PCDD/Fs in Humans, Follow up of Background Data for Germany, 1998/99

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Introduction

There is general agreement that human diet represents the dominant exposure route to poly-chloro-p-dibenzodioxins (PCDDs) and polychlorodibenzofurans (PCDFs). It has been found that there is only a small variation in the PCDD/F concentrations in the normal population of industrialized countries (1, 2). On the other hand for more than 10 years a decrease of PCDD/F levels in residents of industrialized countries could be observed (1, 3, 4). This knowledge resulted in the necessity to use for comparison only current PCDD/F data of the general or normal population when estimating unknown samples for a potential exposure.

We started to publish first background data analyzed in blood of German residents in 1988 updating these information regularly (3, 5, 6, 7). The last data for a background contamination in Germany was published for 1996 by us (6).

Materials and Methods

Whole blood samples were collected in 1998 and 1999 originating from individuals living in different areas in Germany with no known additional PCDD/F exposure than food consumption. After collection, the samples were frozen and kept at - 35 ^{0} C until analysis. The analytical methods applied have been described elsewhere and will not be reported here (7, 8, 9).

Results and Discussion

The PCDD/F background data in human blood from Germany originating from 55 individuals from 1998 and 30 individuals from 1999 are presented in table 1. Due to the limited number of samples we do not present the age dependency of the background contamination here. We expect further samples with environmental exposure only for 1999. After having access to a larger number of analytical data - e.g. > 100 samples totally for 1998 and 1999 - the age dependency will be presented for all samples at the conference.

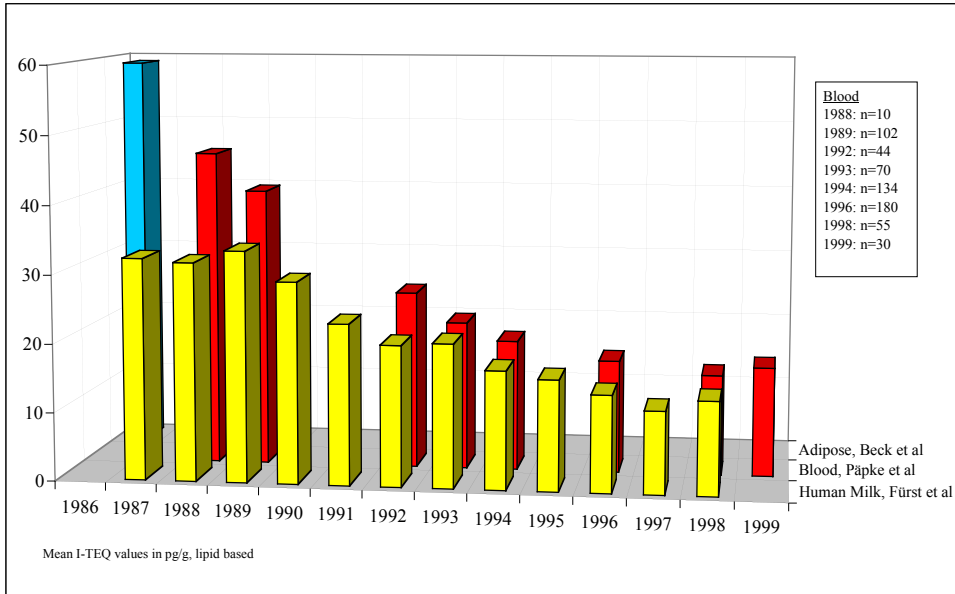|	1998				1999, January - April			
	Mean	Median	Minimum	95 Percentile	Mean	Median	Minimum	95 Percentile
	40,1	38,0	19,0	59,3	42,9	41,0	13,0	62,6
3-Tetra-CDD	2,6	2,6	1,1	4,0	2,7	2,7	1,5	3,6
7.8-Penta-CDD	4,8	4,4	1,8	8,7	5,0	4,8	1,6	8,5
4.7.8-Hexa-CDD	4,4	3,5	n.d.	10,1	5,4	5,1	1,4	9,9
5.7.8-Hexa-CDD	17,2	15,7	4,3	33,3	21,7	19,8	5,3	35,7
7.8.9-Hexa-CDD	3,2	3,0	1,2	5,1	3,9	3,4	1,6	6,8
Hexa-CDD	24,9	23,4	6,5	46,8	31,0	28,4	8,8	50,5
4.6.7.8-Hepta-CDD	34,2	30,2	9,1	69,4	43,1	37,0	9,6	70,7
4.6.7.8.9-Octa-CDD	295,1	280,4	83,5	438,9	392,8	410,3	118,3	652,6
3-Tetra-CDF	0,9	0,9	0,5	1,5	0,9	0,9	0,7	1,0
7.8-Penta-CDF	0,3	0,5	n.d.	0,6	n.d.	n.d.	n.d.	n.d.
7.8-Penta-CDF	10,2	9,5	3,1	18,9	10,8	9,3	2,4	19,2
Penta-CDF	10,5	9,8	3,1	19,7	10,8	9,3	2,4	19,2
4.7.8-Hexa-CDF	6,4	5,8	2,3	12,1	6,0	5,7	1,7	10,6
5.7.8-Hexa-CDF	4,1	4,1	1,3	6,4	4,4	4,0	1,6	7,7
7.8.9-Hexa-CDF	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.	n.d.
5.7.8-Hexa-CDF	2,1	2,1	0,8	3,3	2,4	2,2	0,8	3,7
Hexa-CDF	12,7	12,0	4,9	21,7	12,8	12,0	4,9	21,4
4.6.7.8-Hepta-CDF	6,7	6,5	2,7	10,3	8,9	7,5	4,0	17,3
4.7.8.9-Hepta-CDF	0,4	0,5	n.d.	1,0	n.d.	n.d.	n.d.	n.d.
Hepta-CDF	7,1	6,9	2,7	10,6	8,9	7,5	4,0	17,3
4.6.7.8.9-Octa-CDF	2,5	2,5	1,4	2,5	2,5	2,5	2,5	2,5
PCDD	361,5	343,2	110,3	536,0	474,7	501,4	145,9	768,0
PCDF	33,7	33,6	15,8	49,8	35,9	34,1	19,6	56,4
PCDD/PCDF	395,2	374,8	126,8	586,0	510,6	544,2	169,7	816,3
(NATO/CCMS)	14,7	13,9	5,2	24,1	16,0	15,5	5,4	25,4
WHO)	16,8	15,8	6,0	28,2	18,2	17,6	6,1	29,0

not detectable

: PCDD/Fs in Human blood, Background 1998 / 1999 Jan. –Apr., Germany

in pg/g, lipid based

own in earlier observations (3, 4) the time trend of PCDD/F levels in humans - demonstrated in figure 1 - is still indicating a
se over a period of 13 years.

e 1:   **Time trend of PCDD/F mean values, 1986 - 1999, Germany**

eady presented earlier the concentration found in human milk and blood can be compared well. In table 2, we show the data in
nd blood for 1996, 1997, 1998 and 1999.

2: **I-TEQ in milk and blood, mean values in pg/g, lipid based:**

Year	Human milk / 10 /		Human blood / 6 /, this paper	
	I-TEQ		**I-TEQ**	
1996	14,1	(n =22)	16,5	(n = 180)
1997	12,0	(n = 9)	-	
1998	13,6	(n = 13)	14,7	(n = 55)
1999			16,0	(n = 30)

ightly lower values reported for milk can be explained by a lower mean age of the female group of about 8 years.

aring our mean data for 1996 at 16,5 pg I-TEQ/g blood lipids to the recent data for 1999, found at a mean of 16,0 pg I-TEQ/g, a decrease of 0,5 pg I-TEQ/g can be observed between 1996 and 1999. It has to be mentioned, that the data set for 1999 contains 0 samples, collected between January and April.

ecrease observed in blood is quite similar to the decrease calculated by the data reported by Fürst et al. for human milk (10).

ences

/1/ Liem A.K.D., Ahlborg U.G., Beck H., Haschke F., Nygren M., Younes M., Yrjänheikki E. Levels of PCBs, PCDDs and PCDFs in human milk. Results from the Second Round of a WHO-coordinated Exposure study. Organohalogen Compounds, 30, 268-273, 1996

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/8/ Stephens R.D., Rappe C., Hayward D.G., Nyren M., Startin J., Esboll A., Carlé J., Yrjänheikki E. World Health Organisation international intercalibration study on dioxins and furans in human milk and blood. Anal. Chem. 64, 3109-3117, 1992

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**Table 1: PCDD/Fs in Human blood, Background 1998 / 1999 Jan. –Apr., Germany**
Values in pg/g, lipid based

	1998				1999, January - April			
	Mean	Median	Minimum	95 Percentile	Mean	Median	Minimum	95 Percentile
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2.3.7.8-Tetra-CDF	0,9	0,9	0,5	1,5	0,9	0,9	0,7	1,0
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2.3.4.7.8-Penta-CDF	10,2	9,5	3,1	18,9	10,8	9,3	2,4	19,2
Total Penta-CDF	10,5	9,8	3,1	19,7	10,8	9,3	2,4	19,2
1.2.3.4.7.8-Hexa-CDF	6,4	5,8	2,3	12,1	6,0	5,7	1,7	10,6
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Total Hepta-CDF	7,1	6,9	2,7	10,6	8,9	7,5	4,0	17,3
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As shown in earlier observations (3, 4) the time trend of PCDD/F levels in humans - demonstrated in figure 1 - is still indicating a decrease over a period of 13 years.

Figure 1: **Time trend of PCDD/F mean values, 1986 - 1999, Germany**
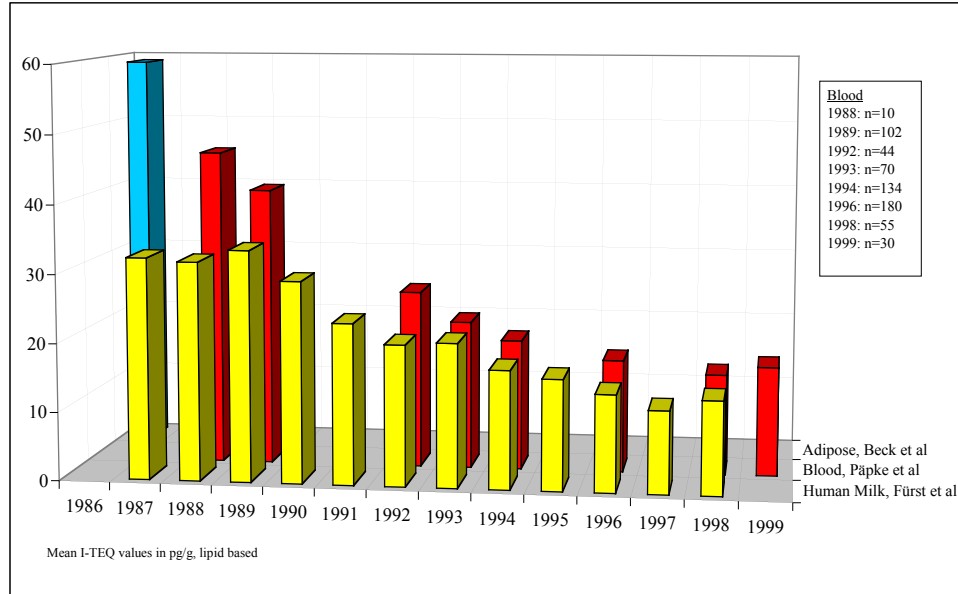
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References

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