

Predictive aggregate exposure assessments put considerable requirements to the input data, both the fate and exposure factors as the input levels. Average model parameter values and exposure factors could provide adequate central tendency estimates but they cannot reflect the significant variation that exists across geographical areas and populations. The combination of worst-case choices, to the contrary, results in unrealistic predictions. Therefore, there is a need for adequate (probabilistic) methods to deal with variation in exposure patterns both in time and space and within populations. Moreover, the quality of an assessment is determined by the quality of the data sets used. Preferably, coupled data sets are used, but these are often not available and data sets are selected according to availability. The advantages of our approach compared to the existing state of the art studies, lie on:

- integration of aggregate exposure assessment in a tiered approach to guarantee economy of effort;
- the flexibility - adaptation of the TAGS methodology that allows the user to tackle contaminants with completely different environmental fate, exposure pathways and exposure route by different parameterization and individual model selection;
- the fusion of mechanistic and probabilistic approaches in order to minimize the total boundaries of uncertainty;
- the development of an exposure biology based approach, taking into account inter-individual susceptibility and the different biological response to the same exposure levels as well as lifetime (incl. in utero and post-neonatal) exposure and evaluation of time windows of exposure;
- environmental exposure and metabolic processes are tackled simultaneously and continuously, describing in a realistic way the interaction among human body and the continuously changing environment;

- provision of complementary information on data quality issues, including probabilistic approaches and on verification strategies.

Key data and methodological gaps from the current state of the art will be identified and new rules for optimal cost-efficiency analysis of required measurements (environmental or biological) will be determined. Finally, several case studies of aggregate exposure assessment will be performed to check, refine and validate the tiered approach developed in the project. We propose including contaminants, which can be easily met in indoor-outdoor environments and consumer products (e.g. benzene and formaldehyde), food and drinking water (pesticides) and in consumer products and air (Bisphenol A, flame retardants).