previously reported hair Hg isotopes for 21 mothers from this cohort.[2] In the present study, Hg isotopes were analyzed in 244 additional maternal hair samples, including those mothers whose children participated in the study's 12-month neurodevelopmental assessment (n=265/398, 67%).[3,4]

Questionnaire data. While in the hospital, mothers filled out a questionnaire concerning demographics, socioeconomic factors, and pregnancy health history. Mothers also completed a modified semi-quantitative 102-item food frequency questionnaire (FFQ), which was previously validated among pregnant mothers in rural, western China.[5] The FFQ queried mothers concerning their diet during the third trimester, including ingestion of rice, seven categories of fish/shellfish (freshwater fish, ocean fish, shrimp, eel, snails, crab, and other shellfish) (hereafter

"fish"), and other foods. For each food item, mothers selected from eight intake frequencies ranging from "never or rarely" to "≥2 times/day," which were converted to servings/day. For rice, mothers estimated quantity/serving by selecting one of three bowls from a picture of bowls or actual bowls, with known quantities of rice. For fish, we assumed 170 g/serving for ocean fish and freshwater fish[6], and 100 g/serving for shrimp, eel, snails, crab, and other shellfish.[5] Serving sizes for other food groups were assigned based on Cheng et al.[5] Data from the FFQ were used to calculate maternal energy intake (kcal), and the proportion (%) of calories from protein, carbohydrates, and fat.

Rice and fish methylmercury (MeHg) intake. We assumed rice and fish ingestion were the only two sources of dietary MeHg intake. Dietary MeHg intake from rice was calculated as follows:

(1) Rice MeHg intake (μg/day) = Rice MeHg (μg/g) × Rice ingestion rate (servings/day) × serving size (g/serving).

Eq. (1) was also used to calculate fish MeHg intake, by substituting fish for rice. Because MeHg comprises >90% of total mercury (THg) in fish[7], THg concentrations in fish were used in place of MeHg. Dietary MeHg intake for fish was calculated for each of the seven categories, and then summed to obtain a single value.

Each family brought a ~100 g polished rice sample from home for analysis of rice MeHg, which was frozen until analysis. THg concentrations were analyzed in seven varieties of freshwater fish purchased in Daxin markets in 2014 (n=13 samples).[1] For the other six categories of fish, THg concentrations were estimated based on a comprehensive literature review, as follows.[1] Articles were retrieved from Thomas Reuters (ISI) Web of Science using the phrase "mercury and China", combined with the terms: "seafood", "fish", "eel", "shrimp", "crab",

"mollusk", "shellfish", "snail", "scallop", "oyster", "lobster", "spiral shell", or "bivalve," resulting in 209 articles. Eleven studies were included that met the following criteria: a) published after January 2011, b) conducted in non-contaminated sites in China, and c) concentrations of THg (or MeHg) in seafood were reported in wet weight. None of these studies analyzed eel; so for eel we relied on one study published in 2006, bringing the total number of articles to 12.

Total dietary MeHg intake (μg/day) was estimated as the sum of MeHg intake from rice and the MeHg intake from fish. The proportion (%) of MeHg intake for each dietary source (rice or fish) was also calculated.

Biomarker collection. While mothers were in the hospital, a maternal hair sample (~50 strands) was collected for analysis of hair THg, a biomarker for fetal MeHg exposure.[8] Hair was collected from the occipital region using stainless steel scissors, the proximal end was tied with dental floss, and the sample was stored in a plastic bag at room temperature until analysis. With the proximal end secured, it was possible to analyze hair segments that corresponded to exposures occurring during each trimester of pregnancy, based on the growth rate of hair for Asian women (i.e., third trimester: 3.4 cm, second trimester: 3.8 cm, first trimester: 3.8 cm).[9] While in the hospital, a maternal blood sample was collected for analysis of polyunsaturated fatty acids (with serum separated by centrifugation), which was stored at -26°C until analysis.

Hair washing. All hair samples were washed in acid-cleaned porcelain bowls for 1 h in 0.1% (v/v) beta-mercaptoethanol, then triple-rinsed with Milli-Q H_2O (18.2 MΩ cm^{-1}) and air-dried overnight, as previously described.[1] Prior to use, porcelain bowls (250 mL) were acid-washed overnight with 1.2 N hydrochloric acid (HCl) and triple rinsed with Milli-Q H_2O.

Analyses of total mercury (THg) and methylmercury (MeHg). At the U.S. Geological Survey Mercury Research Laboratory, hair THg concentrations were analyzed, using U.S. Environmental Protection Agency (EPA) Method 1631.[10] The hair digestion methods differed slightly in 2016 and 2021. In 2016, hair samples were digested in 1.5 mL of nitric (HNO_3):HCL (3:1 v/v) at 85-95 ^oC for 1.5-2.5 h, then 0.25 mL of bromine monochloride (BrCl) was added at least 12 hr before analysis. In 2021, hair samples were digested in 2 mL of HNO_3 and heated at ~90^oC for 8 h, then 0.2 mL of BrCl was added, and samples were heated for an additional 2 h before analysis.

At the University of South Carolina, MeHg concentrations were analyzed in hair samples corresponding to the third trimester.[1] Briefly, hair samples were digested in 50 mL Teflon tubes (Savillex, MN, USA) and 5 mL of 25% (w/v) sodium hydroxide-Milli-Q H_2O, for 3 hours at 75^{o}C. After digestion, the volume was raised to 50 mL and samples were analyzed according to U.S. EPA Method 1630 using gas chromatography-cold vapor atomic fluorescence spectrometry (GC-CVAFS) (Brooks Rand Model III, Seattle, WA, USA).[12] To analyze rice MeHg, approximately 0.5 g rice was digested in 2 mL of 25% (w/v) potassium hydroxide-methanol for 3 h at 75 °C, then 6 mL of dichloromethane and 1.5 mL hydrochloric acid (HCl) was added, samples were shaken for 30 min, centrifuged (4000 rpm = 3000 × *g*, 30 min), the phases were separated (Whatman, 1PS), and Milli-Q H_2O was added to 25 mL.[11] The following day, samples were heated for 1.5 h in a water bath at 60-70 °C to expel dichloromethane, and the volume was raised using Milli-Q H_2O to 40 mL. Digests were analyzed using U.S. EPA Method 1630[12], as described above.

Fish tissue THg concentrations were analyzed at the Beijing Lumex Analytical Co. Ltd., China, by sample combustion coupled to atomic absorption spectrophotometry, using EPA Method 7473 (Lumex Model RA-915+/PYRO-915+, St. Petersburg, Russia).[13]

Serum fatty acids. Maternal serum fatty acids (omega-3: docosahexaenoic acid and eicosapentaenoic acid; omega-6: alpha-linolenic acid, linoleic acid and arachidonic acid) were assessed at the State Key Laboratory of Nutrition and Metabolism in Shanghai, China, by gas-liquid chromatography (Agilent 6890N-5975B with flame ionization detector).[3,4] Peak retention times were identified by injecting known standards of >99% purity.

Detailed methods for Hg isotopes. Hg isotopes were analyzed at the U.S. Geological Survey Mercury Research Laboratory (Madison, WI), as previously described.[14,15] Hg isotopes were also analyzed in the certified reference material for hair [International Atomic Energy Agency (IAEA)-086] (n=33, Table S2). Sample digests for five maternal hair samples and four IAEA-086 samples were pre-concentrated using established protocols.[14] Following digestion (or digestion + pre-concentration), samples were diluted with ultrapure H_2O so that the acid content was <50%. Briefly, standards, samples, and reference materials were diluted to a THg concentration of 0.5 ng/mL (acid content <10%) and neutralized with hydroxylamine hydrochloride. Hg isotope analysis was performed using standard sample bracketing with a concentration- and matrix-matched National Institute of Standards (NIST) 3133 dilution. Hg and stannous chloride (in 3% in 10% HCl, respectively) were introduced using a custom gas-liquid separator[15] at a flow rate of 0.85 mL min^{-1}, allowing for the reduction of Hg(II) to Hg(0) prior to introduction to the MC-ICP-MS. A thallium standard (Tl, 40 ng/L) was simultaneously introduced to the gas-liquid separator for mass bias correction using a desolvating nebulizer (Apex, ESI).[14] The MC-ICP-MS was tuned for optimal voltage and signal intensity for ^{202}Hg and

^{205}Tl prior to analysis.[14,15] The concentration difference between the bracketing standard and the samples was <15%.

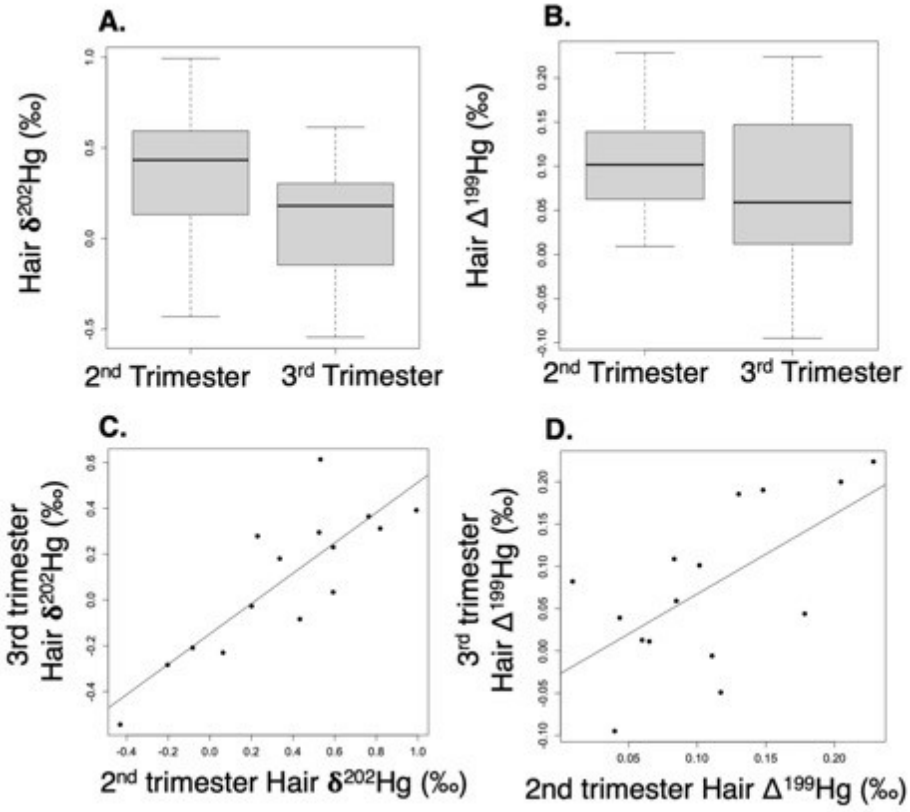

Figure S1. Bivariate associations between paired second and third trimester hair mercury isotopes (n=15 mothers), including A) boxplot for hair δ^{202}Hg (‰), B) boxplot for hair Δ^{199}Hg (‰), C) scatterplot relating hair δ^{202}Hg (‰) corresponding to exposures during the third trimester versus the second trimester, and D) scatterplot relating hair Δ^{199}Hg (‰) corresponding to exposures during the third trimester versus the second trimester. The center line in the boxplot represents the median, the box represents the lower and upper quartiles (i.e., middle 50% of the data), and the whiskers represent 1.5 times the interquartile range from the lower and upper quartiles. For these data, there were no potential outliers.

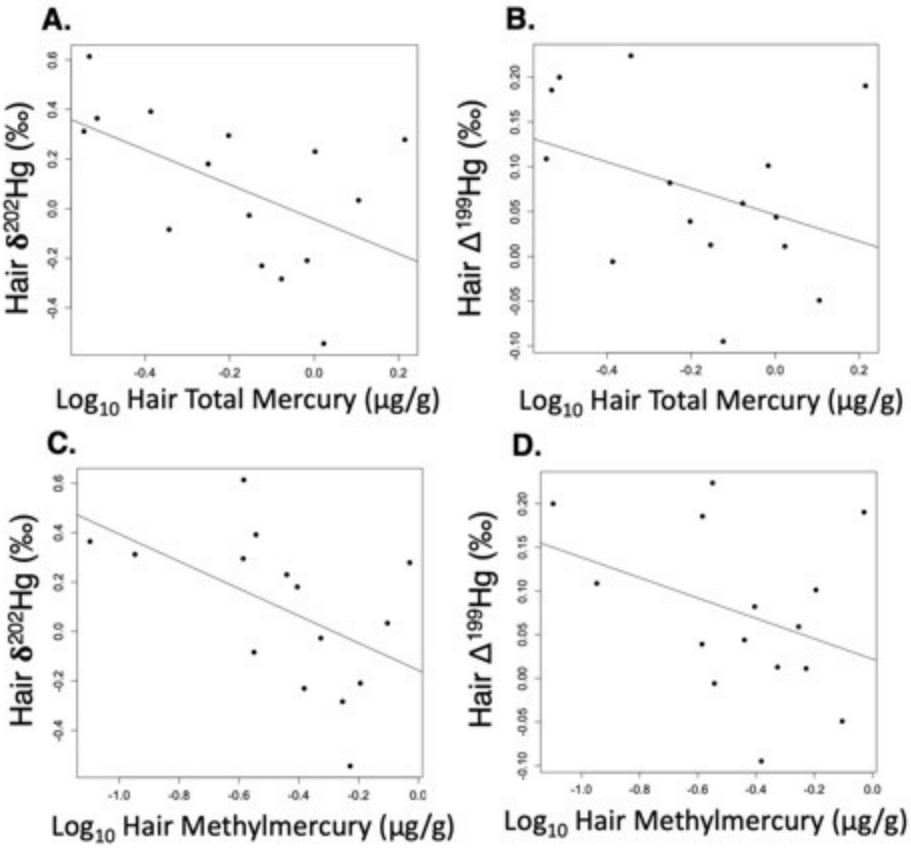

Figure S2. Bivariate associations between mercury isotopes and concentrations of total mercury and methylmercury, which were measured in hair samples corresponding to exposures during the third trimester (n=15), including a) hair δ^{202}Hg (‰) versus $\log_{10}$ hair total mercury (µg/g) (Spearman's rho: -0.59), b) hair Δ^{199}Hg (‰) versus $\log_{10}$ hair total mercury (µg/g) (Spearman's rho: -0.36), c) hair δ^{202}Hg (‰) versus $\log_{10}$ hair methylmercury (µg/g) (Spearman's rho: -0.62), b) hair Δ^{199}Hg (‰) versus $\log_{10}$ hair methylmercury (µg/g) (Spearman's rho: -0.34).

Table S1. Studies reporting stable mercury isotopes in human hair.

Reference	Location	Sample size	Age (yr) Median (range)	Mercury exposure sources	Hair THg (μg/g) Median (range)	δ^{202}Hg (‰) Median (range)	Δ^{199}Hg (‰) Median (range)	Δ^{201}Hg (‰) (‰) Median (range)
This study	Daxin, China	265	27 (17,45)	Rice, fish	0.47 (0.13, 1.8)	0.44 (-0.89, 1.8)	0.13 (-0.15, 0.66)	0.08 (-0.18, 0.47)
16	1) Wanshan, China	25	9 (5, 75)	Rice, fish	4.22 (2.27, 7.49)	-0.32 (-1.43, 0.65)	0.03 (-0.27, 0.14)	0 (-0.36, 0.13)
	2) Guiyang, China	21	9 (8, 56)	Rice, fish	0.368 (0.152, 0.992)	1.67 (0.82, 2.36)	0.38 (0.01, 0.86)	0.31 (-0.03, 0.75)
	3) Changshun, China	9	12 (7, 68)	Rice, fish	0.313 (0.204, 0.547)	0.90 (0.76, 1.35)	0.01 (-0.07, 0.03)	-0.03 (-0.08, 0.01)
17	Wanshan, China:	7	NA	Rice, fish	3.13 (0.73, 5.67)	0.69 (0.01, 0.91)	0.13 (0.04, 0.1)	0.06 (-0.004, 0.12)
2[1]	Daxin, China	21	27 (23, 42)	Rice, fish	0.51 (0.23, 1.0)	0.45 (-0.86, 1.3)	0.10 (-0.09, 0.42)	0.08 (-0.11, 0.35)
18	Southern China (3 cities)	45	46 (5.5, 82)	Rice, fish	1.09 (0.148, 6.74)	0.94 (-0.17, 2.1)	0.61 (0.11, 0.96)	0.42 (0.06, 0.84)
19	Sicily, Italy	21	40 (30, 40)	Fish	1.83 (0.45, 5.28)	1.79 (1.12, 3.36)	1.17 (0.73, 1.54)	0.99 (0.64, 1.33)
20	Faroe Islands	6	NA	Pilot whale	18.9 (10.6, 37)	3.32 (3.02, 3.61)	1.28 (1.23, 1.31)	1.04 (1.01, 1.07)
	Louisiana, USA	15	NA	Fish	1.05 (0.38, 3.65)	1.80 (1.46, 3.22)	1.11 (0.49, 2.11)	0.9 (0.22. 1.69
21	Ghana	6	30 (18, 45)	ASGM	1.32 (0.57, 2.61)	-0.315 (-1.67, 0.77)	0.44 (0.23, 0.55)	0.385 (-0.06, 0.43)
	Indonesia	5	NA	ASGM	6.41 (2.98, 20.6)	1.35 (0.64, 1.65)	0.81 (0.21, 1.32)	0.67 (0.04, 1.08)
22	USA	11	58 (44, 69)	Fish, dental amalgams	2.6 (0.69, 6.2)	2.29 (2.00, 2.93)	1.92 (1.67, 2.04)	1.56 (1.36, 1.66)
23	Bolivia	27	38 (19, 53)	Fish, rice	0.68 (0.17, 2.3)	0.93 (-0.87, 2.19)	0.45 (0.11, 1.18)	0.37 (0.04, 0.99)
	France	11	26	Fish	0.54	2.19	1.14	0.89

			(2, 49)		(0.26, 1.9)	(1.81, 3.23)	(0.85, 1.71)	(0.67, 1.33)
24	Bolivia, population A	7	21 (6, 50)	Fish, rice	19 (12, 24)	1.17 (1.00, 1.27)	0.18 (0.14, 0.23)	0.13 (0.08, 0.18)
	Bolivia, population B	7	10 (3, 45)	Fish, rice	8.8 (6.3, 15)	1.23 (1.04, 1.42)	0.42 (0.25, 0.81)	0.32 (0.15, 0.66)

ASGM (artisanal and small scale gold mining), Hg (mercury), NA (not applicable), THg (total mercury)

[1] Maternal hair samples (n=21) were also included in the present analysis

Table S2. Quality assurance and quality control for total mercury and methylmercury analyses.

		%Recovery					%RSD
Reference	**Parameter**	**IAEA-086 (Hair) Mean ± SD (n)**	**NIST 1515 (Apple Leaves) Mean ± SD (n)**	**NRC-TORT2 (Lobster) Mean ± SD (n)**	**NIST 3133 (Hg standard) Mean ± SD (n)**	**Matrix spikes Mean ± SD (n)**	**Mean ± SD (n)**
This study	Hair THg (2nd trimester exposures)	96 ± 5.6 (33)	NA	NA	95 ± 2.8 (6)	NA	NA
2	Hair THg (2nd trimester exposures)	95 ± 2.4 (2)	NA	NA	NA	NA	NA
1	Hair MeHg (3rd trimester exposures)	78 ± 14 (52)	NA	95 ± 13 (45)	NA	98 ± 25 (69)	8.4 ± 5.9 (75)
	Fish tissue THg	NA	91 ± 7.2 (4)	NA	NA	NA	4.2 ± 3.9 (13)
	Rice MeHg	NA	NA	96 ± 9.5 (32)	NA	96 ± 24 (56)	7.7 ± 5.1 (56)

Hg (mercury), MeHg (methylmercury), NA (not applicable), RSD (relative standard deviation), THg (total mercury)

Table S3. Comparison of maternal biomarkers and maternal diet between households with non-farming parents, and households where one or both parents are farmers. This table compares the same parameters as in Table S5.

	All participants (n=265) Median (range)	**Non-farmers (N=62, 23%) Median (range)**	**Farmers (N=203, 77%) Median (range)**	**p-value**
N	**265**	**62**	**203**	
Hair THg (2nd trimester) (µg/g)	0.47 (0.13, 1.8)	0.46 (0.13, 1.8)	0.48 (0.15, 1.5)	0.59
Rice MeHg (ng/g)	2.2 (0.32, 15)	2.3 (0.60, 12)	2.1 (0.32, 15)	0.29
Rice MeHg intake (µg/day)	0.43 (0, 5.0)	0.51 (0.021, 3.4)	0.42 (0, 5.0)	0.24
Fish MeHg intake (µg/day)	0.17 (0, 19)	0.44 (0, 5.3)	0.033 (0, 19)	<0.0001***
Fish ingestion (weekly servings)	0.23 (0, 20)	0.63 (0, 10)	0.23 (0, 20)	<0.0001***
N	**263**	**62**	**201**	
%MeHg intake from rice	82 (0.30, 100)	56 (2.9, 100)	94 (0.30, 100)	0.0004***
%MeHg intake from fish	18 (0, 99.7)	44 (0, 97)	6.1 (0, 99.7)	0.0004***
N	**265**	**62**	**203**	
Serum N-3 (mg/mL)	0.13 (0.06, 0.42)	0.14 (0.06, 0.40)	0.12 (0.06, 0.42)	0.02*
Serum N-6 (mg/mL)	1.5 (1.1, 2.4)	1.5 (1.2, 2.4)	1.4 (1.1, 2.4)	0.004**
Serum N-6/N-3 (unitless)	12 (3.5, 25)	12 (5.3, 24)	12 (3.5, 25)	0.24
N	**256**	**58**	**198**	
% Calories from fat	33 (13, 81)	33 (20, 80)	33 (13, 81)	0.84
% Calories from carbohydrates	56 (12, 75)	53 (12, 71)	56 (12, 75)	0.24
% Calories from protein	12 (5.1, 25)	13 (6.1, 21)	11 (5.1, 25)	0.0002***
Total Energy Intake (kcal)	2055 (549, 4438)	2241 (585, 4065)	2008 (549, 4438)	0.08

*p ≤ 0.05, **p≤0.01, *** p<0.001 p-values are for Wilcoxon rank sum test.
MeHg (methylmercury), N-3 fatty acids (docosahexaenoic acid, eicosapentaenoic acid, and alpha-linolenic acid), N-6 fatty acids (linoleic acid and arachidonic acid), THg (total mercury).

Table S4. Comparison of characteristics between mothers with and without analysis of maternal hair mercury isotopes.

		Mercury isotopes analyzed		
	All (n=398) n (%)	**No (N=133, 33%) n (%)**	**Yes (N=265, 67%) n (%)**	**p-value**
Mother's Age upon Enrollment (years)				
Age < 20	30 (8)	10 (8)	20 (8)	0.77
20 ≤ Age < 30	225 (57)	72 (54)	153 (58)	
30 ≤ Age < 45	143 (36)	51 (38)	92 (35)	
Mother's Ethnicity				
Zhuang	339 (85)	109 (82)	230 (87)	0.38
Han	50 (13)	21 (16)	29 (11)	
Other	9 (2)	3 (2)	6 (2)	
Mother's Education Completed				
< High School	321 (98)	114 (86)	207 (78)	0.07
High School	49 (12)	11 (8)	38 (14)	
Some University	18 (5)	3 (2)	15 (6)	
Missing	10 (3)	5 (3)	5 (2)	
Father's Education Completed				
< High School	310 (78)	109 (82)	201 (76)	0.08
High School	58 (15)	13 (10)	45 (17)	
Some University	20 (5)	4 (3)	16 (6)	
Missing	10 (3)	7 (5)	3 (1)	
Mother's Occupation				
Farmer	302 (76)	111 (83)	191 (72)	0.03*
Worker[a]	32 (8)	6 (5)	26 (10)	
Unemployed	44 (11)	12 (9)	32 (12)	
Other	13 (3)	1 (<1)	12 (5)	
Missing	7 (2)	3 (2)	4 (2)	
Father's Occupation				
Farmer	292 (73)	104 (78)	188 (71)	0.09
Worker[a]	54 (14)	13 (10)	41 (15)	
Unemployed	26 (7)	8 (6)	18 (7)	
Other	17 (4)	2 (2)	15 (6)	
Missing	9 (2)	6 (5)	3 (1)	
Mother or Father is a Farmer				
No	78 (20)	17 (13)	61 (23)	0.02*
Yes	314 (79)	113 (85)	201 (76)	
Missing	6 (2)	3 (2)	3 (1)	

Household Monthly Income (RMB)[b]				
Income < 2000	233 (59)	69 (52)	164 (62)	0.15
2000 ≤ Income < 5000	110 (28)	43 (32)	67 (25)	
Income ≥ 5000	20 (5)	8 (6)	12 (5)	
Missing	35 (9)	13 (10)	22 (8)	
Maternal Pre-Pregnancy BMI (kg/m^2)[c]				
Underweight	94 (23)	27 (20)	67 (25)	0.25
Normal Weight	233 (59)	81 (61)	152 (57)	
Overweight	61 (15)	24 (18)	37 (14)	
Obese	9 (2.3)	1 (<1)	8 (3)	
Missing	1 (<1)	0 (0)	1 (<1)	
Maternal Smoking During Pregnancy				
No	384 (96)	123 (92)	261 (98)	0.004**
Yes	5 (1)	5 (3)	0 (0)	
Missing	9 (2)	5 (3)	4 (2)	
2nd-Hand Smoke Exposure During Pregnancy				
No	218 (55)	70 (53)	148 (56)	0.83
Yes	165 (41)	55 (41)	110 (42)	
Missing	15 (4)	8 (6)	7 (3)	
Alcohol During Pregnancy				
No	386 (97)	127 (95)	259 (98)	1.0
Yes	4 (1)	1 (<1)	3 (1)	
Missing	8 (2)	5 (3)	3 (1)	
Anemia During Pregnancy				
No	384 (96)	129 (97)	255 (96)	0.56
Yes	13 (3)	3 (2)	10 (4)	
Missing	1 (<1)	1 (<1)	0 (0)	
Primipara				
No	189 (47)	69 (52)	120 (45)	0.16
Yes	193 (49)	57 (43)	136 (51)	
Missing	16 (4.1)	7 (5)	9 (3)	
Maternal Rice Consumption				
< Daily	49 (12)	16 (12)	33 (12)	1.0
≥ Daily	327 (82)	111 (83)	216 (82)	
Missing	22 (6)	6 (5)	16 (6)	
Maternal Fish Consumption (servings/week)				
0 servings/week	172 (43)	62 (47)	110 (42)	0.38

0 < servings/week < 2	181 (45)	54 (41)	127 (48)	
≥ 2 servings/week	45 (11)	17 (13)	28 (11)	

*p ≤ 0.05, **p<0.01, p-values are for chi-squared test or Fisher's exact test between non-missing categories.
BMI (body mass intake), RMB (ren min bi = Chinese currency)

[a]Workers include: civil servant, white-collar worker, skilled worker, unskilled worker, and shopkeeper.

[b]Between 2013-2014, 2000 RMB = US$324, 5000 RMB = US$810

[c]BMI for Asian populations: underweight (BMI < 18.5 kg/m^2), normal weight (18.5 kg/m^2 ≤ BMI < 23 kg/m^2), overweight (23 kg/m^2 ≤ BMI < 27.5 kg/m^2), and obese (BMI ≥ 27.5 kg/m^2).[25]

Table S5. Comparison of maternal biomarkers and maternal diet between mothers with and without analysis of hair mercury isotopes.

		Hg isotopes analyzed		
	All (n=398) Median (range)	**No (N=133, 33%) Median (range)**	**Yes (N=265, 67%) Median (range)**	**p-value**
N	**398**	**133**	**265**	
Hair THg (2nd trimester) (μg/g)	NA	NA	0.47 (0.13, 1.8)	NA
Rice MeHg (ng/g)	2.2 (0.32, 15)	2.2 (0.53, 9.7)	2.2 (0.32, 15)	0.80
Rice MeHg intake (μg/day)	0.44 (0, 5.0)	0.45 (0, 3.0)	0.43 (0, 5.0)	0.61
Fish MeHg intake (μg/day)	0.15 (0, 19)	0.03 (0, 5.8)	0.17 (0, 19)	0.23
N	**396**	**133**	**263**	
%MeHg intake from rice	87 (0, 100)	90 (0, 100)	82 (0.30, 100)	0.28
%MeHg intake from fish	13 (0. 100)	9.6 (0, 100)	18 (0, 99.7)	0.28
N	**397**	**132**	**265**	
Serum N-3 (mg/mL)	0.13 (0.06, 0.42)	0.13 (0.06, 0.28)	0.13 (0.06, 0.42)	0.32
Serum N-6 (mg/mL)	1.5 (0.95, 2.4)	1.5 (0.95, 2.1)	1.5 (1.1, 2.4)	0.48
Serum N-6/N-3 (unitless)	12 (3.5, 25)	12 (5.3, 24)	12 (3.5, 25)	0.48
N	**383**	**127**	**256**	
% Calories from fat	33 (13, 81)	33 (16, 80)	33 (13, 81)	0.46
% Calories from carbohydrates	56 (12, 78)	57 (14, 78)	56 (12, 75)	0.93
% Calories from protein	11 (5.1, 25)	10 (5.2, 18)	12 (5.1, 25)	0.0007***
Total Energy Intake (kcal)	2000 (515, 4637)	1838 (515, 4637)	2055 (549, 4438)	0.014*

*p ≤ 0.05, **p≤0.01, *** p<0.001 p-values are for Wilcoxon rank sum test.
MeHg (methylmercury), N-3 fatty acids (docosahexaenoic acid, eicosapentaenoic acid, and alpha-linolenic acid), N-6 fatty acids (linoleic acid and arachidonic acid), THg (total mercury).

Table S6. Multivariable regression results relating maternal hair isotopes with %methylmercury intake from rice (Model A) (n=62 mothers). Same as Table 1 excluding households where one or both parents were rice farmers.

	Hair Δ^{199}Hg (‰)				Hair δ^{202}Hg (‰)		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Fish weekly servings							
Never or rarely	(referent)				(referent)		
0 < servings/weekly ≤ 2	0.011	(-0.087, 0.11)	0.82		-0.31	(-0.72, 0.10)	0.14
≥ 2 servings/weekly	0.084	(-0.035, 0.20)	0.16		-0.14	(-0.63, 0.35)	0.57
Daily rice ingestion (Yes)	0.046	(-0.069, 0.16)	0.43		0.055	(-0.43, 0.54)	0.82
Adjusted							
Fish weekly servings							
Never or rarely	(referent)				(referent)		
0 < servings/weekly ≤ 2	0.055	(-0.060, 0.17)	0.34		0.047	(-0.35, 0.44)	0.82
≥ 2 servings/weekly	0.13	(-0.023, 0.28)	0.096		0.020	(-0.50, 0.54)	0.94
Daily rice ingestion (Yes)	0.041	(-0.095, 0.18)	0.55		0.042	(-0.42, 0.51)	0.86
Log_{10} hair THg (μg/g)	-0.16	(-0.36, 0.047)	0.13		**-1.8**	**(-2.5, -1.1)**	**<0.001*** **
Maternal age (years)	0.0018	(-0.0076, 0.011)	0.70		0.026	(-0.0061, 0.058)	0.11
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)				(referent)		
Normal weight	0.020	(-0.082, 0.12)	0.70		-0.18	(-0.52, 0.17)	0.32
Overweight or obese	0.000024	(-0.12, 0.12)	1.0		-0.21	(-0.62, 0.19)	0.30
Mother or father is a farmer (Yes)	N/A				N/A		
Log_{10} Maternal energy intake (kcal)	-0.016	(-0.37, 0.34)	0.93		-0.47	(-1.7, 0.75)	0.44
Maternal %calories from protein	-0.0027	(-0.026, 0.020)	0.81		0.033	(-0.045, 0.11)	0.40

***p < 0.001 p-value is for the Beta coefficient

BMI (body mass index), Hg (mercury), N/A (not applicable), THg (total mercury)

Table S7. Multivariable regression results relating maternal hair isotopes with %methylmercury intake from rice (Model B) (n=62 mothers). Same as Table 2 excluding households where one or both parents were rice farmers.

	Hair Δ^{199}Hg (‰)				**Hair δ^{202}Hg (‰)**		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
%MeHg intake from rice	-0.00026	(-0.0014, 0.00089)	0.65		0.00048	(-0.0043, 0.0053)	0.84
Adjusted							
%MeHg intake from rice	-0.00053	(-0.0020, 0.00098)	0.49		-0.0014	(-0.0064, 0.0036)	0.59
Log_{10} hair THg (μg/g)	-0.14	(-0.34, 0.052)	0.15		**-1.8**	**(-2.5, -1.2)**	**<0.001*****
Maternal age (years)	0.0016	(-0.0077, 0.011)	0.73		0.025	(-0.0056, 0.057)	0.11
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	0.029	(-0.074, 0.13)	0.58		-0.15	(-0.49, 0.19)	0.38
Overweight or obese	0.010	(-0.11, 0.13)	0.87		-0.19	(-0.59, 0.21)	0.34
Mother or father is a farmer (Yes)	N/A				N/A		
Log_{10} Maternal energy intake (kcal)	0.039	(-0.29, 0.37)	0.82		-0.30	(-1.4, 0.81)	0.59
Maternal %calories from protein	0.0017	(-0.021, 0.024)	0.88		0.020	(-0.053, 0.095)	0.59

***p≤0.001 p-value is for the Beta coefficient

BMI (body mass index), Hg (mercury), THg (total mercury)

Table S8. Multivariable regression results relating maternal hair isotopes with rice methylmercury intake and fish methylmercury intake (Model C) (n=62 mothers). Same as Table 3 excluding households where one or both parents were rice farmers.

	Hair Δ^{199}Hg (‰)				Hair δ^{202}Hg (‰)		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Log_{10} Rice MeHg intake (μg/day)	0.021	(-0.071, 0.11)	0.64		**-0.39**	**(-0.75, -0.021)**	**0.04***
Log_{10} Fish MeHg intake (μg/day)	0.022	(-0.023, 0.067)	0.34		-0.13	(-0.31, 0.052)	0.16
Adjusted							
Log_{10} Rice MeHg intake (μg/day)	0.039	(-0.082, 0.16)	0.52		-0.29	(-0.70, 0.11)	0.15
Log_{10} Fish MeHg intake (μg/day)	0.039	(-0.017, 0.096)	0.17		-0.022	(-0.21, 0.17)	0.82
Log_{10} hair THg (μg/g)	-0.19	(-0.39, 0.014)	0.07		**-1.7**	**(-2.3, -0.99)**	**<0.001*** **
Maternal age (years)	0.0021	(-0.0072, 0.011)	0.66		0.025	(-0.0058, 0.056)	0.11
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	0.019	(-0.085, 0.12)	0.71		-0.11	(-0.46, 0.24)	0.53
Overweight or obese	-0.0038	(-0.12, 0.12)	0.95		-0.15	(-0.55, 0.25)	0.45
Mother or father is a farmer (Yes)	N/A				N/A		
Log_{10} Maternal energy intake (kcal)	-0.052	(-0.44, 0.33)	0.79		0.13	(-1.2, 1.4)	0.85
Maternal %calories from protein	0.0024	(-0.020, 0.025)	0.83		0.016	(0.057, 0.090)	0.66

*p<0.05 ***p≤0.001 p-value is for the Beta coefficient
BMI (body mass index), Hg (mercury), THg (total mercury)

Table S9. Multivariable regression results relating maternal hair isotopes with serum omega-3 fatty acids and serum omega-6 fatty acids (Model D) (n=62 mothers). Same as Table 4 excluding households where one or both parents were rice farmers.

	Hair Δ^{199}Hg (‰)				**Hair δ^{202}Hg (‰)**		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Log_{10} Serum N-3 Fatty Acids (mg/mL)	**0.48**	**(0.23, 0.73)**	**<0.001*****		1.0	(-0.085, 2.1)	0.07
Log_{10} Serum N-6 Fatty Acids (mg/mL)	-0.35	(-1.0, 0.35)	0.32		0.62	(-2.5, 3.7)	0.69
Adjusted							
Log_{10} Serum N-3 Fatty Acids (mg/mL)	**0.51**	**(0.24, 0.79)**	**<0.001*****		0.83	(-0.17, 1.8)	0.10
Log_{10} Serum N-6 Fatty Acids (mg/mL)	-0.33	(-1.1, 0.43)	0.39		0.31	(-2.4, 3.0)	0.82
Log_{10} hair THg (μg/g)	-0.091	(-0.26, 0.081)	0.29		**-1.7**	**(-2.3, -1.1)**	**<0.001*****
Maternal age (years)	0.0027	(-0.0058, 0.011)	0.53		0.027	(0.0039, 0.057)	0.09
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	0.035	(-0.056, 0.13)	0.44		-0.13	(-0.46, 0.20)	0.43
Overweight or obese	-0.015	(-0.12, 0.093)	0.79		-0.25	(-0.64, 0.14)	0.21
Mother or father is a farmer (Yes)	N/A				N/A		
Log_{10} Maternal energy intake (kcal)	-0.014	(-0.30, 0.27)	0.92		-0.45	(-1.5, 0.58)	0.38
Maternal %calories from protein	-0.0011	(-0.019, 0.017)	0.91		0.023	(-0.041, 0.088)	0.47

*p<0.05 **p<0.01 ***p≤0.001 p-value is for the Beta coefficient

BMI (body mass index), Hg (mercury), N-3 fatty acids (docosahexaenoic acid, eicosapentaenoic acid, and alpha-linolenic acid), N-6 fatty acids (linoleic acid and arachidonic acid), THg (total mercury)

Table S10. Multivariable regression results relating maternal hair isotopes with fish weekly servings and daily rice ingestion (Model A) (n=236 mothers). Same as Table 1 excluding mothers with imputed values.

	Hair Δ^{199}Hg (‰)				**Hair δ^{202}Hg (‰)**		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Fish weekly servings							
Never or rarely	(referent)				(referent)		
0 < servings/weekly ≤ 2	0.022	(-0.015, 0.060)	0.24		-0.031	(-0.19, 0.12)	0.69
≥ 2 servings/weekly	**0.087**	**(0.027, 0.15)**	**0.005****		0.032	(-0.22, 0.28)	0.80
Daily rice ingestion (Yes)	-0.0029	(-0.057, 0.051)	0.92		0.046	(-0.18, 0.27)	0.69
Adjusted							
Fish weekly servings							
Never or rarely	(referent)				(referent)		
0 < servings/weekly ≤ 2	0.0056	(-0.033, 0.044)	0.77		-0.038	(-0.18, 0.10)	0.59
≥ 2 servings/weekly	0.048	(-0.021, 0.12)	0.17		0.10	(-0.14, 0.35)	0.41
Daily rice ingestion (Yes)	-0.016	(-0.084, 0.051)	0.63		0.038	(-0.21, 0.28)	0.76
Log_{10} hair THg (μg/g)	**-0.13**	**(-0.21, -0.041)**	**0.004****		**-1.4**	**(-1.7, -1.1)**	**<0.001*****
Maternal age (years)	0.00056	(-0.0026, 0.0037)	0.73		**0.018**	**(0.0062, 0.029)**	**0.003****
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)				(referent)		
Normal weight	0.000038	(-0.043, 0.043)	1.0		0.046	(-0.11, 0.20)	0.55
Overweight or obese	0.012	(-0.042, 0.066)	0.67		0.11	(-0.084, 0.31)	0.26
Mother or father is a farmer (Yes)	**-0.058**	**(-0.10, -0.015)**	**0.008****		-0.12	(-0.27, 0.037)	0.13
Log_{10} Maternal energy intake (kcal)	0.023	(-0.13, 0.18)	0.78		-0.067	(-0.63, 0.49)	0.81
Maternal %calories from protein	0.0038	(-0.0041, 0.012)	0.34		-0.011	(-0.040, 0.017)	0.44

**p≤0.01 ***p≤0.001 p-value is for the Beta coefficient
BMI (body mass index), Hg (mercury), THg (total mercury)

Table S11. Multivariable regression results relating maternal hair isotopes with %methylmercury intake from rice (Model B) (n=235 mothers).[1] Same as Table 2 excluding mothers with imputed values.

	Hair Δ^{199}Hg (‰)				Hair δ^{202}Hg (‰)		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
%MeHg intake from rice	**-0.00062**	**(-0.0011, -0.00010)**	**0.02***		0.00019	(-0.0020, 0.0023)	0.86
Adjusted							
%MeHg intake from rice	-0.00028	(-0.00086, 0.00029)	0.33		-0.00004	(-0.0021, 0.0020)	0.97
Log_{10} hair THg (μg/g)	**-0.12**	**(-0.21, -0.040)**	**0.004****		**-1.4**	**(-1.7, -1.1)**	**<0.001*****
Maternal age (years)	0.00075	(-0.0024, 0.0039)	0.64		**0.018**	**(0.0065, 0.029)**	**0.002****
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	0.0053	(-0.047, 0.037)	0.80		0.042	(-0.11, 0.19)	0.58
Overweight or obese	0.0088	(-0.045, 0.063)	0.75		0.11	(-0.086, 0.30)	0.27
Mother or father is a farmer (Yes)	**-0.062**	**(-0.10, -0.019)**	**0.005****		-0.11	(-0.27, 0.041)	0.15
Log_{10} Maternal energy intake (kcal)	0.024	(-0.097, 0.15)	0.70		-0.075	(-0.51, 0.36)	0.74
Maternal %calories from protein	0.0037	(-0.0042, 0.011)	0.36		-0.0045	(-0.033, 0.024)	0.75

*p<0.05 **p≤0.01 ***p≤0.001 p-value is for the Beta coefficient
BMI (body mass index), Hg (mercury), THg (total mercury)
[1]One mothers did not eat rice or fish, reducing the sample size from 236 to 235.

Table S12. Multivariable regression results relating maternal hair isotopes with rice methylmercury intake and fish methylmercury intake (Model C) (n=236 mothers). Same as Table 3 excluding mothers with imputed values.

	Hair Δ^{199}Hg (‰)				Hair δ^{202}Hg (‰)		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Log_{10} Rice MeHg intake (μg/day)	-0.024	(-0.059, 0.012)	0.19		-0.10	(-0.25, 0.043)	0.17
Log_{10} Fish MeHg intake (μg/day)	**0.026**	**(0.0069, 0.045)**	**0.008****		-0.026	(-0.10, 0.052)	0.51
Adjusted							
Log_{10} Rice MeHg intake (μg/day)	-0.026	(-0.068, 0.017)	0.23		-0.043	(-0.20, 0.11)	0.59
Log_{10} Fish MeHg intake (μg/day)	0.013	(-0.0084, 0.034)	0.23		-0.013	(-0.090, 0.065)	0.75
Log_{10} hair THg (μg/g)	**-0.12**	**(-0.20, -0.030)**	**0.008****		**-1.4**	**(-1.7, -1.1)**	**<0.001*****
Maternal age (years)	0.00064	(-0.0025, 0.0038)	0.69		**0.018**	**(0.0064, 0.029)**	**0.002****
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	0.0021	(-0.044, 0.040)	0.92		0.039	(-0.11, 0.19)	0.61
Overweight or obese	0.012	(-0.042, 0.066)	0.66		0.11	(-0.085, 0.30)	0.27
Mother or father is a farmer (Yes)	**-0.059**	**(-0.10, -0.016)**	**0.007****		-0.12	(-0.28, 0.032)	0.12
Log_{10} Maternal energy intake (kcal)	0.045	(-0.10, 0.19)	0.54		0.062	(-0.47, 0.59)	0.82
Maternal %calories from protein	0.0032	(-0.0047, 0.011)	0.42		-0.0087	(-0.037, 0.020)	0.55

*p<0.05 **p<0.01 ***p≤0.001 p-value is for the Beta coefficient
BMI (body mass index), Hg (mercury), THg (total mercury)

Table S13. Multivariable regression results relating maternal hair isotopes with serum omega-3 fatty acids and serum omega-6 fatty acids (Model D) (n=236 mothers). Same as Table 4 excluding mothers with imputed values.

	Hair Δ^{199}Hg (‰)				**Hair δ^{202}Hg (‰)**		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Log_{10} Serum N-3 Fatty Acids (mg/mL)	**0.27**	**(0.13, 0.41)**	**<0.001*** **		-0.073	(-0.65, 0.51)	0.62
Log_{10} Serum N-6 Fatty Acids (mg/mL)	0.040	(-0.28, 0.36)	0.80		0.19	(-1.2, 1.5)	0.78
Adjusted							
Log_{10} Serum N-3 Fatty Acids (mg/mL)	**0.28**	**(0.15, 0.41)**	**<0.001*** **		0.20	(-0.30, 0.70)	0.43
Log_{10} Serum N-6 Fatty Acids (mg/mL)	-0.072	(-0.38, 0.24)	0.65		-0.44	(-1.6, 0.72)	0.46
Log_{10} hair THg (μg/g)	**-0.14**	**(-0.22, -0.061)**	**0.001*** **		**-1.4**	**(-1.7, -1.1)**	**<0.001*** **
Maternal age (years)	0.0010	(-0.0020, 0.0041)	0.50		**0.018**	**(0.0070, 0.030)**	**0.002****
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	-0.013	(-0.054, 0.027)	0.52		0.035	(-0.12, 0.19)	0.65
Overweight or obese	0.0034	(-0.049, 0.055)	0.90		0.11	(-0.089, 0.30)	0.29
Mother or father is a farmer (Yes)	**-0.048**	**(-0.090, -0.0058)**	**0.03***		-0.12	(-0.28, 0.038)	0.14
Log_{10} Maternal energy intake (kcal)	-0.013	(-0.10, 0.13)	0.83		-0.041	(-0.47, 0.39)	0.85
Maternal %calories from protein	0.0053	(-0.0016, 0.012)	0.13		-0.0070	(-0.033, 0.019)	0.59

**p<0.01 ***p≤0.001 p-value is for the Beta coefficient

BMI (body mass index), Hg (mercury), N-3 fatty acids (docosahexaenoic acid, eicosapentaenoic acid, and alpha-linolenic acid), N-6 fatty acids (linoleic acid and arachidonic acid), THg (total mercury)

Table S14. Multivariable regression results relating maternal hair isotopes with fish weekly servings and daily rice ingestion (Model A) (n=252 mothers). Same as Table 1, excluding 13 participants with hair isotopes corresponding to exposures during more than one trimester.

	Hair Δ^{199}Hg (‰)				**Hair δ^{202}Hg (‰)**		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Fish weekly servings							
Never or rarely	(referent)				(referent)		
0 < servings/weekly ≤ 2	0.018	(-0.019, 0.055)	0.33		-0.053	(-0.21, 0.10)	0.50
≥ 2 servings/weekly	**0.082**	**(0.023, 0.14)**	**0.007****		-0.0011	(-0.25, 0.25)	0.99
Daily rice ingestion (Yes)	0.00084	(-0.050, 0.051)	0.97		-0.011	(-0.22, 0.20)	0.92
Adjusted							
Fish weekly servings							
Never or rarely	(referent)				(referent)		
0 < servings/weekly ≤ 2	0.0047	(-0.033, 0.043)	0.81		-0.038	(-0.18, 0.10)	0.59
≥ 2 servings/weekly	0.050	(-0.020, 0.12)	0.16		0.10	(-0.15, 0.35)	0.43
Daily rice ingestion (Yes)	-0.0056	(-0.069, 0.058)	0.86		0.0059	(-0.23, 0.24)	0.96
Log_{10} hair THg (μg/g)	**-0.12**	**(-0.20, -0.030)**	**0.008****		**-1.4**	**(-1.8, -1.1)**	**<0.001*****
Maternal age (years)	0.00082	(-0.0023, 0.0040)	0.61		**0.017**	**(0.0051, 0.028)**	**0.005****
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)				(referent)		
Normal weight	0.0051	(-0.036, 0.047)	0.81		0.050	(-0.10, 0.20)	0.52
Overweight or obese	0.0020	(-0.053, 0.057)	0.94		0.12	(-0.076, 0.33)	0.22
Mother or father is a farmer (Yes)	**-0.055**	**(-0.098, -0.013)**	**0.011***		-0.098	(-0.25, 0.058)	0.22
Log_{10} Maternal energy intake (kcal)	0.0014	(-0.15, 0.15)	0.99		-0.047	(-0.60, 0.51)	0.87
Maternal %calories from protein	0.0034	(-0.0049, 0.012)	0.42		-0.016	(-0.046, 0.014)	0.29

*p<0.05 **p≤0.01 ***p≤0.001 p-value is for the Beta coefficient
BMI (body mass index), Hg (mercury), THg (total mercury)

Table S15. Multivariable regression results relating maternal hair isotopes with %methylmercury intake from rice (Model B) (n=250 mothers)[1]. Same as Table 2, excluding 13 participants with hair isotopes corresponding to exposures during more than one trimester.

	Hair Δ^{199}Hg (‰)				**Hair δ^{202}Hg (‰)**		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
%MeHg intake from rice	**-0.00058**	**(-0.0011, -0.000071)**	**0.03***		0.00050	(-0.0017, 0.0027)	0.65
Adjusted							
%MeHg intake from rice	-0.00030	(-0.00087, 0.00028)	0.31		-0.00016	(-0.0023, 0.0020)	0.88
Log_{10} hair THg (μg/g)	**-0.12**	**(-0.20, -0.037)**	**0.005****		**-1.4**	**(-1.8, -1.1)**	**<0.001*****
Maternal age (years)	0.00075	(-0.0023, 0.0038)	0.63		**0.017**	**(0.0052, 0.028)**	**0.005****
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	0.0011	(-0.041, 0.039)	0.96		0.042	(-0.11, 0.19)	0.58
Overweight or obese	0.00080	(-0.053, 0.054)	0.98		0.12	(-0.077, 0.32)	0.22
Mother or father is a farmer (Yes)	**-0.060**	**(-0.10, -0.019)**	**0.005****		-0.093	(-0.25, 0.061)	0.23
Log_{10} Maternal energy intake (kcal)	0.023	(-0.095, 0.14)	0.70		-0.095	(-0.54, 0.35)	0.68
Maternal %calories from protein	0.0033	(-0.0048, 0.011)	0.42		-0.0084	(-0.039, 0.022)	0.59

*p<0.05 **p≤0.01 ***p≤0.001 p-value is for the Beta coefficient
BMI (body mass index), Hg (mercury), THg (total mercury)
[1]Two mothers did not eat rice or fish, reducing the sample size from 252 to 250.

Table S16. Multivariable regression results relating maternal hair isotopes with rice methylmercury intake and fish methylmercury intake (Model C) (n=252 mothers). Same as Table 3, excluding 13 participants with hair isotopes corresponding to exposures during more than one trimester.

	Hair Δ^{199}Hg (‰)				Hair δ^{202}Hg (‰)		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Log_{10} Rice MeHg intake (μg/day)	**-0.033**	**(-0.066, -0.00029)**	**0.048***		-0.14	(-0.28, 0.00043)	0.051
Log_{10} Fish MeHg intake (μg/day)	**0.024**	**(0.0057, 0.043)**	**0.011***		-0.038	(-0.12, 0.039)	0.33
Adjusted							
Log_{10} Rice MeHg intake (μg/day)	**-0.043**	**(-0.082, -0.0047)**	**0.03***		-0.098	(-0.24, 0.045)	0.18
Log_{10} Fish MeHg intake (μg/day)	0.012	(-0.0087, 0.034)	0.25		-0.014	(-0.093, 0.063)	0.72
Log_{10} hair THg (μg/g)	**-0.10**	**(-0.19, -0.019)**	**0.02***		**-1.4**	**(-1.7, -1.1)**	**<0.001*****
Maternal age (years)	0.00074	(-0.0024, 0.0039)	0.64		**0.017**	**(0.0051, 0.028)**	**0.005****
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	0.0033	(-0.037, 0.044)	0.87		0.042	(-0.11, 0.19)	0.58
Overweight or obese	0.0031	(-0.051, 0.057)	0.91		0.13	(-0.074, 0.33)	0.22
Mother or father is a farmer (Yes)	**-0.060**	**(-0.10, -0.018)**	**0.006****		-0.11	(-0.27, 0.043)	0.15
Log_{10} Maternal energy intake (kcal)	0.070	(-0.070, 0.21)	0.32		0.13	(-0.39, 0.65)	0.62
Maternal %calories from protein	0.0018	(-0.0063, 0.0099)	0.67		-0.015	(-0.044, 0.015)	0.34

*p<0.05 **p<0.01 ***p≤0.001 p-value is for the Beta coefficient
BMI (body mass index), Hg (mercury), THg (total mercury)

Table S17. Multivariable regression results relating maternal hair isotopes with serum omega-3 fatty acids and serum omega-6 fatty acids (Model D) (n=252 mothers) Same as Table 4, excluding 13 participants with hair isotopes corresponding to exposures during more than one trimester.

	Hair Δ^{199}Hg (‰)				**Hair δ^{202}Hg (‰)**		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Log_{10} Serum N-3 Fatty Acids (mg/mL)	**0.27**	**(0.13, 0.40)**	**<0.001*** **		-0.070	(-0.65, 0.51)	0.81
Log_{10} Serum N-6 Fatty Acids (mg/mL)	0.13	(-0.17, 0.44)	0.39		0.12	(-1.2, 1.5)	0.86
Adjusted							
Log_{10} Serum N-3 Fatty Acids (mg/mL)	**0.27**	**(0.14, 0.41)**	**<0.001*** **		0.16	(-0.34, 0.66)	0.54
Log_{10} Serum N-6 Fatty Acids (mg/mL)	0.030	(-0.28, 0.34)	0.85		-0.51	(-1.7, 0.66)	0.39
Log_{10} hair THg (μg/g)	**-0.13**	**(-0.21, -0.047)**	**0.002** **		**-1.5**	**(-1.8, -1.1)**	**<0.001*** **
Maternal age (years)	0.00062	(-0.0024, 0.0037)	0.69		**0.018**	**(0.0058, 0.029)**	**0.003** **
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	-0.0031	(-0.043, 0.036)	0.88		0.040	(-0.11, 0.19)	0.60
Overweight or obese	0.0041	(-0.057, 0.049)	0.88		0.12	(-0.081, 0.32)	0.24
Mother or father is a farmer (Yes)	**-0.046**	**(-0.087, -0.0051)**	**0.03***		-0.10	(-0.26, 0.053)	0.19
Log_{10} Maternal energy intake (kcal)	-0.0043	(-0.12, 0.11)	0.94		-0.081	(-0.52, 0.36)	0.72
Maternal %calories from protein	0.0053	(-0.0018, 0.012)	0.14		-0.0098	(-0.037, 0.017)	0.48

*p<0.05 **p<0.01 ***p≤0.001 p-value is for the Beta coefficient

BMI (body mass index), Hg (mercury), N-3 fatty acids (docosahexaenoic acid, eicosapentaenoic acid, and alpha-linolenic acid), N-6 fatty acids (linoleic acid and arachidonic acid), THg (total mercury)

Table S18. Multivariable regression results relating maternal hair isotopes with fish weekly servings and daily rice ingestion (Model A) (n=244 mothers). Same as Table 1, excluding 21 maternal hair samples from a previous analysis (Rothenberg et al., 2017).

	Hair Δ^{199}Hg (‰)				**Hair δ^{202}Hg (‰)**		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Fish weekly servings							
Never or rarely	(referent)				(referent)		
0 < servings/weekly ≤ 2	0.020	(-0.016, 0.056)	0.28		-0.057	(-0.21, 0.099)	0.47
≥ 2 servings/weekly	**0.062**	**(0.0010, 0.12)**	**0.046***		-0.0026	(-0.26, 0.26)	0.99
Daily rice ingestion (Yes)	0.0098	(-0.040, 0.060)	0.70		-0.018	(-0.23, 0.20)	0.87
Adjusted							
Fish weekly servings							
Never or rarely	(referent)				(referent)		
0 < servings/weekly ≤ 2	0.0064	(-0.032, 0.045)	0.74		-0.027	(-0.17, 0.11)	0.71
≥ 2 servings/weekly	0.035	(-0.036, 0.10)	0.33		0.13	(-0.13, 0.38)	0.33
Daily rice ingestion (Yes)	-0.0059	(-0.069, 0.057)	0.85		0.028	(-0.20, 0.25)	0.81
Log_{10} hair THg (μg/g)	**-0.088**	**(-0.17, -0.0056)**	**0.04***		**-1.5**	**(-1.8, -1.2)**	**<0.001*****
Maternal age (years)	0.00037	(-0.0027, 0.0034)	0.81		**0.016**	**(0.0053, 0.028)**	**0.004****
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)				(referent)		
Normal weight	0.0069	(-0.035, 0.048)	0.75		0.061	(-0.090, 0.21)	0.43
Overweight or obese	0.011	(-0.044, 0.065)	0.70		0.14	(-0.056, 0.34)	0.16
Mother or father is a farmer (Yes)	**-0.046**	**(-0.089, -0.0037)**	**0.03***		-0.13	(-0.29, 0.023)	0.09
Log_{10} Maternal energy intake (kcal)	0.049	(-0.10, 0.20)	0.53		-0.15	(-0.71, 0.41)	0.60
Maternal %calories from protein	0.0018	(-0.0062, 0.097)	0.67		-0.013	(-0.042, 0.016)	0.39

*p<0.05 **p≤0.01 ***p≤0.001 p-value is for the Beta coefficient
BMI (body mass index), Hg (mercury), THg (total mercury)

Table S19. Multivariable regression results relating maternalΔ^{199}Hg hair isotopes with %methylmercury intake from rice (Model B) (n=242 mothers).[1] Same as Table 2, excluding 21 maternal hair samples from a previous analysis (Rothenberg et al., 2017).

	Hair Δ^{199}Hg (‰)				**Hair δ^{202}Hg (‰)**		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
%MeHg intake from rice	-0.00042	(-0.00092, -0.000069)	0.09		0.00061	(-0.0015, 0.0028)	0.58
Adjusted							
%MeHg intake from rice	-0.00018	(-0.00073, 0.00038)	0.53		0.000042	(-0.0020, 0.0021)	0.97
Log_{10} hair THg (μg/g)	**-0.092**	**(-0.17, -0.012)**	**0.03***		**-1.5**	**(-1.8, -1.2)**	**<0.001*****
Maternal age (years)	0.00033	(-0.0026, 0.0033)	0.83		**0.017**	**(0.0058, 0.028)**	**0.003****
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	0.0012	(-0.039, 0.041)	0.95		0.052	(-0.098, 0.20)	0.50
Overweight or obese	0.010	(-0.043, 0.063)	0.71		0.14	(-0.057, 0.34)	0.16
Mother or father is a farmer (Yes)	**-0.050**	**(-0.091, -0.0086)**	**0.02***		-0.13	(-0.28, 0.026)	0.10
Log_{10} Maternal energy intake (kcal)	0.075	(-0.044, 0.19)	0.22		-0.16	(-0.60, 0.29)	0.49
Maternal %calories from protein	0.0014	(-0.0063, 0.0092)	0.72		-0.0043	(-0.033, 0.024)	0.77

*p<0.05 **p≤0.01 ***p<0.001 p-value is for the Beta coefficient

BMI (body mass index), Hg (mercury), THg (total mercury)

[1]Two mothers did not eat rice or fish, reducing the sample size from 244 to 242.

Table S20. Multivariable regression results relating maternal hair isotopes with rice methylmercury intake and fish methylmercury intake (Model C) (n=244 mothers). Same as Table 3, excluding 21 maternal hair samples from a previous analysis (Rothenberg et al., 2017).

	Hair Δ^{199}Hg (‰)				**Hair δ^{202}Hg (‰)**		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Log_{10} Rice MeHg intake (μg/day)	-0.015	(-0.049, 0.019)	0.39		-0.14	(-0.29, -0.0033)	0.055
Log_{10} Fish MeHg intake (μg/day)	**0.020**	**(0.0019, 0.039)**	**0.03***		-0.046	(-0.12, 0.032)	0.25
Adjusted							
Log_{10} Rice MeHg intake (μg/day)	-0.029	(-0.070, 0.012)	0.16		-0.085	(-0.23, 0.064)	0.26
Log_{10} Fish MeHg intake (μg/day)	0.011	(-0.010, 0.032)	0.32		-0.017	(-0.094, 0.059)	0.66
Log_{10} hair THg (μg/g)	-0.079	(-0.16, 0.0039)	0.06		**-1.5**	**(-1.8, -1.1)**	**<0.001*** **
Maternal age (years)	0.00026	(-0.0028, 0.0033)	0.87		**0.016**	**(0.0051, 0.027)**	**0.004****
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	0.0070	(-0.034, 0.048)	0.74		0.055	(-0.094, 0.20)	0.47
Overweight or obese	0.013	(-0.041, 0.067)	0.64		0.15	(-0.051, 0.34)	0.15
Mother or father is a farmer (Yes)	**-0.049**	**(-0.091, -0.0061)**	**0.03***		-0.14	(-0.30, 0.0098)	0.07
Log_{10} Maternal energy intake (kcal)	0.091	(-0.051, 0.23)	0.21		0.048	(-0.47, 0.57)	0.86
Maternal %calories from protein	0.00041	(-0.0075, 0.0083)	0.92		-0.011	(-0.040, 0.018)	0.45

*p<0.05 **p<0.01 ***p<0.001 p-value is for the Beta coefficient
BMI (body mass index), Hg (mercury), THg (total mercury)

Table S21. Multivariable regression results relating maternal hair isotopes with serum omega-3 fatty acids and serum omega-6 fatty acids (Model D) (n=244 mothers). Same as Table 4, excluding 21 maternal hair samples from a previous analysis (Rothenberg et al., 2017).

	Hair Δ^{199}Hg (‰)				**Hair δ^{202}Hg (‰)**		
	Beta	**(95% Confidence Interval)**	**p-value**		**Beta**	**(95% Confidence Interval)**	**p-value**
Unadjusted							
Log_{10} Serum N-3 Fatty Acids (mg/mL)	**0.29**	**(0.16, 0.42)**	**<0.001*** **		-0.043	(-0.61, 0.53)	0.88
Log_{10} Serum N-6 Fatty Acids (mg/mL)	0.046	(-0.26, 0.35)	0.77		-0.0015	(-1.4, 1.4)	1.0
Adjusted							
Log_{10} Serum N-3 Fatty Acids (mg/mL)	**0.30**	**(0.17, 0.42)**	**<0.001*** **		0.16	(-0.31, 0.64)	0.50
Log_{10} Serum N-6 Fatty Acids (mg/mL)	-0.020	(-0.33, 0.29)	0.90		-0.51	(-1.7, 0.67)	0.40
Log_{10} hair THg (μg/g)	**-0.10**	**(-0.18, -0.023)**	**0.011***		**-1.5**	**(-1.8, -1.2)**	**<0.001*** **
Maternal age (years)	0.00054	(-0.0024, 0.0035)	0.71		**0.017**	**(0.0063, 0.029)**	**0.002****
Pre-pregnancy BMI (kg/m^2)							
Underweight	(referent)						
Normal weight	-0.0013	(-0.040, 0.038)	0.95		0.051	(-0.098, 0.20)	0.50
Overweight or obese	0.0063	(-0.045, 0.058)	0.81		0.14	(-0.059, 0.33)	0.17
Mother or father is a farmer (Yes)	-0.035	(-0.076, 0.0052)	0.09		-0.14	(-0.29, 0.018)	0.08
Log_{10} Maternal energy intake (kcal)	0.056	(-0.058, 0.17)	0.34		-0.13	(-0.57, 0.31)	0.56
Maternal %calories from protein	0.0026	(-0.0043, 0.0094)	0.46		-0.0073	(-0.033, 0.019)	0.58

*p<0.05 **p<0.01 ***p≤0.001 p-value is for the Beta coefficient

BMI (body mass index), Hg (mercury), N-3 fatty acids (docosahexaenoic acid, eicosapentaenoic acid, and alpha-linolenic acid), N-6 fatty acids (linoleic acid and arachidonic acid), total mercury (THg)

Table S22. Spearman's correlation for continuous variables in regression models (n=265 mothers).

	Hair Δ^{199}Hg (‰)	Hair δ^{202}Hg (‰)	%MeHg intake from rice[1]	Rice MeHg intake (μg/day)	Fish MeHg intake (μg/day)	Serum N-3 Fatty Acids (mg/mL)	Serum N-6 Fatty Acids (mg/mL)	Hair THg (μg/g)	Maternal age (years)	Maternal energy intake (kcal)	Maternal %calories from protein
Hair Δ^{199}Hg (‰)	1										
Hair δ^{202}Hg (‰)	0.25	1									
%MeHg intake from rice[1]	-0.17	0.03	1								
Rice MeHg intake (μg/day)	-0.07	-0.16	0.15	1							
Fish MeHg intake (μg/day)	0.17	-0.07	-0.96	0.05	1						
Serum N-3 Fatty Acids (mg/mL)	0.25	-0.02	-0.14	-0.03	0.15	1					
Serum N-6 Fatty Acids (mg/mL)	0.15	-0.02	-0.08	-0.03	0.07	0.46	1				
Hair THg (μg/g)	-0.18	-0.54	-0.03	-0.18	0.06	0.11	-0.002	1			
Maternal age (years)	-0.05	0.11	0.04	-0.04	-0.04	0.02	0.06	0.08	1		
Maternal energy intake (kcal)	0.09	-0.09	-0.26	0.40	0.34	0.07	0.02	0.09	-0.008	1	
Maternal %calories from protein	0.17	-0.08	-0.47	0.08	0.49	0.07	0.10	0.01	-0.08	0.61	1

BMI (body mass index), Hg (mercury), MeHg (methylmercury), N-3 fatty acids (docosahexaenoic acid, eicosapentaenoic acid, and alpha-linolenic acid), N-6 fatty acids (linoleic acid and arachidonic acid), THg (total mercury)

[1]n=263

Table S23. Associations between categorical and continuous variables in regression models (n=265 mothers).

	Hair Δ^{199}Hg (‰) Median (range)	**p-value**	**Hair δ^{202}Hg (‰) Median (range)**	**p-value**	**%MeHg intake from rice[1] Median (range)**	**p-value**	**Rice MeHg intake (µg/day) Median (range)**	**p-value**	**Fish MeHg intake (µg/day) Median (range)**	**p-value**		
Fish consumption												
0 meals/weekly	0.11 (-0.15, 0.63)	0.006 **	0.50 (-0.89, 1.8)	0.79	100 (100, 100)	0.0001 ***	0.40 (0. 3.2)	0.29	0 (0, 0)	0.0001 ***		
0<meals/weekly<2 meals/weekly	0.13 (-0.09, 0.66)		0.39 (-0.69, 1.8)		54 (0.37, 97)		0.44 (0.004, 5.0)		0.43 (0.03, 1.3)			
≥2 meals/weekly	0.20 (-0.06, 0.61)		0.44 (-0.82, 1.8)		15 (0.30, 74)		0.55 (0.006, 2.1)		2.1 (0.36, 19)			
Daily rice ingestion												
No	0.12 (-0.05, 0.53)	0.79	0.52 (-0.51, 1.6)	0.70	100 (0.30, 100)	0.84	0.09 (0, 0.90)	<0.0001 ***	0 (0, 4.6)	0.17		
Yes	0.13 (-0.15, 0.06)		0.43 (-0.89, 1.8)		0.81 (3.6, 100)		0.47 (0.05, 5.0)		0.17 (0, 19)			
Mother or father is a farmer												
No	0.19 (-0.02, 0.62)	0.002 **	0.36 (-0.59, 1.7)	0.57	56 (2.9, 100)	0.0004 ***	0.51 (0.02, 3.4)	0.24	0.44 (0, 5.3)	<0.0001 ***		
Yes	0.12 (-0.15, 0.66)		0.44 (-0.89, 1.8)		94 (0.30, 100)		0.42 (0, 5.0)		0.03 (0, 19)			
Pre-pregnancy BMI												
Underweight	0.15 (-0.05, 0.61)	0.71	0.25 (-0.82, 1.8)	0.09	70 (0.30, 100)	0.32	0.37 (0.006, 5.0)	0.70	0.17 (0, 13)	0.32		
Normal weight	0.12 (-0.09, 0.63)		0.44 (-0.89, 1.8)		86 (2.4, 100)		0.43 (0, 4.1)		0.17 (0, 19)			
Overweight or Obese	0.15 (-0.15, 0.66)		0.64 (-0.46, 1.7)		91 (0.37, 100)		0.53 (0.004, 3.2)		0.03 (0, 15)			
	Serum N-3 Fatty Acids (mg/mL) Median (range)	**p-value**	**Serum N-6 Fatty Acids (mg/mL) Median (range)**	**p-value**	**Hair THg (µg/g) Median (range)**	**p-value**	**Maternal age (yrs) Median (range)**	**p-value**	**Maternal energy intake (kcal) Median (range)**	**p-value**	**Maternal %calories from protein Median (range)**	**p-value**
Fish consumption												
0 meals/weekly	0.12 (0.07, 0.42)	0.03*	1.5 (1.1, 2.4)	0.20	0.44 (0.13, 1.4)	0.78	28 (18, 42)	0.91	1780 (549, 4480)	0.0001 ***	9.9 (5.1, 19)	0.0001 ***
0<meals/weekly<2	0.13		1.5		0.48		28		2150		12	

meals/weekly	(0.06, 0.28)		(1.1, 2.4)		(0.15, 1.8)		(17, 42)		(602, 4440)		(6.8, 19)	
≥2 meals/weekly	0.14 (0.06, 0.40)		1.5 (1.2, 1.7)		0.52 (0.21, 0.89)		26 (17, 45)		2670 (1540, 4210)		15 (12, 25)	
Daily rice ingestion												
No	0.12 (0.06, 0.28)	0.71	1.5 (1.2, 2.0)	0.53	0.47 (0.24, 1.8)	0.77	28 (17, 42)	0.48	1150 (549, 2210)	<0.0001 ***	9.9 (5.1, 19)	0.011*
Yes	0.13 (0.06, 0.42)		1.5 (1.1, 2.4)		0.48 (0.13, 1.5)		27 (17, 45)		2163 (842, 4480)		12 (5.7, 25)	
Mother or father is a farmer												
No	0.14 (0.06, 0.40)	0.02*	1.5 (1.2, 2.4)	0.004**	0.46 (0.13, 1.8)	0.59	26 (17, 37)	0.06	2270 (585, 4070)	0.02*	13 (6.1, 21)	<0.0001 ***
Yes	0.12 (0.06, 0.42)		1.4 (1.1, 2.4)		0.48 (0.15, 1.5)		28 (17, 45)		1990 (549, 4480)		11 (5.1, 25)	
Pre-pregnancy BMI												
Underweight	0.12 (0.07, 0.40)	0.45	1.4 (1.2, 2.1)	0.53	0.50 (0.18, 1.5)	0.09	26 (17, 43)	0.07	2210 (606, 4480)	0.22	12 (6.3, 25)	0.04*
Normal weight	0.13 (0.06, 0.42)		1.5 (1.1, 2.4)		0.48 (0.13, 1.5)		28 (17, 45)		1984 (548, 4212)		11 (5.1, 19)	
Overweight or Obese	0.13 (0.06, 0.26)		1.5 (1.1, 2.4)		0.43 (0.19, 1.8)		27 (17, 38)		1990 (602, 4440)		12 (5.7, 22)	

*p<0.05, **p<0.01, ***p<0.001 p-value is for Wilcoxon rank sum test or Kruskal-Wallis test

BMI (body mass index), Hg (mercury), MeHg (methylmercury), N-3 fatty acids (docosahexaenoic acid, eicosapentaenoic acid, and alpha-linolenic acid), N-6 fatty acids (linoleic acid and arachidonic acid), THg (total mercury)

[1]n=263

LEGEND FOR DATASET S1

DATASET S1. Worksheet A. Hair total mercury (THg) concentrations and hair mercury (Hg) isotopes (n=265).

DATASET S1. Worksheet B. Quality assurance and quality control for isotopes

SUPPORTING INFORMATION REFERENCES

1. C. Hong, X. Yu, J. Liu, Y. Cheng and S.E. Rothenberg. Low-level methylmercury exposure through rice ingestion in a cohort of pregnant mothers in rural China. *Environ. Res*., 2016, **150**, 519-527.

2. S.E. Rothenberg, R. Yin, J.P. Hurley, D.P. Krabbenhoft, Y. Ismawati, C. Hong and A. Donohue. Stable mercury isotopes in polished rice (*Oryza sativa* L.) and hair from rice consumers. *Environ. Sci. Technol*., 2017, **51**, 6480-6488.

3. S.E. Rothenberg, X. Yu, J. Liu, F.J. Biasini, C. Hong, X. Jiang, Y. Nong, Y. Cheng and S.A. Korrick. Maternal methylmercury exposure through rice ingestion and offspring neurodevelopment: a prospective cohort study. *Int. J. Hyg. Environ. Health*, 2016, **219**, 832-842.

4. S.E. Rothenberg, S.A. Korrick, J. Liu, Y. Nong, H. Nong, C. Hong, E.P. Trinh, X. Jiang and F.J. Biasini, F. Ouyang. Maternal methylmercury exposure through rice ingestion and child neurodevelopment in the first three years: a prospective cohort study in rural China. *Environ. Health*. 2021, DOI: 10.1186/s12940-021-00732-z.

5. Y. Cheng, M.J. Dibley, X. Zhang, L. Zeng and H. Yan. Assessment of dietary intake among pregnant women in a rural area of western China. *BMC Public Health*., 2009; DOI: 10.1186/1471-2458-9-222.

6. U.S. Food and Drug Administration. Consumer Advisory: An Important Message for Pregnant Women of Childbearing Age Who May Become Pregnant and the Risks of Mercury in Fish. 2001. www.rst2.org/ties/mercury/University/pdfs/me35.pdf Accessed 27 July 2024.

7. N.S. Bloom. On the chemical form of mercury in edible fish and marine invertebrate tissue. *Can. J. Fish Aquat. Sci.,* 1992, **49**, 1010-1017.

8. T.W. Clarkson and L. Magos. The toxicology of mercury and its chemical compounds. *Crit. Rev. Toxicol.,* 2006, **36**, 609-662.

9. G. Loussouarn, C. El Rawadi and G. Genain. Diversity of hair growth profiles. *Int. J. Dermatol*., 2005, **44**, 6-9.

10. U.S. Environmental Protection Agency. Method 1631, Revision E: Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry. Washington, DC. 2002. www.epa.gov/sites/default/files/2015-08/documents/method_1631e_2002.pdf. Accessed 27 July 2024.

11. L. Liang, M. Horvat, E. Cernichiari, B. Gelein, S. Balogh. Simple solvent extraction technique for elimination of matrix interferences in the determination of methylmercury in environmental and biological samples by ethylation-gas chromatography-cold vapor atomic fluorescence spectrometry. *Talanta*, 1996, **43**, 1883-1888.

12. U.S. Environmental Protection Agency. Method 1630, Methyl Mercury in Water by Distillation, Aqueous Ethylation, Purge and Trap, and Cold Vapor Atomic Spectrometry. Environmental Protection Agency, Washington, DC. 2001. www.epa.gov/sites/default/files/2015-08/documents/method_1630_1998.pdf Accessed 27 July 2024.

13. U.S. Environmental Protection Agency. Method 7473, Mercury in Solids and Solutions by Thermal Decomposition, Amalgamation and Atomic Absorption Spectrophotometry. Environmental Protection Agency, Washington, DC. 2007. www.epa.gov/sites/default/files/2015-07/documents/epa-7473.pdf Accessed 27 July 2024.

14. S.E. Janssen, R.F. Lepak, M.T. Tate, J.M. Ogorek, J.F. DeWild, C.L. Babiarz, J.P. Hurley and D.P. Krabbenhoft. Rapid pre-concentration of mercury in solids and water for isotopic analysis. *Anal. Chim. Acta,* 2019, **1054**, 95-103.

15. R. Yin, D.P. Krabbenhoft, B.A. Bergquist, W. Zheng, R.F. Lepak and J.P. Hurley. Effects of mercury and thallium concentrations on high precision determination of mercury isotope composition by Neptune Plus multiple collector inductively coupled plasma mass spectrometry. *J. Anal. At. Spectrom*., 2016, **31**, 2060-2068.

16. B. Du, X. Feng, P. Li, R. Yin, B. Yu, J.E. Sonke, B. Guinot, C.W.N. Anderson and L. Maurice. Use of mercury isotopes to quantify mercury exposure sources in inland populations, China. *Environ. Sci. Technol*. 2018, **52**, 5407-5416.

17. P. Li, B. Du, L. Maurice, L. Laffont, C. Lagane, D. Point, J.E. Sonke, R. Yin, C. Lin and X. Feng. Mercury isotope signatures of methylmercury in rice samples from the Wanshan mercury mining area, China: environmental implications. *Environ Sci Technol*., 2017, **51**, 12321-12328.

18. S. Yang, B. Wang, C. Qin, R. Yin, P. Li, J. Liu, D. Point, L. Maurice, J.E. Sonke, L. Zhang and X. Feng. Compound-specific stable isotope analysis provides new insights for tracking human monomethylmercury exposure sources. *Environ Sci Technol*., 2021, **55**, 12493-12503.

19. M. Bonsignore, S. Tamburrino, E. Oliveri, A. Marchetti, C. Durante, A. Berni, E. Quinci and M. Sprovieri. Tracing mercury pathways in Augusta Bay (southern Italy) by total concentration and isotope determination. *Environ. Pollut*. 2015, **205**, 178-185.

20. M. Li, L.S. Sherman, J.D. Blum, P. Grandjean, B. Mikkelsen, P. Weihe, E.M. Sunderland and J.P. Shine. Assessing sources of human methylmercury exposure using stable mercury isotopes. *Environ Sci Technol*., 2014, **48**, 8800-8806.

21. L.S. Sherman, J.D. Blum, N. Basu, M. Rajaee, D.C. Evers, D.G. Buck, J. Petrik and J. DiGangi. Assessment of mercury exposure among small-scale gold miners using mercury stable isotopes. *Environ. Res*. 2015, **137**, 226-234.

22. L.S. Sherman, J.D. Blum, A. Franzblau and N. Basu. New insight into biomarkers of human mercury exposure using naturally occurring mercury stable isotopes. *Environ Sci Technol*., 2013; **47**, 3403-3409.

23. L. Laffont, J.E. Sonke, L. Maurice, S.L. Monrroy, J. Chincheros, D. Amouroux and P. Behra. Hg speciation and stable isotope signatures in human hair as a tracer for dietary and occupational exposure to mercury. *Environ. Sci. Technol*., 2011, **45**, 9910-9916.

24. L. Laffont, J.E. Sonke, L. Maurice, H. Hintelmann, M. Pouilly, Y.S. Bacarreza, T. Perez and P. Behra. Anomalous mercury isotopic compositions of fish and human hair in the Bolivian Amazon. *Environ. Sci. Technol*. 2009, **43**, 8985-8990.

25. World Health Organization (WHO) Expert Consultation. Appropriate body-mass index for Asian populations and its implications for policy and intervention strategies. *Lancet*, 2004, **363**, 157-163.