

INTERRELATIONS BETWEEN BLOOD SERUM LEVELS OF PERSISTENT ORGANIC POLLUTANTS AND THEIR DETERMINANTS IN INUIT, POLISH AND UKRAINIAN MALES (CLEAR PROJECT)

1. Virissa Lenters, *Institute for Risk Assessment Sciences, The Netherlands*
2. Bo AG Jönsson, *Lund University Hospital, Sweden*
3. Cathrine Thomsen, *Norwegian Institute of Public Health, Norway*
4. Lars Rylander, *Lund University Hospital, Sweden*
5. Gunnar Toft, *Aarhus University Hospital, Denmark*
6. Jens Peter Bonde, *Bispebjerg University Hospital, Denmark*
7. Aldert H Piersma, *National Institute for Public Health and the Environment (RIVM), The Netherlands*
8. Roel Vermeulen, *Institute for Risk Assessment Sciences, The Netherlands*
9. Dick Heederik, *Institute for Risk Assessment Sciences, The Netherlands*
10. CLEAR, <http://www.inuendo.dk/clear>

Background and Aims: The overall objective of the multi-center CLEAR project is to investigate the possible impact of climate change on human exposure to environmental contaminants and their impact on fertility and child development. CLEAR is a follow-up of the INUENDO project (Bonde et al 2008), comprising parent-child cohorts from Arctic and two local European populations. Numerous environmental contaminants, notably persistent organic pollutants (POPs), are suspected endocrine modulators. As many POPs have common determinants, we anticipate that future epidemiological analyses could suffer from multi-collinearity and multiple testing issues, and thus explored multivariate data analysis approaches.

Methods: Cross-sectional serum blood concentrations of POPs were measured in 602 male partners of pregnant women recruited in 2002-04; 199 Inuit from Greenland, 197 from Warsaw, Poland, and 206 from Kharkiv, Ukraine. Brominated flame retardants, including the polybrominated diphenyl ethers (PBDEs) BDE-28, 47, 99, 100, 153, 154, and 183 and brominated biphenyl BB-153 were measured in a subset of 300 by GC-HR/MS. Six metabolites of di(2-ethylhexyl)phthalate (DEHP) and seven perfluorinated compounds were measured by LC-MS/MS, in addition to dichlorodiphenyldichloroethane (p,p'-DDE) and polychlorinated biphenyl congener (PCB-153) already characterized in the baseline INUENDO study (Jönsson et al 2005). We used bivariate correlation and exploratory factor analysis to explore the relationship between potential determinants and levels of POPs.

Results: Geometric mean concentrations of all compounds differed significantly between the three populations (ANOVA), and highest concentrations were generally measured in Greenland. All compounds showed right skewed distributions, and a high proportion of PBDEs were below the limit of quantification. Several PBDEs and PCB-153 were highly correlated with PFCs ($r > 0.7$).

Conclusions: There is a large contrast in body burdens of POPs in the CLEAR cohorts. Multivariate exploratory factor analysis may yield additional insight into common determinants of exposure to POPs in these three populations.

References:

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