

SUPPORTING INFORMATION

Determinants of serum concentrations of perfluoroalkyl acids (PFAAs) in school children and the contribution of low-grade PFAA-contaminated drinking water

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336

Certificate

valid until July 31, 2015

This is to certify you participated in the intercomparison programme 53 / 2014 for occupational / environmental medical - toxicological analyses. In accordance with the guidelines issued by the German Federal Medical Council (Bundesärztekammer) of January 16th, 1987 and October 16th, 1987 and August 24th, 2001 on implementation of intercomparison programmes in the medical field you have fulfilled the requirements for the following parameters:

Environmental medical field

Pb in blood
3-PBA in urine
5-carboxy-MEPP in urine
PFOS in serum
As total in urine
Zn in urine

Pt in urine
Cotinine in urine
MEHP in urine
MnBP in urine
Cu in urine
Trichloropyridinol in urine

1-HP in urine
5-OH-MEHP in urine
PFOA in serum
MBzP in urine
Sr in urine

Erlangen, 2014/07/01

Prof. Dr. med. H. Drexler



Prof. Dr. rer. nat. Th. Göen

Figure 1. Certificate of fulfillment of the requirements.

Table S1. PFHxS, PFOS and PFOA concentrations in raw/drinking water from the water works supplying drinking water to the participating schools.

Water	School	Year	PFHxS (ng/L)	PFOS (ng/L)	PFOA (ng/L)
Drinking	3, 4	2016	<1.6	<1.0	<1.0
Drinking	3, 4	2016	<1.6	<1.0	<1.0
Drinking	3, 4	2016	<1.6	<1.0	<1.0
Drinking	3, 4	2016	<1.6	<1.0	<1.0
Raw	3, 4	2015	<1.6	<1.0	<1.0
Raw	3, 4	2015	<1.6	<1.0	<1.0
Raw	3, 4	2016	<1.6	<1.0	<1.0
Raw	3, 4	2017	<1.6	1.1	<1.0
Raw	3, 4	2017	<1.6	<1.0	<1.0
Drinking	5, 6	-	0.4	1.2	0.4
Raw	5, 6	-	-	0.25	0.37
Drinking	7, 8	2015	1.8	3.7	1.6
Drinking	7, 8	2015	2.0	3.9	1.5
Raw	7, 8	2015	2.1	4.1	1.5
Drinking	9	2012-2015	17 (5-70)	5.0 (0.5-31)	1.1 (0.50-4.3)
Raw	11	2014	<1.0	<1.0	<1.0

Schools 1, 2 and 10 missing data due to high limits of detections (LODs ≥ 10 ng/L)

The results for drinking water supplied to school 9: median (range), N=69 (PFHxS, PFOS), N=27 (PFOA)

Table S2. Classification of countries in the study according to the UN classification of countries by their per capita gross national income 2014.

High-income	Upper-middle income	Lower-middle/low income
Sweden	Bosnia-Herzegovina	Afghanistan
Canada	Iran	Angola
Croatia	Iraq	Congo
Denmark	Lebanon	El Salvador
Finland	Serbia	Eritrea
Germany	Turkey	India
Greece		Palestine
Japan		Philippines
Norway		Somalia
Poland		Syria
Russia		Togo
Spain		
USA		

Table S3 F-values and P-values for the potential determinants of PFAA serum concentrations in 12-year-old girls and boys in the analysis of variance from the multiple regression analysis^a

Determinant	PFHxS (N=198; 195)	PFOS (N=200)	PFHpA (N=199)	PFOA (N=200)	PFNA (N=200; 195)	PFDA (N=200; 198)	PFUnDA (N=200; 198)
School -outliers	75; <0.001 165; <0.001	8.1; <0.001	2.6; 0.005	5.6; <0.001	3.5; <0.001 5.9; <0.001	3.4; <0.001 3.6; <0.001	1.9; 0.048 2.3; 0.017
Sex -outliers	5.1; 0.025 26; <0.001	10; 0.002	5.6; 0.019	0.73; 0.393	3.4; 0.068 6.9; 0.009	3.9; 0.049 4.9; 0.029	0.84; 0.362 1.7; 0.192
Sex ^b	22; <0.001	8.6; <0.001	8.7; 0.004	1.1; 0.307	7.5; 0.007	6.9; 0.009	1.9; 0.172
Length -outliers	0.85; 0.357 0.06; 0.799	1.7; 0.190	1.3; 0.261	0.54; 0.463	3.8; 0.052 0.33; 0.568	0.93; 0.337 0.25; 0.615	1.6; 0.212 2.7; 0.103
Weight -outliers	0.11; 0.739 0.08; 0.772	0.00; 0.978	0.35; 0.552	0.07; 0.798	0.79; 0.377 1.0; 0.310	0.04; 0.844 0.21; 0.648	0.93; 0.337 2.1; 0.149
Child birth country -outliers	0.55; 0.459 0.57; 0.453	7.7; 0.006	0.19; 0.661	3.0; 0.084	4.4; 0.038 5.6; 0.019	4.7; 0.032 4.4; 0.038	7.1; 0.008 9.1; 0.003
Maternal birth country -outliers	0.72; 0.373 0.67; 0.515	9.1; <0.001	0.17; 0.841	7.1; 0.001	2.5; 0.090 4.0; 0.021	6.5; 0.002 7.1; 0.001	2.8; 0.063 1.6; 0.206
Maternal education -outliers	0.36; 0.699 2.7; 0.070	3.1; 0.049	0.54; 0.586	0.27; 0.764	1.4; 0.253 1.9; 0.156	1.6; 0.195 1.8; 0.171	1.5; 0.232 0.60; 0.549
Paternal education -outliers	0.06; 0.945 0.05; 0.947	1.0; 0.362	1.6; 0.202	3.6; 0.030	1.5; 0.225 3.0; 0.054	3.3; 0.039 3.1; 0.048	0.65; 0.52 0.35; 0.706
Passive smoking -outliers	0.80; 0.373 0.04; 0.837	0.25; 0.615	0.47; 0.495	0.08; 0.777	0.09; 0.760 0.05; 0.827	0.77; 0.381 1.2; 0.272	0.08; 0.773 0.29; 0.590
Older siblings -outliers	0.27; 0.764 0.58; 0.561	0.78; 0.458	0.20; 0.819	3.8; 0.024	0.14; 0.872 0.82; 0.444	0.24; 0.784 0.55; 0.579	0.02; 0.978 0.04; 0.965
Breastfeeding -outliers	0.04; 0.964 0.64; 0.528	2.5; 0.081	0.07; 0.935	0.50; 0.610	0.62; 0.537 0.12; 0.887	0.77; 0.466 0.51; 0.604	1.1; 0.347 1.2; 0.307
Menstruation ^c	7.2; 0.010	2.1; 0.151	2.0; 0.164	6.4; 0.014	2.9; 0.095	0.10; 0.755	1.5; 0.232

^aLength and weight are continuous variables and all the other are categorical. Variables with a significance level $p \leq 0.05$ in **bold**. If a categorical determinant is significant then all the level means are not equal. First N-value: all included; second N-value outliers excluded (standardized residual ≥ 3).

^bModel including menstruation bleeding (yes/no). Outliers excluded.

^cIncluding only girls (outliers excluded, N=87-92).