



National report on the implementation of the project including data analysis and integrated interpretation

Slovak Republic – Úrad verejného zdravotníctva SR N°15

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I. Introduction

The aim of the Slovak participation in DEMOCOPHES was to obtain and contribute with Slovak data to the harmonization of human biomonitoring.

The primary aim of DEMOCOPHES is to test the feasibility of an EU-HBM approach, generating comparable data. Two sub-populations of priority are addressed in this study:

- a) Children (age group of 6 to 11 years)
- b) Mothers representing women at childbearing age (age group ≤ 45 years)

A sample of 240 individuals (120 children and 120 mothers) per participating country and half of that for the smaller countries was aimed. Children and mother pairs are recruited from 2 sampling locations according to the degree of urbanisation using the upper and lower category (big city vs. rural) in each participating country, not including hot-spots.

Performing of this study was approved by national Ethics Committee.

II. Recruitment

2.1 Sampling locations

Bratislava (urban area) as a capital city of the Slovak republic have district with a mixed population regarding socio-economical structure (as every big city in the European Union). Bratislava is the biggest city in Slovakia and for this reason has been selected as a urban sampling location for the pilot study of the Democophes project in Slovakia. District of Bratislava (urban) has 462.603 inhabitants and a population density of 1258 inhabitants per square kilometer.

Recruitment of 60 children together with their respective mothers has been done via schools. To obtain at least 300 children in the age cohort from 6 to 11 (SOP recommendation) we have



decided to select more than 550 mothers and children to be able to have enough candidates for recruitment of participants.

Four schools (in different Bratislava districts: Lamač, Karlova Ves (Dlhé Diely), Ružinov and Petržalka) with all socio-economic status groups, with high degree of urbanization and which are commuter areas of the “big city” area have been selected:

Lamač (School name: Malokarpatské nám.)

number of inhabitants: 6804

Karlova Ves (School name: Veternicová)

number of inhabitants: 34 772, population density: 3 000 inhab. per square km

Ružinov (School name: Drieňová)

number of inhabitants: 72 360, population density: 1 768 inhab. per square km

Petržalka (School name: Lachova)

number of inhabitants: 111 778, population density: 4 087 inhab. per square km

Schools in every part of the capital city Bratislava are public schools and parents/children belong to different socio-economic background. Selected schools had 623 children in the age from 6 to 11 (school in Lamač: 201 pupils, school in Karlova Ves: 122 pupils, school in Ružinov: 182 pupils, school in Petržalka: 118 pupils).

Banská Bystrica (rural area) district with a mixed population regarding socio-economical structure has been selected as a rural sampling location for the pilot study of the Democophes project. District of Banská Bystrica has 111 026 inhabitants and a population density of 137 inhabitants per square kilometer.

Recruitment of 60 children together with their respective mothers has been done via schools. To obtain at least 300 children in the age cohort from 6 to 11 (SOP recommendation) we have decided to select two villages with all socio-economic status groups, with low degree of urbanization and which are not commuter areas of the “big city” area:

Slovenska Lupca

number of inhabitants: 3080, population density: 95, 3 inhab. per square km

Brusno

number of inhabitants: 2153, population density: 49, 5 inhab. per square km

Schools in both villages are public schools and parents/children belong to different socio-economic background. Selected schools had 367 children in the age from 6 to 11 (school in Slovenska Lupca: 228 pupils, school in Brusno: 139 pupils).

2.2 Selection of participants

Bratislava



After the selection of schools, directors of selected schools have been asked to give their permissions and lists of children in classes 1 through 5 with name. Survey office staff decided to inform parents of these children about DEMOCOPHES project during the parental meetings at schools. Survey office staff gave invitation letters and responder reply cards to the parents according to selected children born in the years 2000 to 2005. All children of the selected classes with age between 6 and 11 years have been asked for participation by their parents (mothers). For each selected child-mother envelope with invitation letter, office staff gave to the parents, an, information leaflet, reply card and leaflets with information about mercury, cadmium, cotinine, and phthalates have been prepared.

After a dialogue with directors of selected schools, survey and tasks of the pupils and their mothers have been explained to the teachers. Teachers had been informed, that every pupil who brings back the reply card, will receive a small incentive regardless the fact pupil will take part in the study or not.

Tab. 1: Number of children invited to the study by sex and age groups (urban area)

	Years of born						total
	2000	2001	2002	2003	2004	2005	
boys	32	45	49	58	63	28	275
girls	39	58	79	55	68	49	348
total	71	103	128	113	131	77	623

Selection of participants - time schedule:

Lamač (Malokarpatské nám.):

- meeting with director of the school: june 2011
- parental meeting at school, handing out the envelopes with invitation letters, information leaflets and reply cards: 19.9.2011
- collection of the envelopes with reply card by survey office staff: 4.10.2011
- meeting with teachers, handing out the envelopes with reminder letter and reply cards: 6.10.2011
- collection of the envelopes with reply card after reminder letter by survey office staff: 21.10.2011

Karlova Ves (Veternicová):

- meeting with director of the school: june 2011
- parental meeting at school, handing out the envelopes with invitation letters, information leaflets and reply cards: 21.9.2011
- collection of the envelopes with reply card by survey office staff: 4.10.2011



- meeting with teachers, handing out the envelopes with reminder letter and reply cards: 6.10.2011
- collection of the envelopes with reply card after reminder letter by survey office staff: 21.10.2011

Ružinov (Drieňová):

- meeting with director of the school: june 2011
- parental meeting at school, handing out the envelopes with invitation letters, information leaflets and reply cards: 3.10.2011
- collection of the envelopes with reply card by survey office staff: 10.10.2011
- meeting with teachers, handing out the envelopes with reminder letter and reply cards: 21.10.2011
- collection of the envelopes with reply card after reminder letter by survey office staff: 24.10.2011

Petržalka (Lachova):

- meeting with director of the school: september 2011
- parental meeting at school, handing out the envelopes with invitation letters, information leaflets and reply cards: 26.10.2011
- collection of the envelopes with reply card by survey office staff: 2.11.2011

Starting date of urban field work: 14.11.2011

Finishing date of urban field work: 31.1.2012

A member of survey staff has collected the reply cards hidden in envelopes from teachers in each school. The survey office has evaluated the reply cards.

Summary of the evaluation of the reply cards:

- number of reply cards distributed: 623 (Lamač - 201, Karlova Ves - 122, Ružinov - 182, Petržalka - 118),
- number of reply cards with acceptance of the invitation: 69 - 11,08 % (Lamač - 14, Karlova Ves - 26, Ružinov - 25, Petržalka - 4),
- number of reply cards with definitive refusal: 121 - 19,4 % (Lamač - 8, Karlova Ves - 63, Ružinov - 46, Petržalka - 4),
- number of unreturned reply cards: 433 - 69,50 %

- number of reminder letters: 398
- number of acceptations after reminder letter: 21 - 5,28 %
- number of refusals after reminder letter: 60 - 15,08 %

Because of low percentage of accepting reply cards we decided to agreed with every participant who accepted to be involve in the study under the proposition DEMOCOPHES study.



After evaluation of the reply cards the members of field work started to call the mothers to ask remaining questions checking the inclusion criteria (age of mother, language ability, place of residence and health status) by means of recruitment questionnaire and if eligible, to fix a date and place of the meeting. Within recruitment, an protocol sheet with ID number has been founded for the documentation of the recruitment and field work process for every family.

Six pupils and their mothers have been excluded from the study after recruitment questionnaire has been filled in during the telephone call because some of inclusion criteria wasn't met: place of residence (2 cases), age of mother (4 cases).

Banská Bystrica

29 pupils in Slovenská Lupča and 15 pupils in Brusno from relevant classes were excluded because they were born in the years 1996 to 1999. Teachers of selected classes also indicated children living in a children's home and mothers with poor language ability, which were excluded from the selection process (21 children in Slovenská Lupča and 1 child in Brusno). All the others with age between 6 and 11 years have been asked for participation.

For each selected child an envelope with invitation letter, information leaflet, reply card and leaflets with information about cadmium, cotinine, phthalate and mercury have been prepared.

After a dialogue with directors of the selected schools, a meeting of representatives of the survey office with teachers of eligible classes took place. Survey staff explained the survey tasks of the pupils and their mothers to the teachers and handed out the envelopes. The teachers have been informed, that every pupil, who brings back the reply card will receive a small incentive regardless pupil will take part in the project or not. After these meetings, teachers have explained the survey to their classes, distributed the envelopes to children and have informed the children about the collection of the reply cards in the next three days.

Tab. 2: Number of children invited to the study by sex and age groups (rural area)

	Years of born						total
	2000	2001	2002	2003	2004	2005	
Boys	27	20	18	31	42	11	149
Girls	27	38	21	26	26	14	152
Total	54	58	39	57	68	25	301

Selection of participants - time schedule:

Slovenská Lupča:

- meeting with the school director: 16.9.2011
- meeting with teachers, handing out the envelopes with invitation letters, information leaflets and reply cards: 27.9.2011
- distribution the envelopes to children: 3.10.2011



- collection of the envelopes with reply card by survey office: 10.10.2011

Brusno:

- meeting with director of the school: 16.9.2011
- meeting with teachers, handing out the envelopes with invitation letters, information leaflets and reply cards: 26.9.2011
- distribution the envelopes to children: 29.9.2011
- collection of the envelopes with reply card by survey office: 10.10.2011

Starting date of rural field work: 9.11.2011

Finishing date of rural field work: 23.1.2012

A member of survey staff has collected the reply cards hidden in envelopes from teachers in each school. The survey office has evaluated the reply cards.

Reply cards have been sorted according to gender and age group and database of all children and their mothers which have accepted the invitation to the study has been prepared – name of child, name of mother, address, phone number, dates of contacting families, date, time and place of meeting, documentation of questionnaires, samples.

Summary of the evaluation of the reply cards:

- number of reply cards distributed: 301 (Slovenska Lupca - 178, Brusno - 123),
- number of reply cards with acceptance of the invitation: 71 - 23,59 % (Slovenska Lupca - 59, Brusno - 12),
- number of reply cards with definitive refusal: 96 - 31,89 % (Slovenska Lupca – 80, Brusno – 16),
- number of reply cards with no tick box for reply, with no address and with no phone number: 105 – 34,9 % (Slovenska Lupca - 39, Brusno – 66),
- number of unreturned reply cards: 29 – 9,63 % (Brusno - 29) ,

- number of reminder letters: 30 (Brusno - 30),
- number of acceptations after reminder letter: 4 – 13,3 %,
- number of refusals after reminder letter: 7 – 23,3 %

Reminder letters have been sent to the families which have not reacted to the invitation letter. Only four families have accepted additional invitation to the study.

After evaluation of reply cards the members of field work team started to call the mothers to ask remaining questions, to check the inclusion criteria (age of mother, language ability, place of residence and health status) by means of recruitment questionnaire and to fix a date and place of the meeting in case of eligibility. An ID number and a protocol sheet has been set up for the documentation of the recruitment and field work process for every family.



Nine pupils and their mothers have been excluded from the study when recruitment questionnaire has been filled in during the telephone call, because one some inclusion criterion wasn't met: place of residence (2 cases), age of mother (1 case), disease of mother (1 case), more than one child in the family (1 case) and because of additional refusals (4 cases).

All the mothers who have accepted invitation to the study have provided their phone number so we have not visited families at home personally to ask either to participate or to respond the non-responder questionnaire.

III. Methods

3.1 Fieldwork

For performing the fieldwork, manual with SOP's and with all other necessary materials has been prepared. Fieldwork was performed by 10 qualified interviewers (Adamčáková, Dančová, Fabianová, Halzlová, Jajcaj, Kališ, Kerlik, Kosorínová, Miklánková, Pilarčíková, Slotová) which undertook the fieldwork training in Bratislava after the international training in Berlin.

Consent form, all types of questionnaires, pen, sample vessels for urine, plastic and paper bags, scissors, gloves and tape with marker to take hair samples as well as the gifts for children were prepared before each meeting with responders.

Procedure of field work and visits at home or in the project center:

- welcome, answering additional questions
- ask for the signed informed consent form for the survey of the mother and child
- the interview with mother – basic questionnaire
- sampling of hair
- performing the questionnaires on hair sampling – mother, child
- handing over the urine vessels with guidance how to collect first morning urine
- giving the gifts to children, thank's
- collection of the urine samples on the agreed day, questionnaires on the collection of urine

Recruited pairs:

During the field work we have examined 63 mother-child pairs in **urban area** with ID numbers from SKU001 to SKU065 (ID numbers SKU062 and SKU064 not used not used due to additional refusals). Number of involved families according to the birth year of the child and gender are presented in tab. 3:

Tab. 3: Number of cases according to the birth year of the child and gender (children in urban area)



2000		2001		2002		2003		2004		2005	
Child ID (SKU...C)											
ID Boys	ID Girls	ID Boys	ID Girls	ID Boys	ID Girls	ID Boys	ID Girls	ID Boys	ID Girls	ID Boys	ID Girls
008	049	004	010	003	005	021	001	007	002	031	016
012		006	017	018	013	039	015	019	032	041	026
014		009		037	022	053	023	020	042	043	027
024		011		048	025	054	028	035	050	055	029
036		033			034		030	051		057	038
		056			040		046	058		063	045
		061			044		047			065	052
					059		060				

In spite of the reminder letters, we did not obtain sufficient number of girls born in the years 2000, 2001, 2003 and 2004 and boys born in the years 2002 and 2003.

In **rural area** 66 families with ID numbers from SKR001 to SKR067 (ID number SKU047 not used due to additional refusals) were involved. Number of involved families according to the birth year of the child and gender are presented in tab. 4:

Tab. 4: Number of cases according to the birth year of the child and gender (children in rural area)

2000		2001		2002		2003		2004		2005	
Child ID (SKR...C)											
ID Boys	ID Girls	ID Boys	ID Girls	ID Boys	ID Girls	ID Boys	ID Girls	ID Boys	ID Girls	ID Boys	ID Girls
001	003	007	014	005	019	033	015	006	024	013	030
002	004	009	022	011	027	040	016	008	028	032	066
018	010	017	026	023	057	056	031	021	035	044	
043	012	020	039	059	062		058	029	041	050	
	025	038	053	061	064		067	034	045		
	042	060	063		065			036			
	046							037			
	049							048			
	054							051			
								052			
								055			

In spite of reminder letters, we did not obtain sufficient number of boys born in the years 2000, 2003, 2005 and girls born in the years 2005.



Toxicological analysis

Handling of samples

Tab. 5: Sample handling for individual markers

Marker	Received	Laboratory	Distributed	Procedure of sample handling
Mercury	15.1. 2012	Slovak Republic	By car	In the paper envelope
Creatinine	7.12. 2011 14.12.2011		By car	Refrigerated under the DEMOCOPHES propositions
Cadmium	29.2.2012	Czech Republic	By car	Refrigerated under the DEMOCOPHES propositions
Cotinine	22.2.2012		By car	Refrigerated under the DEMOCOPHES propositions
Pthalates	29.2.2012		By car	Refrigerated under the DEMOCOPHES propositions

Chemical analysis

A. Mercury in hair

Laboratory identification

Name of the laboratory: Regionálny úrad verejného zdravotníctva, Banská Bystrica, Slovakia
 Name of the responsible: Ing. Zuzana Vassányi
 Full address: RÚVZ BB, Cesta k nemocnici 1, 975 56 Banská Bystrica

Reception of samples

Date of receipt: 15.1.2012

Brief summary of the method

Analytical apparatus ŠPP 37 AAS A

Description of the quality performance characteristics

Limit of quantification: 0,016 µg/g

Limit of detection: 0,005 µg/g

Accuracy: ± 12 %



B. Cadmium in urine

Laboratory identification

Name of the laboratory: Státní zdravotní ústav
Name of the responsible: RNDr. Lucie Kašparová
Full address: Šrobárová 48, 100 42 Praha 10

Reception of samples

Date of receipt: 1.3.2012 (29.2.2012 distributed by car from UVZ SR)

Brief summary of the method

Analytical apparatus ICP-MS
SOP 3/1.4

Description of the quality performance characteristics

Limit of quantification: 0,05 µg/g

Limit of detection: 0,02 µg/g

Accuracy: ± 15%

C. Cotinine in urine

Laboratory identification

Name of the laboratory: Státní zdravotní ústav Šrobárová 48, 100 42 Praha
Name of the responsible: RNDr. Jaroslav Mráz, CSc.
Full address: Šrobárová 48, 100 42 Praha

Reception of samples

Date of receipt: 22.2.2012

Brief summary of the method

Analytical apparatus GC-MS

Description of the quality performance characteristics

Limit of quantification: 0,300 µg/l

Limit of detection: 0,100 µg/l

Accuracy: ±15%



D. Phthalates

Laboratory identification

Name of the laboratory: Státní zdravotní ústav
Name of the responsible: Ing. Karel Vrbík
Full address: Šrobárova 48, 100 42 Praha 10

Reception of samples

Date of receipt: 29.2. 2012

Brief summary of the method

Analytical apparatus LC-MS-MS

3.3. Data handling and statistical analysis

Methods of database creation

Instructions for establishing of the national database were provided by COPHES WP4 team and defined by the SOP document “Annex IV_1 Data management”. All the samples were given a unique ID number according to common DEMOCOPHES coding principle.

For creation of the national DEMOCOPHES database, following tools were used (**Tab. 6**):

Data type	Tool
Questionnaires (BQ, HM, HC, UM, UC, NR)	national version of web-based SOCRATOS – CAPI (translated in slovak language)
Questionnaires / Protocols (PS, RI) (not be a subject of QC and SA)	excel files prepared according to variables defined in SOP Annex IV_1 Data management
Chemical analysis data on biomarkers (TM, TC)	common pre-defined excel files with input and export sheets

National version of web-based SOCRATOS-CAPI tool, intended for facilitation of data collection during interviews and database processing, alternately using the paper questionnaires, was prepared by COPHES WP4 team (VITO) based on material translated by our institute. After subsequent testing, corrections and tuning of this tool was performed.

Quality control



Completed database containing the data from individual questionnaires as well as the chemical analysis was checked using the scripts for software “R” provided by WP4 team. Based on the outputs of this program, all the mistakes and invalid values were checked again in questionnaires and replaced by correct data properly. Finally, non pre-defined text values were converted to as unified form as possible.

Final database was a subject of national analysis, while provided to VITO team as a part of common database and international analysis.

National statistical analysis

Statistical analysis of national database is using the SPSS software package with centrally provided analysis scripts. As slovakian DEMOCOPHES team do not have a licence for “SPSS Custom Tables” modul, all the reporting tables were processed manually following the SOP document “Annex IV_2 Statistical analysis”, it’s supplement, as well as information gained on Copenhagen meeting.

IV. Results

4.1. Recruitment

The study population consisted of 129 children and their mothers. 63 of them lived in the urban area of Bratislava and 66 pairs in the rural area of Banská Bystrica.

Tab. 7: Number of children in the different age-groups (boys and girls) in the two sampling locations

Year of birth	Urban		Rural		Total	
	Boys	Girls	Boys	Girls	Boys	Girls
2000	5	1	4	9	9	10
2001	7	2	6	6	13	8
2002	4	8	5	6	9	14
2003	4	8	3	5	7	13
2004	6	4	5	11	11	15
2005	7	7	4	2	11	9
Sum	33	30	27	39	60	69



4.2. Response rate and non responder analysis

Tab. 8: Response rate

Member state	Total N	Total participating	Not participating			Response rate (1)
			Not reached	Not eligible	Refusing	
SK	924	129	475	11	284	0,14

(1) Response rate = total participating / (total N – not eligible)

number of subjects (families) selected (= number of invitations send)		924
number of subjects (families) who could never be reached (= number of invitations send – number of invitations coming back)		475
number of subjects (families) who responded (= number of invitations coming back)		449
number of subjects (families) refusing		284
number of subjects (families) not eligible		11
<i>reason</i>	→ <i>residence in studied area for less then 5 years</i>	4
	→ <i>mother's age</i>	5
	→ <i>mother's disease</i>	1
	→ <i>another child from the involved family</i>	1
number of subjects (families) with partial participation (not all necessary samples)		0
number of subjects (families) with full participation (all necessary samples)		129

Tab. 9: Variables and statistical tests for non-responder analysis

	Statistics	Responders N = 129		Non-responders N = 52		p-value (1)
Number (%) of mothers smoking	N, %	23	17,80%	20	38,50%	0,003
Number (%) of households with at least one smoker	N, %	58	45,00%	23	44,20%	0,929
Number (%) of mothers eating fish/shellfish at least once per week	N, %	51	39,50%	28	53,80%	0,079
Number (%) of single mothers	N, %	7	5,40%	2	3,90%	1,000*
Highest educational level in the family (mother or partner) – N (%) with primary or lower	N, %					No license for SPSS Exact Tests in UVZ SR - test could not be performed.



secondary education (ISCED: 0-2)						
– N (%) with higher secondary or post-secondary non-tertiary education (ISCED: 3-4)	N, %					
– N (%) with tertiary education (ISCED: 5-6)	N, %					
Number (%) of working mothers	N, %	106	84,1%	38	73,1%	0,088
Number (%) of working fathers / spouses / partners	N, %	119	98,3%	45	90,0%	0,023*

- (1) Proportions are compared by a Chi-square test. If one or more cells contain less than 5 observations, the non-parametric Fisher's Exact is used (indicated with *).

4.3. Description of study population

Tab. 10: Descriptive statistics for study population - mothers

Mothers (N = 129)			
Parameter	Statistics	Values	
Age, years	Total N	129	
	Median	37	
	P25 – P75	33	40
	Min.–max.	24	46
Age distribution:	Total N	129	
	≤35 years	N, %	49, 38,0%
	35-40 years	N, %	51, 39,5%
≥40 years	N, %	29, 22,5%	
Urinary creatinine, mg/L	Total N	129	
	Median	1311,00	
	P25 – P75	874,00	1747,00
	Min.–max.	143	3590
Urinary creatinine in classes	Total N	129	
	< 300 mg/L (=exclusion criterium)	N, %	2, 1,6%
	300 – 1000 mg/L	N, %	38, 29,5%
	1000 – 1500 mg/L	N, %	71, 55,0%
	1500 – 3000 mg/L	N, %	16, 12,4%
	> 3000 mg/L (=exclusion criterium)	N, %	2, 1,6%



Urinary volume, mL	Total N Median P25 – P75 Min.–max.		There are no valid cases for Urinary volume mother (g). Statistics cannot be computed.
Urinary volume in classes < 80 gram 80 – 120 gram ≥ 120 gram	Total N N, % N, % N, %		There are no valid cases for Urinary volume mother (g). Statistics cannot be computed.
Morning urine sample Yes No	Total N N, % N, %	129 0	100% 0%
Urine sampling period (hours)	Total N Median P25 – P75 Min.–max.	107 7,5833 6,7917 2,17	8,5833 14,00
Urine sampling period in classes: ≤5 hours 5-8 hours ≥8 hours	Total N N, % N, % N, %	107 11 52 44	10,3% 48,6% 41,1%
Body weight, kg	Total N Median P25 – P75 Min.–max.	129 65,00 57,00 40	71,00 105
Height, cm	Total N Median P25 – P75 Min.–max.	129 167,00 164,00 150	170,00 181
Body-mass index, kg/m ²	Total N Median P25 – P75 Min.–max.	129 22,8571 20,5457 17,57	25,3906 36,81
Smoking habits: Daily smoker Occasional smoker Former smoker Non smoker (never)	Total N N, % N, % N, % N, %	129 15 8 21 85	11,6% 6,2% 16,3% 65,9%
Smoking, amount of cigarettes	Total N	23	



<i>(in smokers only)</i>	Median P25 – P75 Min.–max.	5,0000 1,0000 0,00	10,0000 15,00
Environmental Tobacco Smoke (ETS) at home <i>(in former and non-smokers only)</i> Daily or less than daily Never	Total N N, % N, %	106 5 101	4,7% 95,3%
Environmental Tobacco Smoke (ETS) elsewhere <i>(in former and non-smokers only)</i> Frequent Sometimes Never	Total N N, % N, % N, %	106 5 47 54	4,7% 44,3% 50,9%
Environmental Tobacco Smoke (ETS) in last 24 hours <i>(in former and non-smokers only)</i> Yes No	Total N N, % N, %	106 6 100	5,7% 94,3%
Alcohol consumption by mother (units/week)	Total N Median P25 – P75 Min.–max.	129 0,5000 0,0000 0,00	1,0000 8,00
Consumption of rice Several times per week Once a week or less	Total N N, % N, %	128 51 77	39,8% 60,2%
Consumption of meat/cold meat Several times per week Once a week or less	Total N N, % N, %	129 104 25	80,6% 19,4%
Consumption of offal Several times per month Once a month or less	Total N N, % N, %	129 8 121	6,2% 93,8%
Consumption of game Several times per month Once a month or less	Total N N, % N, %	128 8 120	6,3% 93,0%
Consumption of wild mushrooms Several times per month Once a month or less	Total N N, % N, %	128 15 113	11,7% 88,3%



Consumption of hazelnut spread	Total N	128	
Once a week or often	N, %	10	7,8%
Less than once a week	N, %	118	92,2%
Consumption of convenience food or fast food	Total N	128	
Several times per week	N, %	5	3,9%
Once a week or less	N, %	123	96,1%
Consumption of milk	Total N	129	
Several times per week	N, %	77	59,7%
Once a week or less	N, %	52	40,3%
Consumption of cheese	Total N	129	
Several times per week	N, %	110	85,3%
Once a week or less	N, %	19	14,7%
Consumption of cereals	Total N	129	
Several times per week	N, %	99	76,7%
Once a week or less	N, %	30	23,3%
Consumption of chocolat	Total N	129	
Several times per week	N, %	63	48,8%
Once a week or less	N, %	66	51,2%
Consumption of ice cream	Total N	127	
More than once a month	N, %	12	9,4%
Once a month or less	N, %	115	90,6%
Consumption of local food	Total N	126	
Several times per week	N, %	55	43,7%
Once a week or less	N, %	71	56,3%
Consumption of dishes served in a canteen	Total N	128	
Several times per week	N, %	52	40,6%
Once a week or less	N, %	76	59,4%
Consumption of chewing gum	Total N	129	
Several times per week	N, %	53	41,1%
Once a week or less	N, %	76	58,9%
Consumption of fish (all types)	Total N	129	
Several times per week	N, %	13	10,1%
Once a week or less	N, %	116	89,9%
Consumption of seafish	Total N	129	
Once a week or often	N, %	33	25,6%
Less than once a week	N, %	96	74,4%
Consumption of shellfish	Total N	127	



Once a month or often	N, %	10	7,9%
Less than once a month	N, %	117	92,1%
Consumption of fresh water fish	Total N	129	
Once a week or often	N, %	7	5,4%
Less then once a week	N, %	122	94,6%
Consumption of sea food products	Total N	127	
Several times per month	N, %	8	6,3%
Once a month or less	N, %	119	93,7%
Ever used skin bleaching	Total N	129	
Yes	N, %	4	3,1%
No	N, %	125	96,9%
Amalgam teeth fillings	Total N	127	
Yes	N, %	110	86,6%
No	N, %	17	13,4%
Hair was dyed/toned in last 6 months	Total N	128	
Yes	N, %	94	73,4%
No	N, %	34	26,6%
Hair has undergone a chemical hair structure treatment in last 6 months	Total N	129	
Yes	N, %	8	6,2%
No	N, %	121	93,8%
Anti lice shampoo used in last 6 months	Total N	128	
Yes	N, %	11	8,6%
No	N, %	117	91,4%
Time spend in traffic	Total N	127	
At least one hour per day	N, %	13	10,2%
One hour per day or less	N, %	114	89,8%
Time spend in new car (less than 2 years old)	Total N	22	
More than 45 minutes per day	N, %	10	45,5%
45 minutes per day or less	N, %	12	54,5%
Wearing plastic gloves	Total N	129	
Daily	N, %	5	3,9%
Less than daily	N, %	16	12,4%
Never	N, %	108	83,7%
Use of personal care products	Total N	124	
High	N, %	64	51,6%
Moderate	N, %	53	42,7%
Low	N, %	7	5,6%



Area of residence	Total N	129	
Urban	N, %	63	48,8%
Rural	N, %	66	51,2%
Highest educational level of the family	Total N	129	
Primary or lower secondary education	N, %	0	0,0%
Higher sec. or post-sec. non-tertiary education	N, %	55	42,6%
Tertiary education	N, %	74	57,4%
Industry with possible contamination of heavy metals in neighborhood of residence	Total N	129	
Yes	N, %	3	2,3%
No	N, %	126	97,7%
Industry with possible contamination of phthalates in neighborhood of residence	Total N	129	
Yes	N, %	3	2,3%
No	N, %	126	97,7%
Fossil materials as main source for heating or cooking	Total N	120	
Yes	N, %	20	16,7%
No	N, %	100	83,3%
Redecoration or renovation of house in last two years	Total N	127	
Yes	N, %	59	46,5%
No	N, %	68	53,5%
PVC in house	Total N	115	
PVC in floors and walls	N, %	0	0,0%
PVC in floors or walls	N, %	24	20,9%
No PVC	N, %	91	79,1%
Main source of water for drinking	Total N	127	
Public water supply	N, %	122	96,1%
Commercial producers	N, %	5	3,9%
Mercury containing thermometer broken in the house	Total N	128	
Yes	N, %	44	34,4%
No	N, %	84	65,6%
Energy saving lamp broken in the house	Total N	125	
Yes	N, %	7	5,6%
No	N, %	118	94,4%
Soldering indoors	Total N	129	



Yes	N, %	19	14,7%
No	N, %	110	85,3%
Grey text	variables or its categories not used in the analysis due to the data missing or less than 5 observation per category		
Blue text	variables with recoded categories, where less than 5 observations were found by the original coding		

Fig. 1: Age of mothers involved in DEMOCOPHES study - Slovakia

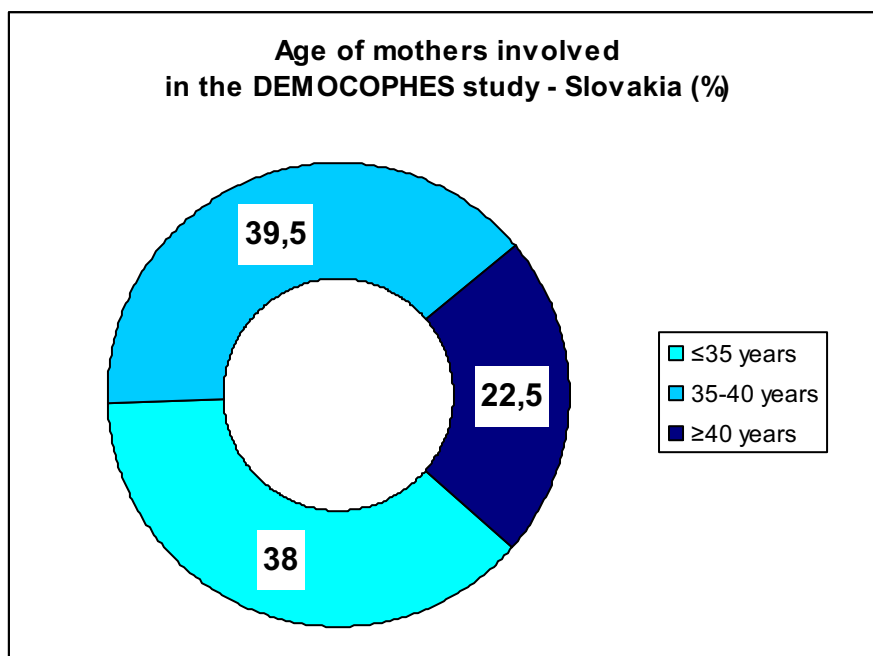
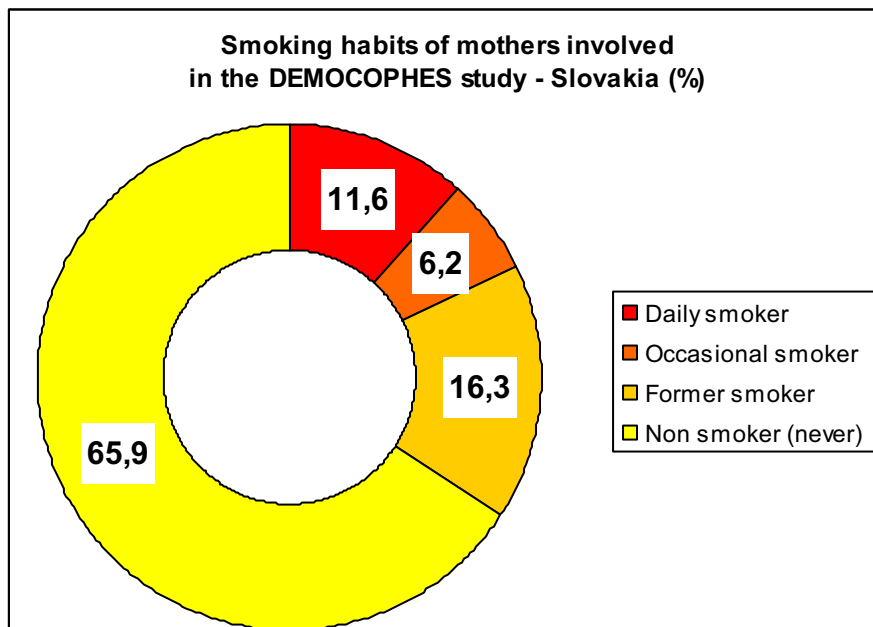


Fig. 2: Smoking habits of mothers involved in DEMOCOPHES study - Slovakia



Tab. 11: Descriptive statistics for study population – children

Children (N = 129)			
Parameter	Statistics	Values	
Gender	Total N	129	
Boy	N, %	66	51,20%
Girl	N, %	63	48,80%
Age, years	Total N	129	
	Median	8	
	P25 – P75	7	10
	Min.–max.	6	11
Age distribution:	Total N	129	
5-8 years	N, %	67	51,90%
9-11 years	N, %	62	48,10%
Urinary creatinine, mg/L	Total N	129	
	Median	1279	
	P25 – P75	942	1647
	Min.–max.	458	3061
Urinary creatinine in classes	Total N	129	
< 300 mg/L (=exclusion criterium)	N, %	0	0%



300 – 1000 mg/L	N, %	37	28,70%
1000 – 1500 mg/L	N, %	79	61,20%
1500 – 3000 mg/L	N, %	11	8,50%
> 3000 mg/L (=exclusion criterium)	N, %	2	1,60%
Urinary volume, mL	Total N Median P25 – P75 Min.–max.		There are no valid cases for Urinary volume child (g). Statistics cannot be computed.
Urinary volume in classes	Total N		There are no valid cases for Urinary volume child (g). Statistics cannot be computed.
< 80 gram	N, %		
80 – 120 gram	N, %		
≥ 120 gram	N, %		
Morning urine sample	Total N		
Yes	N, %	129	100%
No	N, %	0	0%
Urine sampling period (hours)	Total N Median P25 – P75 Min.–max.	105 10 9,4167 1	10,75 16
Urine sampling period in classes:	Total N	105	
Less than 8 hours	N, %	9	8,60%
8 hours and more	N, %	96	91,40%
Body weight, kg	Total N Median P25 – P75 Min.–max.	127 30 26 15	36 75
Height, cm	Total N Median P25 – P75 Min.–max.	129 137 164 128	170 146
Smoking habits:	Total N	129	
Daily smoker	N, %	0	0,00%
Occasional smoker	N, %	0	0,00%
Former smoker	N, %	0	0,00%
Non smoker (never)	N, %	129	100,00%
Environmental Tobacco Smoke (ETS) at home (in non-smokers only)	Total N	129	



Daily or less than daily	N, %	8	6,20%
Never	N, %	121	93,80%
Environmental Tobacco Smoke (ETS) elsewhere (in non-smokers only)	Total N	129	
Frequent	N, %	0	0,00%
Sometimes	N, %	33	25,60%
Never	N, %	96	74,40%
Environmental Tobacco Smoke (ETS) in last 24 hours (in non-smokers only)	Total N	129	
Yes	N, %	5	3,90%
No	N, %	124	96,10%
Consumption of rice	Total N	129	
Several times per week	N, %	64	49,60%
Once a week or less	N, %	65	50,40%
Consumption of meat/cold meat	Total N	129	
Several times per week	N, %	114	88,40%
Once a week or less	N, %	15	11,60%
Consumption of offal	Total N	128	
Several times per month	N, %	6	4,70%
Once a month or less	N, %	122	95,30%
Consumption of game	Total N	128	
Several times per month	N, %	5	3,90%
Once a month or less	N, %	123	96,10%
Consumption of wild mushrooms	Total N	127	
Several times per month	N, %	8	6,30%
Once a month or less	N, %	119	93,70%
Consumption of hazelnut spread	Total N	125	
Several times per week	N, %	16	12,80%
Once a week or less	N, %	109	87,20%
Consumption of convenience food or fast food	Total N	127	
Several times per week	N, %	7	5,50%
Once a week or less	N, %	120	94,50%
Consumption of milk	Total N	129	
Several times per week	N, %	101	78,30%
Once a week or less	N, %	28	21,70%



Consumption of cheese	Total N	129	
Several times per week	N, %	104	80,60%
Once a week or less	N, %	25	19,40%
Consumption of cereals	Total N	129	
Several times per week	N, %	105	81,40%
Once a week or less	N, %	24	18,60%
Consumption of chocolat	Total N	129	
Several times per week	N, %	92	71,30%
Once a week or less	N, %	37	28,70%
Consumption of ice cream	Total N	127	
Once a week or often	N, %	9	7,10%
Less than once a week	N, %	118	92,90%
Consumption of local food	Total N	126	
Several times per week	N, %	58	46,00%
Once a week or less	N, %	68	54,00%
Consumption of dishes served in a canteen	Total N	128	
Several times per week	N, %	103	80,50%
Once a week or less	N, %	25	19,50%
Consumption of chewing gum	Total N	129	
Several times per week	N, %	38	29,50%
Once a week or less	N, %	91	70,50%
Consumption of fish (all types)	Total N	129	
Several times per week	N, %	10	7,80%
Once a week or less	N, %	119	92,20%
Consumption of seafish	Total N	129	
Once a week or often	N, %	29	22,50%
Less than once a week	N, %	100	77,50%
Consumption of shellfish	Total N	128	
Once a month or often	N, %	5	3,90%
Less than once a month	N, %	123	96,10%
Consumption of fresh water fish	Total N	129	
Once a week or often	N, %	5	3,90%
Less than once a week	N, %	124	96,10%
Consumption of sea food products	Total N	128	
Several times per month	N, %	6	4,70%
Once a month or less	N, %	122	95,30%
Ever used skin bleaching	Total N	129	
Yes	N, %	0	0,00%



No	N, %	129	100,00%
Amalgam teeth fillings	Total N	129	
Yes	N, %	42	32,60%
No	N, %	87	67,40%
Hair was dyed/toned in last 6 months	Total N	129	
Yes	N, %	4	3,10%
No	N, %	125	96,90%
Hair has undergone a chemical hair structure treatment in last 6 months	Total N	129	
Yes	N, %	1	0,80%
No	N, %	128	99,20%
Anti lice shampoo used in last 6 months	Total N	128	
Yes	N, %	18	14,10%
No	N, %	110	85,90%
Time spend in traffic	Total N	125	
More than 45 minutes per day	N, %	12	9,60%
45 minutes per day or less	N, %	113	90,40%
Time spend in new car (less than 2 years old)	Total N	23	
At least 30 minutes per day	N, %	8	34,80%
Less than 30 minutes per day	N, %	15	65,20%
Playing with plastic toys	Total N	121	
Daily	N, %	15	12,40%
Less than daily	N, %	25	20,70%
Never	N, %	81	66,90%
Use of personal care products	Total N	126	
High	N, %	7	5,60%
Moderate	N, %	53	42,10%
Low	N, %	66	52,40%
Grey text	variables or its categories not used in the analysis due to the data missing or less then 5 observation per category		
Blue text	variables with recoded categories, where less then 5 observations were found by the original coding		

Fig. 3: Gender of children involved in DEMOCOPHES study - Slovakia

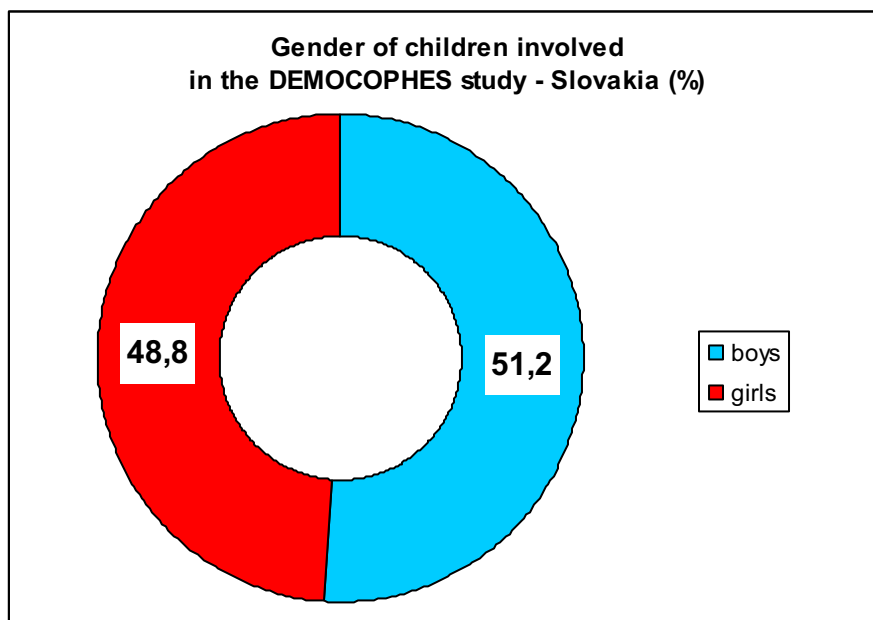
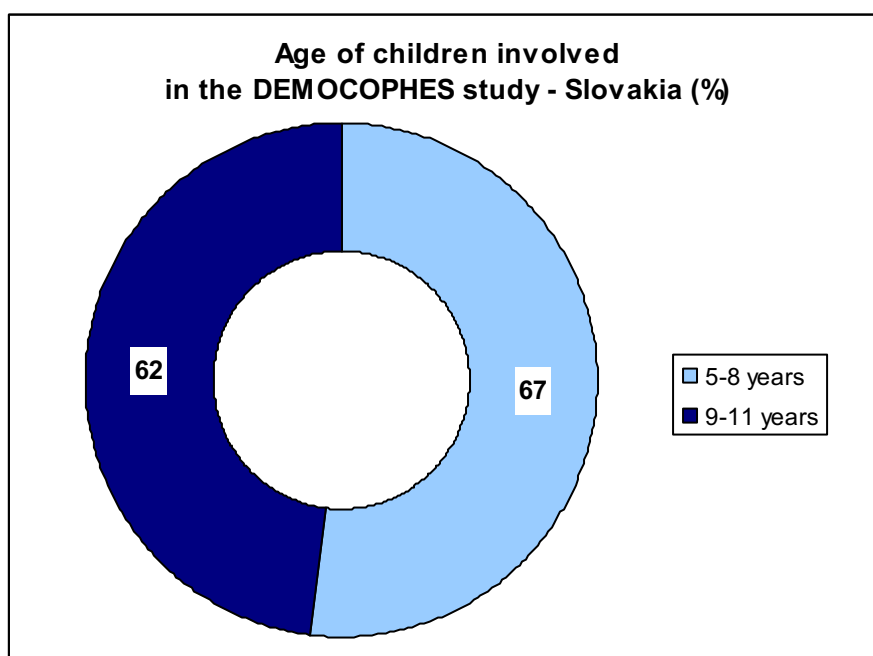


Fig. 4: Age of children involved in DEMOCOPHES study - Slovakia



4.4. Biomarkers

4.4.1. Mercury in hair

4.4.1.1. Mercury: fact sheet

Mercury is a silver to white metal and is liquid at room temperature. As organic form it is available as methyl mercury.

Mercury and its compounds have been used in medicine, although they are much less common today than they once were, now that the toxic effects of mercury and its compounds are more widely understood. The element mercury is an ingredient in dental amalgams. Thiomersal (called *Thimerosal* in the United States) is an organic compound used as a preservative in vaccines, though this use is in decline. Another mercury compound Merbromin (Mercurochrome) is a topical antiseptic used for minor cuts and scrapes is still in use in some countries.

Sources of exposure:

Amalgam dental fillings are known to emit measurable doses of mercury.

There are a lot of factors influencing the mercury concentration in the mouth: number of dental fillings, composition and quality of the fillings and in addition, the duration and intensity of chewing gums, eating habits, etc.

Intake through foods is basically in the form of methyl mercury. Higher intake levels may result on days when fish or fish products are eaten.

Occurrence of mercury:

Mercury occurs naturally in the environment.

Preindustrial deposition rates of mercury from the atmosphere may be about 4 ng / (1 L of ice deposit). Although that can be considered a natural level of exposure, regional or global sources have significant effects. Volcanic eruptions can increase the atmospheric source by 4–6 times.

Natural sources, such as volcanoes are responsible for approximately half of atmospheric mercury emissions.

The human-generated half can be divided into the following estimated percentage:

65% from stationary combustion, of which coal-fired power plants coal-fired power are the largest aggregate source (40% of U.S. mercury emissions in 1999). This includes power plants fueled with gas where the mercury has not been removed. Emissions from coal combustion are between one and two orders of magnitude higher than emissions from oil combustion, depending on the country.

11% from gold production. The three largest point sources for mercury emissions in the U.S. are the three largest gold mines. Hydrogeochemical release of mercury from gold-mine tailings has been accounted as a significant source of atmospheric mercury in eastern Canada.

6.8% from non-ferrous metal production, typically smelters.

6.4% from cement production.

3.0% from waste disposal, including municipal and hazardous waste, crematoria, and sewage sludge incineration.

3.0% from caustic soda production.

1.4% from pig iron and steel production.

1.1% from mercury production, mainly for batteries.

2.0% from other sources.

The above percentages are estimates of the global human-caused mercury emissions in 2000, excluding biomass burning, an important source in some regions. Current atmospheric mercury contamination in outdoor urban air is (0.01–0.02 $\mu\text{g}/\text{m}^3$) indoor concentrations are significantly elevated over outdoor concentrations, in the range 0.0065–0.523 $\mu\text{g}/\text{m}^3$ (average 0.069 $\mu\text{g}/\text{m}^3$) (Indoor Air Mercury, 2003).

In water, mercury can be absorbed by fish. Fish and shellfish have a natural tendency to concentrate mercury in their bodies, often in the form of methylmercury, a highly toxic organic compound of mercury. Species of fish that are high on the food chain, such as shark, swordfish, king mackerel king, bluefin tuna, albacore tuna, and tilefish contain higher concentrations of mercury than others. As mercury and methylmercury are fat soluble, they primarily accumulate in the viscera, although they are also found throughout the muscle tissue. When this fish is consumed by a predator, the mercury level is accumulated. Since fish are less efficient at depurating than accumulating methylmercury, fish-tissue concentrations increase over time. Thus species that are high on the food chain amass body burdens of mercury that can be ten times higher than the species they consume.

Chronic toxicity:

Symptoms typically include sensory impairment (vision, hearing, speech), disturbed sensation and a lack of coordination. The type and degree of symptoms exhibited depend upon the individual toxin, the dose, and the method and duration of exposure.

Chronic exposure to mercury is associated with damage to the central nervous system, kidney and stomach and also influences the immune system, blood pressure, heart beat, trembling, changes in personality (easy irritability, social distance) as well as decrease of the short term memory can be damaged.

Hair analysis is an classic method to ascertain a history of mercury exposure.

4.4.1.2. Mercury in hair: results in mothers

Tab. 12: Statistical analysis of mercury in hair ($\mu\text{g/g}$) in mothers

Age group: mothers, 18-45 years
Biomarker: mercury in hair
Unit: $\mu\text{g/g}$
LOQ: 0,016 $\mu\text{g/g}$

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	129	100,00%	0,13	0,113	0,148	0,1809	0,18934	0,027	0,054	0,068	0,12	0,222	0,37	0,6	1,445
Age (p=0.082)															
≤ 35 years	49	100,00%	0,11	0,087	0,13	0,1425	0,13729	0,038	0,054	0,063	0,084	0,148	0,3	0,38	0,706
35-40 years	51	100,00%	0,15	0,114	0,184	0,2198	0,25462	0,027	0,057	0,074	0,131	0,225	0,48	0,74	1,445
> 40years	29	100,00%	0,15	0,116	0,187	0,1771	0,10225	0,044	0,054	0,1	0,157	0,236	0,35	0,35	0,37
Smoking (p=0.061)															
daily smoker	15	100,00%	0,1	0,075	0,144	0,1281	0,09338	0,044	0,057	0,063	0,077	0,222	0,27	0,35	0,345
occasional smoker	8	100,00%	0,2	0,133	0,303	0,2378	0,16528	0,097	0,097	0,133	0,182	0,291	0,6	0,6	0,595
former smoker	21	100,00%	0,1	0,072	0,129	0,1226	0,09928	0,027	0,049	0,066	0,095	0,158	0,22	0,33	0,423
never smoker	85	100,00%	0,14	0,116	0,164	0,1992	0,21577	0,03	0,055	0,068	0,137	0,236	0,38	0,62	1,445
Fish consumption (p=0.001)															
Several times per week	13	100,00%	0,26	0,182	0,372	0,3209	0,23315	0,109	0,117	0,157	0,222	0,352	0,62	0,87	0,869
Once per week or less	116	100,00%	0,12	0,104	0,137	0,1662	0,17823	0,027	0,054	0,066	0,109	0,2	0,35	0,44	1,445
Consumption of sea fish (p=0.033)															
Once a week or often	33	100,00%	0,17	0,128	0,215	0,2227	0,19545	0,038	0,06	0,109	0,154	0,273	0,6	0,62	0,869
Less than once a week	96	100,00%	0,12	0,102	0,138	0,1665	0,18607	0,027	0,051	0,066	0,097	0,221	0,35	0,44	1,445
Consumption of shellfish (p=0.093)															
Once a month or often	10	100,00%	0,19	0,122	0,3	0,2432	0,19573	0,057	0,074	0,117	0,214	0,29	0,54	0,74	0,739
Less than once a month	117	100,00%	0,13	0,108	0,143	0,1746	0,18659	0,027	0,054	0,067	0,117	0,208	0,35	0,6	1,445
Consumption of fresh water fish (p=0.146)															

Secondary education or post-secondary non-tertiary education (ISCED 3-4)	55	100,00%	0,076	0,063	0,091	0,10027	0,10432	0,022	0,034	0,04	0,067	0,135	0,163	0,2	0,703
Tertiary education (ISCED 5-6)	74	100,00%	0,107	0,088	0,129	0,1618	0,2162	0,02	0,04	0,06	0,102	0,166	0,311	0,66	1,56
Main source of water for drinking (p=0.636)															
Public water supply	122	100,00%	0,091	0,079	0,105	0,13492	0,182433	0,02	0,036	0,05	0,09	0,147	0,232	0,39	1,56
Commercial producers	5	100,00%	0,077	0,04	0,146	0,0952	0,068896	0,034	0,034	0,05	0,066	0,134	0,197	0,2	0,197
Mercury containing thermometer broken in the house (p=0.411)															
Yes	44	100,00%	0,085	0,07	0,103	0,10595	0,083416	0,02	0,042	0,05	0,072	0,134	0,197	0,25	0,412
No	84	100,00%	0,096	0,079	0,115	0,15089	0,212884	0,022	0,034	0,05	0,094	0,159	0,257	0,66	1,56
Energy saving lamp broken in the house (p=0.259)															
Yes	7	100,00%	0,127	0,064	0,254	0,19557	0,223157	0,051	0,051	0,07	0,096	0,311	0,66	0,66	0,66
No	118	100,00%	0,089	0,077	0,103	0,13099	0,178403	0,02	0,036	0,05	0,09	0,147	0,228	0,39	1,56
Soldering indoors (p=0.916)															
Yes	19	100,00%	0,094	0,067	0,131	0,11963	0,083071	0,022	0,036	0,05	0,112	0,164	0,257	0,31	0,311
No	110	100,00%	0,092	0,079	0,107	0,13832	0,191312	0,02	0,036	0,05	0,09	0,144	0,23	0,41	1,56

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Figures

Fig. 5 and 6: Mercury concentration in hair (GM) and **fish and sea fish consumption** of mothers in Slovakia

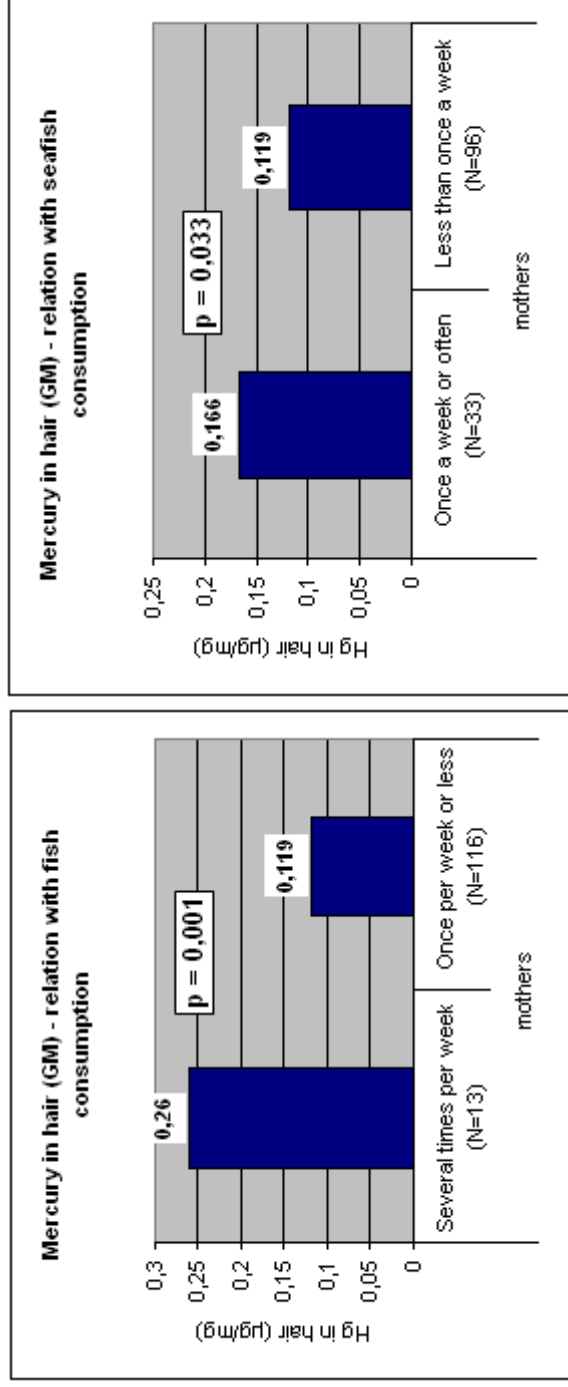


Fig. 7: Mercury concentration in hair (GM) and sea food products consumption of mothers and children in Slovakia

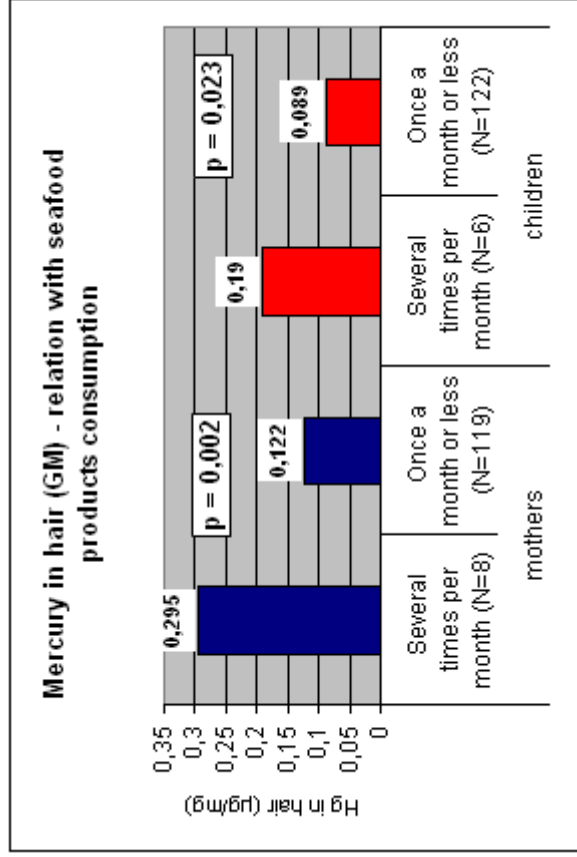
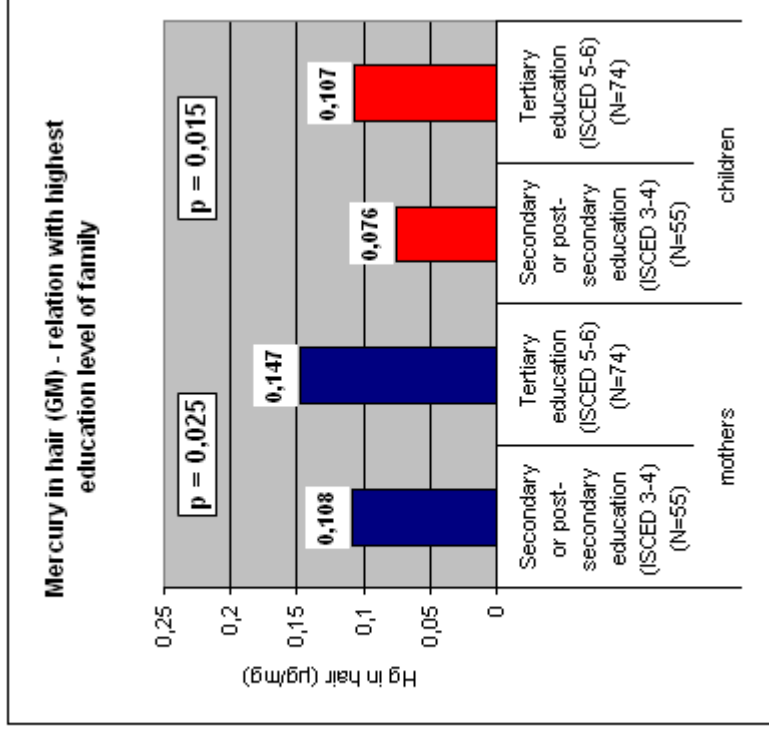
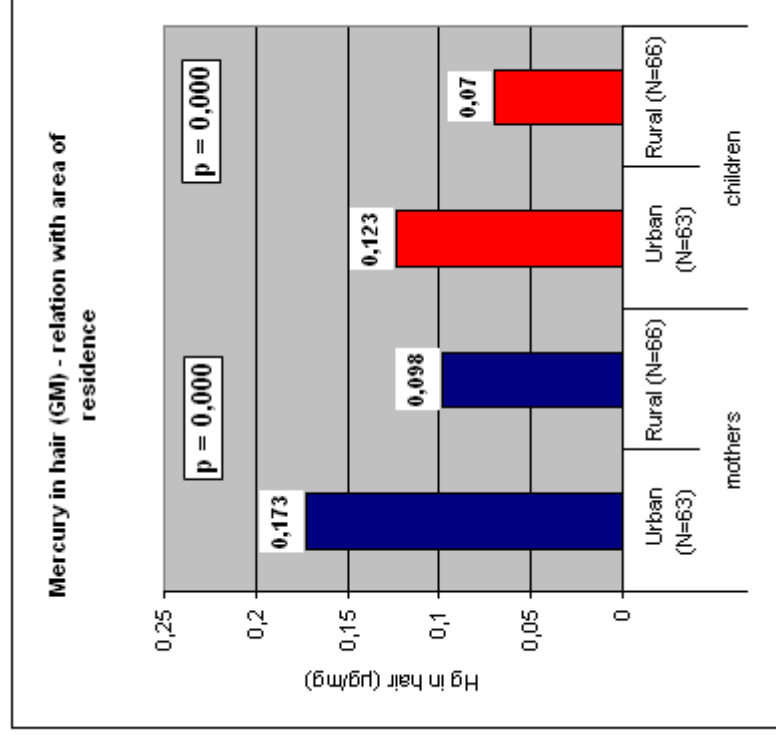
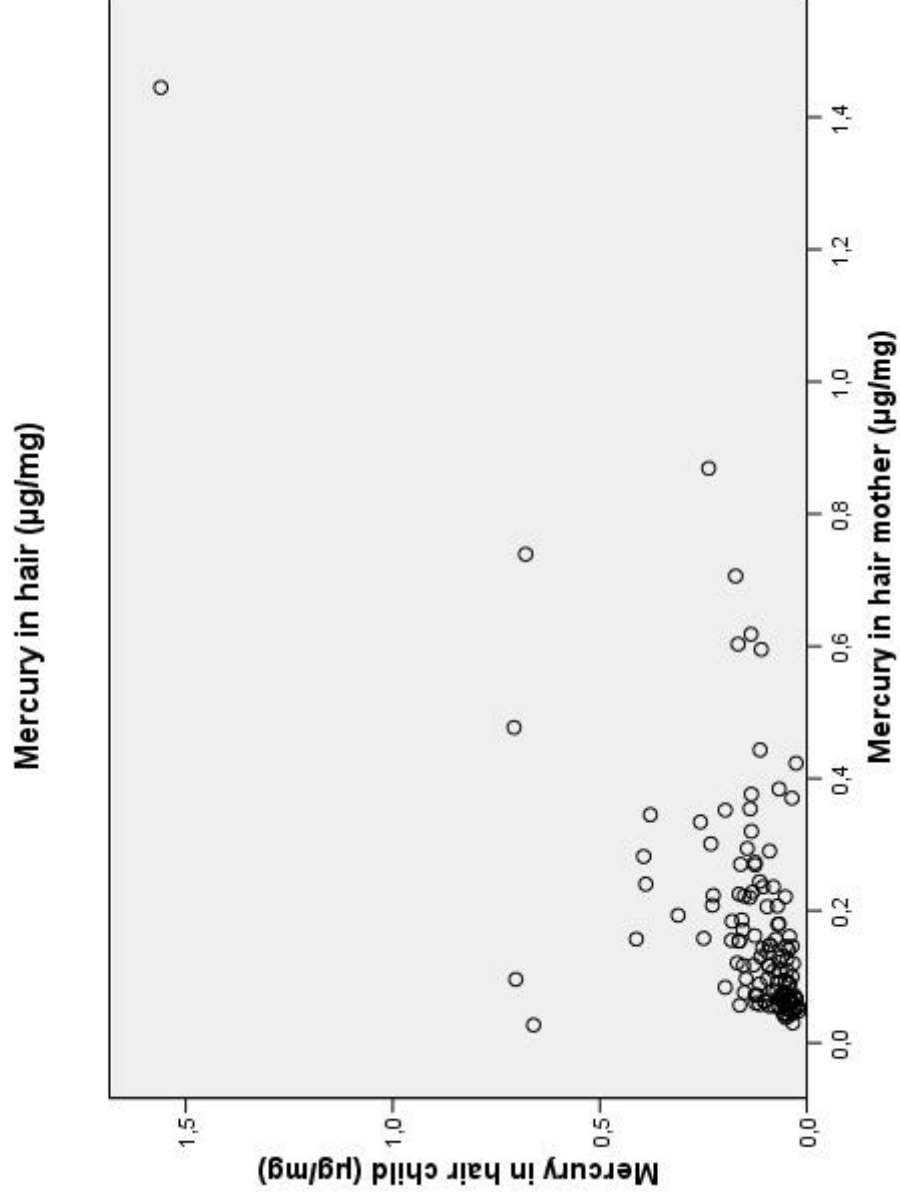


Fig. 8 and 9: Mercury concentration in hair (GM) by area of residence and education level of family in Slovakia



Presented data show relationship between frequency of fish meals consumption (especially sea fish and sea food products) and mercury concentrations in hair of mothers and child in Slovakia. Significant also is relationship with area of family residence and education level of parents showing that living in urban environment with higher education stages gained are more exposed to environmental mercury. Association between fresh water fishes and other mercury sources as amalgam fillings or broken mercury thermometers and energy saving lamps is not significant both for mothers and children sampled in the pilot study.

4.4.1.4. Mercury in hair: comparing mothers and children (Fig. 10)



BIOMARKER	VARIABLE 1		VARIABLE 2		STATISTICAL TEST	
	HM_HG	HC_HG	HM_HG	HC_HG	Spearman correlation coefficient	p-value
Mercury in hair (µg/mg)					0,565	0,000

4.4.1.5. Mercury in hair: comparison with guidelines (Tab. 14)

Mercury in hair (µg/g)	Mothers (N, %)	Children (N, %)
The German HBM-I value		
< HBM I.	5 µg/g 129	N, % 129
≥ HBM I.	0	0
Provisional threshold value JECFA/WHO		
< threshold value	2.3 µg/g 129	2.3 µg/g 129
≥ threshold value	0	0

4.4.1.6. Mercury in hair: comparison with literature (Tab. 15)

Country	Population	Sampling period	Age	Sample size	Reference value	
					µg/g	P ₉₅
Belgium	Adult females	2007-2009	20-40	250	0,86	
	Adolescents	2007-2009	14-16	209	0,47	
Czech Republic	Children	2008	8-10	316	0,60	0,60
Slovakia (DEMOCOPHES)	Children	2011-2012	6-11	127	0,24	0,39
	Women		24-45	125	0,37	0,60



4.4.2. Urinary cadmium

4.4.2.1. Cadmium: fact sheet

Cadmium is a natural element and can be found as mineral with other elements in the earth crust. It is a soft, silver metal. Cadmium occurs as a minor component in most zinc ores and therefore is a byproduct of zinc production. It was used for a long time as a pigment and for corrosion resistant plating on steel while cadmium compounds were used to stabilize plastic. The use of cadmium is generally decreasing. These declines have been due to competing technologies, cadmium's toxicity in certain forms and concentration and resulting regulations. Cadmium has no known biological function in higher organisms, a cadmium-dependent carbonic anhydrase has been found in marine diatoms.

Likely sources of exposure:

Cadmium is absorbed by plants. Cadmium is one of six substances banned by the European Union's Restriction on Hazardous Substances (RoHS) directive, which bans certain hazardous substances in electrical and electronic equipment but allows for certain exemptions and exclusions from the scope of the law. Although some studies linked exposure to cadmium with lung and prostate cancer, there is still a substantial controversy about the carcinogenicity of cadmium. More recent studies suggest that arsenic rather than cadmium may lead to the increased lung cancer mortality rates. Furthermore, most data regarding the carcinogenicity of cadmium rely on research confounded by the presence of other carcinogenic substances.

Tobacco smoking is the most important single source of cadmium exposure in the general population. It has been estimated that about 10% of the cadmium content of a cigarette is inhaled through smoking. The absorption of cadmium from the lungs is much more effective than that from the gut, and as much as 50% of the cadmium inhaled via cigarette smoke may be absorbed. On average, smokers have 4–5 times higher blood cadmium concentrations and 2–3 times higher kidney cadmium concentrations than non-smokers. Despite the high cadmium content in cigarette smoke, there seems to be little exposure to cadmium from passive smoking. No significant effect on blood cadmium concentrations has been detected in children exposed to environmental tobacco smoke.

Cadmium exposure is a risk factor associated with early atherosclerosis and hypertension, which can both lead to cardiovascular disease.

Occurrence of cadmium:

Cadmium makes up about 0.1 ppm of the Earth's crust. Compared with the more abundant 65 ppm zinc, cadmium is rare. No significant deposits of cadmium-containing ores are known. Greenockite (CdS), the only cadmium mineral of importance, is nearly always associated with sphalerite (ZnS). This association is caused by the geochemical similarity between zinc and cadmium which makes geological separation unlikely. As a consequence, cadmium is produced mainly as a byproduct from mining, smelting, and refining sulfidic ores of zinc, and, to a lesser degree, lead and copper. Small amounts of cadmium, about 10% of consumption, are produced from secondary sources, mainly from



dust generated by recycling iron and steel scrap. Production in the United States began in 1907, but it was not until after World War I that cadmium came into wide use.

One place where metallic cadmium can be found is the Vilyuy River basin in Siberia. Rocks mined to produce phosphate fertilizers contain varying amounts of cadmium, leading to a cadmium concentration of up to 300 mg/kg in the produced phosphate fertilizers and thus in the high cadmium content in agricultural soils.

Coal can contain significant amounts of cadmium, which ends up mostly in the flue dust.

Toxicity:

Cadmium has no known useful role in higher organisms, but a cadmium-dependent carbonic anhydrase has been found in some marine diatoms. The diatoms live in environments with very low zinc concentrations and cadmium performs the function normally carried out by zinc in other anhydrases. The discovery was made using X-ray absorption fluorescence spectroscopy (XAFS). The highest concentration of cadmium has been found to be absorbed in the kidneys of humans, and up to about 30 mg of cadmium is commonly inhaled throughout childhood and adolescence. Cadmium can be used to block calcium channels in chicken neurons. The most dangerous form of occupational exposure to cadmium is inhalation of fine dust and fumes, or ingestion of highly soluble cadmium compounds. Inhalation of cadmium-containing fumes can result initially in metal fume fever but may progress to chemical pneumonitis, pulmonary edema, and death.

Cadmium is also an environmental hazard. Human exposures to environmental cadmium are primarily the result of fossil fuel combustion, phosphate fertilizers, natural sources, iron and steel production, cement production and related activities, nonferrous metals production, and municipal solid waste incineration. Bread, root crops, and vegetables also contribute to the cadmium in modern populations. There have been a few instances of general population toxicity as the result of long-term exposure to cadmium in contaminated food and water, and research is ongoing regarding the estrogen mimicry that may induce breast cancer.

4.4.2.2. Urinary cadmium: results in mothers

Tab. 16: Statistical analysis of urinary cadmium (µg/L) in mothers

Age group: mothers, 18-45 years
 Biomarker: urinary cadmium
 Unit: µg/L
 LOQ: 0,05 µg/L

Strata	N	%	>	GM	low	up	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
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	LOQ	CI	CI	LOQ	CI	CI	LOQ	CI	CI	LOQ	CI	CI	LOQ	CI	CI	LOQ	CI	CI
All	125		0,29	0,26	0,33	0,35176	0,218259	0,06	0,13	0,18	0,3	0,45	0,61	0,76	1,36			
Urinary creatinine (p=0.000)																		
300-1000 mg/L	38	100,00%	0,17	0,15	0,2	0,195	0,096556	0,06	0,09	0,11	0,17	0,27	0,33	0,39	0,42			
1000-2000 mg/L	71	100,00%	0,33	0,3	0,37	0,36972	0,165521	0,11	0,18	0,25	0,33	0,5	0,58	0,72	0,81			
2000-3000 mg/L	16	100,00%	0,59	0,47	0,73	0,64438	0,296377	0,26	0,37	0,45	0,58	0,82	1,06	1,36	1,36			
Period of urine sampling (p=0.844)																		
< 5 hours	9	100,00%	0,26	0,18	0,38	0,29444	0,146894	0,09	0,09	0,18	0,3	0,36	0,54	0,54	0,54			
5-8 hours	51	100,00%	0,29	0,24	0,35	0,35255	0,210731	0,06	0,1	0,2	0,33	0,52	0,6	0,78	0,97			
≥ 8 hours	43	100,00%	0,29	0,25	0,34	0,32581	0,162513	0,11	0,17	0,22	0,29	0,42	0,5	0,61	0,95			
Age (p=0.065)																		
≤ 35 years	45	100,00%	0,31	0,26	0,36	0,36133	0,233	0,06	0,14	0,22	0,3	0,44	0,62	0,68	1,36			
35-40 years	51	100,00%	0,26	0,21	0,31	0,31412	0,214627	0,08	0,11	0,17	0,25	0,42	0,56	0,76	1,06			
> 40years	29	100,00%	0,35	0,29	0,43	0,4031	0,194773	0,11	0,14	0,27	0,39	0,52	0,72	0,78	0,81			
Smoking (p=0.270)																		
daily smoker	15	100,00%	0,38	0,3	0,48	0,42133	0,196827	0,14	0,25	0,26	0,44	0,52	0,6	0,95	0,95			
occasional smoker	8	100,00%	0,24	0,15	0,4	0,29625	0,188144	0,08	0,08	0,15	0,27	0,43	0,61	0,61	0,61			
former smoker	21	100,00%	0,27	0,2	0,36	0,33	0,200823	0,08	0,09	0,18	0,3	0,4	0,62	0,66	0,76			
never smoker	81	100,00%	0,29	0,26	0,33	0,35	0,229205	0,06	0,14	0,18	0,3	0,45	0,57	0,78	1,36			
ETS at home, in former and non-smokers only (p=0.563)																		
daily or less than daily	5	100,00%	0,34	0,23	0,48	0,358	0,133492	0,18	0,18	0,31	0,34	0,42	0,54	0,54	0,54			
never	97	100,00%	0,29	0,25	0,32	0,34526	0,226937	0,06	0,11	0,18	0,29	0,45	0,63	0,78	1,36			
ETS elsewhere, in former and non-smokers in only (p=0.738)																		
frequent	5	100,00%	0,25	0,13	0,46	0,296	0,188361	0,09	0,09	0,18	0,25	0,39	0,57	0,57	0,57			
sometimes	46	100,00%	0,3	0,25	0,36	0,35783	0,202977	0,08	0,11	0,18	0,31	0,51	0,68	0,76	0,81			
never	51	100,00%	0,28	0,24	0,33	0,34	0,244924	0,06	0,14	0,18	0,3	0,38	0,58	0,97	1,36			
Consumption of rice (p=0.942)																		
Several times per week	50	100,00%	0,3	0,25	0,35	0,3476	0,195777	0,08	0,11	0,2	0,31	0,5	0,61	0,72	0,97			
Once per week or less	74	100,00%	0,29	0,25	0,34	0,35581	0,23462	0,06	0,14	0,18	0,3	0,44	0,61	0,81	1,36			
Consumption of offal (p=0.372)																		
Several times per month	8	100,00%	0,36	0,28	0,45	0,37375	0,120112	0,2	0,2	0,26	0,4	0,48	0,52	0,52	0,52			

Once per month or less	117	100,00%	0,29	0,26	0,33	0,35026	0,223643	0,06	0,11	0,18	0,3	0,45	0,62	0,78	1,36
Consumption of game (p=0.841)															
Several times per month	7	100,00%	0,31	0,17	0,57	0,42571	0,431001	0,11	0,11	0,17	0,3	0,49	1,36	1,36	1,36
Once per month or less	117	100,00%	0,29	0,26	0,33	0,34769	0,202367	0,06	0,13	0,18	0,3	0,45	0,61	0,76	1,06
Consumption of wild mushrooms (p=0.875)															
Several times per month	15	100,00%	0,29	0,21	0,38	0,328	0,155527	0,09	0,11	0,18	0,32	0,47	0,56	0,58	0,58
Once per month or less	109	100,00%	0,3	0,26	0,33	0,35555	0,226807	0,06	0,13	0,18	0,3	0,45	0,63	0,78	1,36
Consumption of chocolat (p=0.982)															
Several times per week	60	100,00%	0,29	0,25	0,35	0,3545	0,225429	0,06	0,14	0,18	0,31	0,49	0,63	0,7	1,36
Once per week or less	65	100,00%	0,29	0,25	0,34	0,34923	0,213156	0,08	0,11	0,2	0,3	0,44	0,57	0,78	1,06
Consumption of local food (p=0.577)															
Several times per week	53	100,00%	0,3	0,25	0,36	0,3666	0,226919	0,06	0,11	0,2	0,34	0,47	0,63	0,72	1,36
Once per week or less	69	100,00%	0,28	0,25	0,33	0,33899	0,215926	0,09	0,13	0,18	0,27	0,44	0,61	0,81	1,06
Time spend in traffic (p=0.645)															
More than one hour per day	13	100,00%	0,32	0,2	0,51	0,41923	0,278043	0,06	0,1	0,14	0,44	0,58	0,81	0,95	0,95
One hour per day or less	110	100,00%	0,29	0,26	0,32	0,34327	0,21163	0,08	0,14	0,18	0,3	0,44	0,61	0,72	1,36
Area of residence (p=0.128)															
Urban	62	100,00%	0,27	0,23	0,31	0,31806	0,179415	0,06	0,11	0,2	0,27	0,44	0,54	0,58	0,97
Rural	63	100,00%	0,32	0,27	0,37	0,38492	0,247692	0,09	0,14	0,18	0,33	0,5	0,68	0,81	1,36
Educational level (highest of family) (p=0.187)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	54	100,00%	0,32	0,27	0,38	0,3837	0,247259	0,09	0,14	0,23	0,33	0,5	0,66	0,95	1,36
Tertiary education (ISCED 5-6)	71	100,00%	0,28	0,24	0,32	0,32746	0,1916	0,06	0,11	0,18	0,3	0,44	0,58	0,76	0,97
Fossil materials as main source for heating or cooking (p=0.068)															
Yes	19	100,00%	0,36	0,27	0,49	0,44105	0,30223	0,1	0,11	0,25	0,39	0,5	0,95	1,36	1,36
No	97	100,00%	0,27	0,24	0,31	0,32134	0,19089	0,06	0,11	0,18	0,28	0,44	0,56	0,63	1,06
Redecoration or renovation of house in last two years (p=0.900)															
Yes	56	100,00%	0,29	0,25	0,34	0,355	0,235187	0,08	0,11	0,17	0,32	0,47	0,58	0,81	1,36
No	67	100,00%	0,29	0,26	0,34	0,34552	0,200962	0,06	0,14	0,2	0,3	0,44	0,62	0,72	1,06
Main source of water for drinking (p=0.827)															

Public water supply	118	100,00%	0,29	0,26	0,33	0,35161	0,219186	0,06	0,13	0,18	0,3	0,45	0,61	0,78	1,36
Commercial producers	5	100,00%	0,28	0,14	0,54	0,332	0,181301	0,08	0,08	0,26	0,31	0,47	0,54	0,54	0,54
Soldering indoors (p=0.381)															
Yes	19	100,00%	0,33	0,26	0,41	0,36947	0,184526	0,14	0,17	0,22	0,31	0,5	0,72	0,78	0,78
No	106	100,00%	0,29	0,26	0,33	0,34858	0,224395	0,06	0,11	0,18	0,3	0,45	0,61	0,76	1,36

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 17: Statistical analysis of urinary cadmium ($\mu\text{g/g}$ creatinine) in mothers

Age group: mothers, 18-45 years

Biomarker: urinary cadmium

Unit: $\mu\text{g/g}$ creatinine

LOQ: 0,05 $\mu\text{g/L}$

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	100,00%	0,24	0,221	0,259	0,26475	0,123317	0,086	0,1312	0,1731	0,2371	0,331	0,4565	0,5111	0,669
Period of urine sampling (p=0.866)															
< 5 hours	9	100,00%	0,25	0,187	0,333	0,27492	0,146231	0,137	0,1371	0,1947	0,225	0,2926	0,6193	0,6193	0,619
5-8 hours	51	100,00%	0,23	0,203	0,265	0,2589	0,118817	0,086	0,1261	0,15	0,2513	0,3441	0,4357	0,5111	0,523
≥ 8 hours	43	100,00%	0,23	0,2	0,259	0,24967	0,111988	0,102	0,1312	0,1693	0,2094	0,3252	0,4118	0,4565	0,577
Age (p=0.021)															
≤ 35 years	45	100,00%	0,23	0,201	0,261	0,25373	0,127021	0,098	0,1392	0,1693	0,2196	0,2926	0,4397	0,5769	0,619
35-40 years	51	100,00%	0,22	0,195	0,25	0,24412	0,112239	0,086	0,1156	0,1577	0,225	0,3111	0,3818	0,4542	0,669
> 40years	29	100,00%	0,29	0,25	0,342	0,31814	0,124791	0,13	0,1442	0,2338	0,2953	0,4357	0,5111	0,5141	0,523
Smoking (p=0.421)															
daily smoker	15	100,00%	0,27	0,222	0,333	0,29121	0,104201	0,12	0,1337	0,2094	0,2937	0,4015	0,4118	0,4624	0,462
occasional smoker	8	100,00%	0,2	0,136	0,278	0,22039	0,126867	0,105	0,1048	0,1394	0,1596	0,2929	0,4744	0,4744	0,474

former smoker	21	100,00%	0,24	0,195	0,298	0,137888	0,103	0,1261	0,1762	0,2373	0,3464	0,4397	0,4565	0,669
never smoker	81	100,00%	0,24	0,216	0,262	0,262666	0,086	0,1392	0,1743	0,2317	0,3144	0,4636	0,5141	0,619
ETS at home, in former and non-smokers only (p=0.260)														
daily or less than daily	5	100,00%	0,3	0,172	0,518	0,338	0,102	0,1017	0,3111	0,376	0,3871	0,5141	0,5141	0,514
never	97	100,00%	0,24	0,216	0,257	0,26054	0,086	0,1351	0,1743	0,2317	0,3144	0,4565	0,5229	0,669
ETS elsewhere, in former and non-smokers in only (p=0.513)														
frequent	5	100,00%	0,19	0,138	0,259	0,19784	0,102	0,1017	0,187	0,225	0,2338	0,2417	0,2417	0,242
sometimes	46	100,00%	0,24	0,207	0,281	0,27578	0,086	0,1261	0,1581	0,2468	0,376	0,4743	0,5769	0,669
never	51	100,00%	0,24	0,217	0,269	0,26055	0,098	0,1606	0,1907	0,2326	0,3144	0,4397	0,5141	0,586
Consumption of rice (p=0.905)														
Several times per week	50	100,00%	0,24	0,212	0,275	0,2682	0,102	0,13	0,1643	0,2577	0,3464	0,4708	0,5111	0,523
Once per week or less	74	100,00%	0,24	0,216	0,265	0,26412	0,086	0,1337	0,187	0,2262	0,3252	0,4357	0,5769	0,669
Consumption of offal (p=0.122)														
Several times per month	8	100,00%	0,3	0,222	0,417	0,33318	0,1551	0,15	0,2382	0,2668	0,4431	0,6193	0,6193	0,619
Once per month or less	117	100,00%	0,24	0,217	0,255	0,26007	0,086	0,1299	0,1695	0,2317	0,3275	0,4542	0,5111	0,669
Consumption of game (p=0.843)														
Several times per month	7	100,00%	0,23	0,156	0,343	0,2641	0,13	0,1299	0,15	0,2275	0,3464	0,586	0,586	0,586
Once per month or less	117	100,00%	0,24	0,221	0,26	0,26538	0,086	0,1312	0,1743	0,2372	0,331	0,4565	0,5111	0,669
Consumption of wild mushrooms (p=0.254)														
Several times per month	15	100,00%	0,27	0,211	0,349	0,30384	0,126	0,1442	0,1731	0,2326	0,4565	0,5229	0,5769	0,577
Once per month or less	109	100,00%	0,24	0,216	0,256	0,25979	0,086	0,1299	0,1695	0,2372	0,3252	0,4397	0,4743	0,669
Consumption of chocolat (p=0.804)														
Several times per week	60	100,00%	0,24	0,216	0,271	0,26601	0,098	0,1361	0,1754	0,2355	0,34	0,4601	0,4744	0,586

Once per week or less	65	100,00%	0,24	0,211	0,265	0,2636	0,128807	0,086	0,1299	0,1643	0,2371	0,331	0,4542	0,5229	0,669
Consumption of local food (p=0.067)															
Several times per week	53	100,00%	0,26	0,228	0,295	0,28866	0,135962	0,098	0,1288	0,1982	0,2564	0,376	0,4744	0,5769	0,669
Once per week or less	69	100,00%	0,22	0,201	0,247	0,24467	0,112122	0,086	0,1312	0,1643	0,2203	0,2975	0,4357	0,4565	0,619
Time spend in traffic (p=0.846)															
More than one hour per day	13	100,00%	0,23	0,178	0,304	0,25752	0,110691	0,098	0,1048	0,1804	0,2693	0,3252	0,4015	0,4357	0,436
One hour per day or less	110	100,00%	0,24	0,219	0,26	0,26503	0,126198	0,086	0,1332	0,1695	0,2321	0,3346	0,463	0,5141	0,669
Area of residence (p=0.103)															
Urban	62	100,00%	0,22	0,199	0,251	0,24908	0,120761	0,098	0,1288	0,15	0,2151	0,3252	0,4022	0,5111	0,619
Rural	63	100,00%	0,26	0,229	0,284	0,28018	0,124813	0,086	0,1581	0,1947	0,2488	0,3526	0,4636	0,4744	0,669
Educational level (highest of family) (p=0.059)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	54	100,00%	0,26	0,231	0,294	0,28702	0,124772	0,086	0,1392	0,2057	0,2593	0,376	0,4636	0,5769	0,619
Tertiary education (ISCED 5-6)	71	100,00%	0,22	0,201	0,248	0,24781	0,120321	0,098	0,1312	0,1606	0,2196	0,2953	0,4357	0,5111	0,669
Fossil materials as main source for heating or cooking (p=0.014)															
Yes	19	100,00%	0,3	0,243	0,359	0,31956	0,118058	0,086	0,1606	0,2497	0,299	0,4015	0,4744	0,586	0,586
No	97	100,00%	0,22	0,205	0,245	0,2478	0,117626	0,098	0,1288	0,1643	0,2201	0,2975	0,4542	0,5111	0,619
Redecoration or renovation of house in last two years (p=0.882)															
Yes	56	100,00%	0,24	0,209	0,266	0,26137	0,121918	0,086	0,1288	0,1659	0,2332	0,3388	0,4357	0,5229	0,586
No	67	100,00%	0,24	0,215	0,265	0,26204	0,116936	0,098	0,1337	0,1747	0,2373	0,331	0,4565	0,4744	0,619
Main source of water for drinking (p=0.621)															
Public water supply	118	100,00%	0,24	0,222	0,261	0,26603	0,122079	0,086	0,1312	0,1747	0,2372	0,331	0,4565	0,5111	0,669

Commercial producers	5	100,00%	0,22	0,12	0,393	0,26127	0,176449	0,104	0,1039	0,1392	0,1731	0,376	0,5141	0,5141	0,514
Soldering indoors (p=0.158)															
Yes	19	100,00%	0,27	0,218	0,344	0,3066	0,140253	0,102	0,1312	0,1743	0,2953	0,4565	0,5141	0,5229	0,523
No	106	100,00%	0,23	0,214	0,254	0,25725	0,119217	0,086	0,1299	0,1695	0,2321	0,3111	0,4357	0,4743	0,669

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

4.4.2.3. Urinary cadmium: results in children

Tab. 18: Statistical analysis of urinary cadmium (µg/L) in children

Age group: children, 6-11 years
 Biomarker: urinary cadmium
 Unit: µg/L
 LOQ: 0,05 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	97,60%	0,2	0,13	0,16	0,17335	0,096652	0,025	0,07	0,1	0,16	0,22	0,28	0,36	0,64
Urinary creatinine (p=0.000)															
300-1000 mg/L	37	94,60%	0,1	0,08	0,12	0,12189	0,077337	0,025	0,05	0,08	0,1	0,15	0,22	0,26	0,42
1000-2000 mg/L	79	98,70%	0,2	0,15	0,18	0,18323	0,087684	0,025	0,09	0,13	0,17	0,22	0,26	0,34	0,64
2000-3000 mg/L	11	100,00%	0,3	0,18	0,34	0,27545	0,119026	0,07	0,12	0,2	0,28	0,36	0,37	0,48	0,48
Period of urine sampling (p=0.916)															
< 8 hours	9	100,00%	0,2	0,11	0,2	0,15778	0,063988	0,06	0,06	0,12	0,15	0,2	0,27	0,27	0,27
≥ 8 hours	94	97,90%	0,1	0,13	0,16	0,16681	0,099558	0,025	0,07	0,1	0,15	0,21	0,28	0,34	0,64
Gender (p=0.913)															
boys	66	97,00%	0,2	0,13	0,17	0,17818	0,110908	0,025	0,06	0,1	0,16	0,22	0,34	0,37	0,64

girls	61	98,40%	0,2	0,13	0,17	0,16811	0,078984	0,025	0,08	0,1	0,16	0,21	0,26	0,27	0,48
Age (p=0.123)															
5-8 years	66	97,00%	0,1	0,12	0,16	0,16136	0,097596	0,025	0,07	0,1	0,15	0,21	0,24	0,3	0,64
9-11 years	61	98,40%	0,2	0,14	0,19	0,18631	0,09471	0,025	0,08	0,12	0,17	0,24	0,34	0,37	0,42
ETS at home, in former and non-smokers only (p=0.088)															
daily or less than daily	7	100,00%	0,2	0,14	0,32	0,24429	0,134395	0,1	0,1	0,12	0,22	0,34	0,48	0,48	0,48
never	120	97,50%	0,2	0,13	0,16	0,16921	0,093098	0,025	0,07	0,1	0,16	0,21	0,26	0,35	0,64
ETS elsewhere, in former and non-smokers in only (p=0.192)															
sometimes	33	100,00%	0,2	0,14	0,2	0,18697	0,086186	0,05	0,08	0,12	0,19	0,24	0,3	0,34	0,4
never	94	96,80%	0,1	0,13	0,16	0,16856	0,100058	0,025	0,07	0,1	0,15	0,21	0,26	0,37	0,64
Consumption of rice (p=0.830)															
Several times per week	63	96,80%	0,2	0,13	0,17	0,17778	0,109193	0,025	0,06	0,1	0,16	0,23	0,34	0,37	0,64
Once per week or less	64	98,40%	0,2	0,13	0,17	0,16898	0,083129	0,025	0,08	0,11	0,16	0,21	0,26	0,3	0,48
Consumption of offal (p=0.060)															
Several times per month	6	100,00%	0,2	0,15	0,36	0,26	0,130231	0,1	0,1	0,16	0,24	0,4	0,42	0,42	0,42
Once per month or less	120	97,50%	0,2	0,13	0,16	0,16996	0,093169	0,025	0,07	0,1	0,16	0,22	0,26	0,34	0,64
Consumption of game (p=0.007)															
Several times per month	5	80,00%	0,1	0,04	0,15	0,093	0,056965	0,025	0,03	0,05	0,09	0,15	0,15	0,15	0,15
Once per month or less	121	98,30%	0,2	0,14	0,17	0,1776	0,096469	0,025	0,08	0,11	0,16	0,22	0,28	0,36	0,64
Consumption of wild mushrooms (p=0.615)															
Several times per month	8	100,00%	0,2	0,11	0,24	0,1875	0,090514	0,07	0,07	0,11	0,2	0,24	0,34	0,34	0,34
Once per month or less	117	97,40%	0,2	0,13	0,17	0,17415	0,097223	0,025	0,07	0,1	0,16	0,22	0,28	0,37	0,64
Consumption of chocolate (p=0.920)															
Several times per week	91	97,80%	0,2	0,13	0,17	0,17374	0,100348	0,025	0,07	0,1	0,15	0,21	0,33	0,37	0,64
Once per week or less	36	97,20%	0,2	0,12	0,18	0,17236	0,087949	0,025	0,08	0,1	0,17	0,24	0,26	0,28	0,48
Consumption of local food (p=0.480)															
Several times per week	57	96,50%	0,2	0,13	0,18	0,18351	0,107092	0,025	0,07	0,11	0,18	0,24	0,3	0,4	0,64
Once per week or less	67	98,50%	0,1	0,13	0,16	0,16575	0,088387	0,025	0,07	0,1	0,15	0,21	0,28	0,34	0,48
Time spend in traffic (p=0.117)															
More than 45 minutes per day	12	100,00%	0,2	0,14	0,27	0,21917	0,103963	0,06	0,08	0,15	0,21	0,32	0,34	0,37	0,37

45 minutes per day or less	111	97,30%	0,2	0,13	0,16	0,16932	0,096466	0,025	0,07	0,1	0,15	0,22	0,26	0,36	0,64
Area of residence (p=0.627)															
Urban	61	98,40%	0,2	0,13	0,17	0,17074	0,102493	0,025	0,07	0,1	0,15	0,21	0,28	0,34	0,64
Rural	66	97,00%	0,2	0,13	0,18	0,17576	0,091648	0,025	0,08	0,11	0,17	0,22	0,27	0,37	0,48
Educational level (highest of family) (p=0.693)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	55	98,20%	0,2	0,13	0,17	0,16718	0,093856	0,025	0,08	0,1	0,14	0,21	0,3	0,4	0,48
Tertiary education (ISCED 5-6)	72	97,20%	0,2	0,13	0,17	0,17806	0,099128	0,025	0,07	0,11	0,17	0,24	0,27	0,34	0,64
Fossil materials as main source for heating or cooking (p=0.869)															
Yes	20	95,00%	0,1	0,11	0,19	0,17425	0,110731	0,025	0,06	0,12	0,15	0,21	0,34	0,44	0,48
No	98	98,00%	0,2	0,13	0,16	0,16998	0,091615	0,025	0,07	0,1	0,16	0,21	0,26	0,34	0,64
Redecoration or renovation of house in last two years (p=0.047)															
Yes	59	94,90%	0,1	0,11	0,16	0,16161	0,106214	0,025	0,06	0,09	0,14	0,2	0,27	0,36	0,64
No	66	100,00%	0,2	0,15	0,18	0,18379	0,087614	0,05	0,08	0,13	0,17	0,23	0,34	0,37	0,42
Main source of water for drinking (p=0.423)															
Public water supply	121	97,50%	0,2	0,13	0,17	0,17335	0,096554	0,025	0,07	0,1	0,16	0,22	0,27	0,36	0,64
Commercial producers	4	100,00%	0,1	0,06	0,24	0,1475	0,128938	0,07	0,07	0,08	0,09	0,22	0,34	0,34	0,34
Soldering indoors (p=0.856)															
Yes	18	94,40%	0,2	0,1	0,2	0,17639	0,098962	0,025	0,05	0,12	0,17	0,23	0,37	0,37	0,37
No	109	98,20%	0,2	0,13	0,17	0,17284	0,096723	0,025	0,07	0,1	0,16	0,21	0,28	0,34	0,64

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 19: Statistical analysis of urinary cadmium ($\mu\text{g/g}$ creatinine) in children

Age group: children, 6-11 years

Biomarker: urinary cadmium

Unit: $\mu\text{g/g}$ creatinine

LOQ: 0,05 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	97,60%	0,12	0,113	0,134	0,13788	0,071961	0,022	0,0663	0,098	0,1267	0,1612	0,2104	0,2391	0,56
Period of urine sampling (p=0.515)															
< 8 hours	9	100,00%	0,11	0,079	0,143	0,11592	0,051964	0,053	0,0535	0,0965	0,1078	0,1342	0,2252	0,2252	0,225
≥ 8 hours	94	97,90%	0,12	0,107	0,129	0,13116	0,069346	0,034	0,0669	0,0926	0,1187	0,1539	0,2028	0,2348	0,56
Gender (p=0.832)															
Boys	66	97,00%	0,12	0,109	0,141	0,14122	0,081186	0,022	0,0634	0,0965	0,1297	0,174	0,2045	0,2349	0,56
Girls	61	98,40%	0,12	0,108	0,137	0,13427	0,060899	0,034	0,074	0,0986	0,1192	0,1564	0,2196	0,2548	0,361
Age (p=0.999)															
5-8 years	66	97,00%	0,12	0,109	0,138	0,13799	0,074145	0,022	0,0663	0,0934	0,1267	0,1736	0,2038	0,2349	0,56
9-11 years	61	98,40%	0,12	0,109	0,139	0,13777	0,070136	0,034	0,0669	0,0989	0,1267	0,1579	0,2104	0,2692	0,428
ETS at home, in former and non-smokers only (p=0.909)															
daily or less than daily	7	100,00%	0,13	0,095	0,165	0,1329	0,048082	0,066	0,0663	0,0989	0,1263	0,1579	0,2196	0,2196	0,22
Never	120	97,50%	0,12	0,112	0,134	0,13817	0,073245	0,022	0,0657	0,0973	0,1267	0,1623	0,2075	0,247	0,56
ETS elsewhere, in former and non-smokers in only (p=0.904)															
sometimes	33	100,00%	0,12	0,106	0,14	0,1318	0,052799	0,052	0,0721	0,0934	0,1263	0,1533	0,2028	0,2349	0,269
Never	94	96,80%	0,12	0,111	0,137	0,14002	0,077711	0,022	0,0645	0,0986	0,1267	0,1635	0,2196	0,2548	0,56
Consumption of rice (p=0.172)															
Several times per week	63	96,80%	0,12	0,101	0,132	0,13363	0,081015	0,022	0,0634	0,0926	0,1154	0,1564	0,2045	0,2391	0,56
Once per week or less	64	98,40%	0,13	0,118	0,145	0,14207	0,062142	0,04	0,0736	0,1019	0,1337	0,1724	0,2104	0,2349	0,428
Consumption of offal (p=0.316)															
Several times per month	6	100,00%	0,15	0,092	0,245	0,17863	0,129593	0,078	0,0775	0,0964	0,1328	0,2045	0,4277	0,4277	0,428
Once per month or less	120	97,50%	0,12	0,112	0,133	0,13646	0,068164	0,022	0,0666	0,0986	0,1267	0,1605	0,2071	0,237	0,56
Consumption of game (p=0.026)															
Several times per month	5	80,00%	0,08	0,049	0,121	0,08444	0,036806	0,034	0,0339	0,0739	0,0783	0,103	0,1331	0,1331	0,133
Once per month or less	121	98,30%	0,13	0,116	0,137	0,1407	0,072252	0,022	0,0707	0,0989	0,1272	0,1635	0,2104	0,2391	0,56

Consumption of wild mushrooms (p=0.383)																
Several times per month	8	100,00%	0,11	0,075	0,154	0,11824	0,046532	0,035	0,0345	0,0871	0,132	0,1448	0,1838	0,1838	0,1838	0,184
Once per month or less	117	97,40%	0,13	0,115	0,137	0,14046	0,073287	0,022	0,0707	0,0989	0,1267	0,1635	0,2196	0,2548	0,2548	0,56
Consumption of chocolat (p=0.421)																
Several times per week	91	97,80%	0,12	0,108	0,133	0,13598	0,074926	0,022	0,0663	0,0934	0,1248	0,1612	0,2038	0,2349	0,2349	0,56
Once per week or less	36	97,20%	0,13	0,112	0,15	0,14269	0,0646	0,04	0,0669	0,1003	0,1319	0,1665	0,2252	0,2751	0,2751	0,361
Consumption of local food (p=0.236)																
Several times per week	57	96,50%	0,13	0,114	0,15	0,14959	0,088256	0,034	0,0663	0,1004	0,1391	0,174	0,2252	0,3606	0,3606	0,56
Once per week or less	67	98,50%	0,12	0,105	0,132	0,12966	0,054816	0,022	0,0645	0,0917	0,1182	0,1579	0,2038	0,2348	0,2348	0,275
Time spend in traffic (p=0.348)																
More than 45 minutes per day	12	100,00%	0,14	0,11	0,176	0,15019	0,0583	0,065	0,0779	0,1104	0,149	0,1931	0,2349	0,2391	0,2391	0,239
45 minutes per day or less	111	97,30%	0,12	0,11	0,133	0,13668	0,074385	0,022	0,0663	0,0965	0,1248	0,1612	0,2038	0,2548	0,2548	0,56
Area of residence (p=0.316)																
Urban	61	98,40%	0,12	0,104	0,133	0,13342	0,080392	0,035	0,0645	0,0899	0,1182	0,1521	0,2038	0,2391	0,2391	0,56
Rural	66	97,00%	0,13	0,114	0,144	0,142	0,063533	0,022	0,074	0,0989	0,1348	0,1762	0,2104	0,2349	0,2349	0,428
Educational level (highest of family) (p=0.565)																
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	55	98,20%	0,12	0,106	0,135	0,13213	0,064436	0,034	0,0669	0,0926	0,1182	0,1599	0,2045	0,2349	0,2349	0,428
Tertiary education (ISCED 5-6)	72	97,20%	0,13	0,111	0,142	0,14228	0,077374	0,022	0,0645	0,0988	0,135	0,1674	0,2252	0,2548	0,2548	0,56
Fossil materials as main source for heating or cooking (p=0.393)																
Yes	20	95,00%	0,11	0,087	0,141	0,12456	0,055774	0,022	0,0596	0,0854	0,1203	0,153	0,212	0,2224	0,2224	0,225
No	98	98,00%	0,12	0,111	0,134	0,13633	0,070442	0,034	0,0663	0,0986	0,1265	0,1579	0,2038	0,2391	0,2391	0,56
Redecoration or renovation of house in last two years (p=0.221)																
Yes	59	94,90%	0,12	0,1	0,133	0,13361	0,083116	0,022	0,0625	0,0802	0,1192	0,1599	0,2196	0,2692	0,2692	0,56
No	66	100,00%	0,13	0,116	0,142	0,13954	0,060284	0,035	0,0775	0,1016	0,132	0,1593	0,2045	0,2348	0,2348	0,428
Main source of water for drinking (p=0.015)																
Public water supply	121	97,50%	0,13	0,115	0,136	0,1395	0,072443	0,022	0,0721	0,0986	0,1267	0,1612	0,2104	0,2391	0,2391	0,56
Commercial producers	4	100,00%	0,07	0,039	0,12	0,07712	0,045022	0,035	0,0345	0,0504	0,0666	0,1038	0,1407	0,1407	0,141	0,141
Soldering indoors (p=0.410)																
Yes	18	94,40%	0,11	0,091	0,139	0,12266	0,047454	0,034	0,0634	0,0842	0,1161	0,1593	0,1859	0,1964	0,1964	0,196

No	109	98,20%	0,13	0,114	0,137	0,1404	0,075113	0,022	0,0663	0,0986	0,1267	0,1612	0,2252	0,2548	0,56
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N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Figures

Fig. 11 and 12: Cadmium concentration in urine (GM) by age of responders and education level of family in Slovakia

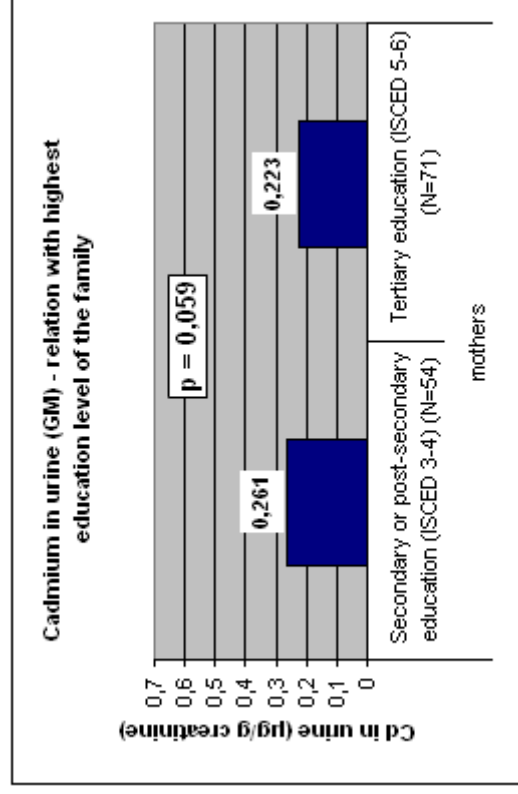
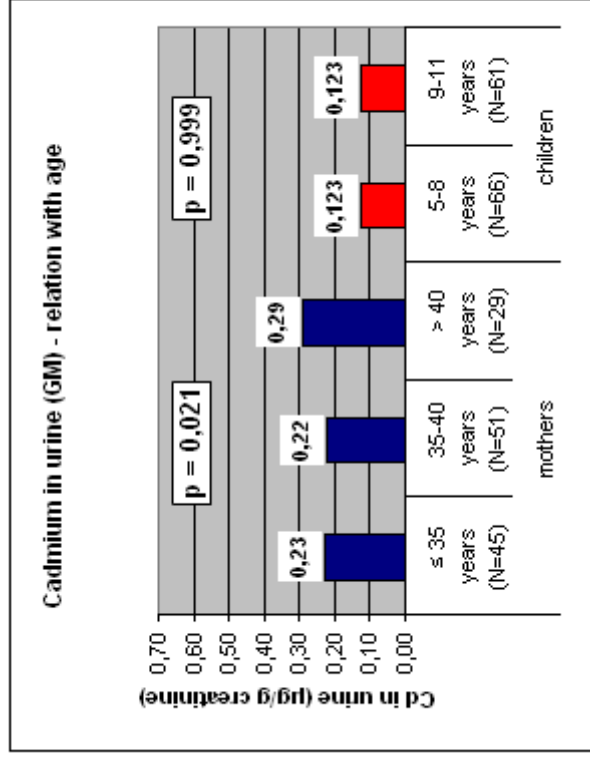


Fig. 13: Cadmium concentration in urine (GM) related to creatinine levels in Slovakia

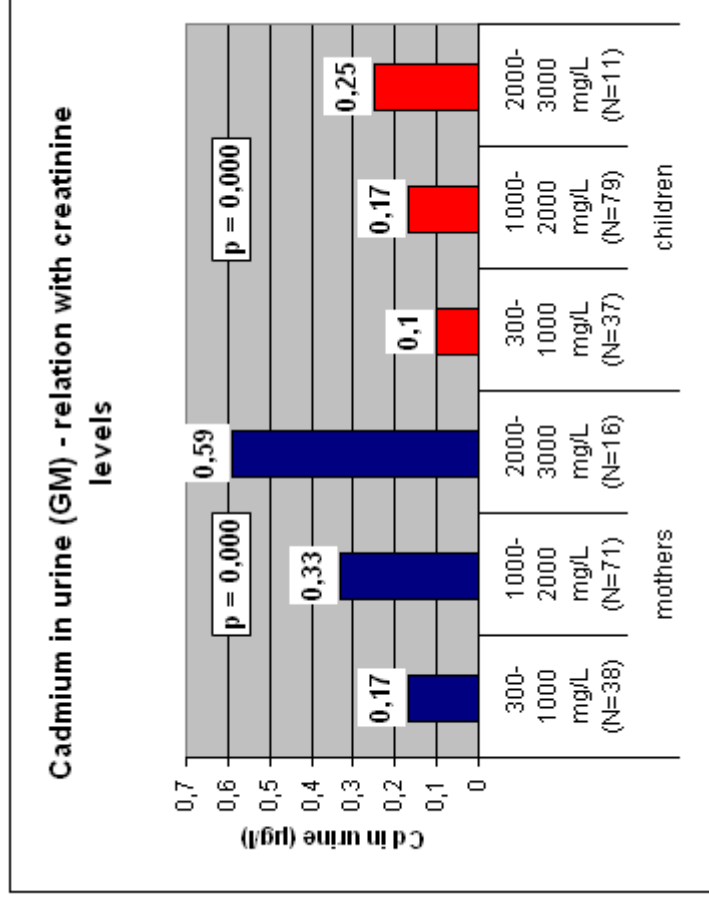
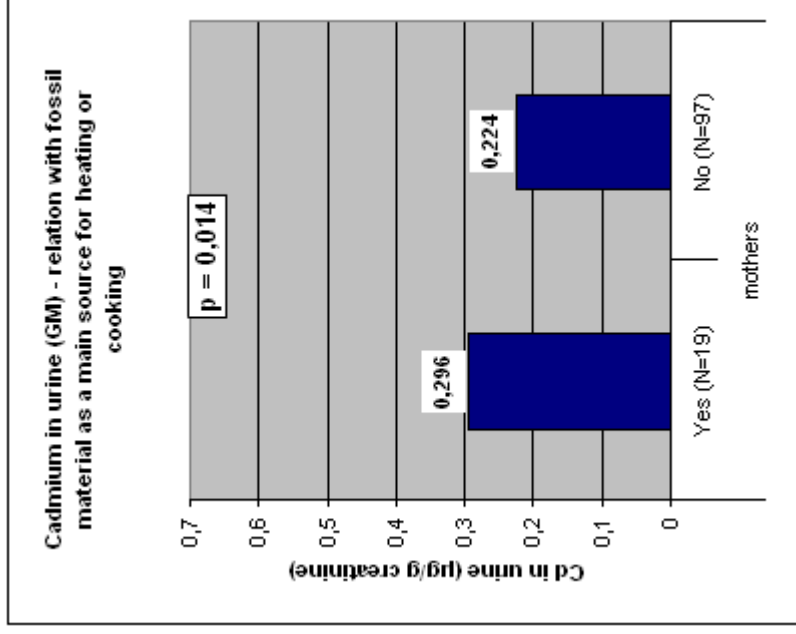
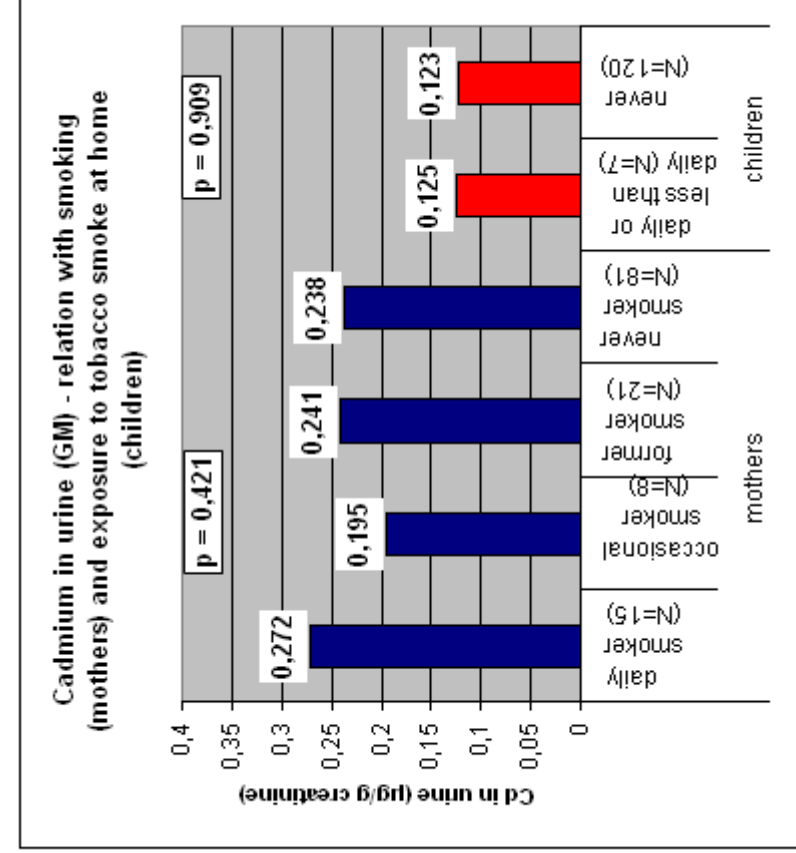
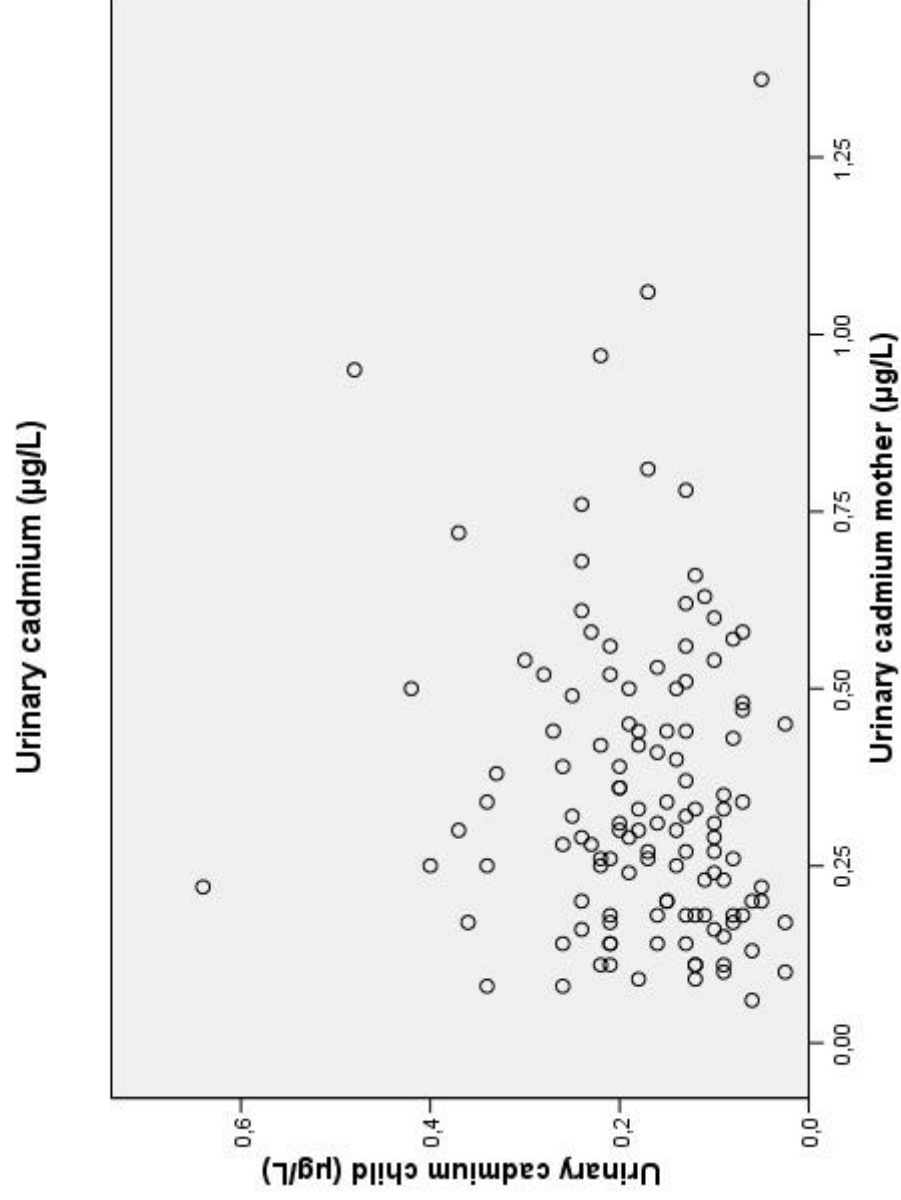


Fig. 14 and 15: Cadmium concentration in urine (GM) related to tobacco smoke exposure and fossil materials used for heating and cooking

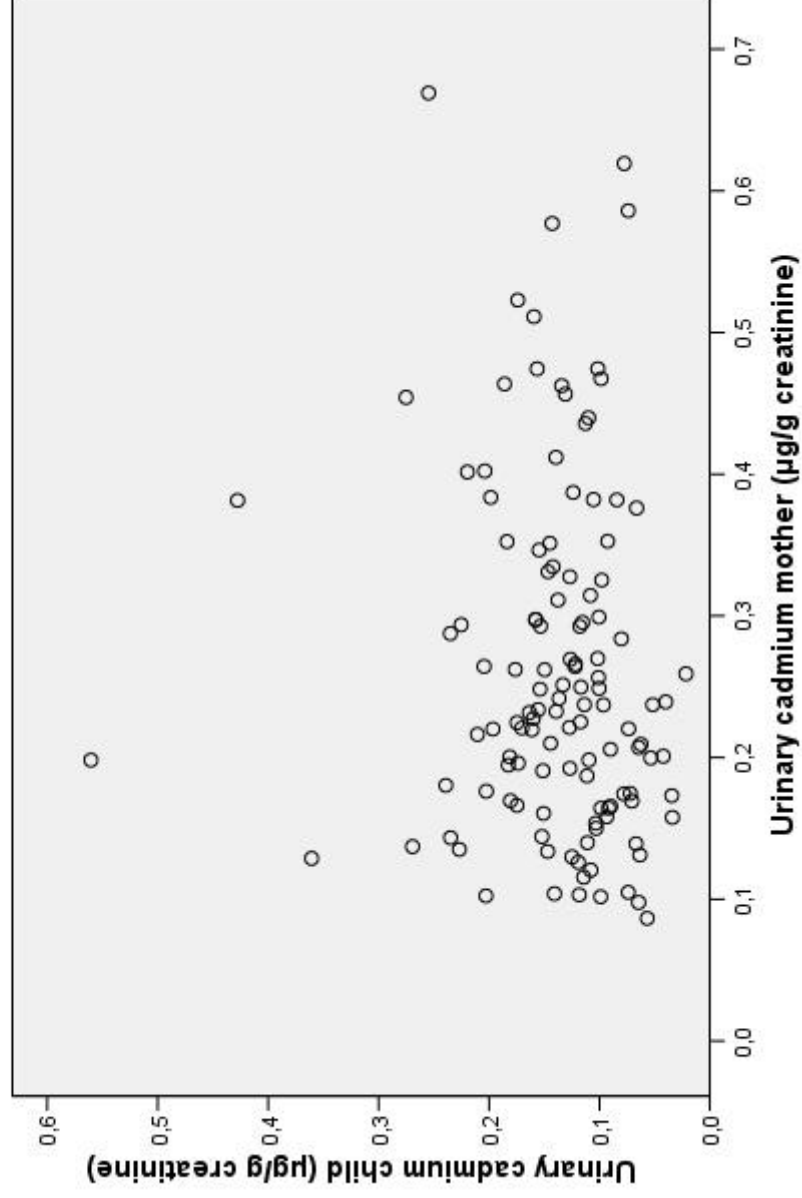


Results of the statistical analysis of exposure to cadmium do not suggest too strong associations on the national level. Presented data show relationships between cadmium concentrations and creatinine levels and very slight relationship to tobacco exposure and using of fossil materials for heating or cooking. When relating to age, only in mothers results some, but not strong relationship could be assumed. However, frequencies for several questionnaire variables are distributed too unevenly and notice of results on the national level is therefore weak.

4.4.2.4. Urinary cadmium: comparing mothers and children (Fig. 16 and 17)



Urinary cadmium ($\mu\text{g/g creatinine}$)



STATISTICAL TEST

BIOMARKER	VARIABLE 1	VARIABLE 2	Spearman correlation coefficient	p-value
Urinary cadmium (µg/L)	UM_CD	UC_CD	0,13	0,152
Urinary cadmium (µg/g creatinine)	UM_CD_C	UC_CD_C	0,15	0,099

4.4.2.5. Urinary cadmium: comparison with guidelines (Tab. 20)

Urinary cadmium (µg/L)	Mothers	Children
The German HBM-I value 1 µg/l	1 µg/l	0.5 µg/l
The German HBM-II value 4 µg/l	4 µg/l	2.0 µg/l
< HBM I.	126	123
≥ HBM I. / < HBM II.	2	3
≥ HBM II.	0	0
BE (USEPA chronic RfD) 1,5 µg/l	1,5 µg/l	1,5 µg/l
< BE	128	126
≥ BE	0	0

4.4.2.6. Urinary cadmium: comparison with literature (Tab. 21)

Country	Population	Sampling period	Age	Sample size	Reference value		
					µg/l	P ₉₀	P ₉₅
Germany	Non-smoking children	2003-2006	3-14	1734		0,20	
	Non-smoking adults	1997-1999	18-69	4740		0,80	
Belgium	Adults	2007-2009	20-40	194	0,44		0,41
Czech Republic	Children	2008	8-10	195			0,60

	Adults	2009	18-64	372				0,60
USA (NHANES)	Children	2005-	6-11	355	0,18	0,24	0,17	0,20
	Women	2006		1305	0,75	0,98	0,69	0,99
Slovakia (DEMOCOPHES)	Children	2011-	6-11	127	0,28	0,36	0,21	0,24
	Women	2012	24-45	125	0,61	0,76	0,46	0,51

4.4.3. Urinary cotinine

4.4.3.1. Cotinine: fact sheet

Cotinine is an alkaloid found in tobacco and is also a metabolite of nicotine. Cotinine is used as a biomarker for exposure to tobacco smoke and has also been sold as an antidepressant under the brand name Scotine. Similarly to nicotine, cotinine binds to, activates, and desensitizes neuronal nicotinic acetylcholine receptors, though at much lower potency in comparison. It has demonstrated nootropic and antipsychotic-like effects in scientific research.

Likely sources of exposure:

The main way to take up nicotine is tobacco smoke. Active smokers who inhale tobacco smoke are the most exposed to nicotine. Cotinine has an in vivo half-life of approximately 20 hours, and is typically detected for several days (up to one week) after the use of tobacco. The level of cotinine in the blood is proportionate to the amount of exposure to tobacco smoke, so it is a valuable indicator of tobacco smoke exposure, including secondary passive smokers. People who smoke menthol cigarettes may retain cotinine in the blood for a longer period because menthol can compete with enzymatic metabolism of cotinine. Another exposure sources with lesser importance are vegetables and tea, coffee.

Occurrence of Cotinine:

Cotinine is a product of human metabolism of nicotine. Nicotine can be found in tobacco products, in vegetables (potatoes, cabbage) and in the tea and the coffee.

Chronic toxicity:

Cotinine levels <10 ng/mL are considered to be consistent with no active smoking. Values of 10 ng/mL to 100 ng/mL are associated with light smoking or moderate passive exposure, and levels above 300 ng/mL are seen in heavy smokers - more than 20 cigarettes a day. In urine, values between 11 ng/mL and 30 ng/mL may be associated with light smoking or passive exposure, and levels in active smokers typically reach 500 ng/mL or more. Cotinine assays provide an objective quantitative measure that is more reliable than smoking histories or counting the number of cigarettes smoked per day. Cotinine also permits the measurement of exposure to second-hand smoke (passive smoking).

Long-term exposure to tobacco smoke increases the risk for cancer, asthma and coronary heart diseases for active smokers. Passive smokers and children are affected too. Children are especially sensitive to passive smoking and it can cause respiratory diseases, and chest illnesses, phlegm, chronic coughing, asthma, breathlessness, pneumonia and bronchitis.

Infections. Tobacco smoke also increase the risk of sudden infant death and low birth weight in newborns.

The exposure to tobacco smoke can be estimated for individuals in blood or urine.

4.4.3.2. Urinary cotinine: results in mothers

Tab. 22: Statistical analysis of urinary cotinine (µg/L) in mothers

Age group: mothers, 18-45 years
 Biomarker: urinary cotinine
 Unit: µg/L
 LOQ: 0,3 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	100,00%	3	1,9	4,6	194,052	579,6228	0,4	0,7	0,8	1	2	597,5	1709	3033,9
Urinary creatinine (p=0.052)															
300-1000 mg/L	38	100,00%	1,4	0,9	2,3	46,2	249,2255	0,4	0,6	0,7	0,9	1,4	4,9	179,4	1532
1000-2000 mg/L	71	100,00%	3,8	2,1	6,9	192,527	521,1702	0,6	0,7	0,8	1,1	2,8	597,5	1709	2370
2000-3000 mg/L	16	100,00%	6,8	1,3	36,1	551,969	1079,116	0,7	0,7	0,8	1,05	485,1	2957	3034	3033,9

Period of urine sampling (p=0.181)																
< 5 hours	9	100,00%	1,2	0,9	1,6	1,289	0,5645	0,7	0,7	0,9	1,2	1,8	2,3	2,3	2,3	2,3
5-8 hours	51	100,00%	2,7	1,4	5,2	181,882	551,0887	0,6	0,7	0,7	0,9	1,9	160,2	1908	2370	
≥ 8 hours	43	100,00%	5,5	2,3	13	314,335	759,3009	0,6	0,7	0,8	1,3	7,1	1532	1860	3033,9	
Age (p=0.152)																
≤ 35 years	45	100,00%	4,2	1,8	9,9	311,729	772,2987	0,6	0,6	0,7	0,9	2,4	1315	2370	3033,9	
35-40 years	51	100,00%	1,8	1,1	2,9	72,939	338,9264	0,4	0,7	0,8	1	1,7	7,1	160,2	1907,8	
> 40years	29	100,00%	4,4	1,6	12,2	224,441	543,6055	0,6	0,7	0,8	1,1	4,2	1574	1709	1925,6	
Smoking (p=0.000)																
daily smoker	15	100,00%	701	270,8	1815	1407,09	983,5142	3,1	45,7	480	1532	1926	2957	3034	3033,9	
occasional smoker	8	100,00%	13	2	83,2	105,375	170,2638	0,7	0,7	1,1	17,2	157,3	491,2	491,2	491,2	
former smoker	21	100,00%	1,5	0,7	3	76,062	343,1299	0,6	0,8	0,8	1	1,2	1,8	4,2	1573,6	
never smoker	81	100,00%	1,1	0,9	1,4	8,763	66,2639	0,4	0,6	0,7	0,9	1,3	2,3	4,9	597,5	
ETS at home, in former and non-smokers only (p=0.003)																
daily or less than daily	5	100,00%	4,9	2,3	10,6	6,7	6,0807	2	2	2,3	5,2	7,1	16,9	16,9	16,9	
never	97	100,00%	1,1	0,9	1,4	23,439	170,1741	0,4	0,6	0,7	0,9	1,2	1,9	2,6	1573,6	
ETS elsewhere, in former and non-smokers in only (p=0.265)																
frequent	5	100,00%	1,1	0,7	1,7	1,22	0,6686	0,7	0,7	0,7	0,8	1,9	2	2	2	
sometimes	46	100,00%	1,5	0,9	2,3	48,678	246,0629	0,4	0,7	0,7	0,95	1,3	2,3	16,9	1573,6	
never	51	100,00%	1	0,9	1,2	1,212	1,0037	0,6	0,6	0,7	0,9	1,2	2	4,2	5,2	
ETS in last 24 hours, in former and non-smokers only (p=0.182)																
yes	6	100,00%	2,2	0,8	5,9	4,45	6,3289	0,6	0,6	0,8	1,6	5,2	16,9	16,9	16,9	
no	96	100,00%	1,2	0,9	1,4	23,754	171,042	0,4	0,6	0,7	0,9	1,3	2	4,2	1573,6	
Area of residence (p=0.600)																
Urban	62	100,00%	2,7	1,5	4,7	156,047	541,5267	0,6	0,7	0,8	1	1,9	154,3	1532	3033,9	
Rural	63	100,00%	3,4	1,7	6,6	231,454	616,8776	0,4	0,6	0,7	1	2,4	967,8	1709	2956,5	
Educational level (highest of family) (p=0.671)																
Secondary education or post-secondary non-tertiary	54	100,00%	3,3	1,7	6,6	241,391	716,235	0,4	0,7	0,8	1,05	2,8	967,8	2370	3033,9	

occasional smoker	8	100,00%	11	2	56,7	65,251	96,6783	0,5	0,538	1,378	9,256	115,379	269,445	269,446	269,4
former smoker	21	100,00%	1,3	0,7	2,8	68,748	309,9551	0,4	0,499	0,641	0,863	1,681	2,504	2,765	1421,5
never smoker	81	100,00%	0,9	0,7	1,2	8,48	64,7858	0,3	0,38	0,491	0,808	1,145	1,954	4,97	584,1
ETS at home, in former and non-smokers only (p=0.004)															
daily or less than daily	5	100,00%	4,4	1,6	11,7	6,685	5,9064	1,1	1,13	1,602	6,496	8,624	15,576	15,576	15,6
never	97	100,00%	0,9	0,7	1,2	21,62	155,3421	0,3	0,397	0,509	0,806	1,143	1,954	2,982	1421,5
ETS elsewhere, in former and non-smokers in only (p=0.452)															
frequent	5	100,00%	0,8	0,5	1,3	0,938	0,5233	0,5	0,48	0,524	0,806	1,13	1,75	1,75	1,8
sometimes	46	100,00%	1,2	0,7	1,9	44,926	224,5632	0,3	0,365	0,491	0,853	1,229	3,059	15,576	1421,5
never	51	100,00%	0,9	0,7	1	1,163	1,3231	0,3	0,413	0,56	0,735	1,4	1,954	2,504	8,6
ETS in last 24 hours, in former and non-smokers only (p=0.080)															
yes	6	100,00%	2,3	0,8	6,7	4,799	6,0859	0,5	0,472	1,039	1,542	8,624	15,576	15,576	15,6
no	96	100,00%	0,9	0,7	1,2	21,894	156,1361	0,3	0,397	0,512	0,807	1,187	1,997	3,059	1421,5
Area of residence (p=0.650)															
Urban	62	100,00%	2,2	1,2	3,9	107,788	364,0766	0,3	0,413	0,538	1,022	2,504	115,75	997,204	1752,9
Rural	63	100,00%	2,7	1,4	5,2	153,663	404,8422	0,3	0,445	0,573	0,847	1,784	778,61	1140,79	2066,3
Educational level (highest of family) (p=0.653)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	54	100,00%	2,7	1,4	5,2	147,679	446,2308	0,3	0,458	0,61	1,034	2,982	479,11	1405,89	2066,3
Tertiary education (ISCED 5-6)	71	100,00%	2,2	1,2	4	118,154	332,3691	0,3	0,413	0,538	0,901	1,825	438,85	997,204	1575,4

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

4.4.3.3. Urinary cotinine: results in children

Tab. 24: Statistical analysis of urinary cotinine ($\mu\text{g/L}$) in children

Age group: children, 6-11 years
Biomarker: urinary cotinine
Unit: $\mu\text{g/L}$
LOQ: 0,3 $\mu\text{g/L}$

Strata	N	% LOQ	> GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	100,00%	1,1	0,9	1,3	3,763	23,978	0,5	0,6	0,6	0,9	1,3	2,9	7,2	269,8
Urinary creatinine (p=0.068)															
300-1000 mg/L	37	100,00%	1	0,8	1,2	1,303	1,6252	0,5	0,6	0,6	0,8	1,1	2,9	4,4	9,5
1000-2000 mg/L	79	100,00%	1,1	0,9	1,3	5,024	30,358	0,5	0,6	0,7	0,9	1,3	2,2	10,4	269,8
2000-3000 mg/L	11	100,00%	1,9	1,1	3,3	2,982	3,2701	0,5	0,8	1,3	1,4	5	7,2	10,7	10,7
Period of urine sampling (p=0.317)															
< 8 hours	9	100,00%	1,4	0,9	2,2	1,756	1,2551	0,5	0,5	0,9	1,2	2,5	4,3	4,3	4,3
\geq 8 hours	94	100,00%	1,1	0,9	1,3	1,802	3,397	0,5	0,6	0,6	0,9	1,3	2,2	9,5	26,4
Gender (p=0.435)															
boys	66	100,00%	1,2	0,9	1,5	5,959	33,194	0,5	0,5	0,6	0,85	1,4	2,9	10,7	269,8
girls	61	100,00%	1	0,9	1,2	1,387	1,6443	0,5	0,6	0,7	0,9	1,2	2	4,3	10,4
Age (p=0.737)															
5-8 years	66	100,00%	1,1	0,9	1,3	1,673	2,335	0,5	0,6	0,7	0,9	1,5	2,9	7,2	13,2
9-11 years	61	100,00%	1,1	0,8	1,4	6,025	34,518	0,5	0,5	0,6	0,8	1,3	2,2	5	269,8
ETS at home, in former and non-smokers only (p=0.000)															
daily or less than daily	7	100,00%	7,1	1,6	31	45,14	99,473	1,1	1,1	1,3	5	26,4	270	270	269,8
never	120	100,00%	1	0,9	1,1	1,349	1,8072	0,5	0,6	0,6	0,85	1,25	2,05	3,85	13,2
ETS elsewhere, in former and non-smokers in only (p=0.000)															
sometimes	33	100,00%	1,8	1,1	2,8	10,63	46,632	0,5	0,6	0,7	1,3	2,9	9,5	13,2	269,8

	Never	94	100,00%	0,9	0,8	1,1	1,351	2,8451	0,5	0,6	0,6	0,8	1,1	1,6	2,5	26,4
Area of residence (p=0.000)																
Urban	61	100,00%	1,2	1	1,5	1,952	3,6901	0,6	0,6	0,8	1	1,5	2,9	5	26,4	
Rural	66	100,00%	1	0,8	1,3	5,436	33,106	0,5	0,5	0,6	0,8	1,1	2,5	7,2	269,8	
Educational level (highest of family) (p=0.184)																
Secondary education or post-secondary education (ISCED 3-4)	55	100,00%	1,2	0,9	1,7	6,944	36,323	0,5	0,5	0,6	0,9	1,5	4,4	10,7	269,8	
Tertiary education (ISCED 5-6)	72	100,00%	1	0,9	1,2	1,333	1,7431	0,5	0,6	0,7	0,9	1,3	2	3,4	13,2	

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 25: Statistical analysis of urinary cotinine (µg/g creatinine) in child

Age group: children, 6-11 years
Biomarker: urinary cotinine
Unit: µg/g creatinine
LOQ: 0,3 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	100,00%	0,9	0,8	1,1	2,594	13,6087	0,2	0,4	0,55	0,74	1,139	2,413	4,359	151,8
Period of urine sampling (p=0.606)															
< 8 hours	9	100,00%	1	0,6	1,7	1,334	0,9652	0,3	0,34	0,68	1,07	2,207	2,993	2,993	3
≥ 8 hours	94	100,00%	0,9	0,8	1	1,532	3,0363	0,2	0,4	0,53	0,74	1,138	2,255	6,94	24,5
Gender (p=0.341)															
boys	66	100,00%	1	0,8	1,3	3,979	18,8112	0,3	0,4	0,53	0,73	1,113	3,882	10,474	151,8
girls	61	100,00%	0,8	0,7	1	1,094	1,0802	0,2	0,42	0,55	0,74	1,183	2,183	2,535	7
Age (p=0.186)															

5-8 years	66	100,00%	1	0,8	1,2	1,51	2,125	0,3	0,52	0,64	0,87	1,207	2,535	6,94	12,1
9-11 years	61	100,00%	0,8	0,6	1,1	3,766	19,5277	0,2	0,36	0,5	0,62	0,927	1,964	4,328	151,8
ETS at home, in former and non-smokers only (p=0.000)															
daily or less than daily	7	100,00%	4,2	0,9	18,5	26,51	55,9174	0,6	0,6	0,91	2,26	24,51	151,83	151,83	151,8
never	120	100,00%	0,8	0,7	0,9	1,199	1,6844	0,2	0,4	0,54	0,69	1,111	2,074	3,622	12,1
ETS elsewhere, in former and non-smokers in only (p=0.009)															
sometimes	33	100,00%	1,3	0,8	2	6,463	26,2318	0,3	0,39	0,56	0,87	2,255	4,359	12,144	151,8
never	94	100,00%	0,8	0,7	0,9	1,235	2,6395	0,2	0,42	0,54	0,69	1,099	1,858	2,413	24,5
Area of residence (p=0.370)															
Urban	61	100,00%	1	0,8	1,2	1,592	3,2045	0,4	0,49	0,56	0,85	1,183	2,535	4,328	24,5
Rural	66	100,00%	0,9	0,7	1,1	3,519	18,647	0,2	0,36	0,51	0,68	1,04	2,183	6,94	151,8
Educational level (highest of family) (p=0.215)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	55	100,00%	1	0,8	1,4	4,479	20,5577	0,3	0,4	0,53	0,74	1,357	4,328	10,474	151,8
Tertiary education (ISCED 5-6)	72	100,00%	0,8	0,7	1	1,154	1,5413	0,2	0,41	0,55	0,73	1,111	2,183	3,361	12,1

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Figures

Fig. 18: Cotinine in urine (GM) and active smoking of mothers in Slovakia

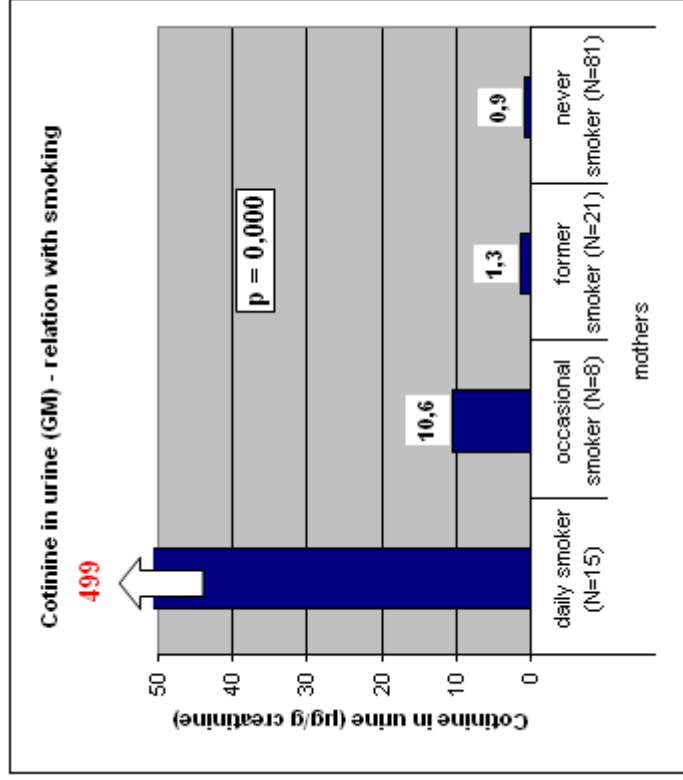


Fig. 19 and 20: Cotinine in urine (GM) and exposure to environmental tobacco smoke (passive smoking) at home or elsewhere in Slovakia

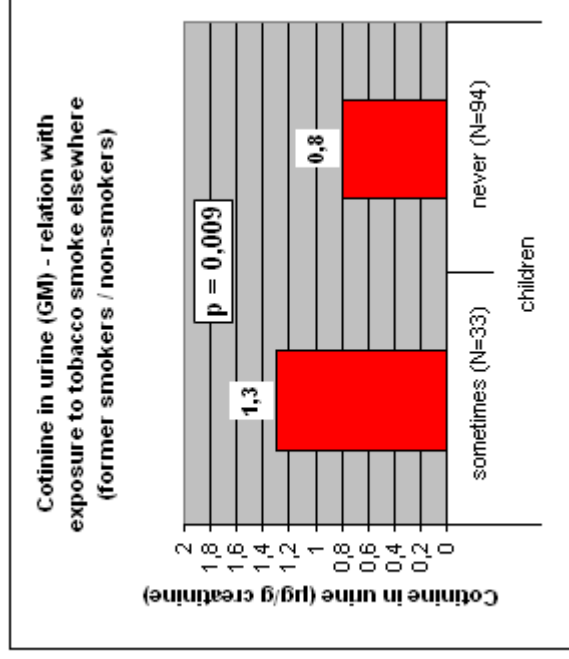
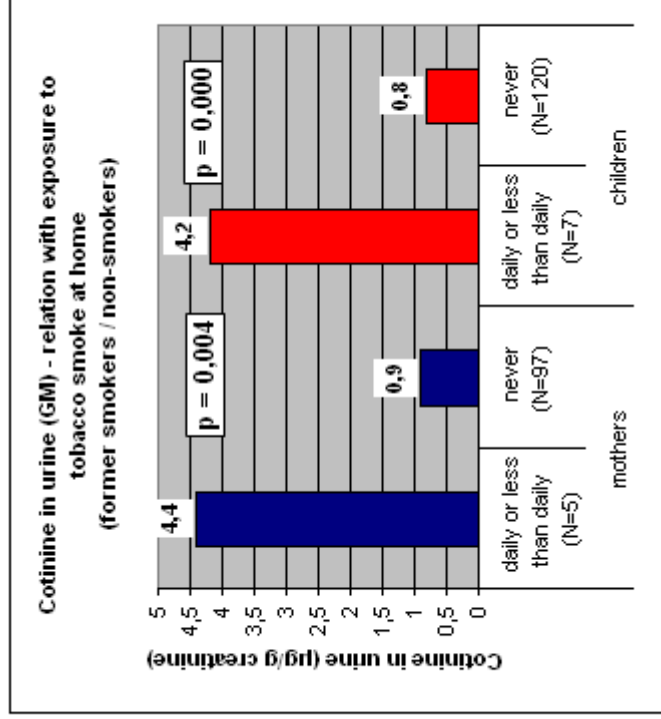


Fig. 21: Cotinine in urine (GM) and exposure to environmental tobacco smoke (passive smoking) in last 24 hours

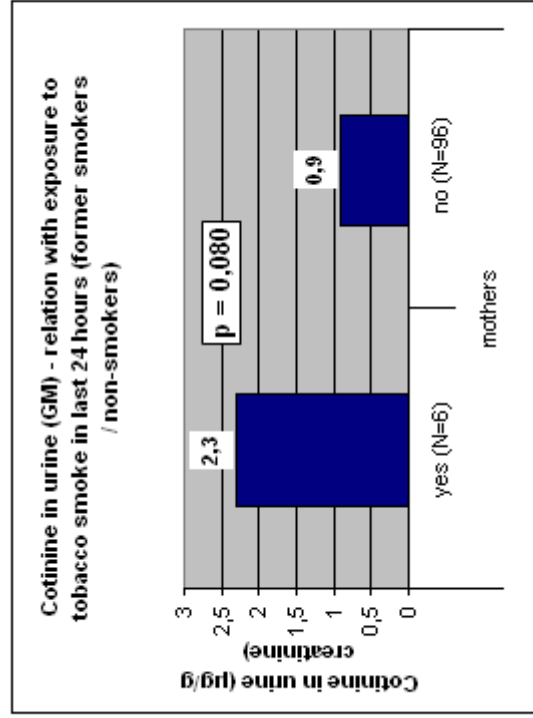
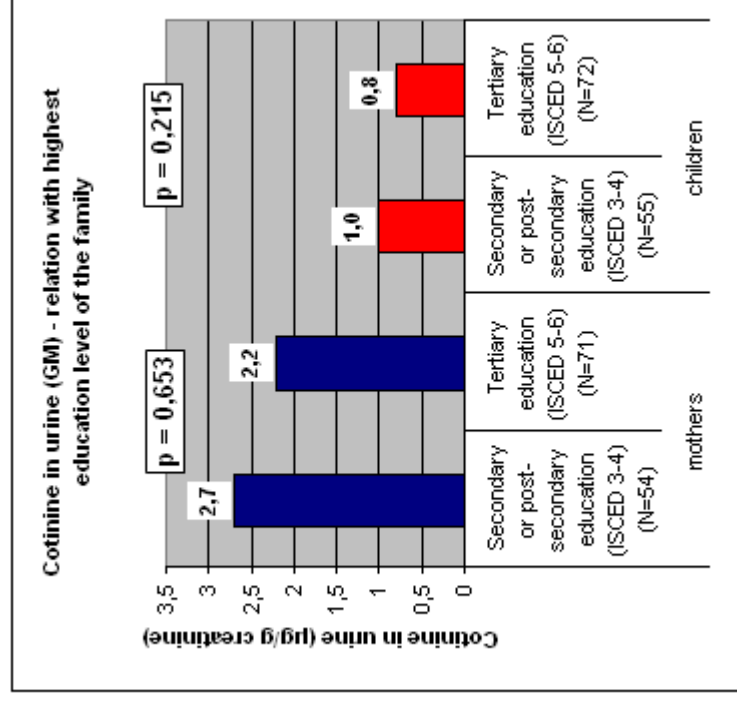
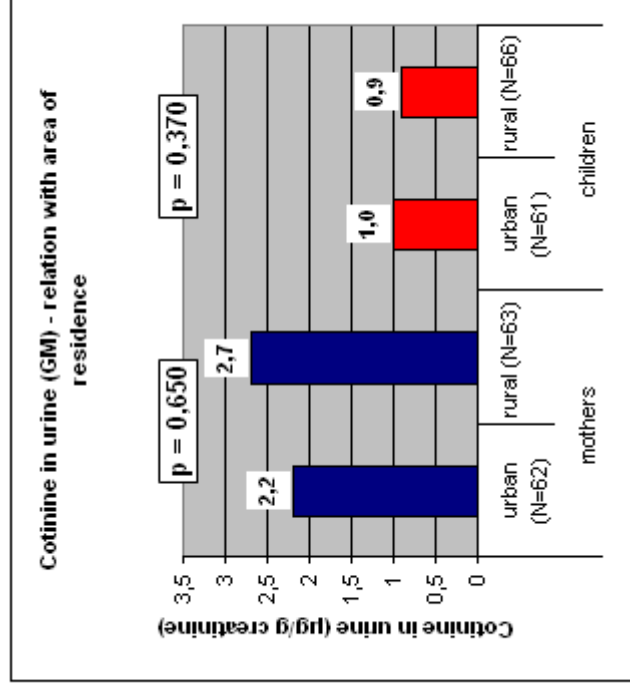


Fig. 22 and 23: Cotinine in urine (GM) related to area of residence and education level of the family in Slovakia



Figures above clearly express strong relationship between cotinine levels in urine and exposure to tobacco smoke both through active or passive smoking. Geometric means of cotinine concentrations are multiple higher in people smoking daily or exposed to passive smoking at home or elsewhere more often. When considering the area of family residence, mothers in rural area are more involved by tobacco exposure. Data also shows the fact, in families with lower educational degree, both mothers and children are exposed to cotinine more.

Urinary cotinine (µg/L)	UM_COT	UC_COT	0,545	0,000
Urinary cotinine (µg/g creatinine)	UM_COT_C	UC_COT_C	0,412	0,000

4.4.3.5. Urinary cotinine: comparison with guidelines (Tab. 26)

Urinary cotinine (µg/g creatinine)		Mothers	Children
Reference value *	50 µg/g		50 µg/g
< reference value	111		128
≥ reference value	18		1

* Value from Riboli et al. (1995): Misclassification of smoking status among women in relation to exposure to environmental tobacco smoke. Eur. Respir. J. 8, 285 - 290

4.4.3.6. Urinary cotinine: comparison with literature (Tab. 27)

Country	Population	Sampling period	Age	Sample size	Reference value			
					µg/l	µg/g creatinine		
					P ₉₀	P ₉₅	P ₉₅	
Germany	Never smokers	1997-1999	18-69	2107	8,00	17,00	5,00	12,00
	Former smokers	1997-1999	18-69	1022	12,00	39,00	9,00	28,00
	Smokers	1997-1999	18-69	1609	2620,00	3420,00	1830,00	2570,00
Belgium	Non-smoking adolescents	2007-2009	14-16	206	22,10		12,50	
	Adult non-smokers	2007-2009	20-40	110	16,40		12,40	
	Adult former smokers	2007-2009	20-40	41	19,20		23,10	

	2007-2009	20-40	24	11812,00	10298,00	
USA (NHANES)	Adult smokers	20-40	24	11812,00	10298,00	
	Children	3-11	1252	2,04	3,35	
	Women		3383	0,86	1,76	
	Children	6-11	127	2,90	7,20	4,36
	daily smoker woman		15	2957,00	3034,00	2066,26
	occasional smoker woman		8	491,20	491,20	269,45
	former smoker woman		21	1,80	4,20	2,77
	never smoker woman					
Slovakia (DEMOCOPHES)	2011-2012	24-45	81	2,30	4,90	4,97

4.4.4. Urinary phthalate metabolites

4.4.4.1. Phthalates: fact sheet

Phthalates or phthalate esters are esters of phthalic acid and are mainly used as plasticizers. They are used primarily to soften polyvinyl chloride. Phthalates are being phased out of many products in the European Union over health concerns.

Likely sources of exposure and occurrence of phthalates:

Phthalates are used in a large variety of products, from enteric coatings of pharmaceutical pills and nutritional supplements to viscosity control agents, gelling agents, film formers, stabilizers, lubricants, dispersants, binders, emulsifying agents, and suspending agents. End-applications include adhesives and glues, electronics, agricultural adjuvants, building materials, personal-care products, medical devices, detergents and surfactants, packaging, children's toys, modeling clay, waxes, paints, printing inks and coatings, pharmaceuticals, food products, and textiles. Phthalates are easily released into the environment because there is no covalent bond

between the phthalates and plastics in which they are mixed. As plastics age and break down, the release of phthalates accelerates. People are commonly exposed to phthalates, and most Americans tested by the Centers for Disease Control and Prevention have metabolites of multiple phthalates in their urine. Because phthalate plasticizers are not chemically bound to PVC, they can easily leach and evaporate into food or the atmosphere. Phthalate exposure can be through direct use or by indirect means through leaching and general environmental contamination. Diet is believed to be the main source of DEHP and other phthalates in the general population. Fatty foods such as milk, butter, and meats are a major source.

Chronic toxicity:

Much of the current research on effects of phthalate exposure has been focused towards children and men's health, however, women may be at higher risk for potential adverse health effects of phthalates due to increased cosmetic use. Diethyl phthalate and dibutyl phthalate are especially ubiquitous in cosmetics and personal care products. There is an association between phthalate exposure and endocrine disruption leading to development of breast cancer. Furthermore, it has been well documented that endocrine disruptors such as phthalates can be additive, so even very small amounts can interact with other chemicals to have cumulative, adverse "cocktail effects" Though the number of studies on phthalate and breast cancer is limited, this should not be reason enough to allow their use in personal care products. Phthalate parent compounds and/or their metabolites have recently been implicated as a cause of breast cancer (BC). A 2010 study published in Environmental Health Perspectives for the first time implicated that the exposure to diethyl phthalates (DEHP), a parent compound of the monoethyl phthalate (MEHP) metabolite, may be associated with increased risk of BC (Odds Ratio of 2.20, p value for trend, $p < 0.003$). The case-control study was age matched to 233 BC cases residing in northern Mexico. The phthalate level was determined in urine samples collected pretreatment from the cases. This is only a preliminary finding therefore additional research is required. Interestingly, exposure to the parent phthalate, butylbenzyl phthalate (BBzP) of the monobenzyl phthalate (MBzP) metabolite showed a negative association with breast cancer (Odds ratio=0.46, p value for trend, $p < 0.008$). This finding may be associated with the demethylation of the estrogen receptor complex in breast cancer cells of this particular phthalate resulting in a negative effect. This explanation will require further confirmatory research since confounders may be playing an unknown role. It is also known that DEHP is found in a high proportion of personal care products, deodorants and perfumes whereas in contrast, BBzP is not detected in most deodorants and hair products and in less than one-third of all products tested, so degree of exposure may also be influencing results. A higher phthalate tertile (microgram/g creatinine) of DEHP/MEHP was compared to a lower phthalate tertile of BBzP/MBzP in this study. In most cases of breast cancer the cause is unknown and less than 25% of patients have a history of commonly associated risk factors, such as: early menarche, later age at first childbirth, nulliparity, family history of BC, or history of benign breast biopsy.

Another exposure of the phthalates may causing of premature birth, reproductive and genital defects, bad sperm production, risk factors for testicular cancer, allergies and asthma.

Large amounts of specific phthalates fed to rodents have been shown to damage liver and testes and initial rodent studies also indicated hepatocarcinogenicity. Following this result, di(2-ethylhexyl) phthalate was listed as a possible carcinogen by IARC, EC, and WHO. Later studies on primates showed that the mechanism is specific to rodents - humans are resistant to the effect. The carcinogen classification was subsequently withdrawn.

The use of some phthalates has been restricted in the European Union for use in children's toys since 1999. DEHP, BBP, and DBP are restricted for all toys; DINP, DIDP, and DNOP are restricted only in toys that can be taken into the mouth. The restriction states that the amount of phthalates may not be greater than 0.1% mass percent of the plasticized part of the toy. These phthalates are allowed at any concentration in other products and other phthalates are not restricted. There are no other specific restrictions in the European Union, although draft proposals have been Tab.d for the inclusion of BBP, DEHP, and DBP on the Candidate list of Substances for Authorisation under REACH. DEHP, BBP and DBP are listed in Annex XIV of the REACH regulation.

The concentration of phthalates is measured in human blood or in urine.

4.4.4.2. Urinary phthalate metabolites: results in mothers

Tab. 28: Statistical analysis of urinary phthalate metabolite MEHP (µg/L) in mothers

Age group: mothers, 18-45 years
 Biomarker: urinary phthalate metabolite MEHP
 Unit: µg/L
 LOQ: 2,00 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	80,00%	4	3,38	4,64	5,8419	5,77398	1	1	2,48	4,02	7,49	11,75	17,12	34,59
Urinary creatinine (p=0.000)															
300-1000 mg/L	38	63,20%	2,2	1,77	2,79	2,9276	2,75714	1	1	1	2,5	3,48	5,16	7,33	16,38

1000-2000 mg/L	71	85,90%	4,7	3,87	5,72	6,4511	5,44939	1	1	3,06	5,11	8,69	11,75	17,43	34,59
2000-3000 mg/L	16	93,80%	7,3	4,8	11,1	10,06	8,71889	1	3,48	4,46	6,91	12,37	26,68	32,47	32,47
Period of urine sampling (p=0.919)															
< 5 hours	9	77,80%	4,2	2,29	7,62	5,6411	3,96213	1	1	2,61	5,69	6,52	13,53	13,53	13,53
5-8 hours	51	76,50%	3,9	3,03	5,02	5,6249	4,60025	1	1	2,11	4,34	7,92	11,47	16,38	19,57
≥ 8 hours	43	81,40%	3,7	2,84	4,81	5,4933	6,02668	1	1	2,54	3,39	6,87	10,9	13,75	34,59
Age (p=0.502)															
≤ 35 years	45	84,40%	4,5	3,41	5,93	7,0167	7,73079	1	1	2,54	4,34	7,75	13,75	26,68	34,59
35-40 years	51	80,40%	3,7	2,96	4,67	5,0945	4,20198	1	1	2,48	3,74	6,96	10,25	17,12	18,15
> 40years	29	72,40%	3,6	2,58	5,15	5,3334	4,32366	1	1	1	3,91	8,84	11,75	12,07	16,38
Consumption of meat (p=0.724)															
Several times per week	102	81,40%	3,9	3,3	4,62	5,573	5,19231	1	1	2,48	3,99	7,33	11,46	13,75	32,47
Once per week or less	23	73,90%	4,2	2,72	6,49	7,0343	7,89414	1	1	1	4,02	9,75	16,38	19,57	34,59
Consumption of hazelnut spread (p=0.586)															
Once a week or often	10	80,00%	3,4	2,13	5,37	4,246	3,08601	1	1	2,79	4,09	4,63	8,395	12,07	12,07
Less than once a week	114	79,80%	4	3,36	4,7	5,9325	5,94237	1	1	2,48	3,97	7,75	11,75	17,43	34,59
Consumption of fast food (p=0.211)															
Several times per week	5	100,00%	6,5	2,8	15,03	9,652	10,1497	2,87	2,87	3,48	3,76	11,47	26,68	26,68	26,68
Once per week or less	119	79,00%	3,9	3,29	4,54	5,6811	5,55885	1	1	2,46	4,02	7,49	11,75	17,12	34,59
Consumption of milk (p=0.330)															
Several times per week	74	82,40%	4,2	3,46	5,16	6,0631	5,68774	1	1	2,6	4,38	7,75	11,75	17,43	32,47
Once per week or less	51	76,50%	3,6	2,79	4,65	5,521	5,93898	1	1	2,11	3,39	7,13	11,47	17,12	34,59
Consumption of cheese (p=0.093)															
Several times per week	106	83,00%	4,2	3,56	4,94	5,9256	5,3021	1	1	2,55	4,32	7,75	11,75	16,38	32,47
Once per week or less	19	63,20%	2,9	1,79	4,62	5,3753	8,08758	1	1	1	2,83	5,93	17,12	34,59	34,59
Consumption of chocolate (p=0.084)															
Several times per week	60	85,00%	4,6	3,64	5,75	6,8357	7,08996	1	1	2,94	4,53	8,12	14,96	23,13	34,59
Once per week or less	65	75,40%	3,5	2,8	4,29	4,9246	4,05873	1	1	2,11	3,39	6,96	10,25	12,07	18,15
Consumption of ice cream (p=0.858)															
More than once a month	12	83,30%	4,2	2,48	7,05	5,8808	4,51012	1	1	2,4	3,83	10,58	10,98	13,53	13,53

Once a month or less	111	80,20%	4	3,37	4,71	5,8923	5,94295	1	1	2,48	4,06	7,33	11,75	17,43	34,59
Consumption of canteen food (p=0.376)															
Several times per week	51	82,40%	4,3	3,35	5,48	6,2184	5,98649	1	1	2,79	4,58	7,85	11,75	18,15	34,59
Once per week or less	73	78,10%	3,7	3,01	4,55	5,5096	5,65347	1	1	2,48	3,67	6,52	11,46	17,12	32,47
Consumption of chewing gum (p=0.380)															
Several times per week	52	78,80%	3,6	2,9	4,57	5,0794	5,08727	1	1	2,4	3,99	6,905	9,75	10,25	34,59
Once per week or less	73	80,80%	4,2	3,39	5,22	6,3851	6,19403	1	1	2,48	4,02	7,92	13,75	18,15	32,47
Time spend in new car (p=0.735)															
More than 45 minutes per day	10	80,00%	3,5	2,09	5,74	4,591	3,75575	1	1	2,61	3,58	5,93	10,44	13,75	13,75
45 minutes per day or less	11	81,80%	3,9	2,38	6,48	5,2664	4,0861	1	1	2,83	3,74	8,39	11,46	13,42	13,42
Wearing plastic gloves (p=0.581)															
Daily	5	60,00%	2,7	1,06	6,67	4,152	4,4805	1	1	1	2,54	4,47	11,75	11,75	11,75
Less than daily	15	86,70%	4,3	2,65	6,94	6,7633	8,11176	1	1	2,48	3,48	7,75	16,38	32,47	32,47
Never	105	80,00%	4	3,36	4,73	5,7908	5,46424	1	1	2,55	4,06	7,49	11,47	17,12	34,59
Use of personal care products (p=0.590)															
High	63	77,80%	3,7	2,97	4,51	4,9922	3,80286	1	1	2,48	3,91	7,33	9,9	11,46	18,15
Moderate	50	82,00%	4,4	3,33	5,73	6,9822	7,68764	1	1	2,46	4,26	8,84	17,28	26,68	34,59
Low	7	71,40%	4,2	1,82	9,86	6,7029	5,73283	1	1	1	3,51	13,53	13,75	13,75	13,75
Area of residence (p=0.250)															
Urban	62	77,40%	3,6	2,89	4,5	5,1579	4,2569	1	1	2,13	3,45	7,92	11,46	13,53	17,43
Rural	63	82,50%	4,3	3,47	5,43	6,5151	6,92246	1	1	2,55	4,58	7,49	13,42	19,57	34,59
Educational level (highest of family) (p=0.215)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	54	81,50%	4,2	3,26	5,38	6,4906	7,23889	1	1	2,48	4,32	7,85	13,42	26,68	34,59
Tertiary education (ISCED 5-6)	71	78,90%	3,8	3,1	4,65	5,3486	4,33712	1	1	2,48	3,51	7,49	11,47	13,75	18,15
Redecoration or renovation of house in last two years (p=0.797)															

Yes	56	83,90%	3,9	3,12	4,75	5,2052	4,44696	1	1	2,5	3,89	6,575	11,46	13,42	26,68
No	67	76,10%	4	3,17	5,09	6,3709	6,74217	1	1	2,11	3,91	7,85	16,38	18,15	34,59
PVC in the house (p=0.620)															
PVC in floors or walls	24	83,30%	4,2	2,93	5,94	5,9483	5,5961	1	1	2,39	4,61	7,355	11,46	13,53	26,68
No PVC	87	79,30%	3,8	3,14	4,54	5,4463	5,15356	1	1	2,48	3,51	7,33	11,47	13,75	34,59
Main source of water for drinking (p=0.232)															
Public water supply	118	79,70%	3,8	3,26	4,48	5,5261	5,26662	1	1	2,48	3,84	7,13	11,47	17,12	34,59
Commercial producers	5	80,00%	6,2	2,42	15,95	8,52	5,57894	1	1	6,48	8,84	9,9	16,38	16,38	16,38

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 29: Statistical analysis of urinary phthalate metabolite MEHP ($\mu\text{g/g}$ creatinine) in mothers

Age group: mothers, 18-45 years

Biomarker: urinary phthalate metabolite MEHP

Unit: $\mu\text{g/g}$ creatinine

LOQ: 2,00 $\mu\text{g/L}$

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	80,00%	3,2	2,8	3,69	4,3556	3,98802	0,42	1,048	2,101	3,33	5,674	7,8282	11,7	27,16
Period of urine sampling (p=0.504)															
< 5 hours	9	77,80%	4,1	2,49	6,59	5,1258	3,77051	1,38	1,382	2,5	4,334	6,156	13,578	13,578	13,58
5-8 hours	51	76,50%	3,1	2,54	3,89	4,2915	4,31457	0,66	1,181	2,104	3,042	5,216	7,8282	11,7	27,16
\geq 8 hours	43	81,40%	2,9	2,25	3,7	4,0392	4,07315	0,42	0,903	1,919	3,33	5,48	6,5259	9,7255	24,53
Age (p=0.847)															
\leq 35 years	45	84,40%	3,4	2,62	4,32	4,7575	4,58063	0,42	0,914	2,204	3,35	5,674	11,7	13,578	24,53
35-40 years	51	80,40%	3,2	2,66	3,88	4,0027	2,67268	0,76	1,299	2,061	3,31	5,819	7,7294	9,4216	12,99

> 40years	29	72,40%	3	2,21	4,11	4,3528	4,92129	0,66	0,903	1,33	3,592	5,48	7,1294	9,6574	27,16
Consumption of meat (p=0.559)															
Several times per week	102	81,40%	3,2	2,73	3,65	4,0564	2,87462	0,42	1,048	2,104	3,388	5,532	7,7294	9,7255	13,58
Once per week or less	23	73,90%	3,5	2,39	5,16	5,6826	7,03205	0,66	1,181	2,022	3,187	5,78	14,637	24,532	27,16
Consumption of hazelnut spread (p=0.537)															
Once a week or often	10	80,00%	2,8	1,65	4,63	3,543	2,21629	0,55	0,734	2,126	3,132	5,676	6,51	7,1294	7,13
Less than once a week	114	79,80%	3,2	2,81	3,74	4,411	4,11954	0,42	1,056	2,061	3,329	5,635	8,2387	12,517	27,16
Consumption of fast food (p=0.236)															
Several times per week	5	100,00%	4,8	2,82	8,27	5,6233	3,58329	2,2	2,204	3,679	4,569	6,17	11,495	11,495	11,5
Once per week or less	119	79,00%	3,2	2,73	3,63	4,2952	4,02488	0,42	1,043	2,036	3,31	5,674	7,8282	12,517	27,16
Consumption of milk (p=0.242)															
Several times per week	74	82,40%	3,5	2,87	4,14	4,6799	4,14538	0,42	1,056	2,101	3,52	5,743	9,6574	12,517	27,16
Once per week or less	51	76,50%	2,9	2,37	3,59	3,8851	3,73794	0,55	1,048	2,024	2,783	4,569	6,4022	7,335	24,53
Consumption of cheese (p=0.550)															
Several times per week	106	83,00%	3,3	2,83	3,79	4,3494	3,73625	0,42	1,056	2,101	3,398	5,743	8,2387	11,7	27,16
Once per week or less	19	63,20%	2,9	1,95	4,35	4,3903	5,30382	0,66	0,734	1,33	2,783	5,501	7,7294	24,532	24,53
Consumption of chocolate (p=0.034)															
Several times per week	60	85,00%	3,8	3,06	4,61	5,1857	4,95219	0,55	1,305	2,257	3,676	6,121	10,61	13,577	27,16
Once per week or less	65	75,40%	2,8	2,33	3,34	3,5894	2,63896	0,42	1,043	1,881	2,951	5,216	6,5933	7,8282	13,58
Consumption of ice cream (p=0.769)															
More than once a month	12	83,30%	3	2,04	4,51	3,6979	2,17881	0,9	1,299	1,709	3,599	5,689	6,4022	7,193	7,19
Once a month or less	111	80,20%	3,3	2,81	3,77	4,4428	4,15664	0,42	1,056	2,104	3,329	5,674	8,2387	12,517	27,16
Consumption of canteen food (p=0.509)															
Several times per week	51	82,40%	3,4	2,71	4,24	4,811	5,14147	0,55	1,048	2,061	3,638	5,635	7,7294	14,637	27,16
Once per week or less	73	78,10%	3,1	2,58	3,67	4,0185	2,95711	0,42	1,056	2,101	3,246	5,674	7,8282	11,495	13,58
Consumption of chewing gum (p=0.277)															
Several times per week	52	78,80%	2,9	2,42	3,56	3,7977	3,52813	0,55	1,043	2,049	3,114	4,753	6,1895	7,8282	24,53
Once per week or less	73	80,80%	3,4	2,84	4,16	4,7531	4,26481	0,42	1,056	2,149	3,35	6,085	9,7255	12,992	27,16
Time spend in new car (p=0.422)															
More than 45 minutes per day	10	80,00%	2,6	1,7	3,84	3,0738	1,88981	1,05	1,052	1,382	2,574	4,569	5,8707	6,5259	6,53
45 minutes per day or less	11	81,80%	3,3	2,14	5,01	4,1734	3,25179	1,04	1,55	2,126	3,246	5,891	8,2387	11,7	11,7

Wearing plastic gloves (p=0.408)														
Daily	5	60,00%	2,3	1,11	4,62	2,8973	2,1116	0,92	0,922	1,048	2,943	3,489	6,0849	6,08
Less than daily	15	86,70%	3,9	2,49	6	5,7123	6,5887	0,76	1,55	2,204	3,552	5,78	12,517	27,164
Never	105	80,00%	3,2	2,75	3,7	4,2313	3,5446	0,42	1,056	2,101	3,31	5,532	7,8282	11,495
Use of personal care products (p=0.406)														
High	63	77,80%	3	2,43	3,59	4,0096	3,84992	0,42	0,922	1,734	3,33	5,532	7,1294	8,2387
Moderate	50	82,00%	3,6	2,9	4,49	4,8935	4,39332	0,66	1,255	2,353	3,499	5,676	11,598	13,578
Low	7	71,40%	3	1,48	6,02	4,2431	3,50704	0,82	0,818	1,311	2,104	7,193	9,7255	9,7255
Area of residence (p=0.283)														
Urban	62	77,40%	3	2,46	3,62	4,0482	3,95184	0,55	1,155	1,881	2,959	5,48	7,193	9,4216
Rural	63	82,50%	3,5	2,85	4,22	4,6582	4,03186	0,42	1,048	2,356	3,489	5,743	9,6574	12,517
Educational level (highest of family) (p=0.451)														
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	54	81,50%	3,4	2,72	4,29	4,7955	4,37431	0,42	0,922	2,149	3,479	5,819	11,495	13,578
Tertiary education (ISCED 5-6)	71	78,90%	3,1	2,59	3,64	4,0211	3,66373	0,66	1,155	2,022	3,31	5,48	7,1294	8,2387
Redecoration or renovation of house in last two years (p=0.778)														
Yes	56	83,90%	3,1	2,63	3,69	3,7788	2,44532	0,42	1,382	2,129	3,329	4,892	6,3391	9,6574
No	67	76,10%	3,2	2,62	4,02	4,7847	4,93217	0,55	0,903	1,881	3,31	5,78	9,7255	13,578
PVC in the house (p=0.909)														
PVC in floors or walls	24	83,30%	3,2	2,4	4,28	4,0611	2,85054	0,73	1,181	2,114	3,21	6,023	8,2387	9,7255
No PVC	87	79,30%	3,1	2,66	3,71	4,3048	4,24883	0,42	1,048	2,036	3,33	5,501	7,7294	11,7
Main source of water for drinking (p=0.216)														
Public water supply	118	79,70%	3,1	2,72	3,59	4,1293	3,41364	0,42	1,043	2,061	3,319	5,635	7,7294	11,495
Commercial producers	5	80,00%	4,9	1,84	12,93	8,3468	10,659	1,3	1,299	3,469	3,646	6,156	27,164	27,16

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 30: Statistical analysis of urinary phthalate metabolite 5OH-MEHP (µg/L) in mothers

Age group: mothers, 18-45 years

Biomarker: urinary phthalate metabolite 5OH-MEHP

Unit: µg/L

LOQ: 0.61 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	100,00%	22,4	19,66	25,53	29,1823	23,53453	1,34	10,4	12,92	25,09	36,12	58,27	71,21	131,05
Urinary creatinine (p=0.000)															
300-1000 mg/L	38	100,00%	12,6	10,16	15,65	15,3097	9,45939	1,34	6,57	9,39	12,54	22,32	26,54	37,06	45,66
1000-2000 mg/L	71	100,00%	26,8	23,33	30,76	31,921	20,60997	7,01	12	16,68	28,43	40,47	53,48	71,21	120,92
2000-3000 mg/L	16	100,00%	39,6	28,34	55,4	49,9769	37,30191	16,8	18,2	24,1	29,36	64,89	111,1	131,1	131,05
Period of urine sampling (p=0.299)															
< 5 hours	9	100,00%	21,2	10,61	42,35	30,8078	22,65195	2,83	2,83	12,89	36,12	41,27	71,21	71,21	71,21
5-8 hours	51	100,00%	25	20,09	31,21	33,0073	26,19225	1,34	11,1	13,67	28,59	40,03	58,27	97,11	131,05
≥ 8 hours	43	100,00%	19,7	16,4	23,6	23,6747	15,89172	6,57	8,72	12,1	19,88	27,42	43,08	63,27	76,22
Age (p=0.629)															
≤ 35 years	45	100,00%	24	18,7	30,79	33,3031	29,5422	1,34	10,5	13,67	25,87	34,06	67,93	110,2	131,05
35-40 years	51	100,00%	20,8	17,18	25,13	25,7361	16,71484	2,83	7,63	12,42	23,04	33,46	45,69	61,28	76,22
> 40years	29	100,00%	23	18,07	29,22	28,8486	23,09714	8,72	10,7	12,87	22,32	40,03	51,85	66,5	120,92
Consumption of meat (p=0.771)															
Several times per week	102	100,00%	22,6	19,66	26,01	29,4672	24,67652	2,83	10,4	12,92	24,54	34,06	58,27	76,22	131,05
Once per week or less	23	100,00%	21,5	15,13	30,55	27,9191	18,0068	1,34	11,1	12,89	25,61	40,03	50,7	65,37	67,93
Consumption of hazelnut spread (p=0.782)															
Once a week or often	10	100,00%	23,7	19,94	28,16	24,585	7,57155	15,38	16,8	19,88	23,13	26,54	35,76	43,08	43,08
Less than once a week	114	100,00%	22,1	19,2	25,5	29,3868	24,42878	1,34	9,51	12,66	25,23	37,06	61,28	76,22	131,05
Consumption of fast food (p=0.494)															
Several times per week	5	100,00%	27,9	10,75	72,53	42,82	41,8315	6,57	6,57	15,38	29,18	51,85	111,1	111,1	111,12
Once per week or less	119	100,00%	22,1	19,36	25,21	28,5282	22,66311	1,34	10,4	12,89	23,98	34,06	58,27	71,21	131,05
Consumption of milk (p=0.730)															

Several times per week	74	100,00%	22,8	19,7	26,47	28,0336	20,46104	2,83	10,9	15,28	24,8	33,03	45,66	65,37	111,12
Once per week or less	51	100,00%	21,8	17,14	27,69	30,849	27,52428	1,34	8,72	11,4	25,09	40,03	66,5	76,22	131,05
Consumption of cheese (p=0.013)															
Several times per week	106	100,00%	24	21,11	27,33	30,193	23,19891	2,83	10,9	15,28	25,78	37,06	53,48	71,21	131,05
Once per week or less	19	100,00%	15,2	9,79	23,54	23,5437	25,23016	1,34	6,78	10,41	12,1	26,02	67,93	97,11	97,11
Consumption of chocolate (p=0.286)															
Several times per week	60	100,00%	24,1	20,03	29,06	31,063	23,73034	2,83	10,4	15,66	25,15	38,55	65,94	84,16	111,12
Once per week or less	65	100,00%	20,9	17,42	25,12	27,4463	23,40127	1,34	9,51	12,1	19,67	33,46	47,92	63,27	131,05
Consumption of ice cream (p=0.308)															
More than once a month	12	100,00%	27,5	18,59	40,59	33,5192	21,30767	6,98	12,3	18,3	28,31	44,69	66,5	76,22	76,22
Once a month or less	111	100,00%	21,8	18,92	25,05	28,6219	23,95342	1,34	10,4	12,87	23,22	34,06	53,48	71,21	131,05
Consumption of canteen food (p=0.528)															
Several times per week	51	100,00%	23,5	19,35	28,54	29,7675	22,52913	2,83	10,9	13,78	25,37	37,68	51,85	71,21	131,05
Once per week or less	73	100,00%	21,6	18,04	25,75	28,7277	24,51149	1,34	9,39	12,87	23,04	33,46	58,27	97,11	120,92
Consumption of chewing gum (p=0.930)															
Several times per week	52	100,00%	22,3	18,14	27,29	28,3194	21,78869	1,34	11,5	16,03	23,6	30,56	45,69	76,22	120,92
Once per week or less	73	100,00%	22,5	18,97	26,71	29,797	24,83333	5,65	9,39	12,02	25,37	38,84	61,28	71,21	131,05
Time spend in new car (p=0.700)															
More than 45 minutes per day	10	100,00%	27,2	19,03	38,84	31,054	15,63576	9,39	11,9	15,38	31,87	38,67	51,06	63,27	63,27
45 minutes per day or less	11	100,00%	24,5	16,55	36,12	30,5482	24,96066	10,92	12,4	14,9	22,87	41,76	45,66	97,11	97,11
Wearing plastic gloves (p=0.500)															
Daily	5	100,00%	30,1	24,76	36,5	30,662	6,89276	23,22	23,2	25,69	30,01	33,72	40,67	40,67	40,67
Less than daily	15	100,00%	19,3	13,26	28,02	25,752	25,45655	6,57	7,63	10,92	16,17	30,92	37,06	110,2	110,21
Never	105	100,00%	22,6	19,51	26,1	29,6019	23,86095	1,34	10,4	12,98	23,98	37,68	61,28	71,21	131,05
Use of personal care products (p=0.415)															
High	63	100,00%	20,8	17,37	24,99	25,8784	16,43978	1,34	8,72	12,42	25,61	33,72	43,08	45,69	97,11
Moderate	50	100,00%	25	20,25	30,96	34,0978	30,60149	5,65	11,2	13,67	22,46	40,67	69,57	111,1	131,05
Low	7	100,00%	24,4	14,98	39,76	29,4843	19,96501	11,2	11,2	12,92	25,37	50,7	63,27	63,27	63,27
Area of residence (p=0.782)															
Urban	62	100,00%	22	18,41	26,25	27,765	19,34656	2,83	8,72	12,87	25,41	37,59	53,48	66,5	97,11
Rural	63	100,00%	22,8	18,81	27,67	30,5771	27,12028	1,34	10,4	12,92	23,98	32,53	61,28	110,2	131,05

Educational level (highest of family) (p=0.992)															
Secondary or post-secondary non-tertiary education (ISCED 3-4)	54	100,00%	22,4	17,96	27,9	30,8546	27,83543	1,34	9,51	12,92	22,6	37,68	65,37	110,2	131,05
Tertiary education (ISCED 5-6)	71	100,00%	22,4	19,12	26,27	27,9104	19,76632	2,83	10,7	12,87	25,61	36,12	50,7	66,5	120,92
Redecoration or renovation of house in last two years (p=0.326)															
Yes	56	100,00%	24	19,6	29,45	31,8057	27,15344	1,34	10,9	14,99	25,92	38,18	53,48	111,1	131,05
No	67	100,00%	21	17,65	25,01	27,0525	20,37438	2,83	7,63	12,02	22,87	36,12	61,28	66,5	110,21
PVC in the house (p=0.287)															
PVC in floors or walls	24	100,00%	25,7	19,4	34,07	33,2367	28,47609	7,55	11,2	13,38	26,78	38,7	53,48	111,1	120,92
No PVC	87	100,00%	21,4	18,31	25,07	27,6025	21,13249	1,34	9,39	12,42	23,98	34,06	51,85	67,93	131,05
Main source of water for drinking (p=0.725)															
Public water supply	118	100,00%	22,1	19,38	25,26	28,5632	22,70458	1,34	10,4	12,92	24,54	33,72	58,27	71,21	131,05
Commercial producers	5	100,00%	24,9	12,01	51,66	31,118	18,88172	6,98	6,98	16,8	37,06	41,27	53,48	53,48	53,48

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 31: Statistical analysis of urinary phthalate metabolite 5OH-MEHP (µg/g creatinine) in mothers

Age group: mothers, 18-45 years
Biomarker: urinary phthalate metabolite 5OH-MEHP
Unit: µg/g creatinine
LOQ: 0.61 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	100,00%	18,2	16,45	20,14	21,4324	13,00687	3,38	8,9245	11,662	17,789	27,686	37,118	48,177	80,72
Period of urine sampling (p=0.063)															
< 5 hours	9	100,00%	20,6	12,71	33,25	25,0118	14,80704	4,35	4,3472	16,95	23,439	28,74	54,235	54,235	54,23
5-8 hours	51	100,00%	20,2	17,22	23,66	23,7245	14,7343	3,38	10	14,637	19,889	28,521	47,612	55,577	80,72

≥ 8 hours	43	100,00%	15,3	13	18,1	17,9519	10,92117	6,19	8,6404	9,7357	13,989	22,665	34,602	37,118	48,18
Age (p=0.897)															
≤ 35 years	45	100,00%	18	15,06	21,41	21,3788	13,23608	3,38	9,347	11,589	16,102	26,954	47,876	48,726	55,58
35-40 years	51	100,00%	18	15,44	20,9	20,7018	11,06803	4,35	8,9041	12,58	18,688	28,521	32,432	47,608	54,23
> 40years	29	100,00%	19	15,3	23,66	22,8006	15,88229	6,19	8,6404	14,229	19,866	26,956	37,118	61,459	80,72
Consumption of meat (p=0.895)															
Several times per week	102	100,00%	18,3	16,4	20,34	21,2625	12,52788	4,35	9,0649	11,662	18,588	27,891	34,602	47,608	80,72
Once per week or less	23	100,00%	17,9	13,57	23,71	22,186	15,24113	3,38	8,6404	11,427	17,139	26,954	48,177	48,893	61,46
Consumption of hazelnut spread (p=0.716)															
Once a week or often	10	100,00%	19,3	14,6	25,63	21,075	8,59679	8,9	9,8778	13,203	20,153	29,097	32,127	34,602	34,6
Less than once a week	114	100,00%	18	16,19	20,1	21,4071	13,39328	3,38	8,9245	11,589	17,084	27,386	38,532	48,726	80,72
Consumption of fast food (p=0.587)															
Several times per week	5	100,00%	20,8	11,18	38,65	24,7623	15,03256	6,95	6,945	18,688	22,412	27,891	47,876	47,876	47,88
Once per week or less	119	100,00%	18	16,24	19,96	21,1856	12,96983	3,38	8,9245	11,589	17,139	27,386	37,118	48,726	80,72
Consumption of milk (p=0.607)															
Several times per week	74	100,00%	18,6	16,45	21,05	21,4051	11,61598	4,35	9,347	13,046	18,656	28,521	35,289	47,876	61,46
Once per week or less	51	100,00%	17,6	14,83	20,95	21,472	14,91848	3,38	8,8253	10,708	16,514	27,686	37,118	54,235	80,72
Consumption of cheese (p=0.168)															
Several times per week	106	100,00%	18,8	16,87	20,86	21,8912	13,0244	4,35	9,347	12,56	18,756	28,521	35,289	47,876	80,72
Once per week or less	19	100,00%	15,4	11,39	20,75	18,8728	12,95219	3,38	7,3001	9,0649	14,229	21,454	48,177	48,726	48,73
Consumption of chocolate (p=0.121)															
Several times per week	60	100,00%	19,8	17,24	22,71	22,7834	12,49217	4,35	10,099	13,875	20,464	28,315	45,181	48,809	61,46
Once per week or less	65	100,00%	16,9	14,57	19,49	20,1854	13,43989	3,38	8,72	10,17	16,102	27,386	34,602	47,608	80,72
Consumption of ice cream (p=0.520)															
More than once a month	12	100,00%	19,9	14,95	26,53	22,3196	11,10967	9,06	9,5499	14,124	21,339	26,955	35,289	47,608	47,61
Once a month or less	111	100,00%	17,8	15,97	19,83	21,0316	13,09028	3,38	8,9041	11,589	16,95	27,686	34,602	48,726	80,72
Consumption of canteen food (p=0.736)															
Several times per week	51	100,00%	18,6	15,69	22,05	22,393	14,20406	4,35	8,9041	11,488	18,824	28,521	47,612	54,235	61,46
Once per week or less	73	100,00%	17,9	15,8	20,37	20,8201	12,24604	3,38	9,347	11,662	17,361	26,956	34,16	42,487	80,72
Consumption of chewing gum (p=0.823)															
Several times per week	52	100,00%	18	15,13	21,31	21,64	14,10218	3,38	8,9041	11,298	18,139	28,863	35,289	48,177	80,72

Once per week or less	73	100,00%	18,4	16,24	20,81	21,2846	12,26551	6,41	9,0649	12,56	16,95	26,956	37,118	48,893	61,46
Time spend in new car (p=0.941)															
More than 45 minutes per day	10	100,00%	20	15,1	26,61	21,7871	8,45747	8,64	9,278	18,688	21,34	30,029	32,809	34,16	34,16
45 minutes per day or less	11	100,00%	20,4	14,59	28,49	23,6806	14,02453	9,55	12,856	13,046	16,93	30,022	47,612	48,726	48,73
Wearing plastic gloves (p=0.391)															
Daily	5	100,00%	25,7	20,73	31,74	26,2814	6,62659	21,06	21,062	21,401	22,199	31,457	35,289	35,289	35,29
Less than daily	15	100,00%	17,4	12,61	23,89	21,0742	14,82832	6,95	7,254	11,427	16,93	23,399	42,487	61,459	61,46
Never	105	100,00%	18	16,14	20,14	21,2527	13,00936	3,38	9,0649	11,589	17,139	27,686	37,118	48,177	80,72
Use of personal care products (p=0.155)															
High	63	100,00%	16,8	14,54	19,47	19,7915	11,57445	3,38	8,6404	11,427	17,789	23,912	34,302	47,608	61,46
Moderate	50	100,00%	20,7	17,73	24,2	24,3161	15,03616	7,3	9,8745	13,976	19,775	30,016	48,027	54,235	80,72
Low	7	100,00%	17,2	12,33	23,95	18,7034	8,15321	10	10	10,573	14,679	26,954	30,029	30,029	30,03
Area of residence (p=0.979)															
Urban	62	100,00%	18,2	15,71	21,03	21,382	12,45388	4,35	8,72	11,108	20,185	27,686	37,118	47,612	61,46
Rural	63	100,00%	18,2	15,82	21	21,4821	13,62919	3,38	9,9155	11,662	17,139	27,891	35,289	48,177	80,72
Educational level (highest of family) (p=0.944)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	54	100,00%	18,3	15,58	21,44	21,6206	12,69051	3,38	9,1149	11,589	16,99	28,74	42,487	48,726	55,58
Tertiary education (ISCED 5-6)	71	100,00%	18,1	15,91	20,69	21,2894	13,33051	4,35	8,9245	11,662	18,489	26,954	34,302	47,612	80,72
Redecoration or renovation of house in last two years (p=0.196)															
Yes	56	100,00%	19,5	16,83	22,5	22,6524	13,81967	3,38	10	13,125	18,239	28,685	35,289	54,235	80,72
No	67	100,00%	17	14,72	19,59	20,2012	12,42319	4,35	8,6384	10,17	16,95	26,059	38,532	47,612	61,46
PVC in the house (p=0.447)															
PVC in floors or walls	24	100,00%	19,7	15,86	24,57	23,0742	15,44216	8,64	8,8253	14,327	19,215	28,685	32,432	47,876	80,72
No PVC	87	100,00%	17,8	15,75	20,17	21,0226	12,43258	3,38	9,0649	11,427	18,489	27,686	37,118	48,177	61,46
Main source of water for drinking (p=0.773)															
Public water supply	118	100,00%	18,1	16,35	20,02	21,1142	12,5138	3,38	8,9245	12,56	17,575	26,956	35,289	48,177	80,72
Commercial producers	5	100,00%	19,5	8,58	44,43	26,8163	22,06679	6,19	6,1878	9,0649	28,63	28,74	61,459	61,459	61,46

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 32: Statistical analysis of urinary phthalate metabolite 5oxo-MEHP ($\mu\text{g/L}$) in mothers

Age group: mothers, 18-45 years
Biomarker: urinary phthalate metabolite 5oxo-MEHP
Unit: $\mu\text{g/L}$
LOQ: 0,24 $\mu\text{g/L}$

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	100,00%	14,2	12,49	16,17	18,3745	14,61469	0,9	5,57	9,1	14,14	22,35	35,34	46,8	83,79
Urinary creatinine (p=0.000)															
300-1000 mg/L	38	100,00%	8,02	6,44	9,98	9,7566	5,93244	0,9	4,17	5,5	8,325	13,64	16,88	24,5	27,37
1000-2000 mg/L	71	100,00%	16,9	14,79	19,27	19,7956	11,6711	5,15	7,94	10,88	16,76	25,14	35,34	46,8	54,71
2000-3000 mg/L	16	100,00%	25,7	18,4	35,89	32,5356	25,13124	10,77	12,6	15,14	20,3	37,62	82,76	83,8	83,79
Period of urine sampling (p=0.522)															
< 5 hours	9	100,00%	13,4	6,61	27,1	19,1967	12,94616	1,48	1,48	10,23	23,86	27,3	39,9	39,9	39,9
5-8 hours	51	100,00%	15,3	12,39	18,85	19,5135	13,89658	0,9	6,78	9,36	16,67	22,36	36,47	51,7	72,96
\geq 8 hours	43	100,00%	12,9	10,76	15,42	15,5402	10,72899	4,93	5,5	8,13	12,59	17,86	29,42	35,3	51,2
Age (p=0.561)															
\leq 35 years	45	100,00%	15,6	12,14	19,94	21,6667	19,71764	0,9	5,57	10,11	15,16	24,56	51,65	73	83,79
35-40 years	51	100,00%	13,2	10,92	16,05	16,4025	10,5518	1,48	5,22	8,16	13,94	22,33	31,21	38,8	51,2
> 40years	29	100,00%	14	11,2	17,45	16,7338	10,43239	5,5	6,28	7,7	13,21	22,35	36,47	37,1	41,78
Consumption of meat (p=0.953)															
Several times per week	102	100,00%	14,2	12,41	16,33	18,3176	14,97347	1,48	5,57	8,93	14,04	22,33	35,34	41,8	83,79
Once per week or less	23	100,00%	14,1	9,87	20,12	18,6265	13,20916	0,9	6,78	9,36	15,11	27,3	33,15	46,8	54,71
Consumption of hazelnut spread (p=0.914)															
Once a week or often	10	100,00%	14,5	12,01	17,37	15,109	5,46107	9,72	10,9	12,45	13,27	16,24	23,15	29,4	29,42

Less than once a week	114	100,00%	14,1	12,23	16,18	18,4966	15,09771	0,9	5,5	8,49	14,29	22,36	35,34	51,2	83,79
Consumption of fast food (p=0.350)															
Several times per week	5	100,00%	19,2	7,3	50,67	30,48	31,70053	4,93	4,93	9,72	17,88	37,11	82,76	82,8	82,76
Once per week or less	119	100,00%	14	12,3	15,96	17,8802	13,56112	0,9	5,57	8,93	13,94	22,35	34,95	46,8	83,79
Consumption of milk (p=0.603)															
Several times per week	74	100,00%	14,6	12,6	16,97	18,1269	14,39051	1,48	6,33	10,11	15,05	21,37	29,93	51,7	83,79
Once per week or less	51	100,00%	13,6	10,8	17,2	18,7337	15,07091	0,9	5,41	7,55	12,59	27,37	38,76	46,8	72,96
Consumption of cheese (p=0.010)															
Several times per week	106	100,00%	15,3	13,42	17,34	19,0815	14,54074	1,48	6,28	10,11	15,14	22,52	34,95	41,8	83,79
Once per week or less	19	100,00%	9,55	6,23	14,64	14,43	14,78737	0,9	4,17	5,5	8,49	13,94	46,83	51,7	51,65
Consumption of chocolate (p=0.187)															
Several times per week	60	100,00%	15,6	12,88	18,79	20,2583	16,50402	1,48	5,49	10,28	15,08	24,85	38,51	53,2	83,79
Once per week or less	65	100,00%	13,1	10,96	15,58	16,6355	12,50313	0,9	5,68	7,7	13,47	21,58	33,15	38,8	72,96
Consumption of ice cream (p=0.402)															
More than once a month	12	100,00%	16,8	11,3	24,88	20,5925	13,48676	4,17	8,93	10,8	16,37	27,47	36,47	51,2	51,2
Once a month or less	111	100,00%	13,9	12,07	15,93	18,0934	14,88663	0,9	5,57	8,49	13,94	21,87	34,95	46,8	83,79
Consumption of canteen food (p=0.457)															
Several times per week	51	100,00%	15	12,35	18,21	18,9602	14,1683	1,48	6,99	10,11	14,99	22,35	37,11	51,2	72,96
Once per week or less	73	100,00%	13,6	11,39	16,14	17,8385	15,05726	0,9	5,5	8,13	13,83	21,87	32,72	41,8	83,79
Consumption of chewing gum (p=0.963)															
Several times per week	52	100,00%	14,3	11,67	17,43	17,6896	11,45197	0,9	7,09	10,83	14,19	21,48	32,72	46,8	51,65
Once per week or less	73	100,00%	14,2	11,95	16,8	18,8623	16,56417	3,72	5,5	7,94	14,14	22,52	36,47	54,7	83,79
Time spend in new car (p=0.489)															
More than 45 minutes per day	10	100,00%	16,4	12,09	22,29	18,153	8,17622	6,28	8	11,82	17,28	22,36	29,41	35	34,95
45 minutes per day or less	11	100,00%	13,8	9,68	19,78	16,7036	12,7959	5,68	8,16	9,36	14,14	18,63	24,45	51,7	51,65
Wearing plastic gloves (p=0.722)															
Daily	5	100,00%	17,3	13,99	21,44	17,74	4,34786	13,64	13,6	13,94	16,41	22,35	22,36	22,4	22,36
Less than daily	15	100,00%	12,8	8,7	18,89	17,77	19,55036	4,93	5,22	6,05	10,45	20,05	27,37	83,8	83,79
Never	105	100,00%	14,3	12,37	16,49	18,491	14,2267	0,9	5,57	9,1	14,14	23,86	36,47	46,8	82,76
Use of personal care products (p=0.425)															
High	63	100,00%	13,2	10,99	15,86	16,4484	10,32725	0,9	5,41	8,49	14,99	21,87	28,5	33,2	51,65

Moderate	50	100,00%	15,8	12,86	19,53	21,3856	19,14469	3,72	6,56	9,61	13,78	27,37	44,31	73	83,79
Low	7	100,00%	15	9,79	22,82	17,2471	10,23215	7,55	7,55	8,65	15,12	27,3	34,95	35	34,95
Area of residence (p=0.575)															
Urban	62	100,00%	13,7	11,52	16,26	16,9452	11,04679	1,48	5,5	8,93	13,4	22,35	31,21	36,5	51,65
Rural	63	100,00%	14,7	12,15	17,89	19,7811	17,40867	0,9	6,05	9,72	14,99	22,52	38,76	54,7	83,79
Educational level (highest of family) (p=0.892)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	54	100,00%	14,4	11,46	17,98	20,1863	18,84578	0,9	5,41	9,1	14,04	25,14	46,83	73	83,79
Tertiary education (ISCED 5-6)	71	100,00%	14,1	12,12	16,4	16,9965	10,24648	1,48	6,78	8,93	14,99	22,35	31,21	37,1	51,2
Redecoration or renovation of house in last two years (p=0.600)															
Yes	56	100,00%	14,7	12,04	17,94	19,1279	15,45775	0,9	6,28	9,51	15,05	23,11	37,11	51,7	82,76
No	67	100,00%	13,7	11,5	16,3	17,7148	14,17455	1,48	5,22	8,13	13,21	21,58	35,34	46,8	83,79
PVC in the house (p=0.257)															
PVC in floors or walls	24	100,00%	16,2	12,47	21,1	20,2354	16,25695	5,15	7,55	9,355	16,57	25,93	32,45	41,8	82,76
No PVC	87	100,00%	13,4	11,48	15,67	17,1251	12,50306	0,9	5,5	8,49	13,64	21,79	34,95	39,9	72,96
Main source of water for drinking (p=0.775)															
Public water supply	118	100,00%	14	12,32	15,98	17,8692	13,54144	0,9	5,57	9,1	14,04	22,33	35,34	46,8	82,76
Commercial producers	5	100,00%	15,4	7,31	32,55	19,474	12,12444	4,17	4,17	10,77	20,05	29,93	32,45	32,5	32,45

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 33: Statistical analysis of urinary phthalate metabolite 5oxo-MEHP ($\mu\text{g/g}$ creatinine) in mothers

Age group: mothers, 18-45 years

Biomarker: urinary phthalate metabolite 5oxo-MEHP

Unit: $\mu\text{g/g}$ creatinine

LOQ: 0,24 $\mu\text{g/L}$

Strata	N	%	> GM	low	up	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
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	LOQ	CI	CI	CI															
All	125	100,00%	11,5	10,45	12,75	13,5102	7,88939	2,27	5,8758	7,4759	11,607	16,87	25,495	31,98	40,92				
Period of urine sampling (p=0.172)																			
< 5 hours	9	100,00%	13	7,87	21,4	15,7901	8,70496	2,27	2,2734	10,6	14,514	20,843	30,388	30,388	30,39				
5-8 hours	51	100,00%	12,3	10,58	14,34	14,1992	7,789	2,27	5,5503	9,0909	12,328	17,372	25,495	30,942	40,92				
≥ 8 hours	43	100,00%	10,1	8,57	11,78	11,7017	7,45528	3,97	5,8758	6,6315	8,7449	14,557	19,729	31,98	33,62				
Age (p=0.989)																			
≤ 35 years	45	100,00%	11,6	9,76	13,88	13,956	9,15583	2,27	6,5189	7,4759	10,787	16,588	30,942	33,213	40,92				
35-40 years	51	100,00%	11,4	9,78	13,39	13,3216	7,36735	2,27	5,4743	7,9532	11,81	17,201	22,093	30,388	33,62				
> 40years	29	100,00%	11,6	9,57	14,01	13,1501	6,81694	3,97	5,5947	7,3138	11,933	16,188	20,843	27,891	33,25				
Consumption of meat (p=0.865)																			
Several times per week	102	100,00%	11,5	10,34	12,78	13,2917	7,39729	2,27	5,9559	7,4598	11,594	17,201	23,305	30,388	35,66				
Once per week or less	23	100,00%	11,8	8,92	15,49	14,4791	9,9199	2,27	5,3333	9,0691	11,613	14,557	33,213	33,25	40,92				
Consumption of hazelnut spread (p=0.883)																			
Once a week or often	10	100,00%	11,8	8,82	15,76	12,9631	5,73874	6,14	6,5061	7,0381	12,329	17,377	21,188	21,476	21,48				
Less than once a week	114	100,00%	11,5	10,31	12,75	13,5016	8,07983	2,27	5,5947	7,4759	11,577	16,607	25,849	32,302	40,92				
Consumption of fast food (p=0.387)																			
Several times per week	5	100,00%	14,3	7,7	26,62	17,2748	11,5441	5,21	5,2114	11,81	13,733	19,962	35,657	35,657	35,66				
Once per week or less	119	100,00%	11,4	10,31	12,64	13,3423	7,76207	2,27	5,8758	7,4598	11,574	16,87	25,495	31,98	40,92				
Consumption of milk (p=0.456)																			
Several times per week	74	100,00%	11,9	10,53	13,48	13,7168	7,60637	2,27	5,9559	8,3481	11,68	17,372	22,093	32,302	40,92				
Once per week or less	51	100,00%	11	9,33	13,03	13,2105	8,35079	2,27	5,5503	6,7433	10,32	16,607	27,891	31,98	33,62				
Consumption of cheese (p=0.141)																			
Several times per week	106	100,00%	11,9	10,73	13,24	13,84	7,91154	2,27	5,9657	7,9532	11,779	17,372	25,495	31,98	40,92				
Once per week or less	19	100,00%	9,67	7,26	12,89	11,6703	7,7101	2,27	4,443	5,8924	10,065	13,204	25,916	33,213	33,21				
Consumption of chocolate (p=0.058)																			
Several times per week	60	100,00%	12,8	11,05	14,73	14,899	8,68631	2,27	6,6229	8,647	12,131	19,377	31,345	33,437	40,92				
Once per week or less	65	100,00%	10,5	9,19	12,05	12,2282	6,89639	2,27	5,5503	6,7717	10,32	16,588	22,093	25,849	31,98				
Consumption of ice cream (p=0.685)																			
More than once a month	12	100,00%	12,2	9,16	16,13	13,605	7,01429	5,33	5,4156	9,829	13,175	14,67	18,736	31,98	31,98				
Once a month or less	111	100,00%	11,3	10,19	12,61	13,3202	7,95765	2,27	5,8924	7,3138	11,12	16,87	25,297	32,302	40,92				

Consumption of canteen food (p=0.633)															
Several times per week	51	100,00%	11,9	10,02	14,06	14,2393	8,9263	2,27	5,9559	7,0483	11,607	18,516	30,388	33,213	40,92
Once per week or less	73	100,00%	11,3	9,98	12,77	12,9865	7,15494	2,27	5,8758	7,4759	10,962	16,588	21,476	27,891	35,66
Consumption of chewing gum (p=0.960)															
Several times per week	52	100,00%	11,5	9,73	13,61	13,6524	7,85713	2,27	5,8758	7,5008	11,779	18,191	25,495	31,98	33,62
Once per week or less	73	100,00%	11,6	10,23	13,08	13,4089	7,96504	4,44	5,8924	7,4759	10,787	16,588	25,297	32,302	40,92
Time spend in new car (p=0.811)															
More than 45 minutes per day	10	100,00%	12,1	9,87	14,84	12,6449	3,58308	6,63	6,8399	11,418	13,185	14,72	16,894	17,201	17,2
45 minutes per day or less	11	100,00%	11,5	8,4	15,85	13,2195	7,52627	5,33	7,0381	8,3348	8,8062	21,476	25,495	25,916	25,92
Wearing plastic gloves (p=0.614)															
Daily	5	100,00%	14,8	12,41	17,6	15,016	2,96854	11,57	11,574	12,848	14,72	17,201	18,736	18,736	18,74
Less than daily	15	100,00%	11,5	8,32	16,01	14,2126	10,2602	4,61	5,2114	7,6501	9,0691	15,294	33,25	33,624	33,62
Never	106	100,00%	11,4	10,23	12,72	13,3381	7,7131	2,27	5,8758	7,3138	11,58	16,87	25,297	30,388	40,92
Use of personal care products (p=0.143)															
High	63	100,00%	10,7	9,26	12,27	12,3697	6,76247	2,27	5,4156	7,0381	11,418	15,828	20,693	25,495	33,25
Moderate	50	100,00%	13,1	11,17	15,38	15,4548	9,31221	4,44	5,7353	8,7227	12,061	20,843	31,622	33,624	40,92
Low	7	100,00%	10,5	7,96	13,92	11,1759	4,08245	6,53	6,5348	7,0786	9,8952	14,877	16,588	16,588	16,59
Area of residence (p=0.696)															
Urban	62	100,00%	11,3	9,79	13,07	13,2546	7,57353	2,27	5,4743	7,3138	11,577	16,87	25,495	30,388	33,62
Rural	63	100,00%	11,8	10,25	13,53	13,7618	8,2415	2,27	6,5189	7,4759	11,613	17,201	25,297	32,302	40,92
Educational level (highest of family) (p=0.795)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	54	100,00%	11,7	9,95	13,81	14,0618	8,84981	2,27	5,8758	7,0786	11,285	18,736	25,916	33,213	40,92
Tertiary education (ISCED 5-6)	71	100,00%	11,4	10,07	12,93	13,0907	7,10959	2,27	6,1399	7,9532	11,748	15,828	22,093	30,388	33,62
Redecoration or renovation of house in last two years (p=0.482)															
Yes	56	100,00%	11,9	10,34	13,7	13,6836	7,58448	2,27	6,5024	8,4405	11,695	17,286	25,916	30,942	35,66
No	67	100,00%	11,1	9,6	12,76	13,1607	8,21111	2,27	5,4156	7,0483	11,418	16,588	25,495	32,302	40,92
PVC in the house (p=0.399)															
PVC in floors or walls	24	100,00%	12,5	10,06	15,41	14,3392	8,32084	5,47	5,8924	8,9782	12,537	16,655	27,891	33,624	35,66
No PVC	87	100,00%	11,2	9,9	12,58	13,0095	7,32364	2,27	5,5503	7,3138	11,58	16,87	25,297	30,388	33,25

Main source of water for drinking (p=0.839)																				
Public water supply	118	100,00%	11,5	10,39	12,67	13,2954	7,56689	2,27	5,8924	7,6501	11,594	16,588	25,297	30,942	40,92					
Commercial producers	5	100,00%	12,1	5,43	26,93	16,1694	12,0374	3,97	3,9669	5,4156	17,372	20,843	33,25	33,25	33,25					

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 34: Statistical analysis of urinary phthalate metabolite MEP (µg/L) in mothers

Age group: mothers, 18-45 years

Biomarker: urinary phthalate metabolite MEP

Unit: µg/L

LOQ: 0,64 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	100,00%	54,81	44,15	68,04	119,1281	208,92547	3,1	9,74	26,82	57,57	114,53	219,15	422,01	1339,92
Urinary creatinine (p=0.000)															
300-1000 mg/L	38	100,00%	26,82	18,05	39,87	62,1221	108,30352	3,28	6,93	9,47	21,22	61,18	215,51	256,27	595,97
1000-2000 mg/L	71	100,00%	70,5	54,18	91,75	146,8354	257,86836	3,1	24,43	34,23	66,05	131,47	249,05	845,81	1339,92
2000-3000 mg/L	16	100,00%	97,82	62,91	152,1	131,5663	97,77138	12,78	15,97	81,7	105,5	173,67	215,61	422,01	422,01
Period of urine sampling (p=0.559)															
< 5 hours	9	100,00%	51,59	17,37	153,2	195,3989	397,04268	8,47	8,47	10,03	66,05	83,37	1235,2	1235,2	1235,15
5-8 hours	51	100,00%	62,5	43,85	89,08	136,8857	237,10697	3,1	10,75	33	73,62	141,86	215,51	663,75	1339,92
≥ 8 hours	43	100,00%	47,37	34,13	65,75	89,4384	142,65409	3,43	12,78	24,13	43,04	88,55	200,17	256,27	845,81
Age (p=0.459)															
≤ 35 years	45	100,00%	56,32	37,93	83,64	141,608	253,2397	6,73	9,2	22,7	49,34	141,86	249,14	845,81	1235,15
35-40 years	51	100,00%	61,41	45,83	82,28	113,7492	199,55353	3,43	19,77	28,45	66,05	129,48	180,8	279,35	1339,92
> 40years	29	100,00%	43,01	26,59	69,57	93,7048	141,01745	3,1	8,36	18,74	57,02	88,55	249,05	422,01	663,75
Consumption of meat (p=0.129)															

Several times per week	102	100,00%	59,35	46,44	75,84	132,7987	227,90931	3,1	10,75	26,82	64,75	133,18	222,21	595,97	1339,92
Once per week or less	23	100,00%	38,5	25,15	58,94	58,5017	53,41669	3,28	9,47	12,78	48,25	83,37	105,7	129,48	249,14
Consumption of hazelnut spread (p=0.797)															
Once a week or often	10	100,00%	49,46	23,91	102,3	89,115	95,44818	15,04	15,35	15,8	43,33	175,35	239,53	279,35	279,35
Less than once a week	114	100,00%	54,97	43,72	69,11	121,8494	216,99138	3,1	9,47	27,55	57,3	114,53	219,15	595,97	1339,92
Consumption of fast food (p=0.813)															
Several times per week	5	100,00%	48,07	20,51	112,7	67,526	55,61835	15,04	15,04	22,36	49,34	109,03	141,86	141,86	141,86
Once per week or less	119	100,00%	54,97	43,91	68,83	121,6787	213,60602	3,1	9,47	26,82	57,57	123,68	222,21	595,97	1339,92
Consumption of milk (p=0.283)															
Several times per week	74	100,00%	60,49	45,8	79,88	133,123	228,43797	3,28	11,94	26,82	58,98	129,48	256,27	663,75	1339,92
Once per week or less	51	100,00%	47,5	33,7	66,94	98,8218	177,06684	3,1	8,8	22,7	54,3	101,39	215,51	249,05	1235,15
Consumption of cheese (p=0.366)															
Several times per week	106	100,00%	52,53	41,28	66,85	121,6654	224,07932	3,1	9,47	24,13	52,68	110,96	215,61	595,97	1339,92
Once per week or less	19	100,00%	69,43	43,69	110,3	104,9726	86,88444	8,8	11,02	32,2	83,37	205,4	249,05	279,35	279,35
Consumption of chocolate (p=0.824)															
Several times per week	60	100,00%	53,42	38,5	74,12	134,9822	265,13585	6,73	8,635	22,53	54,04	114,05	210,46	830,41	1339,92
Once per week or less	65	100,00%	56,12	42,08	74,84	104,4935	138,97253	3,1	11,94	28,84	65,53	123,68	222,21	256,27	845,81
Consumption of ice cream (p=0.968)															
More than once a month	12	100,00%	54,67	27,22	109,8	93,0283	82,23492	6,9	10,03	20,2	72,79	131,97	215,51	256,27	256,27
Once a month or less	111	100,00%	55,5	44,03	69,96	123,5126	219,75765	3,1	9,74	26,82	60,39	113,56	219,15	595,97	1339,92
Consumption of canteen food (p=0.252)															
Several times per week	51	100,00%	64,58	47,75	87,36	114,3271	153,58181	3,43	19,77	34,1	65,53	129,48	215,61	422,01	845,81
Once per week or less	73	100,00%	49,9	36,94	67,41	123,9505	242,06434	3,1	9,2	22,36	48,25	105,7	249,05	595,97	1339,92
Consumption of chewing gum (p=0.872)															
Several times per week	52	100,00%	55,98	39,05	80,25	132,0008	228,29676	3,1	11,94	23,25	53,07	137,52	256,27	595,97	1235,15
Once per week or less	73	100,00%	53,98	41,24	70,66	109,9585	195,06897	3,43	9,47	26,85	60,39	109,03	215,61	249,14	1339,92
Time spend in new car (p=0.363)															
More than 45 minutes per day	10	100,00%	45,06	26,36	77,02	62,5	53,3271	15,04	15,51	18,74	48,67	73,62	155,16	168,45	168,45
45 minutes per day or less	11	100,00%	67,95	35,04	131,8	126,4364	170,64296	15,66	20,08	32,2	48,25	199,7	205,4	595,97	595,97
Wearing plastic gloves (p=0.030)															
Daily	5	100,00%	212,6	95,65	472,7	284,424	229,73552	54,3	54,3	168,5	256,3	279,35	663,75	663,75	663,75

Less than daily	15	100,00%	65,75	32,67	132,3	129,2467	150,43296	3,43	8,36	22,36	89,46	180,8	249,14	595,97	595,97
Never	105	100,00%	50,06	39,85	62,89	109,8113	213,42859	3,1	9,74	24,54	49,34	99,98	205,4	249,05	1339,92
Use of personal care products (p=0.001)															
High	63	100,00%	70,24	52,55	93,89	133,5892	197,83816	3,43	15,04	29,61	83,65	148,83	249,14	422,01	1235,15
Moderate	50	100,00%	50,93	35,99	72,09	122,3218	241,91691	3,28	9,47	27,55	47,82	98,92	218,91	663,75	1339,92
Low	7	100,00%	12,38	6,91	22,19	15,69	11,14939	3,1	3,1	9,47	10,75	24,43	36,08	36,08	36,08
Area of residence (p=0.209)															
Urban	62	100,00%	47,64	34,63	65,54	113,5097	214,30221	3,28	9,2	22,7	45,65	105,7	215,51	422,01	1339,92
Rural	63	100,00%	62,91	47,03	84,16	124,6573	205,06674	3,1	11,94	34,23	73,62	123,68	219,15	279,35	1235,15
Educational level (highest of family) (p=0.719)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	54	100,00%	52,35	39,07	70,14	88,9096	101,21348	3,43	10,75	24,54	57,3	99,98	219,15	256,27	595,97
Tertiary education (ISCED 5-6)	71	100,00%	56,75	41,6	77,41	142,1111	261,39261	3,1	9,47	26,85	63,96	131,47	215,51	845,81	1339,92
Redecoration or renovation of house in last two years (p=0.831)															
Yes	56	100,00%	53,55	38,6	74,3	109,2884	159,19295	3,1	7,07	28,65	51,82	141,33	215,61	595,97	845,81
No	67	100,00%	56,19	41,82	75,48	128,7103	246,07054	3,43	9,74	24,43	63,96	110,96	249,05	422,01	1339,92
PVC in the house (p=0.508)															
PVC in floors or walls	24	100,00%	65,27	37,35	114,1	149,9321	247,54879	3,28	10,03	24,49	77,01	199,94	249,05	279,35	1235,15
No PVC	87	100,00%	53,89	41,8	69,48	117,8714	212,78711	3,1	9,2	27,55	57,02	101,39	215,61	595,97	1339,92
Main source of water for drinking (p=0.597)															
Public water supply	118	100,00%	54,05	43,25	67,55	118,6941	212,50407	3,1	9,74	24,54	57,3	114,53	219,15	595,97	1339,92
Commercial producers	5	100,00%	73,08	19,18	278,4	150,898	171,07753	8,36	8,36	39,88	68,73	215,51	422,01	422,01	422,01

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 35: Statistical analysis of urinary phthalate metabolite MEP (µg/g creatinine) in mothers

Age group: mothers, 18-45 years

Biomarker: urinary phthalate metabolite MEP

Unit: µg/g creatinine

LOQ: 0,64 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	100,00%	44,53	36,41	54,46	90,264	149,35203	1,86	12,412	21,1009	43,0591	85,7877	208,425	343,734	923,98
Period of urine sampling (p=0.413)															
< 5 hours	9	100,00%	50,02	17,38	144	153,722	256,82764	5,33	5,3323	15,0689	47,8621	208,425	801,525	801,525	801,52
5-8 hours	51	100,00%	50,38	36,69	69,17	95,858	141,8152	1,86	14,654	21,6252	54,9114	101,215	218,161	343,734	724,28
≥ 8 hours	43	100,00%	36,95	27,01	50,56	65,6145	95,20366	3,92	7,5795	21,0924	33,6028	79,991	114,731	182,856	530,29
Age (p=0.304)															
≤ 35 years	45	100,00%	42,13	28,86	61,51	101,532	171,20273	5,33	7,5795	18,2268	39,3123	91,4377	225,365	530,288	801,52
35-40 years	51	100,00%	53,09	40,26	70,01	96,8913	161,38122	3,92	20,139	23,6364	51,2096	101,215	176,61	279,883	923,98
> 40years	29	100,00%	35,61	23,59	53,74	61,1245	71,09309	1,86	12,412	17,2698	41,5136	64,7493	155,437	182,856	343,73
Consumption of meat (p=0.132)															
Several times per week	102	100,00%	47,93	38,4	59,82	97,7298	161,59958	1,86	14,654	21,1009	46,6798	92,7112	182,856	352,019	923,98
Once per week or less	23	100,00%	32,12	20,13	51,27	57,1549	66,56936	3,87	5,9222	13,864	33,6028	60,5037	208,425	218,161	220,87
Consumption of hazelnut spread (p=0.785)															
Once a week or often	10	100,00%	40,37	23,14	70,43	62,0835	74,02643	17,03	17,652	19,9237	31,7774	85,7877	175,088	257,465	257,47
Less than once a week	114	100,00%	44,8	36,11	55,59	93,0133	154,77147	1,86	11,183	21,2581	43,8466	91,4377	208,425	352,019	923,98
Consumption of fast food (p=0.671)															
Several times per week	5	100,00%	35,78	18,2	70,35	46,1549	38,74364	18,27	18,275	21,2581	23,6364	58,6498	108,956	108,956	108,96
Once per week or less	119	100,00%	44,8	36,32	55,25	92,3318	152,63381	1,86	11,183	21,0924	43,0591	91,4377	218,161	352,019	923,98
Consumption of milk (p=0.235)															
Several times per week	74	100,00%	49,29	38,08	63,8	100,621	165,67421	3,87	13,864	21,2599	45,794	92,9505	208,425	530,288	923,98
Once per week or less	51	100,00%	38,42	27,9	52,92	75,2359	121,8845	1,86	8,5593	17,4352	41,5136	83,1855	182,856	225,365	801,52
Consumption of cheese (p=0.059)															
Several times per week	106	100,00%	41,03	32,95	51,09	86,729	157,35291	1,86	8,7971	20,3346	41,6819	83,1433	140,861	352,019	923,98
Once per week or less	19	100,00%	70,31	44	112,4	109,986	93,52345	12,55	14,654	28,0778	60,2141	208,425	257,465	279,883	279,88

secondary non-tertiary education (ISCED 3-4)	71	100,00%	45,94	34,67	60,87	96,8971	158,05777	1,86	12,554	20,1389	51,2096	101,215	176,61	530,288	801,52
Redecoration or renovation of house in last two years (p=0.826)															
Yes	56	100,00%	43,36	31,52	59,65	89,8963	148,33917	1,86	8,3293	21,1753	46,2481	96,9631	218,161	352,019	923,98
No	67	100,00%	45,41	34,87	59,14	91,235	153,25212	3,92	12,554	21,1009	42,3822	83,1855	208,425	279,883	801,52
PVC in the house (p=0.684)															
PVC in floors or walls	24	100,00%	50,11	30,2	83,14	104,902	164,01875	3,87	12,412	21,3036	54,1829	111,993	225,365	257,465	801,52
No PVC	87	100,00%	44,83	35,15	57,18	92,6584	155,93304	1,86	12,554	21,2599	45,7533	83,1433	218,161	352,019	923,98
Main source of water for drinking (p=0.626)															
Public water supply	118	100,00%	44,2	35,87	54,46	90,6001	152,12568	1,86	11,183	21,0924	43,8466	85,7877	208,425	352,019	923,98
Commercial producers	5	100,00%	57,27	18,69	175,6	103,679	113,6741	13,86	13,864	21,349	47,8621	155,437	279,883	279,883	279,88

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 36: Statistical analysis of urinary phthalate metabolite MBZP (µg/L) in mothers

Age group: mothers, 18-45 years

Biomarker: urinary phthalate metabolite MBZP

Unit: µg/L

LOQ: 1,20 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	95,20%	4,7	4,01	5,5	7,2314	9,34546	0,6	1,63	2,66	4,82	8,56	13,17	18,4	72,75
Urinary creatinine (p=0.000)															
300-1000 mg/L	38	84,20%	2,5	1,9	3,34	3,6455	3,3331	0,6	0,6	1,5	2,48	4,81	8,93	10,7	15,37
1000-2000 mg/L	71	100,00%	5,8	4,87	7,02	8,5634	11,2282	1,32	2,47	3,34	5,37	9,02	14,24	27,1	72,75

2000-3000 mg/L	16	100,00%	7,8	5,59	10,89	9,8369	7,61832	3,32	3,34	4,39	7,67	10,65	22,6	29,9	29,87
Period of urine sampling (p=0.415)															
< 5 hours	9	77,80%	3,4	1,66	6,91	4,9978	3,59904	0,6	0,6	2,64	5,37	8,44	9,9	9,9	9,9
5-8 hours	51	98,00%	5,1	4,09	6,26	7,1478	9,98088	0,6	2,15	3,6	5,21	8,33	10,7	15,4	72,75
≥ 8 hours	43	100,00%	4,9	3,79	6,37	7,7265	10,2319	1,26	1,63	2,81	4,2	8,45	16,4	27,1	51,11
Age (p=0.924)															
≤ 35 years	45	95,60%	4,6	3,5	5,91	6,474	5,72259	0,6	1,44	2,31	5,32	8,93	10,43	18,4	29,87
35-40 years	51	92,20%	4,7	3,57	6,13	7,9035	11,9817	0,6	1,69	2,66	4,2	8,56	14,24	16,5	72,75
> 40years	29	100,00%	5	3,71	6,62	7,2245	8,78736	1,2	1,89	3,12	4,77	6,48	15,37	27,1	44,15
Consumption of meat (p=0.569)															
Several times per week	102	95,10%	4,8	4,01	5,75	7,6055	10,1372	0,6	1,63	2,7	4,85	8,86	13,17	22,6	72,75
Once per week or less	23	95,70%	4,3	3,08	5,88	5,5722	4,11901	0,6	1,97	2,6	4	8,44	10,73	15,4	15,37
Consumption of hazelnut spread (p=0.956)															
Once a week or often	10	80,00%	4,6	1,94	11,05	10,232	13,7565	0,6	0,6	2,66	4,41	14,24	33,38	44,2	44,15
Less than once a week	114	96,50%	4,7	4,02	5,52	6,997	8,93416	0,6	1,63	2,65	4,83	8,56	11,36	16,5	72,75
Consumption of fast food (p=0.936)															
Several times per week	5	100,00%	4,9	1,94	12,09	8,5	11,9658	2,15	2,15	2,94	3,6	3,94	29,87	29,9	29,87
Once per week or less	119	95,00%	4,7	3,98	5,52	7,1979	9,31711	0,6	1,5	2,65	4,83	8,73	13,17	18,4	72,75
Consumption of milk (p=0.364)															
Several times per week	74	93,20%	5	3,96	6,29	8,4907	11,6516	0,6	1,87	2,66	4,96	9,02	16,4	29,9	72,75
Once per week or less	51	98,00%	4,3	3,52	5,24	5,4041	3,55462	0,6	1,63	2,65	4,44	7,69	9,9	10,7	16,46
Consumption of cheese (p=0.238)															
Several times per week	106	95,30%	4,9	4,1	5,83	7,6601	9,99068	0,6	1,63	2,7	4,96	8,86	15,35	22,6	72,75
Once per week or less	19	94,70%	3,7	2,64	5,32	4,8395	3,50593	0,6	1,2	2,47	3,95	6,47	10,59	14,2	14,24
Consumption of chocolate (p=0.185)															
Several times per week	60	95,00%	5,3	4,16	6,62	7,7173	7,94408	0,6	1,75	2,71	5,55	9,17	14,81	20,5	51,11
Once per week or less	65	95,40%	4,2	3,41	5,26	6,7828	10,5173	0,6	1,5	2,66	4,2	6,27	10,7	16,5	72,75
Consumption of ice cream (p=0.340)															
More than once a month	12	100,00%	3,8	2,77	5,16	4,3317	2,39623	1,26	2,6	2,73	3,76	5,77	7,52	9,18	9,18
Once a month or less	111	95,50%	4,9	4,13	5,82	7,6337	9,81346	0,6	1,63	2,66	5,19	8,93	14,24	22,6	72,75
Consumption of canteen food (p=0.782)															

Several times per week	51	98,00%	4,8	3,93	5,97	6,5957	6,86024	0,6	2,16	2,77	4,81	7,64	11,76	16,5	44,15
Once per week or less	73	93,20%	4,6	3,67	5,82	7,7349	10,8133	0,6	1,32	2,64	5,04	8,93	14,24	27,1	72,75
Consumption of chewing gum (p=0.257)															
Several times per week	52	90,40%	4,2	3,23	5,49	6,9877	10,6613	0,6	1,26	2,63	4,15	7,725	13,17	22,6	72,75
Once per week or less	73	98,60%	5,1	4,18	6,17	7,4049	8,35645	0,6	1,63	2,7	5,32	8,93	11,76	18,4	51,11
Time spend in new car (p=0.979)															
More than 45 minutes per day	10	100,00%	3,7	2,45	5,44	4,436	3,06145	1,69	1,79	2,15	3,13	5,98	9,53	10,7	10,73
45 minutes per day or less	11	81,80%	3,7	1,89	7,19	6,07	6,32916	0,6	0,6	1,97	4	9,05	9,44	22,6	22,6
Wearing plastic gloves (p=0.927)															
Daily	5	100,00%	5	1,83	13,4	7,456	5,85124	1,26	1,26	1,69	8,33	11,76	14,24	14,2	14,24
Less than daily	15	93,30%	5,1	3,25	7,95	6,7707	4,64323	0,6	2,15	2,55	7,52	9,16	10,7	18,4	18,4
Never	105	95,20%	4,6	3,89	5,51	7,2865	9,99391	0,6	1,63	2,7	4,77	7,8	13,17	22,6	72,75
Use of personal care products (p=0.292)															
High	63	95,20%	4,5	3,61	5,69	7,2371	10,5559	0,6	1,63	2,55	4,83	8,44	10,73	16,5	72,75
Moderate	50	96,00%	5	3,96	6,29	6,8616	5,97574	0,6	1,93	3,12	4,84	9,05	12,47	18,4	29,87
Low	7	100,00%	7,9	3,73	16,64	13,203	17,2653	2,7	2,7	3,64	5,98	15,37	51,11	51,1	51,11
Area of residence (p=0.127)															
Urban	62	96,80%	5,3	4,26	6,65	8,4494	11,9775	0,6	2,15	3,12	5,21	8,93	13,17	27,1	72,75
Rural	63	93,70%	4,2	3,32	5,2	6,0327	5,5305	0,6	1,44	2,16	4,02	8,56	10,7	16,5	29,87
Educational level (highest of family) (p=0.866)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	54	90,70%	4,6	3,53	6,05	7,335	8,3476	0,6	1,26	2,64	5,21	8,86	15,35	22,6	51,11
Tertiary education (ISCED 5-6)	71	98,60%	4,8	3,92	5,76	7,1525	10,0965	0,6	1,89	2,66	4,44	8,33	11,36	16,5	72,75
Redecoration or renovation of house in last two years (p=0.182)															
Yes	56	96,40%	4,2	3,42	5,23	5,7954	5,24885	0,6	1,5	2,48	4,41	7,745	10,7	16,4	29,87
No	67	95,50%	5,3	4,18	6,6	8,5449	11,7025	0,6	1,63	2,77	5,21	9,02	15,37	27,1	72,75
PVC in the house (p=0.133)															
PVC in floors or walls	24	95,80%	6,1	4,06	9,14	9,7921	11,2029	0,6	1,63	3,54	5,39	10,72	22,6	29,9	51,11
No PVC	87	95,40%	4,4	3,7	5,33	6,7389	9,30219	0,6	1,63	2,64	4,44	7,76	11,36	16,4	72,75
Main source of water for drinking (p=0.987)															
Public water supply	118	94,90%	4,7	3,95	5,5	7,268	9,53953	0,6	1,5	2,65	4,82	8,73	13,17	22,6	72,75

Commercial producers	5	100,00%	4,7	3,18	6,92	5,026	1,83356	2,24	2,24	4,77	5,37	5,41	7,34	7,34	7,34
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N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 37: Statistical analysis of urinary phthalate metabolite MBZP ($\mu\text{g/g}$ creatinine) in mothers

Age group: mothers, 18-45 years

Biomarker: urinary phthalate metabolite MBZP

Unit: $\mu\text{g/g}$ creatinine

LOQ: 1,20 $\mu\text{g/L}$

Strata	N	% LOQ	> LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	95,20%	3,8	3,32	4,39	5,5565	7,33714	0,76	1,523	2,119	3,731	6,1196	10,492	14,135	60,07	
Period of urine sampling (p=0.729)																
< 5 hours	9	77,80%	3,3	1,96	5,48	4,1215	2,46593	0,92	0,922	1,404	4,265	6,4244	7,4823	7,4823	7,48	
5-8 hours	51	98,00%	4,1	3,37	4,95	5,72	8,42491	1,31	1,651	2,662	4,171	5,3984	7,1055	14,544	60,07	
\geq 8 hours	43	100,00%	3,8	2,96	4,96	5,974	7,96973	0,81	1,539	2,105	3,108	7,9178	11,782	14,888	46,76	
Age (p=0.487)																
\leq 35 years	45	95,60%	3,4	2,77	4,19	4,3547	3,32711	0,81	1,511	1,803	3,709	5,3144	7,4823	12,87	14,54	
35-40 years	51	92,20%	4,1	3,17	5,17	6,549	10,1448	0,76	1,404	2,193	4,177	6,5294	11,257	13,124	60,07	
> 40years	29	100,00%	4,1	3,12	5,4	5,6758	5,75338	1,54	1,757	2,464	3,631	6,1196	14,888	20,144	26,08	
Consumption of meat (p=0.637)																
Several times per week	102	95,10%	3,9	3,31	4,54	5,7673	7,8904	0,76	1,54	2,13	3,735	6,1196	11,257	14,135	60,07	
Once per week or less	23	95,70%	3,6	2,64	4,78	4,6213	4,05992	0,81	1,523	2,045	3,715	6,3983	7,4823	9,5818	20,14	
Consumption of hazelnut spread (p=0.954)																
Once a week or often	10	80,00%	3,8	1,84	7,78	6,7541	7,92492	0,76	0,768	1,634	3,73	10,492	19,601	26,078	26,08	
Less than once a week	114	96,50%	3,8	3,33	4,42	5,4816	7,33722	0,81	1,539	2,13	3,735	6,1196	9,6272	14,135	60,07	
Consumption of fast food (p=0.877)																

Several times per week	5	100,00%	3,6	1,79	7,29	4,8244	4,61675	1,65	1,651	2,119	3,108	4,3742	12,87	12,87	12,87
Once per week or less	119	95,00%	3,8	3,31	4,41	5,5979	7,47063	0,76	1,511	2,114	3,731	6,1405	10,492	14,544	60,07
Consumption of milk (p=0.278)															
Several times per week	74	93,20%	4,1	3,35	4,95	6,3324	9,02865	0,76	1,539	2,21	3,81	6,5295	12,87	14,888	60,07
Once per week or less	51	98,00%	3,5	2,87	4,21	4,4307	3,50851	0,81	1,511	1,973	3,631	5,3144	9,2297	11,257	20,14
Consumption of cheese (p=0.969)															
Several times per week	106	95,30%	3,8	3,27	4,46	5,7084	7,84703	0,76	1,523	2,119	3,735	6,1196	11,257	14,544	60,07
Once per week or less	19	94,70%	3,8	2,79	5,14	4,7089	3,28134	1,31	1,511	2,045	3,538	6,6	9,5325	13,124	13,12
Consumption of chocolate (p=0.102)															
Several times per week	60	95,00%	4,3	3,54	5,25	5,9786	6,6233	0,76	1,68	2,665	4,084	6,5664	12,495	14,339	46,76
Once per week or less	65	95,40%	3,4	2,81	4,14	5,1668	7,97123	0,81	1,404	1,776	2,996	5,2069	9,5818	11,782	60,07
Consumption of ice cream (p=0.114)															
More than once a month	12	100,00%	2,7	1,96	3,83	3,2813	2,36093	1,4	1,523	1,636	2,499	4,2559	5,3984	9,5325	9,53
Once a month or less	111	95,50%	4	3,45	4,65	5,8581	7,69708	0,77	1,596	2,193	3,88	6,4244	11,257	14,544	60,07
Consumption of canteen food (p=0.975)															
Several times per week	51	98,00%	3,8	3,18	4,63	4,8806	4,10323	0,92	1,757	2,467	3,874	6,1196	9,5818	11,257	26,08
Once per week or less	73	93,20%	3,9	3,15	4,7	6,0839	8,95488	0,76	1,511	1,996	3,731	6,1405	12,87	14,888	60,07
Consumption of chewing gum (p=0.170)															
Several times per week	52	90,40%	3,4	2,73	4,22	5,1422	8,32634	0,76	1,511	1,851	3,288	5,3279	9,5818	13,124	60,07
Once per week or less	73	98,60%	4,1	3,46	4,96	5,8516	6,58741	0,81	1,596	2,13	3,991	6,6	11,782	14,544	46,76
Time spend in new car (p=0.687)															
More than 45 minutes per day	10	100,00%	2,7	1,86	3,89	3,1507	1,85006	1,31	1,355	1,651	2,417	4,3742	5,9411	6,3983	6,4
45 minutes per day or less	11	81,80%	3,1	1,84	5,14	4,1694	3,15419	0,76	0,93	1,416	3,538	7,1055	7,9178	10,492	10,49
Wearing plastic gloves (p=0.605)															
Daily	5	100,00%	4,2	1,97	9,07	5,6401	4,65003	1,73	1,731	1,772	5,484	6,0901	13,124	13,124	13,12
Less than daily	15	93,30%	4,6	3,21	6,52	5,5902	3,51209	0,93	1,651	3,108	4,878	7,0933	11,257	14,135	14,13
Never	105	95,20%	3,7	3,17	4,32	5,5477	7,85453	0,76	1,511	2,114	3,538	5,4772	9,7575	14,544	60,07
Use of personal care products (p=0.364)															
High	63	95,20%	3,7	2,99	4,48	5,4934	8,05717	0,81	1,416	1,803	3,631	5,5194	9,7575	11,782	60,07

Moderate	50	96,00%	4,1	3,42	4,99	5,1437	3,56424	0,77	1,624	2,532	4,221	6,5295	10,874	14,135	14,89
Low	7	100,00%	5,6	2,24	13,74	11,657	16,7801	2,11	2,105	2,21	2,838	20,144	46,761	46,761	46,76
Area of residence (p=0.047)															
Urban	62	96,80%	4,4	3,55	5,44	6,9056	9,78906	0,92	1,54	2,623	4,174	6,6	12,121	20,144	60,07
Rural	63	93,70%	3,3	2,78	3,95	4,2288	3,12664	0,76	1,511	1,996	3,359	5,3984	7,4823	11,782	14,13
Educational level (highest of family) (p=0.895)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	54	90,70%	3,8	3,07	4,63	5,2812	6,52326	0,76	1,539	2,21	3,724	5,4772	10,492	12,87	46,76
Tertiary education (ISCED 5-6)	71	98,60%	3,9	3,18	4,66	5,7659	7,93983	0,81	1,523	2,045	3,731	6,1405	9,7575	14,888	60,07
Redecoration or renovation of house in last two years (p=0.133)															
Yes	56	96,40%	3,4	2,9	4,05	4,1873	2,90471	0,81	1,523	2,055	3,735	5,1303	7,1055	12,121	14,13
No	67	95,50%	4,3	3,43	5,26	6,7728	9,52216	0,76	1,539	2,21	3,715	7,0933	13,124	20,144	60,07
PVC in the house (p=0.211)															
PVC in floors or walls	24	95,80%	4,7	3,22	6,78	7,3585	9,51632	0,76	1,416	2,898	5,017	6,4114	13,124	20,144	46,76
No PVC	87	95,40%	3,7	3,14	4,35	5,3232	7,16173	0,81	1,523	1,996	3,538	5,4772	9,7575	14,135	60,07
Main source of water for drinking (p=0.923)															
Public water supply	118	94,90%	3,8	3,29	4,41	5,6202	7,52207	0,76	1,511	2,114	3,802	6,1196	11,257	14,544	60,07
Commercial producers	5	100,00%	3,7	2,15	6,3	4,328	3,0195	1,76	1,757	2,896	3,715	3,7396	9,5325	9,5325	9,53

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 38: Statistical analysis of urinary phthalate metabolite MNBP (µg/L) in mothers

Age group: mothers, 18-45 years

Biomarker: urinary phthalate metabolite MNBP

Unit: µg/L

LOQ: 1,51 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	100,00%	74,27	64,99	84,87	102,6327	117,36168	7,11	29,61	48,52	73,1	104,95	172,55	259,5	988,38
Urinary creatinine (p=0.000)															
300-1000 mg/L	38	100,00%	40,61	33,86	48,69	46,4226	22,42932	7,11	19,91	30,87	43,935	58,45	78,66	88,09	114,38
1000-2000 mg/L	71	100,00%	93,94	80,52	109,6	123,2828	136,26515	18,12	48,52	62,59	91,1	130,33	195,25	355,4	988,38
2000-3000 mg/L	16	100,00%	109,9	75,43	160	144,4969	118,65293	26,88	42,1	69,89	96,73	178,99	329,32	478,2	478,19
Period of urine sampling (p=0.454)															
< 5 hours	9	100,00%	84,46	33,85	210,8	171,3267	195,60547	7,11	7,11	49,07	75,13	195,25	517,1	517,1	517,1
5-8 hours	51	100,00%	80,5	65,17	99,43	112,8661	141,62478	9,16	33,48	48,96	79,37	130,33	200,19	255,1	988,38
≥ 8 hours	43	100,00%	67,04	56,85	79,06	77,3665	44,18362	18,02	36,24	48,52	72,44	94,68	115,07	156,8	259,54
Age (p=0.172)															
≤ 35 years	45	100,00%	80,52	61,62	105,2	128,2467	169,79162	9,16	28,47	46,29	74,21	130,33	259,54	478,2	988,38
35-40 years	51	100,00%	63,82	53,81	75,69	74,519	37,2429	7,11	28,99	46,56	71,67	98,82	116,51	144,4	172,55
> 40years	29	100,00%	85,53	66,38	110,2	112,3283	103,08656	28,93	44,12	50,79	78,66	136,14	255,08	355,4	485,33
Consumption of meat (p=0.951)															
Several times per week	102	100,00%	74,12	64,15	85,64	101,7771	119,62678	7,11	30,87	48,52	74,115	104,38	157,79	255,1	988,38
Once per week or less	23	100,00%	74,93	52,97	106	106,4274	109,16489	9,16	28,93	46,56	72,83	130,33	226,84	259,5	517,1
Consumption of hazelnut spread (p=0.573)															
Once a week or often	10	100,00%	65,06	48,58	87,12	72,199	37,05707	33,66	37,17	42,1	66,385	90,58	129,18	157,8	157,79
Less than once a week	114	100,00%	75,05	64,98	86,68	105,457	122,11648	7,11	28,99	48,52	74,67	113,89	195,25	329,3	988,38
Consumption of fast food (p=0.811)															
Several times per week	5	100,00%	80,1	37,71	170,1	113,36	122,14262	33,66	33,66	53,98	64,84	85	329,32	329,3	329,32
Once per week or less	119	100,00%	73,66	64,23	84,46	101,9004	118,12481	7,11	28,99	46,56	73,1	104,95	172,55	259,5	988,38
Consumption of milk (p=0.749)															

Several times per week	74	100,00%	75,63	62,97	90,84	108,9097	136,08827	7,11	28,93	49,07	75,05	113,89	158,81	355,4	988,38
Once per week or less	51	100,00%	72,33	59,67	87,68	93,5249	83,52714	9,16	32,77	44,93	72,44	99,33	195,25	255,1	517,1
Consumption of cheese (p=0.251)															
Several times per week	106	100,00%	76,78	66,38	88,81	106,8766	124,35072	7,11	29,61	48,96	75,51	114,38	172,55	329,3	988,38
Once per week or less	19	100,00%	61,71	44,34	85,86	78,9563	63,14049	9,16	28,76	44,93	52,22	98,42	225,27	259,5	259,54
Consumption of chocolate (p=0.056)															
Several times per week	60	100,00%	85,02	67,84	106,6	130,393	158,95411	7,11	32,12	47,63	86,545	133,93	294,43	481,8	988,38
Once per week or less	65	100,00%	65,56	56,71	75,78	77,0078	44,77535	9,16	28,99	48,52	71,67	94,87	136,14	158,8	255,08
Consumption of ice cream (p=0.946)															
More than once a month	12	100,00%	75,62	50,11	114,1	105,9542	132,07925	28,76	42,12	46,43	74,67	88,775	123	517,1	517,1
Once a month or less	111	100,00%	74,42	64,44	85,95	103,0479	117,24716	7,11	29,61	48,52	73,1	113,89	172,55	259,5	988,38
Consumption of canteen food (p=0.236)															
Several times per week	51	100,00%	67,37	53,89	84	99,2335	141,46299	7,11	28,76	42,1	69,97	95,62	157,79	259,5	988,38
Once per week or less	73	100,00%	79,51	67,31	93,92	105,3968	98,98112	9,16	33,66	50,79	75,89	114,38	195,25	329,3	517,1
Consumption of chewing gum (p=0.567)															
Several times per week	52	100,00%	70,9	56,51	88,96	103,1662	138,29016	7,11	28,99	47,97	70,3	108,91	172,55	255,1	988,38
Once per week or less	73	100,00%	76,76	65,25	90,31	102,2527	100,87043	18,02	31,46	48,52	75,13	104,95	156,78	355,4	517,1
Time spend in new car (p=0.851)															
More than 45 minutes per day	10	100,00%	73,15	50,73	105,5	85,038	47,68426	30,87	32,27	49,64	69,985	136,14	154,55	156,8	156,78
45 minutes per day or less	11	100,00%	69,17	44,78	106,8	86,98	61,17679	18,02	28,99	46,56	64,61	104,95	157,79	225,3	225,27
Wearing plastic gloves (p=0.548)															
Daily	5	100,00%	93,32	39,32	221,5	136,252	131,833	30,87	30,87	42,12	100,56	152,32	355,39	355,4	355,39
Less than daily	15	100,00%	62,76	42,92	91,77	88,6387	111,33444	18,02	28,93	40,16	62,59	73,1	131,75	478,2	478,19
Never	105	100,00%	75,26	65,13	86,95	103,031	118,33323	7,11	31,46	48,96	78,66	113,44	172,55	255,1	988,38

Age group: mothers, 18-45 years
Biomarker: urinary phthalate metabolite MNBP
Unit: µg/g creatinine
LOQ: 1,51 µg/L

Strata	N	% LOQ	> GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125	100,00%	60,3	54,05	67,36	75,5574	75,44523	10,92	28,063	40,899	59,747	87,1146	122,675	170,28	733,22
Period of urine sampling (p=0.092)															
< 5 hours	9	100,00%	81,9	41,15	163	123,919	111,5392	10,92	10,922	48,395	98,637	126,703	337,974	337,974	337,97
5-8 hours	51	100,00%	64,9	54,93	76,65	82,8926	99,45407	23,07	32,359	45,724	62,398	97,4794	113,031	170,28	733,22
≥ 8 hours	43	100,00%	52,3	44,18	61,9	60,3948	33,07066	12,46	23,374	39,542	55,886	77,5709	91,8198	125,663	184,07
Age (p=0.234)															
≤ 35 years	45	100,00%	60,2	48,78	74,39	84,0494	110,7378	12,46	24,238	39,641	55,878	84,8982	141,887	184,345	733,22
35-40 years	51	100,00%	55,2	47,59	63,98	62,3602	28,13852	10,92	26,53	40,899	62,398	82,3694	98,2931	107,709	132,07
> 40years	29	100,00%	70,8	56,8	88,28	85,5891	63,13393	18,31	30,372	49,858	60,486	100,076	170,28	184,045	337,97
Consumption of meat (p=0,765)															
Several times per week	102	100,00%	59,9	53,13	67,44	74,8597	78,88804	10,92	28,281	39,991	60,688	86,9894	113,031	141,887	733,22
Once per week or less	23	100,00%	62,5	46,99	83,2	78,6515	59,15329	12,46	26,53	44,846	57,049	107,709	135,041	184,071	274,91
Consumption of hazelnut spread (p=0.499)															
Once a week or often	10	100,00%	53,1	38,87	72,56	58,8246	25,42324	20,6	25,485	39,542	60,488	82,201	90,202	92,682	92,68
Less than once a week	114	100,00%	61,2	54,38	68,8	77,2869	78,47879	10,92	28,063	41,703	60,117	87,2363	125,663	184,045	733,22
Consumption of fast food (p=0.982)															
Several times per week	5	100,00%	59,6	38,48	92,4	67,0743	42,23921	40,9	40,899	45,724	49,8	57,0613	141,887	141,887	141,89
Once per week or less	119	100,00%	60	53,56	67,27	75,5426	76,82016	10,92	26,53	39,793	60,486	87,1146	122,675	184,045	733,22
Consumption of milk (p=0.651)															

Several times per week	74	100,00%	61,6	52,71	72,07	80,4672	90,4174	10,92	24,238	44,946	63,943	87,722	122,675	184,045	733,22
Once per week or less	51	100,00%	58,5	50,5	67,8	68,4335	45,74636	23,07	32,359	39,673	53,135	82,3694	112,576	170,28	274,91
Consumption of cheese (p=0.794)															
Several times per week	106	100,00%	60	53,1	67,72	76,0239	80,11049	10,92	28,063	40,899	58,487	86,873	119,736	170,28	733,22
Once per week or less	19	100,00%	62,5	48,15	81,08	72,9549	42,02955	23,07	26,265	38,341	64,907	96,1442	125,663	184,071	184,07
Consumption of chocolate (p=0,013)															
Several times per week	60	100,00%	69,7	58,34	83,32	92,5898	102,0128	10,92	34,175	45,772	70,066	98,0581	162,966	229,626	733,22
Once per week or less	65	100,00%	52,8	46,54	59,91	59,8352	30,19284	12,46	26,53	39,641	55,759	74,4091	98,2931	119,736	170,28
Consumption of ice cream (p=0.592)															
More than once a month	12	100,00%	54,8	39,4	76,32	68,147	66,6215	26,53	37,351	39,446	50,516	63,2502	77,7135	274,907	274,91
Once a month or less	111	100,00%	60,8	54,01	68,51	76,4654	77,21552	10,92	28,063	40,899	62,103	87,9202	122,675	170,28	733,22
Consumption of canteen food (p=0.059)															
Several times per week	51	100,00%	53,3	44,02	64,56	72,7996	100,7008	10,92	22,859	34,348	53,135	77,5709	98,6367	184,045	733,22
Once per week or less	73	100,00%	66,2	58,14	75,35	77,9836	52,25828	12,46	35,56	44,927	67,494	91,8198	126,703	170,28	337,97
Consumption of chewing gum (p=0.427)															
Several times per week	52	100,00%	57,2	46,98	69,7	77,826	99,90491	10,92	22,859	39,766	57,055	87,4183	113,031	170,28	733,22
Once per week or less	73	100,00%	62,7	55,24	71,1	73,9414	52,21711	18,93	32,359	44,846	62,103	86,9894	122,675	184,045	337,97
Time spend in new car (p=0.771)															
More than 45 minutes per day	10	100,00%	53,9	40	72,71	59,9909	30,17487	26,26	29,312	39,793	52,843	74,4091	110,006	119,736	119,74
45 minutes per day or less	11	100,00%	57,7	41,6	79,98	64,9553	29,06448	18,93	26,53	44,927	73,254	87,2363	91,8198	113,031	113,03
Wearing plastic gloves (p=0.568)															
Daily	5	100,00%	79,6	45,04	140,8	93,4437	57,56211	32,36	32,359	57,857	92,682	100,277	184,045	184,045	184,04
Less than daily	15	100,00%	56,5	44,61	71,58	63,0903	36,60254	18,93	44,946	45,897	55,266	70,1544	80,8722	184,345	184,34
Never	105	100,00%	60,1	53,1	68,05	76,4867	80,25046	10,92	26,53	39,782	60,89	87,2363	122,675	141,887	733,22

Age group: mothers, 18-45 years

Biomarker: urinary phthalate metabolite DEHP (Σ 5-OH-MEHP + 5-oxo-MEHP)

Unit: µg/L

LOQ: -

Strata	N	% LOQ	> GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125		36,7	32,26	41,79	47,5568	37,6818	2,24	15,86	22,59	39,28	57,11	89,48	120,1	204,01
Urinary creatinine (p=0.000)															
300-1000 mg/L	38		20,7	16,68	25,7	25,0663	15,0581	2,24	11,02	15,67	20,58	36,76	46,42	57,11	70,11
1000-2000 mg/L	71		43,8	38,26	50,14	51,7166	31,6271	12,16	19,64	26,38	44,63	62,88	88,96	120,1	162,7
2000-3000 mg/L	16		65,5	46,89	91,36	82,5125	62,0005	27,57	30,75	41,24	48,57	101,51	194	204	204,01
Period of urine sampling (p=0.370)															
< 5 hours	9		34,7	17,29	69,47	50,0044	35,4426	4,31	4,31	23,12	60,68	71,2	111,1	111,1	111,11
5-8 hours	51		40,5	32,62	50,2	52,5208	39,4849	2,24	17,92	22,88	44,67	62,88	89,48	148,8	204,01
≥ 8 hours	43		32,6	27,25	39	39,2149	26,4109	11,5	14,22	19,64	32,47	45,55	72,5	98,22	127,42
Age (p=0.608)															
≤ 35 years	45		39,7	30,96	50,83	54,9698	48,9212	2,24	15,96	23,12	42,91	60,16	120,1	193,9	204,01
35-40 years	51		34,1	28,19	41,25	42,1386	27,032	4,31	12,85	20,58	38,68	55,36	78,84	100	127,42
> 40years	29		37,1	29,38	46,8	45,5824	32,8122	14,22	16,2	20,57	36,76	63,02	88,96	103	162,7
Consumption of meat (p=0.836)															
Several times per week	102		37	32,18	42,44	47,7848	39,1739	4,31	15,86	21,57	39,13	55,51	89,48	127,4	204,01
Once per week or less	23		35,7	25,07	50,75	46,5457	30,9305	2,24	17,92	23,12	40,72	68,53	78,84	114,8	120,08
Consumption of hazelnut spread (p=0.831)															
Once a week or often	10		38,2	32,25	45,36	39,694	12,6862	25,1	27,93	32,47	38,17	39,75	58,05	72,5	72,5
Less than once a week	114		36,3	31,54	41,78	47,8833	39,0458	2,24	15,67	20,68	39,59	59,17	98,22	127,4	204,01
Consumption of fast food															

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 41: Statistical analysis of urinary phthalate metabolite DEHP (µg/g creatinine) in mothers

Age group: mothers, 18-45 years

Biomarker: urinary phthalate metabolite DEHP (Σ 5-OH-MEHP + 5-oxo-MEHP)

Unit: µg/g creatinine

LOQ: -

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	125		29,8	26,99	32,97	34,9426	20,46199	5,64	14,991	19,322	29,394	46,001	64,381	81,39	108,61
Period of urine sampling (p=0.091)															
< 5 hours	9		33,6	20,68	54,61	40,8019	23,37498	6,62	6,6206	27,55	39,377	49,582	84,623	84,623	84,62
5-8 hours	51		32,6	27,93	38,1	37,9237	21,93908	5,64	16,258	24,275	32,636	46,201	73,107	89,813	108,61
≥ 8 hours	43		25,5	21,64	29,93	29,6536	18,08044	10,15	14,531	16,42	23,418	34,994	56,847	66,057	81,39
Age (p=0.953)															
≤ 35 years	45		29,7	24,92	35,34	35,3349	22,1262	5,64	16,823	19,312	26,422	43,567	74,788	83,533	89,81
35-40 years	51		29,5	25,3	34,35	34,0233	18,11121	6,62	14,686	20,534	30,498	47,21	52,11	73,107	84,62
> 40years	29		30,7	24,96	37,76	35,9506	22,27799	10,15	14,42	21,543	32,636	42,823	56,847	94,71	108,61
Consumption of meat (p=0.982)															
Several times per week	102		29,9	26,84	33,19	34,5542	19,45084	6,62	15,308	19,312	29,815	46,201	56,847	74,788	108,61
Once per week or less	23		29,8	22,56	39,25	36,6651	24,88378	5,64	14,883	20,497	29,257	41,467	81,39	89,813	94,71
Consumption of hazelnut spread (p=0.777)															
Once a week or often	10		31,2	23,56	41,36	34,038	13,96602	15,04	16,384	20,241	32,374	50,43	50,563	50,573	50,57
Less than once a week	114		29,6	26,59	32,92	34,9087	21,03253	5,64	14,883	19,312	29,083	43,567	66,057	83,533	108,61
Consumption of fast food (p=0.505)															

Several times per week	5	35,1	18,93	65,23	42,0371	26,53518	12,16	12,156	30,498	36,144	47,854	83,533	83,533	83,53
Once per week or less	119	29,5	26,65	32,67	34,5279	20,30211	5,64	14,991	19,312	28,91	43,567	64,381	81,39	108,61
Consumption of milk (p=0.546)														
Several times per week	74	30,6	27,08	34,6	35,1219	18,90784	6,62	15,044	20,534	31,067	46,001	54,025	74,788	94,71
Once per week or less	51	28,7	24,25	34,06	34,6825	22,72186	5,64	14,686	17,422	28,245	46,201	66,057	84,623	108,61
Consumption of cheese (p=0.151)														
Several times per week	106	30,8	27,7	34,18	35,7312	20,44518	6,62	15,443	19,836	30,467	46,616	64,381	83,533	108,61
Once per week or less	19	25,1	18,69	33,66	30,5431	20,53952	5,64	11,743	14,531	24,054	34,249	74,641	81,39	81,39
Consumption of chocolate (p=0.090)														
Several times per week	60	32,6	28,4	37,51	37,6824	20,82765	6,62	17,273	22,51	33,323	48,111	74,715	84,078	94,71
Once per week or less	65	27,5	23,84	31,61	32,4136	19,94452	5,64	14,686	16,547	25,736	43,415	54,025	73,107	108,61
Consumption of ice cream (p=0.581)														
More than once a month	12	32,2	24,24	42,65	35,9245	17,93957	14,48	14,883	24,795	33,859	41,603	54,025	79,588	79,59
Once a month or less	111	29,2	26,25	32,51	34,3518	20,58832	5,64	15,044	19,312	28,245	46,001	59,599	83,533	108,61
Consumption of canteen food (p=0.702)														
Several times per week	51	30,5	25,78	36,16	36,6323	22,90506	6,62	15,044	19,836	30,436	48,432	79,588	86,518	94,71
Once per week or less	73	29,3	25,89	33,23	33,8066	18,79555	5,64	14,991	19,312	28,245	43,415	55,05	74,641	108,61
Consumption of chewing gum (p=0.879)														
Several times per week	52	29,6	24,95	35,01	35,2925	21,34955	5,64	15,044	19,494	30,337	48,823	66,057	79,588	108,61
Once per week or less	73	30	26,56	33,95	34,6934	19,95171	11,12	14,883	19,322	28,245	43,415	59,599	84,623	94,71
Time spend in new car (p=0.973)														
More than 45 minutes per day	10	32,2	25,08	41,44	34,432	11,85636	15,69	16,118	30,498	34,632	46,616	48,74	48,822	48,82
45 minutes per day or less	11	32	23,11	44,33	36,9001	21,33901	14,88	20,241	21,191	25,736	50,573	73,107	74,641	74,64
Wearing plastic gloves (p=0.476)														
Daily	5	40,5	33,26	49,22	41,2974	9,48737	32,64	32,636	34,249	36,919	48,658	54,025	54,025	54,02
Less than daily	15	29	21,03	39,97	35,2868	24,58899	11,87	12,156	19,312	25,736	38,692	74,788	94,71	94,71
Never	105	29,5	26,46	32,93	34,5908	20,30455	5,64	15,044	19,153	28,91	46,001	59,599	81,39	108,61
Use of personal care products														

Age group: children, 6-11 years

Biomarker: urinary phthalate metabolite MEHP

Unit: µg/L

LOQ: 2.00 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	78,00%	4	3,35	4,65	5,9788	5,73758	1	1	2,26	4,16	7,84	14,07	19	28,53
Urinary creatinine (p=0.000)															
300-1000 mg/L	37	48,60%	2,1	1,58	2,78	3,2884	4,36868	1	1	1	1	4,16	7,84	8,62	25,45
1000-2000 mg/L	79	89,90%	5	4,19	6,01	6,7461	5,0918	1	1	3,03	5,15	8,89	15,31	19	20,16
2000-3000 mg/L	11	90,90%	6	3,33	10,96	9,5182	9,932	1	2,37	3,59	4,81	14,52	28,18	28,5	28,53
Period of urine sampling (p=0.544)															
< 8 hours	9	100,00%	4,6	2,83	7,59	6,1533	5,63363	2	2	2,51	4,22	8,15	19,6	19,6	19,6
≥ 8 hours	94	74,50%	3,8	3,12	4,6	5,8183	5,64142	1	1	1	4,11	7,77	13	17,6	28,53
Gender (p=0.182)															
boys	66	80,30%	4,4	3,48	5,56	6,6942	6,21272	1	1	2,38	4,55	8,72	15,31	19,5	28,53
girls	61	75,40%	3,5	2,81	4,41	5,2048	5,11324	1	1	2,26	4,07	6,26	10,9	17,6	25,45
Age (p=0.381)															
5-8 years	66	74,20%	3,7	2,91	4,66	5,6867	5,34879	1	1	1	3,98	7,99	14,07	16,8	25,45
9-11 years	61	82,00%	4,3	3,4	5,35	6,2949	6,15976	1	1	2,68	4,29	6,79	12,99	19,6	28,53
Consumption of meat (p=0.444)															
Several times per week	114	78,90%	4	3,4	4,79	6,0465	5,73041	1	1	2,27	4,21	7,85	13	19	28,53
Once per week or less	13	69,20%	3,3	1,86	5,73	5,3854	6,00104	1	1	1	3,03	6,05	16,77	19,5	19,5
Consumption of hazelnut spread (p=0.883)															
Several times per week	15	73,30%	3,8	2,39	6,07	5,244	3,63879	1	1	1	5,15	7,02	10,9	11,8	11,84
Once per week or less	108	77,80%	4	3,3	4,73	6,0786	5,9895	1	1	2,26	4,12	7,845	14,52	19,5	28,53
Consumption of fast food (p=0.272)															
Several times per week	7	71,40%	2,7	1,56	4,59	3,2614	1,99338	1	1	1	3,59	4,06	6,77	6,77	6,77
Once per week or less	118	78,00%	4	3,37	4,74	6,0513	5,75594	1	1	2,26	4,26	7,85	14,07	19	28,53

Consumption of milk (p=0.771)															
Several times per week	99	77,80%	4	3,32	4,83	6,1328	5,98706	1	1	2,25	4,49	7,84	14,52	19,6	28,53
Once per week or less	28	78,60%	3,8	2,71	5,26	5,4343	4,80916	1	1	2,42	3,68	7,395	12,99	17,6	17,95
Consumption of cheese (p=0.847)															
Several times per week	104	78,80%	3,9	3,28	4,69	5,9384	5,86044	1	1	2,27	4,07	7,805	13	19,5	28,53
Once per week or less	23	73,90%	4,1	2,72	6,14	6,1617	5,2633	1	1	1	4,29	9,83	15,31	16,8	17,56
Consumption of chocolate (p=0.220)															
Several times per week	91	83,50%	4,2	3,52	5,04	6,028	5,52167	1	1	2,41	4,42	7,84	11,95	19	28,53
Once per week or less	36	63,90%	3,4	2,35	4,79	5,8544	6,33162	1	1	1	3,26	7,775	16,77	20,2	25,45
Consumption of ice cream (p=0.527)															
Once a week or often	9	77,80%	3,2	1,78	5,9	4,8733	5,57212	1	1	2,25	3,34	5,49	19,02	19	19,02
Less than once a week	116	77,60%	4	3,35	4,72	6,0113	5,74184	1	1	2,27	4,21	7,845	13	19,5	28,53
Consumption of canteen food (p=0.554)															
Several times per week	101	77,20%	4,1	3,36	4,92	6,2748	5,9957	1	1	2,25	4,61	8,15	14,07	19	28,53
Once per week or less	25	80,00%	3,6	2,61	4,94	4,9276	4,58063	1	1	2,84	4,06	5,15	8,38	18	19,5
Consumption of chewing gum (p=0.304)															
Several times per week	37	75,70%	3,5	2,58	4,63	5,0981	4,98095	1	1	2	3,62	6,38	11,39	15,3	25,45
Once per week or less	90	78,90%	4,2	3,43	5,08	6,3409	6,00959	1	1	2,38	4,46	8,15	15,65	19,5	28,53
Time spend in new car (p=0.071)															
30 minutes per day and more	8	87,50%	6,6	3,43	12,84	8,9813	6,20417	1	1	4,09	8,3	13,24	19,6	19,6	19,6
less than 30 minutes per day	14	64,30%	3	1,79	4,88	4,4121	3,97083	1	1	1	2,98	7,02	8,89	14,1	14,07
Playing with plastic toys (p=0.172)															
Daily	15	100,00%	5,3	4,05	6,99	6,094	3,38497	2,37	2,41	4,06	4,81	7,02	11,95	13	13
Less than daily	25	92,00%	5,1	3,58	7,23	7,3628	6,5313	1	2,08	2,67	5,06	9,83	17,95	19,5	25,45
Never	79	72,20%	3,7	2,96	4,58	5,8322	5,97483	1	1	1	4,06	7,84	14,52	19,6	28,53
Use of personal care products (p=0.862)															
High	7	71,40%	3,4	1,51	7,73	5,7114	6,42507	1	1	1	2,51	7,4	19,02	19	19,02
Moderate	52	78,80%	3,9	3,03	4,91	5,5519	5,19906	1	1	2,33	4,14	6,74	10,9	18	28,18
Low	65	78,50%	4,1	3,24	5,18	6,3223	6,12752	1	1	2,37	4,22	8,15	15,31	19,5	28,53
Area of residence (p=0.683)															
Urban	61	75,40%	3,8	2,98	4,87	6,0023	6,20195	1	1	2	4,16	7,02	14,52	17,6	28,53

Rural		66	80,30%	4,1	3,28	5,09	5,9571	5,32048	1	1	2,37	4,22	7,99	13	19	25,45
Educational level (highest of family) (p=0.629)																
Secondary education or post-secondary non-tertiary education (ISCED 3-4)		55	74,50%	3,8	2,94	4,84	5,6707	5,50232	1	1	1	4,16	7,02	10,87	19,5	28,53
Tertiary education (ISCED 5-6)		72	80,60%	4,1	3,29	5,09	6,2142	5,93844	1	1	2,32	4,01	7,845	14,07	19	28,18
Redecoration or renovation of house in last two years (p=0.202)																
Yes		59	76,30%	3,5	2,79	4,36	4,9937	4,50782	1	1	2,08	4,06	6,53	9,83	18	20,16
No		66	78,80%	4,3	3,42	5,47	6,6189	6,19298	1	1	2,41	4,64	8,83	15,31	19	28,53
PVC in the house (p=0.980)																
PVC in floors or walls		24	79,20%	3,9	2,72	5,72	5,9721	6,34325	1	1	2,54	3,98	6,725	14,52	17,6	28,53
No PVC		89	78,70%	4	3,27	4,8	5,8373	5,29847	1	1	2,27	4,22	7,77	13	18	28,18
Main source of water for drinking (p=0.721)																
Public water supply		121	77,70%	3,9	3,31	4,63	5,9413	5,72702	1	1	2,26	4,07	7,84	13	18	28,53
Commercial producers		4	75,00%	3,3	1,51	7,21	3,94	1,97833	1	1	2,83	4,74	5,05	5,29	5,29	5,29

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 43: Statistical analysis of urinary phthalate metabolite MEHP ($\mu\text{g/g}$ creatinine) in child

Age group: children, 6-11 years
Biomarker: urinary phthalate metabolite MEHP
Unit: $\mu\text{g/g}$ creatinine
LOQ: 2.00 $\mu\text{g/L}$

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	78,00%	3,3	2,82	3,77	4,5326	3,92574	0,46	1,136	1,742	3,154	6,547	9,6645	11,541	27,02
Period of urine sampling (p=0.796)															

< 8 hours	9	100,00%	3,4	2,13	5,38	4,3658	3,76993	1,71	1,715	2,027	2,423	5,899	13,137	13,137	13,14
≥ 8 hours	94	74,50%	3,1	2,65	3,72	4,324	3,37224	0,46	1,106	1,581	3,093	6,594	9,5039	10,911	16,03
Gender (p=0.086)															
boys	66	80,30%	3,7	3	4,53	5,0732	3,81885	0,59	1,226	1,799	3,894	7,985	10,892	11,771	16,03
girls	61	75,40%	2,9	2,34	3,49	3,9478	3,98698	0,46	1,136	1,704	2,642	5,225	7,1012	10,11	27,02
Age (p=0.936)															
5-8 years	66	74,20%	3,3	2,65	4,06	4,7391	4,38904	0,46	1,146	1,704	3,093	7,027	9,6645	10,911	27,02
9-11 years	61	82,00%	3,2	2,66	3,94	4,3093	3,37601	0,59	1,136	1,923	3,247	5,25	9,0956	11,771	16,03
Consumption of meat (p=0.962)															
Several times per week	114	78,90%	3,3	2,8	3,79	4,495	3,89251	0,46	1,146	1,783	3,148	6,285	9,1885	11,541	27,02
Once per week or less	13	69,20%	3,3	1,98	5,48	4,8628	4,36012	1,06	1,106	1,359	3,536	7,027	10,911	14,317	14,32
Consumption of hazelnut spread (p=0.989)															
Several times per week	15	73,30%	3,3	2,19	4,92	4,228	2,79789	0,71	1,018	1,577	3,981	6,285	7,2715	10,892	10,89
Once per week or less	108	77,80%	3,3	2,79	3,84	4,6036	4,09792	0,46	1,136	1,762	3,063	6,578	10,11	11,771	27,02
Consumption of fast food (p=0.157)															
Several times per week	7	71,40%	2,1	1,42	3,1	2,4394	1,83232	1,36	1,359	1,477	1,776	2,099	6,5474	6,5474	6,55
Once per week or less	118	78,00%	3,3	2,85	3,85	4,5965	3,93787	0,46	1,106	1,783	3,269	6,562	9,6645	11,541	27,02
Consumption of milk (p=0.630)															
Several times per week	99	77,80%	3,3	2,8	3,94	4,6883	4,04968	0,46	1,018	1,783	3,508	6,744	10,11	11,771	27,02
Once per week or less	28	78,60%	3,1	2,35	3,96	3,982	3,46282	1,06	1,477	1,709	2,741	5,046	9,1885	11,307	16,03
Consumption of cheese (p=0.648)															
Several times per week	104	78,80%	3,2	2,73	3,77	4,5051	4,05902	0,46	1,106	1,759	3,148	6,023	9,6645	11,771	27,02
Once per week or less	23	73,90%	3,5	2,51	4,89	4,657	3,33315	0,59	1,359	1,704	3,291	6,594	9,1885	10,911	11,31
Consumption of chocolate (p=0.326)															
Several times per week	91	83,50%	3,4	2,93	3,98	4,4421	3,24936	0,71	1,319	1,799	3,508	6,079	9,1885	11,541	14,32
Once per week or less	36	63,90%	2,9	2,08	4,06	4,7614	5,31564	0,46	0,645	1,604	2,631	6,771	10,11	16,027	27,02
Consumption of ice cream (p=0.265)															
Once a week or often	9	77,80%	2,4	1,38	4,18	3,4007	3,46086	0,71	0,712	1,479	2,322	3,981	11,858	11,858	11,86
Less than once a week	116	77,60%	3,3	2,85	3,86	4,5991	3,97388	0,46	1,146	1,779	3,219	6,555	9,6645	11,541	27,02

No	66	78,80%	3,4	2,77	4,13	4,6024	3,49931	0,59	1,136	1,883	3,093	7,027	10,892	11,541	14,32
PVC in the house (p=0.591)															
PVC in floors or walls	24	79,20%	3,5	2,6	4,69	4,4731	3,16021	0,84	1,477	1,901	3,195	6,541	9,6645	11,307	11,54
No PVC	89	78,70%	3,2	2,66	3,76	4,3302	3,39967	0,46	1,056	1,776	3,154	5,967	9,5039	10,911	16,03
Main source of water for drinking (p=0.203)															
Public water supply	121	77,70%	3,3	2,83	3,8	4,5379	3,89344	0,46	1,146	1,742	3,154	6,547	9,5039	11,307	27,02
Commercial producers	4	75,00%	1,9	1,06	3,45	2,1585	1,09811	0,84	0,836	1,414	2,145	2,904	3,508	3,508	3,51

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 44: Statistical analysis of urinary phthalate metabolite 5OH-MEHP (µg/L) in child

Age group: children, 6-11 years
Biomarker: urinary phthalate metabolite 5OH-MEHP
Unit: µg/L
LOQ: 0.61 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	100,00%	49,3	43,39	56	64,2259	52,65243	8,49	18,39	30,41	49,97	84,56	118,4	142,6	343,17
Urinary creatinine (p=0.000)															
300-1000 mg/L	37	100,00%	30,1	23,5	38,65	42,473	47,09004	8,49	12,88	18,39	26,26	52,72	75,32	141,4	261,24
1000-2000 mg/L	79	100,00%	58,4	51,5	66,29	68,271	39,89571	13,85	29,45	40,47	58,87	87,71	118,4	142,6	233,68
2000-3000 mg/L	11	100,00%	76,1	45,8	126,5	108,344	102,5267	26,11	35,88	36,92	77,23	135,5	253,6	343,2	343,17
Period of urine sampling (p=0.815)															
< 8 hours	9	100,00%	44,6	30,42	65,33	51,5211	28,98729	16,31	16,31	29,9	49,69	56,04	108	108	108,01
≥ 8 hours	94	100,00%	47,4	40,67	55,21	62,5216	52,56725	8,49	16,3	29,34	50,03	77,23	118,4	142,6	343,17

Main source of water for drinking (p=0.702)																				
Public water supply	121	100,00%	48,6	42,53	55,44	63,8896	53,69647	8,49	18,39	29,92	49,69	83,83	118,4	142,6	343,17					
Commercial producers	4	100,00%	56,1	39,23	80,09	58,8125	20,28198	36,92	36,92	41,58	60,55	76,05	77,23	77,23	77,23					

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 45: Statistical analysis of urinary phthalate metabolite 5OH-MEHP (µg/g creatinine) in child

Age group: children, 6-11 years
 Biomarker: urinary phthalate metabolite 5OH-MEHP
 Unit: µg/g creatinine
 LOQ: 0.61 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	100,00%	40,7	36,55	45,31	49,4131	35,37239	8,34	17,426	25,946	40,733	64,2747	82,4878	110,372	277,32
Period of urine sampling (p=0.379)															
< 8 hours	9	100,00%	32,6	21,58	49,19	38,2488	21,11853	12,34	12,339	21,088	37,56	54,4066	70,6409	70,6409	70,64
≥ 8 hours	94	100,00%	39,3	34,77	44,4	46,9394	29,26461	8,34	17,426	25,192	39,738	63,558	81,8223	110,372	152,04
Gender (p=0.253)															
boys	66	100,00%	43,2	37,33	50,06	51,7487	32,66994	12,34	17,5	28,861	41,515	67,1807	102,569	129,945	152,04
girls	61	100,00%	38,1	32,57	44,61	46,8861	38,19386	8,34	17,113	24,513	38,846	58,2403	79,5928	96,4233	277,32
Age (p=0.011)															
5-8 years	66	100,00%	46,5	40,09	53,91	56,303	40,40481	14,74	19,71	28,861	45,752	71,286	96,4233	114,633	277,32
9-11 years	61	100,00%	35,2	30,35	40,89	41,9584	27,39018	8,34	15,848	23,447	38,12	50,8247	66,0092	102,569	143,35
Consumption of meat (p=0.067)															
Several times per week	114	100,00%	39,3	35,2	43,96	47,4486	34,23778	8,34	17,409	25,914	39,738	63,3636	79,5928	102,569	277,32

Once per week or less	13	100,00%	54,8	38,03	78,95	66,6404	41,72568	17,5	24,271	38,12	58,089	101,681	114,633	152,036	152,04
Consumption of hazelnut spread (p=0.960)															
Several times per week	15	100,00%	40,8	30,05	55,29	48,5136	32,14022	15,85	18,214	25,601	38,775	65,9982	72,2585	141,673	141,67
Once per week or less	108	100,00%	41,1	36,51	46,3	50,2041	36,38094	8,34	17,409	26,243	41,345	65,1419	82,6468	110,372	277,32
Consumption of fast food (p=0.152)															
Several times per week	7	100,00%	29,4	19,61	44,02	33,4971	18,96023	17,41	17,409	17,5	30,207	54,879	64,0716	64,0716	64,07
Once per week or less	118	100,00%	41,6	37,18	46,55	50,6091	36,17306	8,34	17,426	26,028	41,345	66,0092	82,6468	114,633	277,32
Consumption of milk (p=0.825)															
Several times per week	99	100,00%	41	36,09	46,48	50,6233	38,31865	8,34	17,426	25,946	40,733	65,9982	101,681	129,945	277,32
Once per week or less	28	100,00%	39,8	32,66	48,43	45,1344	22,02622	12,34	17,409	26,331	40,683	61,9452	75,0183	81,8223	96,42
Consumption of cheese (p=0.728)															
Several times per week	104	100,00%	41,1	36,58	46,09	49,3839	35,06585	8,34	18,068	25,987	40,57	66,0037	80,3842	106,533	277,32
Once per week or less	23	100,00%	39,1	29,34	52,01	49,5452	37,53864	12,34	16,423	20,563	40,733	57,4134	96,4233	141,673	152,04
Consumption of chocolate (p=0.505)															
Several times per week	91	100,00%	39,8	35,21	44,91	47,0561	28,29197	8,34	17,858	26,028	39,449	65,9982	79,5928	106,533	143,35
Once per week or less	36	100,00%	43,1	34,5	53,93	55,3712	48,93999	14,61	17,113	25,758	45,268	63,8191	101,681	152,036	277,32
Consumption of ice cream (p=0.722)															
Once a week or often	9	100,00%	38	28,15	51,19	41,1925	15,79791	15,85	15,848	38,775	41,147	53,3666	66,0092	66,0092	66,01
Less than once a week	116	100,00%	41	36,53	46,02	50,2798	36,66127	8,34	17,426	25,93	40,718	66,0935	82,6468	114,633	277,32
Consumption of canteen food (p=0.933)															
Several times per week	101	100,00%	40,8	36,35	45,75	49,0818	36,03236	14,54	18,214	26,028	39,482	64,0716	80,3842	106,533	277,32
Once per week or less	25	100,00%	40,3	30,09	53,99	51,0784	33,95571	8,34	13,714	24,513	44,868	70,5947	101,681	114,633	141,67
Consumption of chewing gum (p=0.264)															
Several times per week	37	100,00%	37	30,54	44,77	45,9222	44,27525	14,54	18,214	25,192	38,12	51,4499	69,5281	110,372	277,32

Once per week or less	90	100,00%	42,3	37,19	48,17	50,8483	31,16555	8,34	17,261	26,748	44,642	67,7228	89,535	114,633	152,04
Time spend in new car (p=0.875)															
30 minutes per day and more	8	100,00%	45,6	37,07	56,18	47,4602	14,13281	31,94	31,943	34,755	43,618	63,4608	64,0716	64,0716	64,07
less than 30 minutes per day	14	100,00%	43,8	30,58	62,75	54,72	39,50703	18,21	18,504	23,447	42,278	68,9756	129,945	141,673	141,67
Playing with plastic toys (p=0.069)															
Daily	15	100,00%	45,8	35,87	58,56	50,5071	20,90228	18,07	18,214	33,644	49,642	69,5281	79,5928	82,4878	82,49
Less than daily	25	100,00%	51,7	41,15	64,91	62,6278	51,51085	22,13	26,028	33,884	50,207	67,1807	106,533	114,633	277,32
Never	79	100,00%	37,7	32,73	43,49	46,3398	31,8599	8,34	16,423	22,363	38,775	61,0961	82,6468	129,945	152,04
Use of personal care products (p=0.308)															
High	7	100,00%	32,7	24,11	44,42	34,9976	12,98588	15,63	15,625	26,834	33,644	48,5326	53,3666	53,3666	53,37
Moderate	52	100,00%	38	32,1	45,04	45,7958	29,50535	8,34	16,423	25,815	38,718	58,1644	74,9098	114,633	143,35
Low	65	100,00%	43,7	37,54	50,86	53,449	40,41223	12,34	18,214	25,946	44,435	67,7228	82,4878	106,533	277,32
Area of residence (p=0.891)															
Urban	61	100,00%	41	35,11	47,92	49,3575	31,18836	13,71	17,5	25,192	41,147	64,2747	81,8223	110,372	152,04
Rural	66	100,00%	40,4	34,78	46,92	49,4645	39,0835	8,34	17,409	26,748	39,42	64,0716	82,4878	106,533	277,32
Educational level (highest of family) (p=0.918)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	55	100,00%	41	34,34	48,86	50,4372	33,30829	8,34	15,848	25,946	41,883	68,9756	102,569	129,945	152,04
Tertiary education (ISCED 5-6)	72	100,00%	40,5	35,4	46,32	48,6308	37,08391	14,54	17,858	26,186	39,738	63,4608	79,5928	101,681	277,32
Redecoration or renovation of house in last two years (p=0.969)															
Yes	59	100,00%	40	35,02	45,64	45,6696	24,93991	12,34	20,563	26,748	39,449	61,0961	79,5928	101,681	129,94

No	66	100,00%	39,8	33,94	46,69	48,9602	32,40846	8,34	16,423	22,363	40,363	66,0092	82,4878	110,372	152,04
PVC in the house (p=0.279)															
PVC in floors or walls	24	100,00%	44,7	34,46	57,92	54,4904	35,56398	13,71	19,71	28,061	42,753	78,3661	110,372	114,633	141,67
No PVC	89	100,00%	38,5	34,04	43,43	45,3743	27,3805	8,34	17,409	25,946	39,449	61,0961	78,956	82,6468	152,04
Main source of water for drinking (p=0.480)															
Public water supply	121	100,00%	40,7	36,37	45,43	49,5884	36,00055	8,34	17,426	25,946	40,733	64,0716	82,4878	110,372	277,32
Commercial producers	4	100,00%	32,5	21,41	49,37	34,6211	13,14273	18,21	18,214	25,09	35,314	44,1521	49,6419	49,6419	49,64

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 46: Statistical analysis of urinary phthalate metabolite 5oxo-MEHP (µg/L) in child

Age group: children, 6-11 years
 Biomarker: urinary phthalate metabolite 5oxo-MEHP
 Unit: µg/L
 LOQ: 0,24 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	100,00%	33,3	29,23	37,86	43,8678	37,73586	5,67	11,92	20,3	35,04	55,52	86	94,66	267,99
Urinary creatinine (p=0.000)															
300-1000 mg/L	37	100,00%	21,2	16,46	27,27	29,8986	31,74592	5,67	8,76	11,92	17,42	36,94	61,36	90,18	171,31
1000-2000 mg/L	79	100,00%	38,7	33,92	44,19	45,9035	27,82243	8,14	17,15	25,74	38,93	60,26	86	94,66	165,85
2000-3000 mg/L	11	100,00%	51	29,86	86,92	76,2345	79,80756	16,8	21,61	21,73	46,73	88,64	184,5	268	267,99
Period of urine sampling (p=0.799)															
< 8 hours	9	100,00%	30	19,23	46,8	36,0833	22,13169	8,14	8,14	23,49	29,24	39,38	77,29	77,29	77,29
≥ 8 hours	94	100,00%	32,1	27,51	37,44	42,9837	38,89011	5,67	11,4	17,42	34,22	52,48	87,66	94,66	267,99
Gender (p=0.448)															

boys	66	100,00%	34,9	29,05	41,96	47,1018	43,87261	8,14	12,06	20,3	35,77	55,94	90,18	125,8	267,99
girls	61	100,00%	31,6	26,31	37,87	40,3687	29,68552	5,67	11,92	21,24	30,24	52,5	83,66	87,73	171,31
Age (p=0.219)															
5-8 years	66	100,00%	36	30,13	42,93	45,8042	32,52032	5,67	12,83	22,56	39,69	60,26	87,66	91,17	171,31
9-11 years	61	100,00%	30,6	25,31	36,9	41,7726	42,84973	8,14	11,9	17,87	28	46,73	85,8	94,66	267,99
Consumption of meat (p=0.439)															
Several times per week	114	100,00%	32,7	28,5	37,5	43,3092	37,71931	5,67	11,92	20,04	30,66	53,73	86	94,66	267,99
Once per week or less	13	100,00%	38,7	26,28	57,04	48,7662	39,05719	8,61	15,77	33,39	38,93	59,08	69,25	165,9	165,85
Consumption of hazelnut spread (p=0.639)															
Several times per week	15	100,00%	30,6	23,04	40,69	35,2853	19,49863	11,4	14,06	17,87	33,39	47,92	53,73	85,8	85,8
Once per week or less	108	100,00%	33,8	29,16	39,11	45,5272	40,06568	5,67	11,9	20,17	35,2	60,03	87,73	99,27	267,99
Consumption of fast food (p=0.374)															
Several times per week	7	100,00%	26,1	15,48	43,91	31,9371	21,96866	8,61	8,61	15,66	27,79	47,92	73,14	73,14	73,14
Once per week or less	118	100,00%	33,8	29,53	38,73	44,8024	38,66848	5,67	11,92	20,3	35,2	55,94	87,66	99,27	267,99
Consumption of milk (p=0.989)															
Several times per week	99	100,00%	33,3	28,61	38,64	44,6309	40,42259	5,67	11,4	20,3	35,04	53,73	86	125,8	267,99
Once per week or less	28	100,00%	33,3	25,85	42,95	41,1696	26,54923	7,38	11,92	19,89	34,25	59,98	87,66	94,66	99,27
Consumption of cheese (p=0.714)															
Several times per week	104	100,00%	33,6	29,36	38,56	43,5887	37,74442	5,67	14,06	21,67	33,16	54,63	83,66	91,17	267,99
Once per week or less	23	100,00%	31,6	21,86	45,64	45,13	38,51832	7,38	9,75	12,06	36,49	71,97	87,66	99,27	165,85
Consumption of chocolate (p=0.778)															
Several times per week	91	100,00%	32,9	28,39	38,06	42,7063	37,32437	8,14	12,83	20,04	33,39	52,37	77,29	91,17	267,99
Once per week or less	36	100,00%	34,3	26,16	44,87	46,8039	39,1373	5,67	11,9	21,72	35,32	60,03	88,64	165,9	171,31
Consumption of ice cream (p=0.869)															
Once a week or often	9	100,00%	34,6	24,34	49,3	38,9056	18,14477	14,06	14,06	27,98	38,93	52,2	67,06	67,06	67,06
Less than once a week	116	100,00%	33,2	28,87	38,13	44,4214	39,12913	5,67	11,9	20,17	33,16	55,73	87,66	99,27	267,99
Consumption of canteen food (p=0.358)															
Several times per week	101	100,00%	34,1	29,4	39,64	45,7918	40,6774	5,67	12,4	21,24	35,11	55,52	87,73	99,27	267,99
Once per week or less	25	100,00%	29,3	22,68	37,79	35,4864	21,98178	9,75	10,47	17,36	29,1	43,04	73,14	74,03	85,8

Main source of water for drinking (p=0.751)																				
Public water supply	121	100,00%	32,8	28,7	37,53	43,6636	38,41472	5,67	11,92	20,04	33,39	53,73	86	94,66	267,99					
Commercial producers	4	100,00%	37	21,57	63,57	41,5425	23,05788	21,73	21,73	23,74	36,24	59,35	71,97	71,97	71,97					

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 47: Statistical analysis of urinary phthalate metabolite 5oxo-MEHP ($\mu\text{g/g}$ creatinine) in child

Age group: children, 6-11 years
Biomarker: urinary phthalate metabolite 5OH-MEHP
Unit: $\mu\text{g/g}$ creatinine
LOQ: 0.61 $\mu\text{g/L}$

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	100,00%	40,7	36,55	45,31	49,4131	35,37239	8,34	17,426	25,946	40,733	64,2747	82,4878	110,372	277,32
Period of urine sampling (p=0.379)															
< 8 hours	9	100,00%	32,6	21,58	49,19	38,2488	21,11853	12,34	12,339	21,088	37,56	54,4066	70,6409	70,6409	70,64
\geq 8 hours	94	100,00%	39,3	34,77	44,4	46,9394	29,26461	8,34	17,426	25,192	39,738	63,558	81,8223	110,372	152,04
Gender (p=0.253)															
boys	66	100,00%	43,2	37,33	50,06	51,7487	32,66994	12,34	17,5	28,861	41,515	67,1807	102,569	129,945	152,04
girls	61	100,00%	38,1	32,57	44,61	46,8861	38,19386	8,34	17,113	24,513	38,846	58,2403	79,5928	96,4233	277,32
Age (p=0.011)															
5-8 years	66	100,00%	46,5	40,09	53,91	56,303	40,40481	14,74	19,71	28,861	45,752	71,286	96,4233	114,633	277,32
9-11 years	61	100,00%	35,2	30,35	40,89	41,9584	27,39018	8,34	15,848	23,447	38,12	50,8247	66,0092	102,569	143,35
Consumption of meat (p=0.067)															
Several times per week	114	100,00%	39,3	35,2	43,96	47,4486	34,23778	8,34	17,409	25,914	39,738	63,3636	79,5928	102,569	277,32

Once per week or less	13	100,00%	54,8	38,03	78,95	66,6404	41,72568	17,5	24,271	38,12	58,089	101,681	114,633	152,036	152,04
Consumption of hazelnut spread (p=0.960)															
Several times per week	15	100,00%	40,8	30,05	55,29	48,5136	32,14022	15,85	18,214	25,601	38,775	65,9982	72,2585	141,673	141,67
Once per week or less	108	100,00%	41,1	36,51	46,3	50,2041	36,38094	8,34	17,409	26,243	41,345	65,1419	82,6468	110,372	277,32
Consumption of fast food (p=0.152)															
Several times per week	7	100,00%	29,4	19,61	44,02	33,4971	18,96023	17,41	17,409	17,5	30,207	54,879	64,0716	64,0716	64,07
Once per week or less	118	100,00%	41,6	37,18	46,55	50,6091	36,17306	8,34	17,426	26,028	41,345	66,0092	82,6468	114,633	277,32
Consumption of milk (p=0.825)															
Several times per week	99	100,00%	41	36,09	46,48	50,6233	38,31865	8,34	17,426	25,946	40,733	65,9982	101,681	129,945	277,32
Once per week or less	28	100,00%	39,8	32,66	48,43	45,1344	22,02622	12,34	17,409	26,331	40,683	61,9452	75,0183	81,8223	96,42
Consumption of cheese (p=0.728)															
Several times per week	104	100,00%	41,1	36,58	46,09	49,3839	35,06585	8,34	18,068	25,987	40,57	66,0037	80,3842	106,533	277,32
Once per week or less	23	100,00%	39,1	29,34	52,01	49,5452	37,53864	12,34	16,423	20,563	40,733	57,4134	96,4233	141,673	152,04
Consumption of chocolate (p=0.505)															
Several times per week	91	100,00%	39,8	35,21	44,91	47,0561	28,29197	8,34	17,858	26,028	39,449	65,9982	79,5928	106,533	143,35
Once per week or less	36	100,00%	43,1	34,5	53,93	55,3712	48,93999	14,61	17,113	25,758	45,268	63,8191	101,681	152,036	277,32
Consumption of ice cream (p=0.722)															
Once a week or often	9	100,00%	38	28,15	51,19	41,1925	15,79791	15,85	15,848	38,775	41,147	53,3666	66,0092	66,0092	66,01
Less than once a week	116	100,00%	41	36,53	46,02	50,2798	36,66127	8,34	17,426	25,93	40,718	66,0935	82,6468	114,633	277,32
Consumption of canteen food (p=0.933)															
Several times per week	101	100,00%	40,8	36,35	45,75	49,0818	36,03236	14,54	18,214	26,028	39,482	64,0716	80,3842	106,533	277,32
Once per week or less	25	100,00%	40,3	30,09	53,99	51,0784	33,95571	8,34	13,714	24,513	44,868	70,5947	101,681	114,633	141,67
Consumption of chewing gum (p=0.264)															
Several times per week	37	100,00%	37	30,54	44,77	45,9222	44,27525	14,54	18,214	25,192	38,12	51,4499	69,5281	110,372	277,32

Once per week or less	90	100,00%	42,3	37,19	48,17	50,8483	31,16555	8,34	17,261	26,748	44,642	67,7228	89,535	114,633	152,04
Time spend in new car (p=0.875)															
30 minutes per day and more	8	100,00%	45,6	37,07	56,18	47,4602	14,13281	31,94	31,943	34,755	43,618	63,4608	64,0716	64,0716	64,07
less than 30 minutes per day	14	100,00%	43,8	30,58	62,75	54,72	39,50703	18,21	18,504	23,447	42,278	68,9756	129,945	141,673	141,67
Playing with plastic toys (p=0.069)															
Daily	15	100,00%	45,8	35,87	58,56	50,5071	20,90228	18,07	18,214	33,644	49,642	69,5281	79,5928	82,4878	82,49
Less than daily	25	100,00%	51,7	41,15	64,91	62,6278	51,51085	22,13	26,028	33,884	50,207	67,1807	106,533	114,633	277,32
Never	79	100,00%	37,7	32,73	43,49	46,3398	31,8599	8,34	16,423	22,363	38,775	61,0961	82,6468	129,945	152,04
Use of personal care products (p=0.308)															
High	7	100,00%	32,7	24,11	44,42	34,9976	12,98588	15,63	15,625	26,834	33,644	48,5326	53,3666	53,3666	53,37
Moderate	52	100,00%	38	32,1	45,04	45,7958	29,50535	8,34	16,423	25,815	38,718	58,1644	74,9098	114,633	143,35
Low	65	100,00%	43,7	37,54	50,86	53,449	40,41223	12,34	18,214	25,946	44,435	67,7228	82,4878	106,533	277,32
Area of residence (p=0.891)															
Urban	61	100,00%	41	35,11	47,92	49,3575	31,18836	13,71	17,5	25,192	41,147	64,2747	81,8223	110,372	152,04
Rural	66	100,00%	40,4	34,78	46,92	49,4645	39,0835	8,34	17,409	26,748	39,42	64,0716	82,4878	106,533	277,32
Educational level (highest of family) (p=0.918)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	55	100,00%	41	34,34	48,86	50,4372	33,30829	8,34	15,848	25,946	41,883	68,9756	102,569	129,945	152,04
Tertiary education (ISCED 5-6)	72	100,00%	40,5	35,4	46,32	48,6308	37,08391	14,54	17,858	26,186	39,738	63,4608	79,5928	101,681	277,32
Redecoration or renovation of house in last two years (p=0.969)															
Yes	59	100,00%	40	35,02	45,64	45,6696	24,93991	12,34	20,563	26,748	39,449	61,0961	79,5928	101,681	129,94

No	66	100,00%	39,8	33,94	46,69	48,9602	32,40846	8,34	16,423	22,363	40,363	66,0092	82,4878	110,372	152,04
PVC in the house (p=0.279)															
PVC in floors or walls	24	100,00%	44,7	34,46	57,92	54,4904	35,56398	13,71	19,71	28,061	42,753	78,3661	110,372	114,633	141,67
No PVC	89	100,00%	38,5	34,04	43,43	45,3743	27,3805	8,34	17,409	25,946	39,449	61,0961	78,956	82,6468	152,04
Main source of water for drinking (p=0.480)															
Public water supply	121	100,00%	40,7	36,37	45,43	49,5884	36,00055	8,34	17,426	25,946	40,733	64,0716	82,4878	110,372	277,32
Commercial producers	4	100,00%	32,5	21,41	49,37	34,6211	13,14273	18,21	18,214	25,09	35,314	44,1521	49,6419	49,6419	49,64

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 48: Statistical analysis of urinary phthalate metabolite MEP (µg/L) in child

Age group: children, 6-11 years
Biomarker: urinary phthalate metabolite MEP
Unit: µg/L
LOQ: 0,64 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	100,00%	39,6	33,39	47,06	65,3718	97,26134	2,28	11	20,74	41,62	77,73	123,7	183,7	949,87
Urinary creatinine (p=0.000)															
300-1000 mg/L	37	100,00%	23,5	16,77	33,02	40,4495	51,08557	2,28	6,58	10,94	22,2	48,94	72,35	181	257,52
1000-2000 mg/L	79	100,00%	45,6	37,78	55,09	70,2529	111,5389	7,34	13,8	25,49	46,2	81,05	118,9	197,9	949,87
2000-3000 mg/L	11	100,00%	83,5	48,97	142,3	114,146	87,49648	13,97	27,2	59,02	78,86	180,47	183,7	307,2	307,22
Period of urine sampling (p=0.444)															
< 8 hours	9	100,00%	50,8	31,49	81,81	61,4422	34,53508	11,02	11	38,75	60,62	89,7	118,9	118,9	118,93
≥ 8 hours	94	100,00%	38,8	31,52	47,69	68,5453	110,6878	5,4	10,9	16,48	39,76	73,71	173,3	212	949,87
Gender (p=0.142)															

boys	66	100,00%	35	27,54	44,53	54,6452	55,54438	2,28	10,7	20,07	37,04	62,26	118,9	180,5	277,65
girls	61	100,00%	45,3	35,55	57,78	76,9777	127,5136	7,07	13,3	25,49	43,04	78,74	172,5	197,9	949,87
Age (p=0.629)															
5-8 years	66	100,00%	38,1	30,36	47,7	56,5923	52,68033	5,41	10,7	20,74	42,33	72,35	121	173,3	257,52
9-11 years	61	100,00%	41,4	31,88	53,85	74,871	129,1608	2,28	12,6	21,14	41,25	78,86	123,7	197,9	949,87
Consumption of meat (p=0.412)															
Several times per week	114	100,00%	40,6	33,84	48,76	67,5881	101,5575	2,28	11	21,14	43,72	78,29	123,7	197,9	949,87
Once per week or less	13	100,00%	32	19,39	52,84	45,9369	41,82064	5,41	11,1	20,74	36,57	56,56	108	152,9	152,93
Consumption of hazelnut spread (p=0.294)															
Several times per week	15	100,00%	30,3	19,46	47,18	42,3373	34,06509	6,58	11,1	14,22	25,09	72,35	99,26	108	108,04
Once per week or less	108	100,00%	40,3	33,42	48,71	67,1996	102,3318	2,28	10,9	22	41,9	78,515	152,9	183,7	949,87
Consumption of fast food (p=0.436)															
Several times per week	7	100,00%	52,5	27,1	101,8	78,1257	90,35412	20,07	20,1	20,74	48,94	78,29	277,7	277,7	277,65
Once per week or less	118	100,00%	38,8	32,38	46,46	64,819	98,77219	2,28	10,9	20,57	40	77,73	123,7	183,7	949,87
Consumption of milk (p=0.756)															
Several times per week	99	100,00%	40,2	32,91	49,16	69,1447	107,7353	2,28	11	20,74	41,25	78,86	172,5	197,9	949,87
Once per week or less	28	100,00%	37,7	27,18	52,16	52,0318	42,19122	7,34	9,54	18,01	51,8	63,255	94,71	104,3	211,97
Consumption of cheese (p=0.885)															
Several times per week	104	100,00%	39,4	32,39	47,93	67,6288	105,2667	2,28	11	19,36	41,42	78,8	123,7	183,7	949,87
Once per week or less	23	100,00%	40,7	28,87	57,45	55,1665	46,54201	5,4	20,1	22,2	47,54	64,35	81,05	152,9	211,97
Consumption of chocolate (p=0.552)															
Several times per week	91	100,00%	38,4	31,59	46,57	58,5656	60,36291	2,28	11,1	20,74	38,27	66,54	112,1	197,9	307,22
Once per week or less	36	100,00%	43,1	30,1	61,65	82,5764	155,7588	5,4	8,25	21,35	46,51	79,67	152,9	183,7	949,87
Consumption of ice cream (p=0.257)															
Once a week or often	9	100,00%	56,8	39,99	80,55	64,1633	32,62602	27,15	27,2	41,62	59,18	94,4	110,9	110,9	110,85
Less than once a week	116	100,00%	38,4	31,89	46,18	65,6967	101,4231	2,28	10,9	20,29	38,51	75,72	152,9	197,9	949,87
Consumption of canteen food (p=0.038)															
Several times per week	101	100,00%	43,5	36,01	52,63	72,0682	107,1256	5,4	12,6	21,8	46,2	78,86	172,5	197,9	949,87
Once per week or less	25	100,00%	27,6	18,65	40,68	39,8472	30,32009	2,28	7,34	11,11	36,57	61,85	81,05	82,53	123,73

Main source of water for drinking (p=0.993)																		
Public water supply	121	100,00%	39,2	32,91	46,7	64,6089	98,36403	2,28	11	21,14	41,62	73,71	118,9	183,7	949,87			
Commercial producers	4	100,00%	39	11,36	134,1	68,7025	78,53511	13,83	13,8	13,9	40,26	123,51	180,5	180,5	180,47			

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 49: Statistical analysis of urinary phthalate metabolite MEP (µg/g creatinine) in child

Age group: children, 6-11 years
 Biomarker: urinary phthalate metabolite MEP
 Unit: µg/g creatinine
 LOQ: 0,64 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	100,00%	32,72	28,04	38,18	50,381	68,52693	2,89	9,8217	17,2254	30,576	61,7194	96,981	128,4902	532,07
Period of urine sampling (p=0.650)															
< 8 hours	9	100,00%	37,09	22,03	62,47	47,7613	33,72648	9,82	9,8217	29,2895	32,8217	62,5593	114,7973	114,7973	114,8
≥ 8 hours	94	100,00%	32,15	26,76	38,63	52,1069	77,44149	5,7	9,8058	16,5008	30,5509	59,7254	91,3155	140,6023	532,07
Gender (p=0.149)															
boys	66	100,00%	29,33	23,64	36,38	46,9073	72,20452	2,89	9,8217	16,451	28,2275	44,7646	91,3155	114,7973	532,07
girls	61	100,00%	36,84	29,6	45,84	54,1395	64,69845	5,7	12,5069	19,9141	38,9834	63,4456	103,9644	128,4902	476,36
Age (p=0.641)															
5-8 years	66	100,00%	33,9	27,52	41,76	51,7221	71,32715	6,31	11,3981	16,8061	31,818	61,9424	96,981	120,5944	532,07
9-11 years	61	100,00%	31,49	25,02	39,63	48,9301	65,92293	2,89	9,6157	19,4101	30,576	55,2232	90,2578	128,4902	476,36
Consumption of meat (p=0.955)															
Several times per week	114	100,00%	32,77	27,78	38,66	51,3139	71,59841	2,89	9,8217	17,5064	32,8812	61,7194	96,981	136,4907	532,07

Once per week or less	13	100,00%	32,29	21,06	49,52	42,201	30,88131	8,64	12,6751	16,5082	30,0835	59,7254	90,8079	99,499	99,5
Consumption of hazelnut spread (p=0.316)															
Several times per week	15	100,00%	26,12	17,12	39,85	35,7197	28,72582	6,89	9,4863	12,5069	21,1824	58,2247	82,8751	91,3155	91,32
Once per week or less	108	100,00%	33,36	28,21	39,44	51,6343	72,13982	2,89	9,8217	17,8918	32,8812	61,6437	99,499	128,4902	532,07
Consumption of fast food (p=0.479)															
Several times per week	7	100,00%	41,09	22,75	74,23	56,8755	58,92555	19,41	19,4101	21,5593	28,6366	72,2895	183,996	183,996	184
Once per week or less	118	100,00%	32,11	27,3	37,76	50,0455	69,80446	2,89	9,8058	16,5082	30,5509	61,568	96,981	128,4902	532,07
Consumption of milk (p=0.625)															
Several times per week	99	100,00%	33,4	27,96	39,9	53,0114	75,74689	2,89	9,8217	17,5064	32,8217	61,7194	99,499	140,6023	532,07
Once per week or less	28	100,00%	30,42	22,27	41,56	41,081	31,20892	5,7	6,5149	16,0231	29,7535	60,8339	82,8751	103,9644	136,49
Consumption of cheese (p=0.701)															
Several times per week	104	100,00%	32,26	26,97	38,58	51,9351	74,26239	2,89	9,8058	16,5045	30,5509	62,0034	91,3155	128,4902	532,07
Once per week or less	23	100,00%	34,91	26,59	45,82	43,3541	31,81395	9,22	15,5381	21,1824	33,9647	47,9586	99,499	103,9644	136,49
Consumption of chocolate (p=0.298)															
Several times per week	91	100,00%	31,07	25,97	37,18	47,2686	64,25913	2,89	10,3785	16,8061	29,6667	59,7254	90,2578	136,4907	532,07
Once per week or less	36	100,00%	37,29	27,62	50,35	58,2486	78,73055	7,8	9,215	18,7102	42,5121	76,4165	103,9644	120,5944	476,36
Consumption of ice cream (p=0.376)															
Once a week or often	9	100,00%	42,09	27,03	65,55	49,3922	23,43889	12,68	12,6751	41,6725	61,568	62,5593	78,3466	78,3466	78,35
Less than once a week	116	100,00%	31,98	27,12	37,71	50,5703	71,41621	2,89	9,8058	17,0158	30,0383	56,724	99,499	136,4907	532,07
Consumption of canteen food (p=0.171)															
Several times per week	101	100,00%	34,79	29,35	41,26	53,847	74,77966	6,51	11,3981	18,837	33,5524	62,0753	96,981	128,4902	532,07
Once per week or less	25	100,00%	26,52	18,47	38,08	37,8868	32,88305	2,89	6,3113	16,5082	29,4234	49,362	90,8079	103,9644	140,6
Consumption of chewing gum (p=0.477)															
Several times per week	37	100,00%	35,72	27,35	46,65	54,1196	84,29767	6,89	11,3981	24,6894	34,7146	61,568	82,8751	91,3155	532,07
Once per week or less	90	100,00%	31,56	26,14	38,11	48,8441	61,36457	2,89	9,7107	16,5082	29,5451	61,9424	104,5061	136,4907	476,36

drinking (p=0.412)																					
Public water supply	121	100,00%	32,82	28,05	38,39	50,5219	69,6538	2,89	10,3785	17,5064	30,576	61,568	91,3155	128,4902	532,07						
Commercial producers	4	100,00%	22,64	7,58	67,58	34,3195	31,60515	6,89	6,892	9,2278	27,8441	59,4113	74,6978	74,6978	74,7						

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 50: Statistical analysis of urinary phthalate metabolite MBZP (µg/L) in child

Age group: children, 6-11 years
Biomarker: urinary phthalate metabolite MBZP
Unit: µg/L
LOQ: 0,64 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	99,20%	8,35	7,1	9,82	14,4706	27,57988	0,6	2,68	4,69	7,71	14,54	26,93	43,99	269,17
Urinary creatinine (p=0.000)															
300-1000 mg/L	37	97,30%	5,17	3,96	6,75	7,297	7,40831	0,6	1,74	3,59	4,73	8,25	14,54	32,69	34,7
1000-2000 mg/L	79	100,00%	9,62	7,94	11,66	14,7508	18,42552	1,26	3,61	5,08	8,79	15,82	33,14	56,53	108,56
2000-3000 mg/L	11	100,00%	15,11	7,8	29,28	36,5882	77,52018	3,8	5,65	8,22	11,63	18,89	31,87	269,17	269,17
Period of urine sampling (p=0.853)															
< 8 hours	9	100,00%	8,92	4,99	15,95	12,2644	10,18175	1,85	1,85	5,65	8,55	15,83	34,7	34,7	34,7
≥ 8 hours	94	98,90%	8,38	6,89	10,19	15,3706	31,25644	0,6	3,05	4,69	7,945	14,52	26,93	44,44	269,17
Gender (p=0.422)															
boys	66	100,00%	8,9	7,06	11,23	16,5791	34,93631	1,26	3,05	4,72	8,44	14,54	33,14	44,44	269,17
girls	61	98,40%	7,79	6,2	9,78	12,1893	16,27651	0,6	2,68	4,55	7,23	14,22	20,82	32,69	108,56
Age (p=0.546)															
5-8 years	66	100,00%	8,76	7,25	10,59	12,3418	14,25786	1,65	3,28	4,73	8,82	14,54	19,22	32,69	98,59

9-11 years	61	98,40%	7,92	6,04	10,39	16,7739	36,96989	0,6	2,43	4,52	6,41	14,22	33,14	44,44	269,17
Consumption of meat (p=0.893)															
Several times per week	114	99,10%	8,32	6,97	9,93	14,9379	29,00573	0,6	2,63	4,63	7,65	14,52	31,87	44,44	269,17
Once per week or less	13	100,00%	8,63	6,14	12,14	10,3731	6,63396	4,46	4,69	4,73	8,79	14,54	18,89	24,68	24,68
Consumption of hazelnut spread (p=0.525)															
Several times per week	15	100,00%	7,34	5,11	10,55	9,816	10,19218	2,63	3,59	4,12	6,96	13,38	14,22	43,99	43,99
Once per week or less	108	99,10%	8,67	7,22	10,42	15,47	29,57481	0,6	2,59	4,71	8,29	15,525	31,87	44,44	269,17
Consumption of fast food (p=0.880)															
Several times per week	7	100,00%	8,79	6,46	11,95	9,4514	3,82292	5,19	5,19	6,24	8,63	13,75	14,54	14,54	14,54
Once per week or less	118	99,20%	8,31	6,99	9,89	14,8479	28,56792	0,6	2,63	4,63	7,65	14,87	31,87	44,44	269,17
Consumption of milk (p=0.334)															
Several times per week	99	99,00%	8,71	7,24	10,49	15,3564	30,37072	0,6	3,05	4,73	8,22	14,54	26,93	43,99	269,17
Once per week or less	28	100,00%	7,18	5,1	10,09	11,3389	13,73864	1,26	2,08	4,535	6,015	13,49	33,31	44,44	61,63
Consumption of cheese (p=0.635)															
Several times per week	104	99,00%	8,19	6,83	9,84	14,6498	29,73372	0,6	2,63	4,725	7,945	14,68	22,26	34,7	269,17
Once per week or less	23	100,00%	9,08	6,34	13,01	13,6604	14,71194	2,43	3,61	4,52	7,59	14,54	33,31	43,99	61,63
Consumption of chocolate (p=0.934)															
Several times per week	91	98,90%	8,31	6,91	10	14,142	29,26404	0,6	3,28	4,69	8,18	14,22	20,82	43,99	269,17
Once per week or less	36	100,00%	8,44	6,02	11,84	15,3014	23,13475	1,26	2,43	4,305	7,305	17,25	26,93	98,59	108,56
Consumption of ice cream (p=0.541)															
Once a week or often	9	100,00%	10,13	6,08	16,86	13,1411	9,99109	4,01	4,01	4,55	13,05	17,82	34,7	34,7	34,7
Less than once a week	116	99,10%	8,29	6,97	9,86	14,7322	28,71902	0,6	2,63	4,705	7,945	14,53	26,93	44,44	269,17
Consumption of canteen food (p=0.032)															
Several times per week	101	99,00%	9,07	7,51	10,95	16,165	30,54366	0,6	3,05	4,72	8,55	14,87	31,87	44,44	269,17
Once per week or less	25	100,00%	5,79	4,39	7,64	7,4488	6,48128	1,26	2,46	4,52	5,21	8,25	15,58	16,13	32,69
Consumption of chewing gum (p=0.274)															
Several times per week	37	100,00%	7,24	5,5	9,54	11,6835	17,53374	1,85	3,05	4,46	5,54	12,03	20,82	44,44	98,59
Once per week or less	90	98,90%	8,85	7,25	10,8	15,6164	30,78901	0,6	2,635	4,79	8,71	15,47	29,4	34,7	269,17
Time spend in new car (p=0.058)															
30 minutes per day and more	8	100,00%	14,06	7,74	25,54	18,4463	13,51829	2,59	2,59	11,11	14,135	25,25	43,99	43,99	43,99
less than 30 minutes per day	14	92,90%	6,51	4,13	10,26	8,3014	4,74795	0,6	2,68	4,69	7,945	11,7	14,84	16,7	16,7

Playing with plastic toys (p=0.603)															
Daily	15	100,00%	8,99	6,13	13,18	11,588	8,42925	2,68	3,8	4,12	11,47	14,87	22,26	32,69	32,69
Less than daily	25	96,00%	7,03	4,73	10,45	11,4652	13,63705	0,6	2,08	4,73	5,54	11,7	34,7	43,99	56,53
Never	79	100,00%	8,68	6,99	10,77	16,4523	33,83657	1,58	2,59	4,52	7,71	14,84	31,87	61,63	269,17
Use of personal care products (p=0.397)															
High	7	100,00%	5,78	2,89	11,57	8,2586	7,25292	1,58	1,58	2,43	4,84	17,82	19,22	19,22	19,22
Moderate	52	100,00%	7,86	6,19	9,98	12,2821	16,75054	1,26	2,63	4,805	7,045	13,215	26,93	43,99	108,56
Low	65	98,50%	9,13	7,18	11,62	17,1203	35,3711	0,6	3,59	4,68	8,63	15,47	32,69	56,53	269,17
Area of residence (p=0.028)															
Urban	61	100,00%	10,08	7,72	13,18	19,9866	38,10931	1,65	2,68	4,69	9,79	16,7	33,31	61,63	269,17
Rural	66	98,50%	7,01	5,83	8,43	9,3726	8,88504	0,6	3,28	4,69	6,655	11,7	17,82	19,22	56,53
Educational level (highest of family) (p=0.836)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	55	98,20%	8,52	6,53	11,11	17,1653	38,44136	0,6	3,61	4,68	6,96	14,84	26,93	56,53	269,17
Tertiary education (ISCED 5-6)	72	100,00%	8,22	6,7	10,09	12,4122	14,69864	1,26	2,59	4,71	8,205	14,53	22,26	34,7	98,59
Redecoration or renovation of house in last two years (p=0.417)															
Yes	59	98,30%	7,76	6,21	9,68	11,5361	15,10552	0,6	2,46	5,08	8,18	13,27	18,89	33,14	108,56
No	66	100,00%	8,9	6,99	11,33	17,2135	35,4114	1,58	3,2	4,46	7,36	15,82	33,31	56,53	269,17
PVC in the house (p=0.719)															
PVC in floors or walls	24	100,00%	9,11	5,75	14,44	23,3646	54,55248	1,74	3,2	4,755	6,57	14,695	44,44	61,63	269,17
No PVC	89	98,90%	8,43	7,01	10,13	12,6922	15,98429	0,6	2,68	4,72	8,25	14,84	24,68	33,14	108,56
Main source of water for drinking (p=0.844)															
Public water supply	121	99,20%	8,32	7,02	9,85	14,6728	28,22201	0,6	2,68	4,69	7,59	14,52	26,93	43,99	269,17
Commercial producers	4	100,00%	7,57	4	14,3	8,8	5,25869	3,8	3,8	4,43	8,265	13,17	14,87	14,87	14,87

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 51: Statistical analysis of urinary phthalate metabolite MBZP ($\mu\text{g/g}$ creatinine) in child

Age group: children, 6-11 years

Biomarker: urinary phthalate metabolite MBZP

Unit: $\mu\text{g/g}$ creatinine

LOQ: 0,64 $\mu\text{g/L}$

Strata	N	% LOQ	GM >	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	99,20%	6,89	5,96	7,97	10,283	13,15583	0,93	2,6616	3,6558	6,4626	11,4273	18,5521	32,1796	108,89
Period of urine sampling (p=0.834)															
< 8 hours	9	100,00%	6,52	3,34	12,71	10,2747	10,93457	1,65	1,6488	2,6701	6,4626	10,3532	35,8101	35,8101	35,81
\geq 8 hours	94	98,90%	6,95	5,84	8,26	10,6804	14,52825	0,93	2,6616	3,7132	6,7732	12,3867	17,7451	39,6845	108,89
Gender (p=0.270)															
boys	66	100,00%	7,46	6,05	9,19	11,435	15,38996	1,13	2,6701	3,5115	7,525	12,7474	19,7554	32,1796	108,89
girls	61	98,40%	6,33	5,19	7,72	9,0364	10,18976	0,93	2,6616	4,0376	6,1532	10,3118	15,5122	28,1266	54,44
Age (p=0.079)															
5-8 years	66	100,00%	7,81	6,54	9,32	10,474	10,27159	2,06	2,8646	4,9582	7,5699	12,0617	17,7451	35,8101	58,37
9-11 years	61	98,40%	6,02	4,78	7,58	10,0762	15,78221	0,93	2,1734	3,4379	4,9573	10,9406	18,6625	28,407	108,89
Consumption of meat (p=0.288)															
Several times per week	114	99,10%	6,71	5,72	7,87	10,3707	13,81391	0,93	2,5971	3,5	6,291	11,4273	18,5521	35,8101	108,89
Once per week or less	13	100,00%	8,71	6,9	10,99	9,5136	4,43348	4,95	4,9582	6,4537	8,3227	10,3275	16,0573	19,7554	19,76
Consumption of hazelnut spread (p=0.589)															
Several times per week	15	100,00%	6,33	4,49	8,91	7,9383	6,4229	1,87	3,0126	3,6558	7,2363	10,0225	13,2979	28,1266	28,13
Once per week or less	108	99,10%	7,17	6,1	8,42	10,8558	13,98362	0,93	2,6667	3,8726	6,7732	12,509	18,6625	35,8101	108,89
Consumption of fast food (p=0.999)															
Several times per week	7	100,00%	6,88	3,91	12,09	8,7939	6,50645	3,22	3,2209	3,4394	5,5847	13,2979	19,7554	19,7554	19,76

Once per week or less	118	99,20%	6,88	5,91	8,02	10,4143	13,56187	0,93	2,5971	3,7132	6,6129	11,1097	18,5521	35,8101	108,89
Consumption of milk (p=0.216)															
Several times per week	99	99,00%	7,24	6,13	8,54	10,8579	14,13663	0,93	2,5971	4,0376	7,212	12,0617	18,6625	35,8101	108,89
Once per week or less	28	100,00%	5,8	4,3	7,82	8,2501	8,7652	1,13	2,6667	3,2563	5,2715	9,3158	16,9086	32,1796	39,68
Consumption of cheese (p=0.441)															
Several times per week	104	99,00%	6,71	5,71	7,88	10,1882	13,90903	0,93	2,6616	3,6845	6,345	10,5377	17,1762	32,1796	108,89
Once per week or less	23	100,00%	7,79	5,56	10,89	10,7115	9,23408	2	2,6701	3,5115	7,4142	16,0573	19,7554	28,1266	39,68
Consumption of chocolate (p=0.620)															
Several times per week	91	98,90%	6,73	5,69	7,97	10,0236	13,49191	0,93	2,6616	3,6558	6,4537	10,5536	16,9008	32,1796	108,89
Once per week or less	36	100,00%	7,31	5,49	9,73	10,9385	12,42477	1,13	2,7663	3,7746	6,6129	14,5453	18,5521	54,4433	58,37
Consumption of ice cream (p=0.775)															
Once a week or often	9	100,00%	7,51	4,34	13	10,3895	10,14278	2,06	2,0585	4,9573	8,8189	11,1097	35,8101	35,8101	35,81
Less than once a week	116	99,10%	6,91	5,93	8,05	10,375	13,4839	0,93	2,6667	3,6845	6,6129	12,2242	18,5521	32,1796	108,89
Consumption of canteen food (p=0.162)															
Several times per week	101	99,00%	7,25	6,15	8,53	10,8592	13,95895	0,93	2,6667	4,0376	6,7632	12,0617	18,6625	32,1796	108,89
Once per week or less	25	100,00%	5,57	4,05	7,67	8,0135	9,48223	1,13	2,1734	3,2209	4,9525	8,3227	13,5784	15,2495	49,31
Consumption of chewing gum (p=0.216)															
Several times per week	37	100,00%	5,97	4,59	7,78	8,8461	10,73587	1,65	2,3131	3,2209	4,9573	9,568	17,1762	32,1796	58,37
Once per week or less	90	98,90%	7,31	6,15	8,69	10,8736	14,04265	0,93	2,7182	3,9138	7,2241	12,6312	18,6073	35,8101	108,89
Time spend in new car (p=0.128)															
30 minutes per day and more	8	100,00%	9,89	5,72	17,07	12,671	9,18149	2,47	2,4667	6,4096	9,842	19,1357	28,1266	28,1266	28,13
less than 30 minutes per day	14	92,90%	5,53	3,55	8,61	7,2311	4,71446	0,93	1,8747	2,9195	6,7747	10,0225	12,6803	16,9008	16,9
Playing with plastic toys (p=0.705)															
Daily	15	100,00%	6,36	4,11	9,86	9,5755	11,75552	1,87	2,0938	3,2672	6,1548	10,5217	15,5122	49,3062	49,31
Less than daily	25	96,00%	6,22	4,28	9,03	9,4184	9,18851	0,93	2,3131	2,9915	6,4537	10,5536	28,1266	28,407	35,81
Never	79	100,00%	7,2	6,01	8,63	10,8992	15,02002	1,65	2,6701	3,9138	6,7632	12,0617	18,6625	39,6845	108,89
Use of personal care products (p=0.368)															
High	7	100,00%	5,16	2,76	9,67	6,9856	5,97797	1,8	1,7955	2,0033	4,9525	11,1097	18,5521	18,5521	18,55
Moderate	52	100,00%	6,42	5,16	7,99	9,1398	9,6989	1,13	2,6667	3,5058	5,4787	10,4534	17,7451	32,1796	54,44

Low	65	98,50%	7,58	6,13	9,38	11,7513	16,03193	0,93	2,6701	3,8314	7,3139	12,7474	19,7554	39,6845	108,89
Area of residence (p=0.027)															
Urban	61	100,00%	8,16	6,44	10,34	13,403	17,67701	1,65	2,6616	4,0376	7,5338	13,5784	32,1796	49,3062	108,89
Rural	66	98,50%	5,89	4,99	6,96	7,3993	5,42971	0,93	2,6701	3,5115	5,9388	10,3118	13,005	17,1762	28,41
Educational level (highest of family) (p=0.866)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	55	98,20%	6,99	5,58	8,77	10,8993	16,07144	0,93	2,6701	3,9138	6,4537	12,0617	18,6625	28,407	108,89
Tertiary education (ISCED 5-6)	72	100,00%	6,82	5,64	8,24	9,8121	10,4968	1,13	2,6616	3,4964	6,6129	11,2685	17,1762	35,8101	58,37
Redecoration or renovation of house in last two years (p=0.801)															
Yes	59	98,30%	6,7	5,51	8,16	9,2022	9,58739	0,93	2,6701	4,3315	6,4626	10,9406	15,2495	28,1266	54,44
No	66	100,00%	6,96	5,61	8,65	11,1908	15,83385	1,65	2,1734	3,5	6,3935	12,6803	19,7554	35,8101	108,89
PVC in the house (p=0.346)															
PVC in floors or walls	24	100,00%	8,08	5,56	11,73	14,0628	22,3676	2	2,9195	4,5086	7,3661	10,8414	32,1796	39,6845	108,89
No PVC	89	98,90%	6,72	5,66	7,97	9,6045	10,22203	0,93	2,4667	3,7132	6,3333	12,0617	17,7451	24,9736	58,37
Main source of water for drinking (p=0.281)															
Public water supply	121	99,20%	6,96	5,99	8,09	10,4692	13,43211	0,93	2,6667	3,6558	6,7632	11,4273	18,5521	32,1796	108,89
Commercial producers	4	100,00%	4,39	2,4	8,03	4,9666	2,48194	1,87	1,8747	3,0527	5,1928	6,8805	7,6061	7,6061	7,61

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 52: Statistical analysis of urinary phthalate metabolite MNBP (µg/L) in child

Age group: children, 6-11 years

Biomarker: urinary phthalate metabolite MNBP

Unit: µg/L

LOQ: 1,51 µg/L

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	100,00%	122,3	107,62	139	162,4472	159,93942	17,79	51,85	76,96	117,9	202,77	275,6	424,2	1332,28
Urinary creatinine (p=0.000)															
300-1000 mg/L	37	100,00%	72,5	58,57	89,73	88,1678	55,71969	17,79	20,71	51,85	76,13	112,66	161,7	202,8	275,56
1000-2000 mg/L	79	100,00%	146,3	127,43	167,9	183,3273	172,85133	33,56	69,21	97,17	134,04	216,29	289,5	438,8	1332,28
2000-3000 mg/L	11	100,00%	196,4	121,08	318,5	262,3382	207,98807	60,94	63,84	99,1	204,83	424,16	486,8	727,7	727,7
Period of urine sampling (p=0.662)															
< 8 hours	9	100,00%	139,3	94,61	205,1	158,0389	73,13784	36,34	36,34	116,7	157,79	183,94	289,5	289,5	289,48
≥ 8 hours	94	100,00%	124,3	106,58	144,9	169,4907	177,9622	18,92	51,85	76,13	119,12	204,83	275,6	486,8	1332,28
Gender (p=0.970)															
boys	66	100,00%	122,6	102,34	146,9	157,6902	114,06834	18,92	51,68	76,96	122,61	206,45	289,5	424,2	550,39
girls	61	100,00%	122	101,64	146,4	167,5941	198,92609	17,79	57,22	82,77	114,52	176,87	254	321	1332,28
Age (p=0.226)															
5-8 years	66	100,00%	132	110,08	158,3	179,4048	190,84169	18,92	57,22	84,22	122,88	216,29	321	438,8	1332,28
9-11 years	61	100,00%	112,6	94,16	134,7	144,0995	116,64106	17,79	51,4	70,75	109,02	185,04	239,4	289,5	727,7
Consumption of meat (p=0.538)															
Several times per week	114	100,00%	120,7	105,2	138,4	162,0831	165,47312	17,79	51,85	76,96	118,67	200,38	266,1	438,8	1332,28
Once per week or less	13	100,00%	137,9	97,26	195,4	165,64	103,64895	51,68	60,7	101,7	117,9	247,55	275,6	398	398
Consumption of hazelnut spread (p=0.292)															
Several times per week	15	100,00%	101,6	73,37	140,6	118,9087	60,46872	20,71	42,65	62,09	120,33	163,26	176,9	254	253,99
Once per week or less	108	100,00%	126,3	109,43	145,7	170,6256	170,82413	17,79	51,85	76,55	119,57	211,72	289,5	438,8	1332,28
Consumption of fast food (p=0.233)															

Several times per week	7	100,00%	88,11	61,7	125,8	97,9714	52,25786	51,68	51,68	62,09	76,13	138,66	196,2	196,2	196,2	196,24
Once per week or less	118	100,00%	124,1	108,5	142	165,8198	164,20658	17,79	17,79	83,58	120,78	204,83	275,6	438,8	438,8	1332,28
Consumption of milk (p=0.440)																
Several times per week	99	100,00%	125,7	108,19	145,9	171,2033	176,74365	18,92	18,92	76,96	121,23	204,83	321	486,8	486,8	1332,28
Once per week or less	28	100,00%	111,2	87,5	141,3	131,4879	68,68474	17,79	17,79	80,06	113,52	190,93	230,5	231,5	231,5	266,09
Consumption of cheese (p=0.581)																
Several times per week	104	100,00%	120,2	104,46	138,4	159,9469	162,15278	17,79	17,79	78,02	115,77	201,58	275,6	424,2	424,2	1332,28
Once per week or less	23	100,00%	132,1	96,79	180,3	173,7526	152,45491	20,6	20,6	76,96	148,76	216,29	266,1	398	398	752,31
Consumption of chocolate (p=0.921)																
Several times per week	91	100,00%	122,8	105,62	142,8	164,0262	170,33286	17,79	17,79	84,22	120,33	185,62	266,1	438,8	438,8	1332,28
Once per week or less	36	100,00%	121	94,76	154,6	158,4558	132,14367	20,6	20,6	72,36	115,77	218,22	275,6	398	398	727,7
Consumption of ice cream (p=0.718)																
Once a week or often	9	100,00%	133,7	104,61	170,9	141,1211	43,36221	57,22	57,22	120,3	144,57	176,87	200,4	200,4	200,4	200,38
Less than once a week	116	100,00%	121,8	106,01	139,9	165,0684	166,71554	17,79	17,79	74,7	115,63	208,74	285,3	438,8	438,8	1332,28
Consumption of canteen food (p=0.756)																
Several times per week	101	100,00%	123,2	106,28	142,8	166,5587	171,12539	17,79	17,79	82,77	120,33	206,45	285,3	424,2	424,2	1332,28
Once per week or less	25	100,00%	117	90,2	151,8	145,2568	109,06095	33,56	33,56	65,36	116,73	185,04	260,8	275,6	275,6	550,39
Consumption of chewing gum (p=0.247)																
Several times per week	37	100,00%	108,7	84,62	139,5	154,3211	210,90492	17,79	17,79	70,75	114,52	148,76	254	333,4	333,4	1332,28
Once per week or less	90	100,00%	128,4	110,73	148,9	165,7879	134,84899	20,6	20,6	82,77	121,5	211,03	287,4	438,8	438,8	752,31
Time spend in new car (p=0.295)																
30 minutes per day and more	8	100,00%	149,4	95,35	234,2	176,2425	96,45545	62,09	62,09	77,28	190,11	261,81	289,5	289,5	289,5	289,48
less than 30 minutes per day	14	100,00%	105,8	70,96	157,7	131,0914	74,58907	18,92	18,92	60,94	125,63	211,03	215,8	254	254	253,99
Playing with plastic toys (p=0.403)																

Daily	15	100,00%	150,7	104,63	216,9	198,044	181,43252	60,94	62,09	82,77	138,66	238,27	424,2	752,3	752,31
Less than daily	25	100,00%	109,2	83,14	143,3	134,1248	89,39904	17,79	35,9	94,48	114,52	148,76	247,6	275,6	438,78
Never	79	100,00%	125,8	106,69	148,4	170,1678	178,22508	20,6	51,68	76,13	117,01	204,83	289,5	486,8	1332,28
Use of personal care products (p=0.881)															
High	7	100,00%	106,6	90,88	124,9	108,7114	23,85122	82,77	82,77	88,55	100,28	134,04	144,6	144,6	144,57
Moderate	52	100,00%	123,6	100,76	151,5	163,9833	146,44572	17,79	51,4	69,98	123,16	201,58	260,8	438,8	752,31
Low	65	100,00%	122,9	101,93	148,2	167,3891	180,1415	18,92	55,35	83,58	121,23	211,03	289,5	398	1332,28
Area of residence (p=0.344)															
Urban	61	100,00%	130,5	108,11	157,4	170,98	143,37738	17,79	60,7	84,22	125,28	215,83	285,3	424,2	752,31
Rural	66	100,00%	115,2	96,78	137,2	154,5608	174,58466	20,6	51,4	76,13	115,63	176,94	260,8	321	1332,28
Educational level (highest of family) (p=0.906)															
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	55	100,00%	121,2	99,85	147,2	158,4282	134,46354	20,6	55,35	76,13	112,66	206,45	266,1	486,8	752,31
Tertiary education (ISCED 5-6)	72	100,00%	123,1	103,75	146,1	165,5172	177,82912	17,79	51,85	79,87	123,53	201,58	275,6	424,2	1332,28
Redecoration or renovation of house in last two years (p=0.316)															
Yes	59	100,00%	114,1	90,92	143,2	174,1378	213,52552	17,79	35,9	66,75	108,4	211,03	289,5	727,7	1332,28
No	66	100,00%	130,5	113,53	149,9	153,5127	92,85283	36,34	60,7	84,42	127,35	202,77	260,8	333,4	486,78
PVC in the house (p=0.115)															
PVC in floors or walls	24	100,00%	152,2	118,58	195,3	187,7263	152,1805	60,7	70,75	92,52	156,01	199,51	285,3	486,8	752,31
No PVC	89	100,00%	116,2	99,11	136,3	158,0012	168,42086	17,79	42,47	73,26	116,73	200,38	260,8	398	1332,28
Main source of water for drinking (p=0.210)															
Public water supply	121	100,00%	120,2	105,74	136,6	156,9545	151,95671	17,79	51,85	82,77	117,9	196,24	260,8	333,4	1332,28
Commercial producers	4	100,00%	192,6	55,71	665,8	327,04	330,04073	60,94	60,94	65,85	247,46	588,24	752,3	752,3	752,31

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 53: Statistical analysis of urinary phthalate metabolite MNBP ($\mu\text{g/g}$ creatinine) in child

Age group: children, 6-11 years

Biomarker: urinary phthalate metabolite MNBP

Unit: $\mu\text{g/g}$ creatinine

LOQ: 1,51 $\mu\text{g/L}$

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	100,00%	101	90,52	112,6	126,8232	124,73594	22,81	48,8545	68,807	95,6415	154,446	198,252	264,368	1193,8
Period of urine sampling (p=0.958)															
< 8 hours	9	100,00%	101,8	67,37	153,9	118,3329	58,76912	32,39	32,3886	56,299	129,382	162,838	194,021	194,021	194,02
\geq 8 hours	94	100,00%	103	90,42	117,4	132,2957	139,45138	29,96	48,8545	68,807	95,6463	156,44	217,671	328,236	1193,8
Gender (p=0.755)															
boys	66	100,00%	102,7	88,45	119,2	124,3832	85,63021	29,96	50,5904	65,914	100,53	163,893	203,663	264,368	440,19
girls	61	100,00%	99,15	84,38	116,5	129,4633	157,21579	22,81	48,8545	73,733	95,1151	136,987	190,304	224,272	1193,8
Age (p=0.004)															
5-8 years	66	100,00%	117,6	100,2	138	152,9386	161,01019	32,6700	66,0000	1,0000	0,0000	0,0000	66,0000	1,0000	1193,8
9-11 years	61	100,00%	85,6	74,65	98,15	98,5672	55,02232	22,8100	61,0000	1,0000	0,0000	0,0000	61,0000	1,0000	328,24
Consumption of meat (p=0.052)															
Several times	114	100,00%	97,34	86,8	109,2	122,6424	126,66296	22,81	45,3339	65,886	95,1202	144,395	196,918	264,368	1193,8

Several times per week	91	100,00%	99,49	87,37	113,3	126,9338	137,73992	22,81	52,4715	68,807	95,1151	159,509	194,021	264,368	1193,8
Once per week or less	36	100,00%	104,8	85,46	128,5	126,5437	85,00948	29,96	45,3339	66,444	112,67	151,76	224,272	328,236	440,19
Consumption of ice cream (p=0.915)															
Once a week or often	9	100,00%	99,14	78	126	105,4441	40,63939	56,3	56,2988	83,051	85,7051	128,26	175,464	175,464	175,46
Less than once a week	116	100,00%	101,5	90,18	114,2	129,2526	129,81861	22,81	45,3339	65,9	97,1749	155,443	203,663	328,236	1193,8
Consumption of canteen food (p=0.341)															
Several times per week	101	100,00%	98,46	87,19	111,2	124,1335	130,24079	22,81	48,8545	65,914	95,1253	144,395	196,918	258,946	1193,8
Once per week or less	25	100,00%	112,7	87,02	145,8	139,4586	103,58119	29,96	52,4715	71,737	110,433	163,893	224,272	431,002	440,19
Consumption of chewing gum (p=0.171)															
Several times per week	37	100,00%	89,61	71,61	112,1	125,3662	187,17203	22,81	39,0909	59,535	85,7051	124,498	190,304	217,671	1193,8
Once per week or less	90	100,00%	106	93,77	119,9	127,4223	88,63059	29,96	52,7624	73,24	102,184	162,285	213,967	328,236	498,88
Time spend in new car (p=0.527)															
30 minutes per day and more	8	100,00%	105	74,93	147,3	116,4368	55,61377	60,05	60,0484	65,112	99,7985	173,801	194,021	194,021	194,02
less than 30 minutes per day	14	100,00%	89,83	66,31	121,7	103,5987	53,55269	30,06	39,0909	57,234	88,3327	159,509	177,255	190,255	190,25

Once per week or less	36	84,3	64,34	110,5	114,9431	95,69468	14,16	28,2	51,57	86,23	147,5	224,09	399,5	432,55
Consumption of ice cream (p=0.879)														
Once a week or often	9	85,88	60,73	121,5	96,3633	45,8975	36,31	36,31	69,06	92,1	137,8	167,46	167,5	167,46
Less than once a week	116	82,59	72,01	94,73	109,3941	93,24654	14,16	28,2	50,46	83,56	140,73	208,04	241,9	611,16
Consumption of canteen food (p=0.275)														
Several times per week	101	85,37	73,7	98,88	113,075	96,7241	14,16	33,65	52,78	86,93	141,37	208,04	241,9	611,16
Once per week or less	25	71,31	55,27	91,99	86,396	54,04531	23,97	24,52	45,94	77,81	109,11	170,66	179,6	227,19
Consumption of chewing gum (p=0.284)														
Several times per week	37	74,18	61,47	89,52	89,4095	70,16381	24,45	36,31	49,02	68,54	112,63	147,85	167,5	432,55
Once per week or less	90	86,56	73,58	101,8	115,775	96,33896	14,16	26,27	52,78	93,28	146,83	215,26	241,9	611,16
Time spend in new car (p=0.419)														
30 minutes per day and more	8	108,3	82,63	141,9	115,3713	42,61829	54,2	54,2	87,75	107,9	143,97	189,54	189,5	189,54
less than 30 minutes per day	14	85,03	56,88	127,1	108,6721	71,68128	24,68	31,57	38,7	92,42	159,95	208,04	227,2	227,19
Playing with plastic toys (p=0.147)														
Daily	15	107,2	88,72	129,6	114,2147	40,95287	58,65	61,72	78,17	114,2	141,37	147,43	206,1	206,1
Less than daily	25	97,3	76,6	123,6	117,9208	89,26356	24,68	48,94	77,64	96,62	125,47	167,46	337,8	432,55
Never	79	76,78	64,27	91,72	106,4756	99,33008	14,16	24,45	42,91	69,42	146,8	215,78	241,9	611,16
Use of personal care products (p=0.411)														
High	7	62,48	41,86	93,25	70,2843	36,32827	23,97	23,97	53,39	61,72	95,36	137,8	137,8	137,8
Moderate	52	78,23	64,39	95,04	101,4481	91,33483	14,16	33,68	50,86	79,61	124,72	193,24	224,1	611,16
Low	65	88,2	73,11	106,4	116,9983	93,67548	21,49	28,2	49,75	95,22	147,15	215,78	337,8	438,06
Area of residence (p=0.768)														
Urban	61	84,43	68,85	103,5	116,2379	105,772	14,16	28,2	51,16	88,85	146,57	215,78	241,9	611,16
Rural	66	81,23	69,3	95,22	100,5665	72,58215	22,1	33,68	52,78	82,77	137,8	179,57	208	432,55
Educational level (highest of family) (p=0.749)														
Secondary education or post-secondary non-tertiary education (ISCED 3-4)	55	84,76	69,02	104,1	113,0436	90,742	22,1	27,85	42,91	92,4	159,95	208,04	337,8	438,06

Tertiary education (ISCED 5-6)	72	81,25	69,05	95,6	104,3125	89,94997	14,16	33,65	53,49	83,56	134,68	189,54	224,1	611,16
Redecoration or renovation of house in last two years (p=0.499)														
Yes	3	53,79	33,84	85,5	56,6233	20,24576	33,68	31,57	48,94	81,05	141,37	193,24	215,8	71,98
No	124	83,62	73,43	95,22	109,339	90,72966	14,16	24,52	51,9	92,25	138,43	214,73	337,8	611,16
PVC in the house (p=0.738)														
PVC in floors or walls	24	85,15	61,75	117,4	114,6304	95,50733	17,02	28,2	51,97	83,99	158,75	227,19	241,9	438,06
No PVC	89	80,55	69,69	93,09	102,4402	83,40595	14,16	31,57	51,9	83,61	130,26	193,24	215,8	611,16
Main source of water for drinking (p=0.714)														
Public water supply	121	81,56	71,43	93,12	107,5531	91,79388	14,16	30,31	49,75	83,51	138,38	206,1	238	611,16
Commercial producers	4	93,63	61,1	143,5	100,355	41,87907	58,65	58,65	65,32	97,97	135,4	146,83	146,8	146,83

N = total number; % > LOQ = percentage of participants with a value above LOQ; GM = geometric mean; up CI = upper confidence interval of GM; low CI = lower confidence interval of GM; AM = arithmetic mean; SD = standard deviation; min. = minimum; max. = maximum; P10 = 10th percentile; P25 = 25th percentile; P50 = 50th percentile; P75 = 75th percentile; P90 = 90th percentile; P95 = 95th percentile.

Tab. 55: Statistical analysis of urinary phthalate metabolite DEHP ($\mu\text{g/g}$ creatinine) in child

Age group: children, 6-11 years
Biomarker: urinary phthalate metabolite DEHP (Σ 5-OH-MEHP + 5-oxo-MEHP)
Unit: $\mu\text{g/g}$ creatinine
LOQ: -

Strata	N	% > LOQ	GM	low CI	up CI	AM	SD	min.	P10	P25	P50	P75	P90	P95	max.
All	127	68,3	61,3	76,13	83,2745	60,09612	14,64	29,034	43,927	67,005	105,895	143,62	182,336	459,18	
Period of urine sampling (p=0,377)															
< 8 hours	9	54,6	35,4	84,3	65,1313	37,3678	20,28	20,279	35,452	63,304	95,0464	121,19	121,19	121,19	
\geq 8 hours	94	66,1	58,4	74,71	79,2909	50,85577	14,64	29,034	41,249	67,005	101,507	140,619	181,199	259,94	

