

Dietary and Household Sources of Prenatal Exposure to Polybrominated Diphenyl Ethers (PBDEs) in the INMA Birth Cohort (Spain)

Olga Costa,[†] Maria-Jose Lopez-Espinosa,^{*,†,‡} Esther Vizcaino,^{§,||} Mario Murcia,^{‡,†} Carmen Iñiguez,^{†,‡} Eva M. Navarrete-Muñoz,^{‡,⊥} Joan O. Grimalt,^{||} Adonina Tardon,^{§,‡} Ferran Ballester,^{†,‡} and Ana Fernandez-Somoano^{§,‡}

[†]Epidemiology and Environmental Health Joint Research Unit, FISABIO–Universitat Jaume I–Universitat de València, Avenida de Catalunya 21, 46020 Valencia, Spain

[‡]Spanish Consortium for Research on Epidemiology and Public Health (CIBERESP), Calle Monforte de Lemos 3-5, 28029 Madrid, Spain

[§]Department of Preventive Medicine and Public Health, University of Oviedo, Campus del Cristo s/n, 33006 Oviedo, Asturias, Spain

^{||}Department of Environmental Chemistry, Institute of Environmental Assessment and Water Research (IDÆA-CSIC), Jordi Girona 18, 08034 Barcelona, Spain

[⊥]Department of Public Health, Miguel Hernandez University, Ctra. Nacional 332, San Juan de Alicante, 03550 Alicante, Spain

Corresponding author: *Maria-Jose Lopez-Espinosa

Foundation for the Promotion of Health and Biomedical Research in the Valencian Region, FISABIO-Public Health, Avda Catalunya 21, 46020 Valencia, Spain. E-mail: lopez_josp@gva.es; Phone: (+34) 961925941.

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Table S1. Definition of food groups: The Asturias and Valencia INMA Cohorts (Spain), 2003-2008

Food groups	Foods
Eggs	Eggs
Dairy products	Whole milk; semi-skimmed milk; skimmed or low-fat milk; condensed milk; full cream; whole fat yogurt; low-fat yogurt; whole-fat cheese; low-fat cheese; custard, creme caramel, pudding; and ice-cream
Meat	Chicken or turkey; game (duck, quail, and rabbit); beef, pork or lamb; liver; offal; hamburger; ham, salami and others; sausages; pate; and bacon
Cereals and pasta	Breakfast cereals; corn; rice; and pasta
Vegetables and pulses	Spinach; cabbage, cauliflower or broccoli; lettuce or endive; tomatoes; onions; carrots or squash; green beans; eggplant, zucchini, or cucumber; green, red, or yellow peppers; artichokes; asparagus; garlic; and pulses
Fruits	Oranges; orange juice; bananas; apples or pears; peaches, nectarines, or apricots; watermelon or melon; grapes; prunes or plums; kiwis; and olives
Shellfish and cephalopods	Crabs, shrimps, or lobster; clams or mussels; and squid and octopus
Fish	Lean fish; large oily fish; other oily fish; and other fish
Lean fish	Hake, sole, gilthead and similar types of white fish
Large oily fish	Swordfish, bonito, and fresh tuna; and canned tuna
Other oily fish	Mackerel, sardine, anchovy, or salmon; and canned sardine or mackerel
Other fish	Assorted or mixed fried fish; dry or smoked fish; and surimi and other fish-based food products

Table S2. Study population: The Asturias and Valencia INMA Cohorts (Spain), 2003-2008

	Excluded (n=731)	Included (n=541)	OR^a	p^a
Age: yrs	30.3 (4.6)	30.8 (4.5)	0.99	0.61
Height: cm	162.1 (6.2)	162.2 (6.3)	1.00	0.83
BMI: kg/m ²	23.9 (4.7)	23.7 (4.3)	0.99	0.45
Country of birth: n(%)				0.39
Spain	654 (90)	507 (94)	ref	
Other	77 (11)	34 (6)	0.82	
Area of residence: n(%)				0.68
No rural	674 (92)	489 (90)	ref	
Rural	57 (8)	52 (10)	0.92	
Working ^b : n(%)				<0.001
No	161 (22)	105 (19)	ref	
Yes	570 (78)	436 (81)	1.56	
Parity: n(%)				0.39
Primiparous	405 (55)	324 (60)	ref	
Multiparous	326 (45)	217 (40)	0.90	
Previous lactation: n(%)				0.87
None	470 (64)	358 (66)	ref	
< 6 months	136 (19)	104 (19)	1.00	
≥ 6 months	125 (17)	78 (14)	1.09	
Education: n(%)				0.23
Until primary	225 (31)	130 (24)	ref	
Secondary	324 (44)	227 (42)	0.96	
University	182 (25)	184 (34)	1.22	
Social class ^c : n(%)				0.31
I (highest)	165 (23)	162 (30)	ref	
II (medium)	195 (27)	127 (24)	0.81	
III (lowest)	371 (51)	251 (47)	0.81	
Smoking ^b				0.23
No	429 (60)	358 (68)	ref	
Yes	282 (40)	167 (32)	0.85	
Passive smoking ^d : n(%)				0.33
No	213 (30)	220 (42)	ref	
Yes	492 (70)	301 (58)	0.88	
Alcohol intake ^b : n(%)				0.93
No	611 (84)	479 (89)	ref	
Yes	113 (16)	61 (11)	0.98	

Values are *n* (%) or mean (standard deviation). BMI: Body mass index (before pregnancy). ^aInclusion OR and p-value from logistic models adjusted by cohort; ^bAt week 12 of pregnancy; ^cClass I: managerial jobs, senior technical staff, and commercial managers, Class II: skilled nonmanual workers, Class III: manual workers; ^dIn at least two environments from among home, workplace, and leisure areas or restaurants.

Table S3. Dietary and household-level factors: The Asturias and Valencia INMA Cohorts (Spain), 2003-2008

	Excluded (n=731)	Included (n=541)	OR^a	p^a
Dietary variables				
Eggs: g/d	20.1 (8.2)	20.8 (8.2)	1.01	0.18
Dairy products: g/d	539.3 (241.8)	558.9 (241.4)	0.94	0.01
Meat: g/d	121.7 (46.8)	106.4 (41.6)	0.90	0.48
Cereals and pasta: g/d	111.1 (43.8)	95.3 (43.1)	0.78	0.09
Veg. and pulses: g/d	246.9 (117)	245.6 (121.2)	0.96	0.40
Fruits: g/d	314.4 (181.6)	344.8 (207.3)	1.03	0.36
Shellfish and ceph.: g/d	12.6 (10.7)	11.5 (9.2)	0.34	0.08
Fish: g/d	62.3 (37)	70.7 (41.4)	1.03	0.86
Lean fish: sv/wk	1.2 (1)	1.2 (1)	1.02	0.73
Large oily fish: sv/wk	2.2 (1.5)	2.4 (1.6)	0.97	0.50
Other oily fish: sv/wk	0.6 (0.9)	0.6 (0.8)	0.95	0.53
Other fish: sv/wk	1.3 (1.4)	1.5 (1.3)	0.98	0.71
Household variables				
House size: m ²	104.5 (44.3)	99.9 (54.8)	1.00	0.47
Curtains at home: n(%)				0.67
No	33 (5)	33 (6)	ref	
Yes	677 (95)	492 (94)	0.89	
Carpets at home: n(%)				0.48
No	398 (56)	255 (49)	ref	
Yes	309 (44)	270 (51)	0.91	
Mattress: n(%)				0.37
Innerspring	455 (67)	322 (64)	ref	
Foam	222 (33)	180 (36)	1.13	
Housekeeping: n(%)				0.46
>1 t/wk	391 (55)	326 (62)	ref	
≤1 t/wk	318 (45)	199 (38)	1.10	
TV use: h/wk	16.2 (8.9)	15 (7.9)	1.00	0.88

Values are *n* (%) or mean (standard deviation).

Ceph.: cephalopods; g/d: grams per day; h/wk: hours per week; sv/w: servings per week; t/wk: times per week; Veg.: Vegetables.

^aInclusion OR and p-value from logistic models adjusted by cohort. For daily intake variables, OR are expressed for each 100 g increase in daily intake.

Table S4. Sensitivity analysis: The Asturias and Valencia INMA Cohorts (Spain), 2003-2008

	Main analysis ^a			Adding lipids ^a			Dichotomized BDE-209 ^b		
	%change	(95%CI)	p	%change	(95%CI)	p	OR	(95%CI)	p
BDE-47									
Shellfish and ceph.	13.6	(0.03, 29.0)	0.050	9.6	(-3.3, 24.2)	0.152	-	-	-
Fish	13.2	(-0.5, 28.8)	0.061	12.9	(-0.8, 28.5)	0.067	-	-	-
Large oily fish	6.8	(-0.3, 14.4)	0.061	6.7	(-0.4, 14.3)	0.065	-	-	-
Foam mattress	6.3	(-14.7, 32.4)	0.588	6.6	(-14.4, 32.7)	0.569	-	-	-
Housekeeping: >1 t/wk	15.7	(-6.9, 43.8)	0.188	15.8	(-6.8, 43.8)	0.186	-	-	-
BDE-99									
Shellfish and ceph.	21.1	(2.3, 43.5)	0.027	18.6	(-0.0, 40.6)	0.051	-	-	-
Fish	20.8	(1.7, 43.4)	0.032	19.7	(0.9, 42.0)	0.039	-	-	-
Large oily fish	13.8	(4.0, 24.7)	0.005	13.6	(3.8, 24.3)	0.006	-	-	-
Foam mattress	-11.8	(-34.4, 18.6)	0.407	-11.4	(-34.0, 19.0)	0.422	-	-	-
Housekeeping: >1 t/wk	2.9	(-22.8, 37.1)	0.847	3.2	(-22.4, 37.4)	0.827	-	-	-
BDE-153									
Shellfish and ceph.	1.4	(-15.1, 21.0)	0.879	1.7	(-14.9, 21.4)	0.854	-	-	-
Fish	8.2	(-9.4, 29.2)	0.387	8.4	(-9.2, 29.5)	0.372	-	-	-
Large oily fish	8.8	(-1.2, 19.7)	0.086	8.8	(-1.1, 19.8)	0.083	-	-	-
Foam mattress	8.2	(-19.6, 45.7)	0.602	8.2	(-19.6, 45.6)	0.605	-	-	-
Housekeeping: >1 t/wk	35.9	(0.4, 83.9)	0.046	35.9	(0.4, 83.8)	0.046	-	-	-
BDE-209									
Shellfish and ceph.	21.7	(0.4, 47.5)	0.045	22.9	(1.3, 49.0)	0.036	1.023	(1.001, 1.046)	0.039
Fish	14.9	(-7.1, 42.2)	0.200	15.2	(-6.9, 42.6)	0.192	1.003	(0.998, 1.006)	0.276
Large oily fish	8.0	(-3.5, 20.8)	0.182	8.1	(-3.4, 20.9)	0.177	1.088	(0.942, 1.253)	0.248
Foam mattress	48.9	(5.8, 109.7)	0.023	48.0	(5.2, 108.3)	0.025	1.593	(1.021, 2.487)	0.040
Housekeeping: >1 t/wk	-14.7	(-39.5, 20.2)	0.364	-14.8	(-39.5, 20.1)	0.363	0.903	(0.584, 1.404)	0.648

ΣPBDEs									
Shellfish and ceph.	11.5	(2.2, 21.7)	0.015	11.5	(2.2, 21.7)	0.015	-	-	-
Fish	9.1	(-0.03, 19.0)	0.051	9.0	(-0.1, 19.0)	0.053	-	-	-
Large oily fish	5.7	(0.8, 10.8)	0.021	5.7	(0.8, 10.8)	0.022	-	-	-
Foam mattress	8.9	(-6.0, 26.2)	0.255	9.0	(-5.9, 26.2)	0.253	-	-	-
Housekeeping: >1 t/wk	4.6	(-9.8, 21.4)	0.550	4.7	(-9.8, 21.4)	0.548	-	-	-

Ceph.: cephalopods; PBDE: Polybrominated diphenyl ether; t/wk: times per week; Σ PBDEs: Sum of BDE-47, -99, -153, and -209.

^aPercentage change and 95% CI in cord serum PBDE concentrations per interquartile range (IQR) increment in daily intake of shellfish and cephalopods and fish (10.8 and 48.0 g/day, respectively) and per 1-serving increment in weekly intake of large oily fish. Percentage change and 95% CI in cord serum PBDE concentrations with respect to the reference category, being “innerspring” for type of mattress and “ ≤ 1 times/week” for frequency of housekeeping. ^bOR, 95% CI and p-value from logistic models. Categories of dichotomized BDE-209: <LOD, \geq LOD.

Models adjusted by alcohol intake (BDE-47, -99), working at week 12 of pregnancy (BDE-153, Σ PBDEs), country of birth and season of the last menstrual period (BDE-209), and total energy intake (all models).

Results are only presented for those variables which were statistically significant in the main analysis.

Table S5. Association between PBDEs and seafood intake or household-level factors stratified by cohort: The Asturias and Valencia INMA Cohorts (Spain), 2003-2008

	Stratified: Asturias			Stratified: Valencia		
	%change	(95%CI)	p	%change	(95%CI)	p
BDE-47						
Shellfish and ceph.	13.9	(-8.3, 41.5)	0.241	11.4	(-5.6, 31.4)	0.203
Fish	21.1	(-0.8, 47.8)	0.059	-5.2	(-23.2, 17.0)	0.618
Large oily fish	10.1	(-1.2, 22.7)	0.082	0.3	(-9.5, 11.2)	0.952
Foam mattress	3.5	(-29.2, 51.5)	0.224	8.5	(-17.5, 42.7)	0.559
Housekeeping: >1 t/wk	29.2	(-14.5, 95.5)	0.223	8.7	(-15.4, 39.6)	0.514
BDE-99						
Shellfish and ceph.	16.0	(-15.4, 59.1)	0.358	19.7	(-2.0, 46.1)	0.078
Fish	19.3	(-10.4, 58.9)	0.226	8.4	(-16.1, 40.0)	0.537
Large oily fish	15.6	(-0.9, 34.9)	0.066	8.5	(-4.1, 22.9)	0.197
Foam mattress	-29.9	(-60.4, 24.2)	0.221	3.6	(-25.6, 44.2)	0.834
Housekeeping: >1 t/wk	-5.4	(-47.4, 70.1)	0.852	13.5	(-16.2, 53.7)	0.415
BDE-153						
Shellfish and ceph.	3.8	(-18.0, 31.4)	0.757	-10.8	(-33.1, 19.0)	0.437
Fish	17.2	(-6.4, 46.8)	0.169	-24.2	(-45.5, 5.4)	0.099
Large oily fish	15.9	(2.4, 31.1)	0.020	-8.6	(-22.3, 7.4)	0.272
Foam mattress	-11.8	(-42.8, 35.9)	0.568	36.7	(-8.8, 105.0)	0.130
Housekeeping: >1 t/wk	47.5	(-8.6, 137.8)	0.109	26.0	(-13.8, 84.2)	0.233
BDE-209						
Shellfish and ceph.	19.4	(-18.8, 75.7)	0.367	23.5	(-1.0, 54.1)	0.062
Fish	8.2	(-26.8, 59.9)	0.692	10.0	(-17.6, 47.0)	0.519
Large oily fish	2.2	(-17.6, 26.7)	0.842	8.9	(-4.8, 24.5)	0.217
Foam mattress	18.0	(-45.0, 153.2)	0.671	73.5	(23.2, 144.4)	0.002
Housekeeping: >1 t/wk	-8.4	(-59.4, 106.5)	0.833	-20.3	(-42.6, 10.8)	0.178
ΣPBDEs						
Shellfish and ceph.	8.1	(-2.9, 20.3)	0.157	13.1	(-3.1, 31.9)	0.119
Fish	9.4	(-1.2, 21.1)	0.085	-2.5	(-18.5, 16.7)	0.786
Large oily fish	5.2	(-0.6, 11.3)	0.078	3.8	(-4.9, 13.4)	0.403
Foam mattress	0.02	(-17.4, 21.1)	0.998	22.9	(-2.3, 54.5)	0.079
Housekeeping: >1 t/wk	2.9	(-16.4, 26.6)	0.790	5.9	(-14.3, 30.9)	0.597

Ceph.: cephalopods; PBDE: Polybrominated diphenyl ether; t/wk: times per week; ΣPBDEs: Sum of BDE-47, -99, -153, and -209. Percentage change and 95% CI in cord serum PBDE concentrations per interquartile range (IQR) increment in daily intake of shellfish and cephalopods and fish (10.8 and 48.0 g/day, respectively) and per 1-serving increment in weekly intake of large oily fish. Percentage change and 95% CI in cord serum PBDE concentrations with respect to the reference category, being “innerspring” for type of mattress and “≤1 times/week” for frequency of housekeeping.

Models adjusted by alcohol intake (BDE-47, -99), working at week 12 of pregnancy (BDE-153, Σ PBDEs), country of birth and season of the last menstrual period (BDE-209), and total energy intake (all models).

Results are only presented for those variables which were statistically significant in the joint models.