



exposure biomarker	number	reference mean (95 % CI)	reference P90 (95 % CI)
dioxin-like substances (pg Calux TEQ/g fat)	1 397	19.2 (18.2-20.2)	46.1 (43.3-49.0)
sum PCBs (ng/g fat)	1 530	333 (325-341)	515 (499-531)
p,p'-DDE (ng/g fat)	1 530	423 (398-449)	1 360 (1 253-1 467)
HCB (ng/g fat)	1 530	56.9 (55.2-58.6)	110 (104-115)
lead (µg/L)	1 534	39.6 (38.4-40.9)	77.3 (73.8-80.9)
cadmium (µg/L)	1 534	0.42 (0.40-0.44)	1.03 (0.96-1.09)
cadmium (µg/g creatinine)	1 535	0.62 (0.60-0.64)	1.21 (1.14-1.28)
PAH marker (1-hydroxypyrene in ng/g creatinine)	1 529	147 (138-157)	610 (529-690)
benzene marker (t,t'-muconic acid in µg/g creatinine)	1 349	85 (79-92)	331 (280-381)

95 % CI = 95 % confidence interval; p,p'-DDE: dichlorodiphenyldichloroethylene, metabolite of DDT; HCB: hexachlorobenzene, sum PCBs = sum of marker PCBs 138, 153 and 180. Dioxin-like substances (dioxins and furans) were determined using the XDS-Calux® assay. All markers were corrected for age, gender and smoking. Dioxin-like substances, PCBs, p,p'-DDE and HCB were also corrected for Body Mass Index (BMI).

Source: Support Centre for Environment & Health (2006)

## Biomonitoring and the Flemish Human Biomonitoring Programme

In order to study the integrated exposure to pollutants by means of measurements, human biomonitoring can be used. With this method, the concentration of pollutants or their degradation products or early biological effects in humans are measured by means of exposure biomarkers and effect biomarkers respectively. In Flanders, this method has been applied in the Flemish Human Biomonitoring Programme (VHBP), which was set up in the framework of the Support Centre for Environment and Health. In this programme, three age groups (new-borns, young people and adults) were studied in 8 area types.

## Reference values for adults

In order to know more about the accumulation of exposure throughout life, *adults* (between 50 and 60 years old) were studied. The values found among older people are higher than those for young people because people accumulate substances which are difficult to degrade (persistent substances) in their bodies during their lifetime.

*Comparison* with an older Flemish study (the pilot study from 1999) shows that the values for lead in blood, cadmium in urine and the PAH marker were very similar to the values in the VHBP. The values for PCBs, hexachlorobenzene and cadmium in blood were much lower. The VHBP values for adults are comparable to the average values from German and American biomonitoring studies.