

PCDD/PCDFs in Humans, Follow-up of Background Data for Germany, 1994

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Introduction

Polychloro-p-dibenzodioxins and -furans (PCDD/PCDFs) are ubiquitously distributed toxic substances which can be detected in human samples of any origin. Due to industrialization as well as to certain food habits there is only a small variation in the PCDD/PCDF concentration in residents of industrialized countries^{1,2,3,4}.

During the last few years a tendency of decreasing PCDD/PCDF-levels in residents in Germany has been observed by several authors^{5,6,7} — resulting probably from reduced emission of these compounds into the environment followed by a decreased intake via food.

This observation is a strong reason for actualising the background data for humans each year, resulting in a sound reference material, useful in evaluation of current results and in tracing of possible exposures.

We started to publish our first background data for blood in 1988 beginning with 10 samples⁸. These data were extended to 102 samples in 1989⁹ to be continued in 1992 and 1993^{10,5}.

Because of the lack of background data on the dioxin-like coplanar (non-ortho) PCBs we are going to include these substances into the 1994 background levels update of PCDD/PCDFs in human blood.

Materials and Methods

Whole blood samples were frozen after collection and kept at -30°C until starting the analysis. The analytical methods applied have been described elsewhere and will not be reported here^{8,11,12,13,14}.

Results and Discussion

PCDD/F- and PCB-measurements are currently under way. The PCDD/F-background data for human blood — sampled between January and August 1994 — are already available.

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In table 1 the statistical data for 86 donors of this part of our investigation is presented. Supplementary to our last "Update" for 1993 [5] we demonstrate the time trend of PCDD/PCDFs in Figure 1.

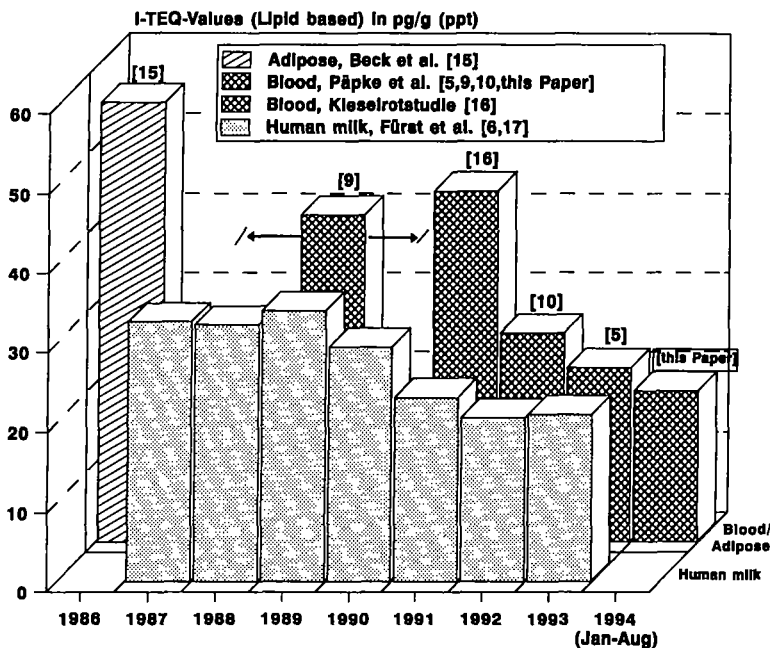


Figure 1. Time trend of PCDD/PCDF-mean-values, 1986-1994

The complete results — including the dioxin-like coplanar (non-ortho) PCBs — will be presented at the conference.

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Values in pg/g (ppt), lipid based

ISOMER	MIN	MAX	MEAN	STD	MEDIAN	PCT 5	PCT 95
Age	18	69	39.8	14.42	38	22	60
2,3,7,8-Tetra-CDD	1.0	5.1	2.7	1.02	2.7	1.3	4.6
1,2,3,7,8-Penta-CDD	1.6	13.7	6.0	2.50	5.6	2.5	10.3
1,2,3,4,7,8-Hexa-CDD	n.d.	16.5	6.5	3.26	5.7	2.2	11.8
1,2,3,6,7,8-Hexa-CDD	5.3	62.2	26.1	12.96	22.8	9.4	50.6
1,2,3,7,8,9-Hexa-CDD	1.3	11.8	4.7	2.05	4.2	2.1	8.6
Total Hexa-CDD	8.0	89.7	37.2	17.02	32.9	16.4	68.3
1,2,3,4,6,7,8-Hepta-CDD	8.6	111	43.1	22.59	36.3	16.8	92.4
Octa-CDD	90.3	836	364	156.36	331	186	702
2,3,7,8-Tetra-CDF	0.9	4.3	1.9	0.63	1.9	1.0	2.8
1,2,3,7,8-Penta-CDF	n.d.	1.8	0.5	0.50	0.5	n.d.	1.4
2,3,4,7,8-Penta-CDF	3.2	36.0	13.1	6.75	11.8	5.0	24.2
Total Penta-CDF	3.6	37.4	13.5	6.94	11.9	5.1	25.4
1,2,3,4,7,8-Hexa-CDF	2.5	29.2	8.0	4.36	7.4	3.7	14.9
1,2,3,6,7,8-Hexa-CDF	1.8	21.9	6.0	3.51	5.0	2.5	12.9
1,2,3,7,8,9-Hexa-CDF	n.d.	1.0	n.d.	0.11	n.d.	n.d.	n.d.
2,3,4,6,7,8-Hexa-CDF	1.0	6.9	2.5	1.17	2.3	1.2	4.7
Total Hexa-CDF	5.7	57.8	16.5	8.58	14.7	7.9	32.7
1,2,3,4,6,7,8-Hepta-CDF	4.0	27.4	10.7	5.08	9.7	5.2	20.8
1,2,3,4,7,8,9-Hepta-CDF	n.d.	2.0	0.5	0.62	n.d.	n.d.	1.7
Total Hepta-CDF	4.0	29.1	11.3	5.28	10.0	5.2	22.6
Octa-CDF	n.d.	4.3	2.6	0.59	2.5	1.8	3.9
Total PCDD	129.0	966.3	453.3	181.62	420.3	227.7	824.0
Total PCDF	18.4	113.7	45.8	17.29	42.6	23.8	76.3
Total PCDD/PCDF	147.4	1019.9	499.2	190.71	480.0	278.7	874.7
I-TEQ (NATO-CCMS)	5.2	38.0	18.8	7.51	17.2	9.3	32.4
TEQ (BCA/UBA)	3.3	22.9	11.1	4.06	10.6	6.3	18.9

n.d. = not detectable

Table 1. PCDD/PCDF-values in whole blood; background, 1994 (January-August), n= 86