Landesamt für Natur,
Umwelt und Verbraucherschutz
Nordrhein-Westfalen

HBM-values derived by the German HBM Commission and their practical use

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The German HBM Commission

Mandate:

advice the president and staff of the German Federal Environment Agency on all HBM related issues

Objective:

harmonization of activities and assessments in the field of HBM in the german states (responsible for Public Health)

Members:

experts in toxicology, epidemiology, statistics, analytics…, from federal government and states authorities, universities, public health institutes and clinical institutions, meet twice a year

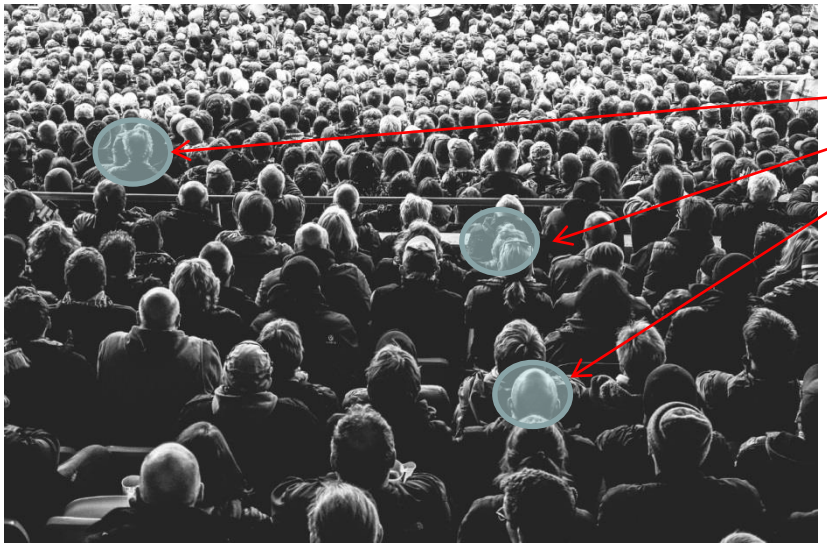
Main Activities:

Evaluation of HBM-concepts

Derivation of reference values and HBM values

Reference Values (RV) derived by the German HBM Commission

- Definition: 95th percentile of the measured pollutant concentration in the relevant matrix of the reference population; rounded off within the 95 % confidence interval
- Basis: German Environmental Surveys (GerES) or other representative sources
- If possible derivation of reference values for sub-groups subjected to specific exposures (e.g., cadmium)
- Reference values are statistically derived values without health relevance



> 95th percentile?

What to tell individuals if they have levels > Reference values?

HBM-Values derived by the German HBM Commission

HBM-I

- concentration of a substance in human biological material below which there is no risk for adverse health effects
- no need for action
- verification or control value

HBM-II

- concentration of a substance in a human biological material above which there is an increased risk for adverse health effects
- acute need for exposure reduction measures and the provision of biomedical advice
- intervention or action level

> HBM-I and < HBM-II

- verify by further measurements, search for potential sources of exposure
- minimize or eliminate exposure sources

Derivation of HBM-values – Find the PoD

First……. find the Point of Departure (PoD) for the most sensitive endpoint / the most sensitive effect

Search the literature

Find the key studies

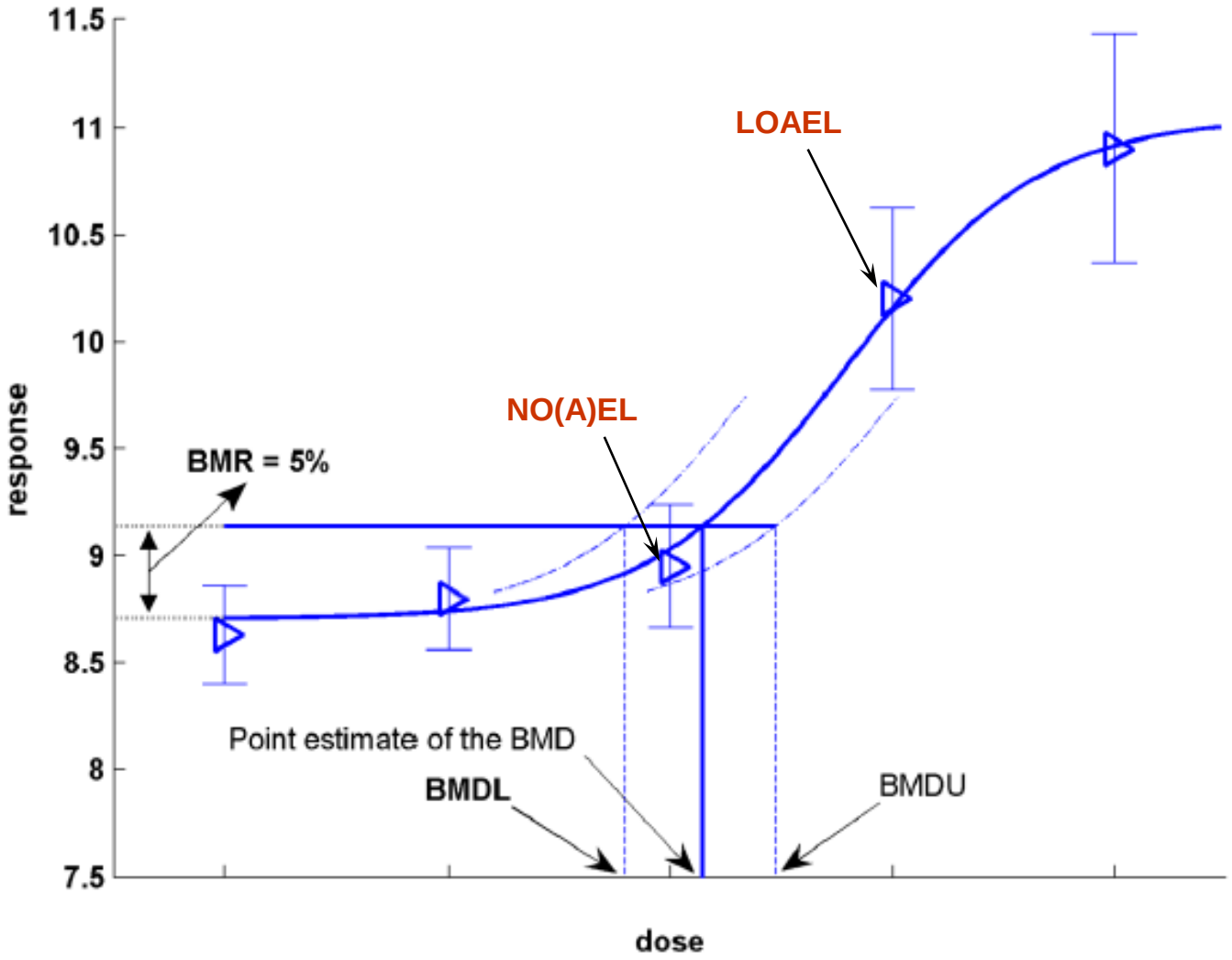
- Human Data (Epidemiology)
- Acceptable/Tolerable Daily Intake (ADI/TDI)
- NO(A)EL (no observed (adverse) effect level) LOAEL (lowest observed adverse effect level) approach
- BMD (Benchmarkdosis)-approach

Bekanntmachung des Umweltbundesamtes

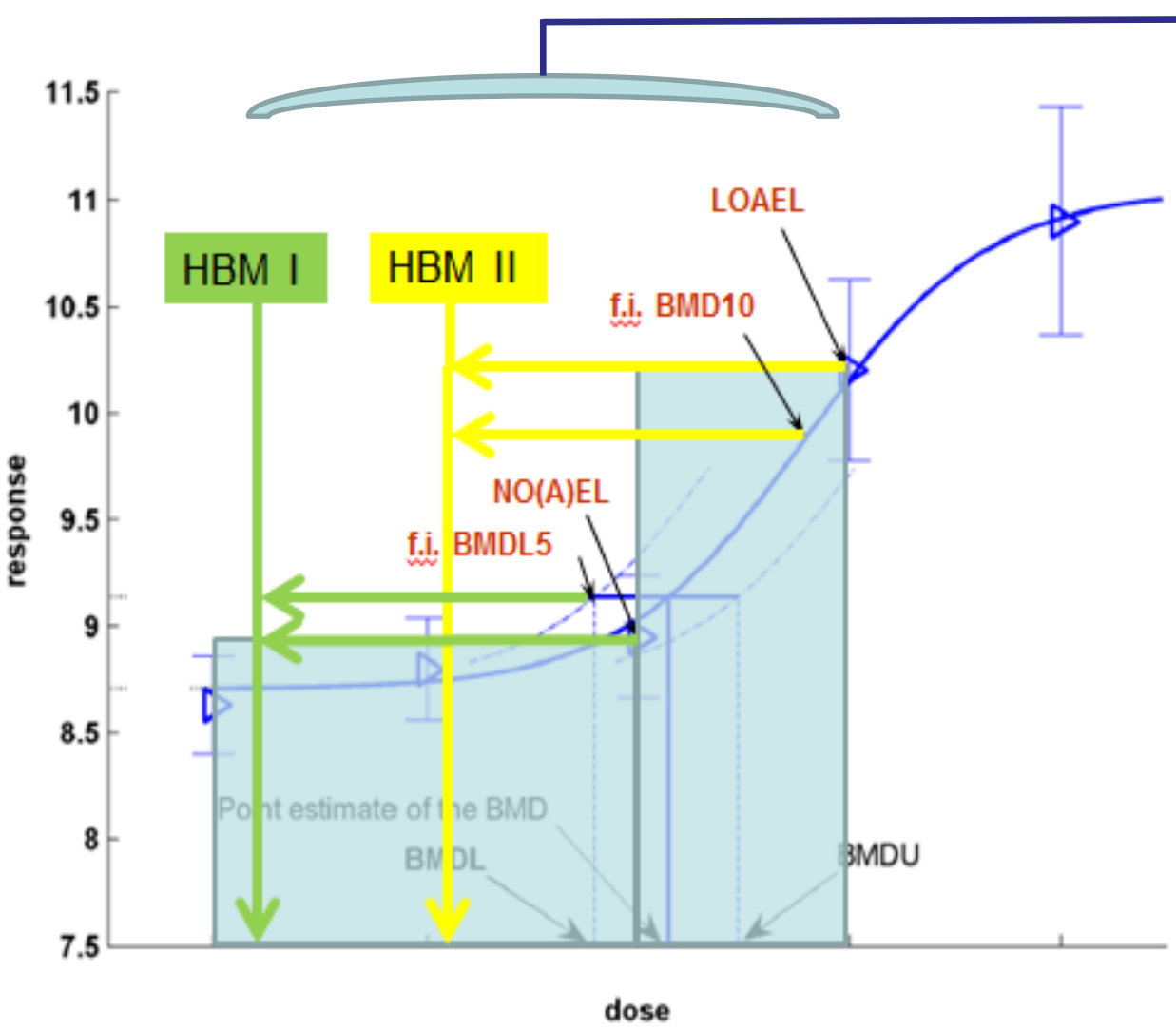
Grundsatzpapier zur Ableitung von HBM-Werten

Stellungnahme der Kommission Human-Biomonitoring des Umweltbundesamtes

NO(A)EL/LOAEL- and BMD-approach



From PoD to HBM-Values



adjust for

interspecies variability

intraspecies variability

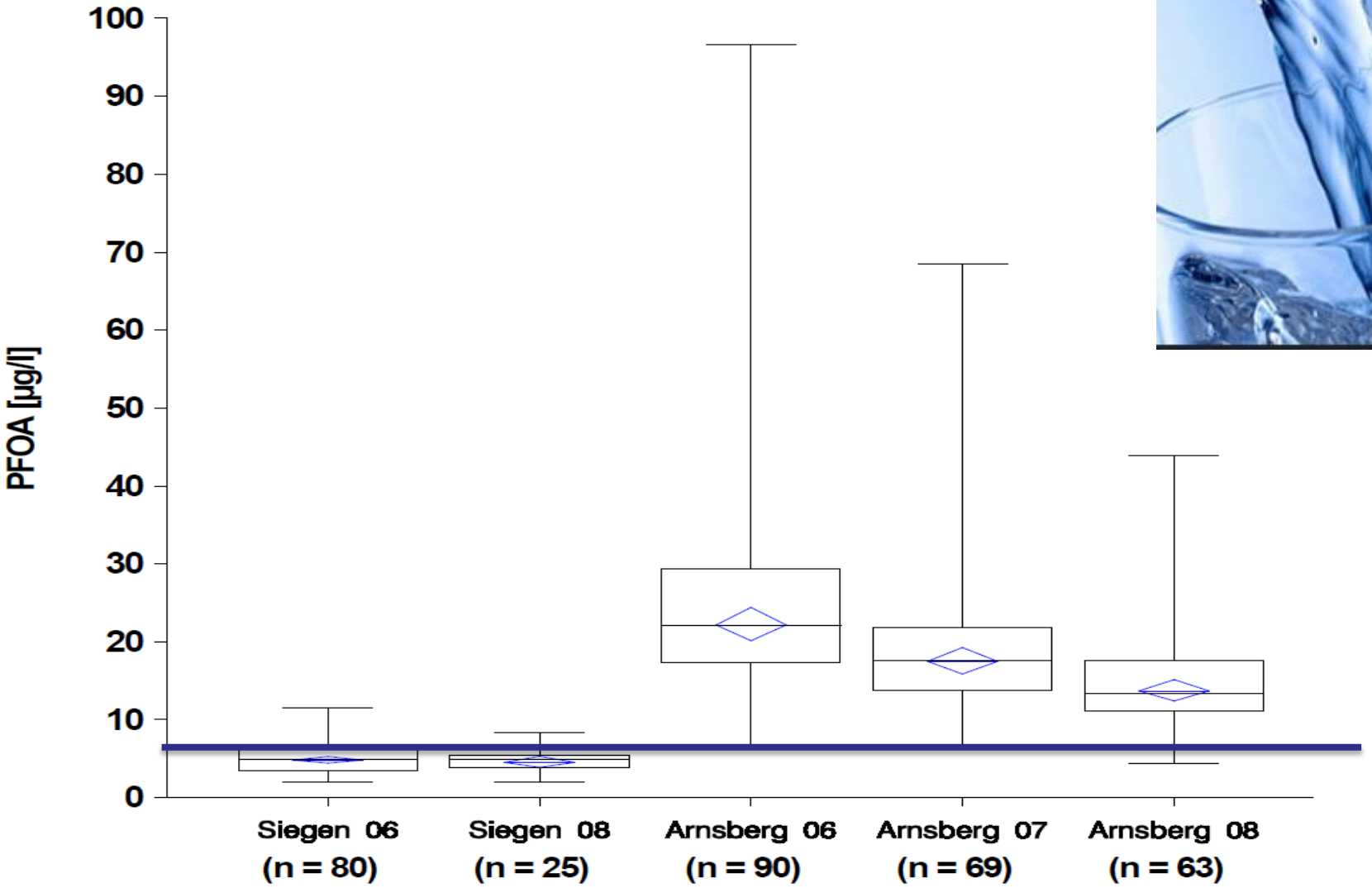
Time scaling

Concept of HBM-Values

Human biomonitoring (HBM) values

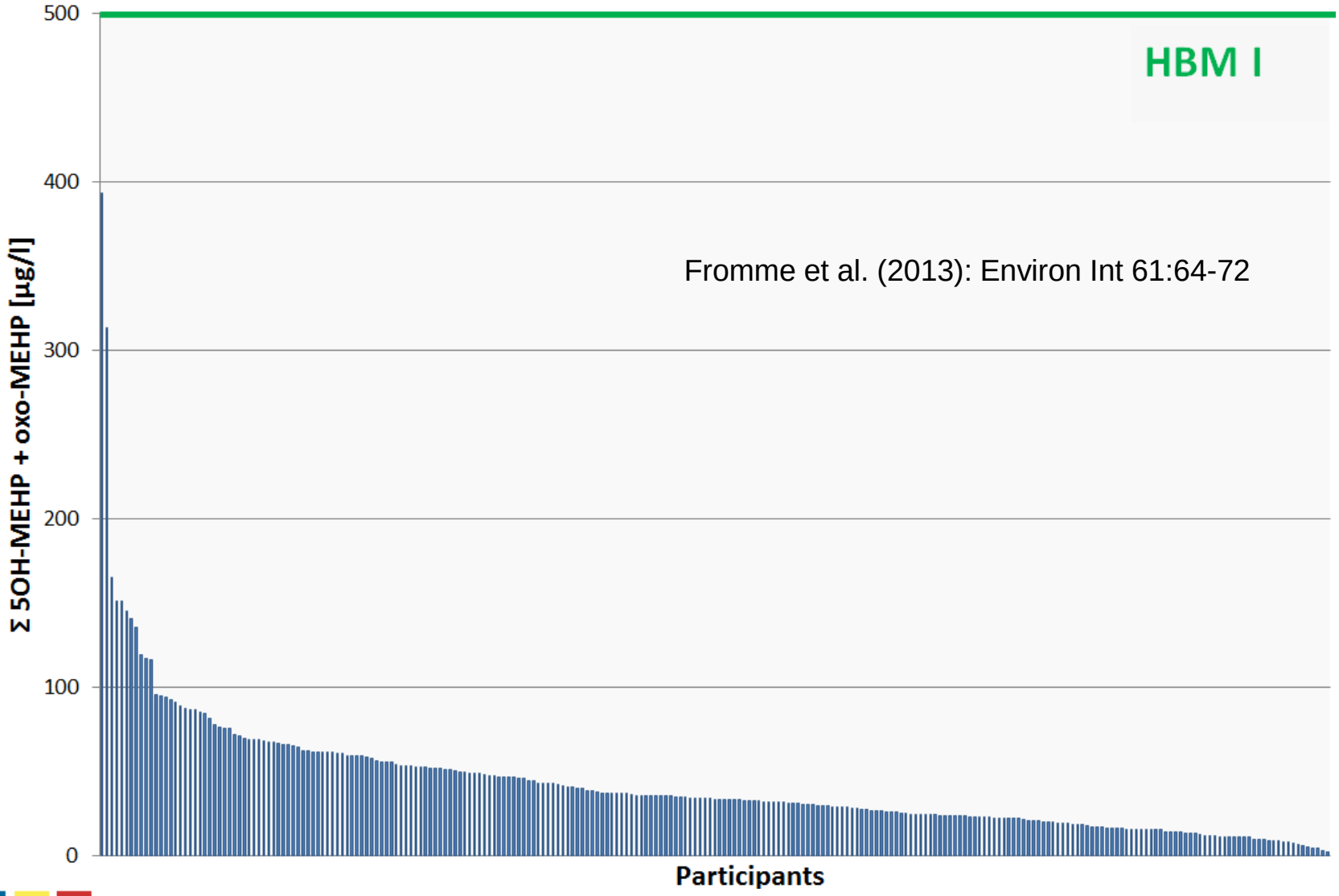
	Damage to health	Recommendation
	Possible	- Care by experts in environmental medicine and - Immediate action to reduce exposure
HBM-II		
	Cannot be excluded with sufficient certainty	- Check analytical results - Identify specific sources of the exposure and - Reduce exposure in adequate way
HBM-I		
	Not to be expected according to current knowledge	- No need for action

PFOA (PerfluoroOctanoic Acid) in blood of children exposed via drinking water

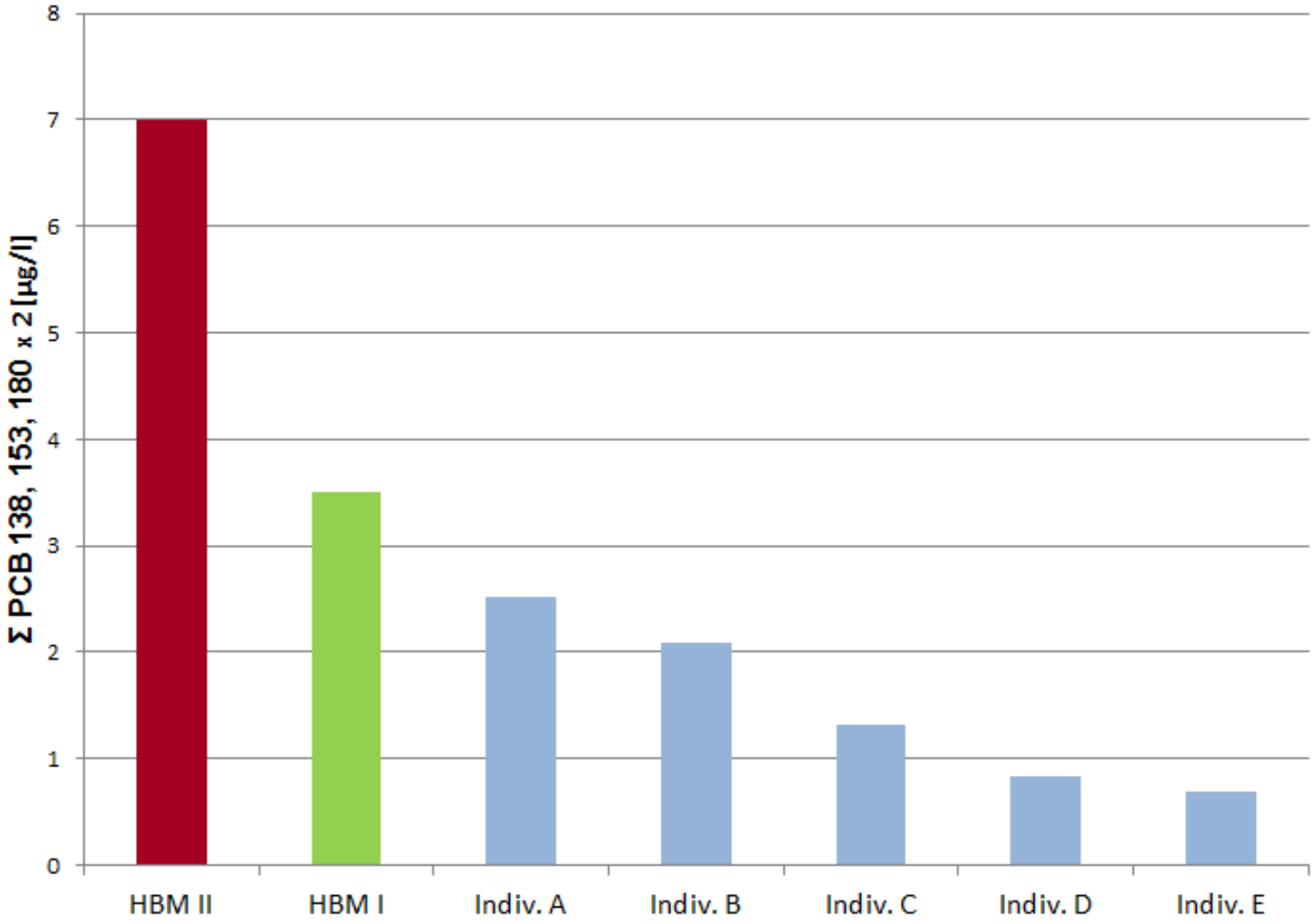


Hölzer et al. (2008): Environ Health Perspect 116 (5):651-7

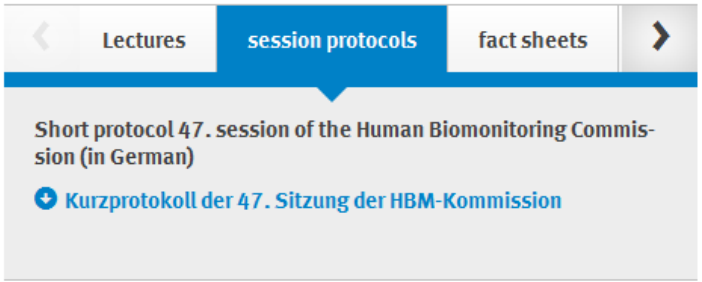
LUPE III: DEHP-Metabolites in the urine of children (2 - 6 y) from North Rhine Westphalia (2011/12; n = 251)



Individual assessment of PCB in blood (serum)

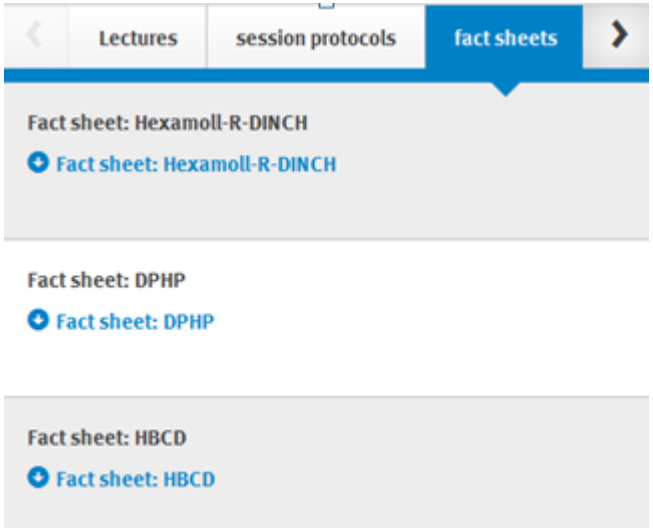


www.umweltbundesamt.de/en/topics/health/commissions-working-groups/human-biomonitoring-commission-hbm-commission



Sum of PCBs (138 + 153 + 180) in serum x 2 [2012]	Infants, small children and women of child-bearing age	3,5 µg/l	7 µg/l
Glykolether, which are metabolized to methoxy acetic acid (MAA) [2014]	General population	0,4 mg MAA/g creatinine	1,6 mg MAA/g creatinine
∑DINCH® metabolites OH-MINCH and cx-MINCH in urine [2015]	Children; adults	3 mg/l; 4,5 mg/l	/
∑ DPHP metabolites OH-MPHP and oxo-MPHP in urine [2015]	Children; adults	1 mg/l; 1,5 mg/l	/
Hexabromcyclododecane (HBCD(D)) [2015]	General population	0,3 µg/g lipid (1,6 µg/l blood plasma)	/
Triclosan in urine [2015]	Children; adults	2 mg/l; 3 mg/l	/
2-Mercaptobenzothiazole (2-MBT) in urine [2015]	Children; adults	4,5 mg/l; 7 mg/l	/
∑ N-Methyl-2-pyrrolidone (NMP)-metabolites 5-Hydroxy-NMP and 2-Hydroxy-N-methylsuccinimid in urine [2015]	Children; adults	10 mg/l; 15 mg/l	30 mg/l; 50 mg/l
∑ N-Ethyl-2-pyrrolidone (NEP)-metabolites 5-HNEP und 2-HESI in urine [2015]	Children; adults	10 mg/l; 15 mg/l	25 mg/l; 40 mg/l

Cadmium in urine [1998, 2011]	Children and juveniles; adults	0,5 µg/l; 1 µg/l	2 µg/l; 4 µg/l
Mercury in urine [1999]	Children and adults	7 µg/l (5 µg/g crea.)	25 µg/l (20 µg/g crea.)
Mercury in whole blood [1999]	Children and adults (was derived for women of child-bearing age, recommended to be applied to the other groups as well)	5 µg/l	15 µg/l
Thallium in urine [2011]	General population	5 µg/l	/
Pentachlorphenol (PCP) in serum [1997]	General population	40 µg/l	70 µg/l
Pentachlorphenol (PCP) in urine [1997]	General population	25 µg/l (20 µg/g crea.)	40 µg/l (30 µg/g crea.)
Sum of DEHP metabolites 5 oxo and 5 OH-MEHP in urine [2007]	Children 6 to 13 years old; women of child-bearing age; men 14 years and older as well as remaining general population	500 µg/l; 300 µg/l; 750 µg/l	/
Bisphenol A in urine [2012, updated 2015]	Children and adults	0,1 mg/l; 0,2 mg/l	/



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