




## EUROPEAN HUMAN BIOMONITORING INITIATIVE (HBM4EU) INDICATOR LEAFLETS

### INTEGRATED EXPOSURE MODELLING

**6.1** Number of chemicals/ priority substances for which external and internal modelling predictions have been made (as in WP12)

 **SPECIFIC GOAL 6:** Linking external to internal exposure in order to improve exposure models for risk assessment

 **RESPONSIBLE:** Aristotle University of Thessaloniki (AUTH), Greece  **WORK PACKAGE:** 12 (AUTH)

#### KEY MESSAGES

- An **HBM4EU exposure database (WP12)** has been launched containing exposure-related data for HBM4EU priority substances.
- The exposure database will provide users data needed for the exposure models which **will be used for associating external exposure with human biomonitoring (HBM) data.**
- The exposure modeling results (of existing integrated exposure models) and the estimation of internal dose of the 1<sup>st</sup> and 2<sup>nd</sup> set of prioritized substances has been concluded.

#### WHY

To help determine external exposure levels for priority chemicals based on both bottom up exposure estimates and exposure reconstruction starting from HBM data.

To assess newly proposed regulatory thresholds against exposure levels reconstructed starting from HBM data.

To identify exposure levels in Europe that are above reference exposure/intake levels.

To determine whether exposure to priority chemicals is driven by diet, consumer exposure, occupation or environmental contamination for different age groups.

To support risk assessment of chemical mixtures by quantifying the effect of potential biochemical and metabolic interactions among mixture components.

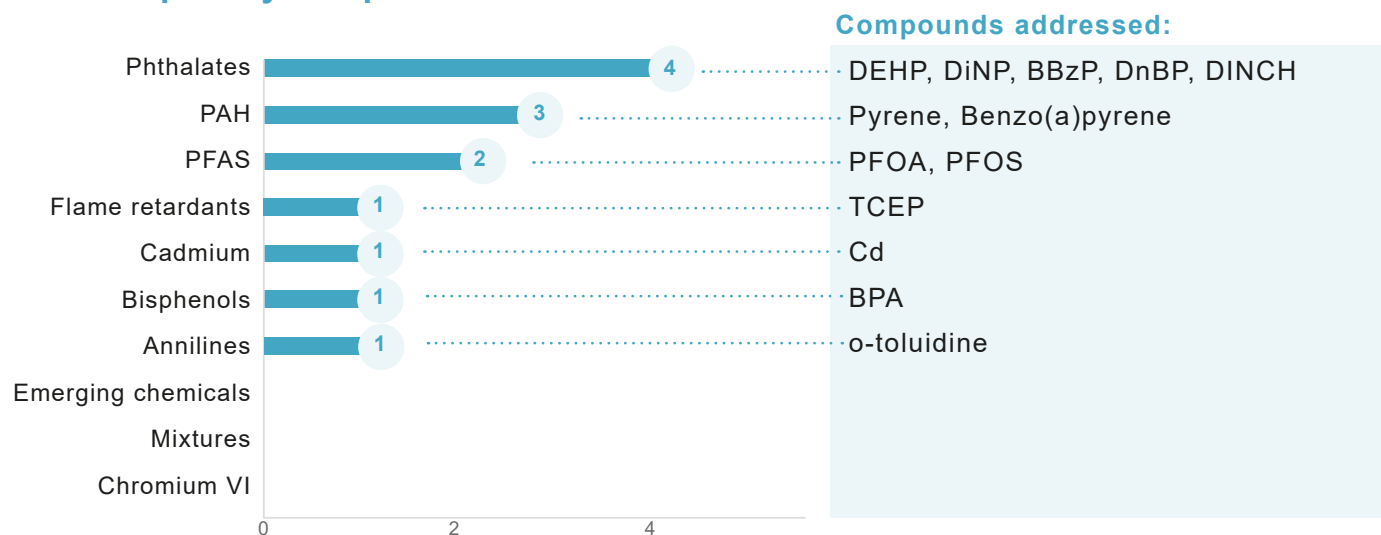




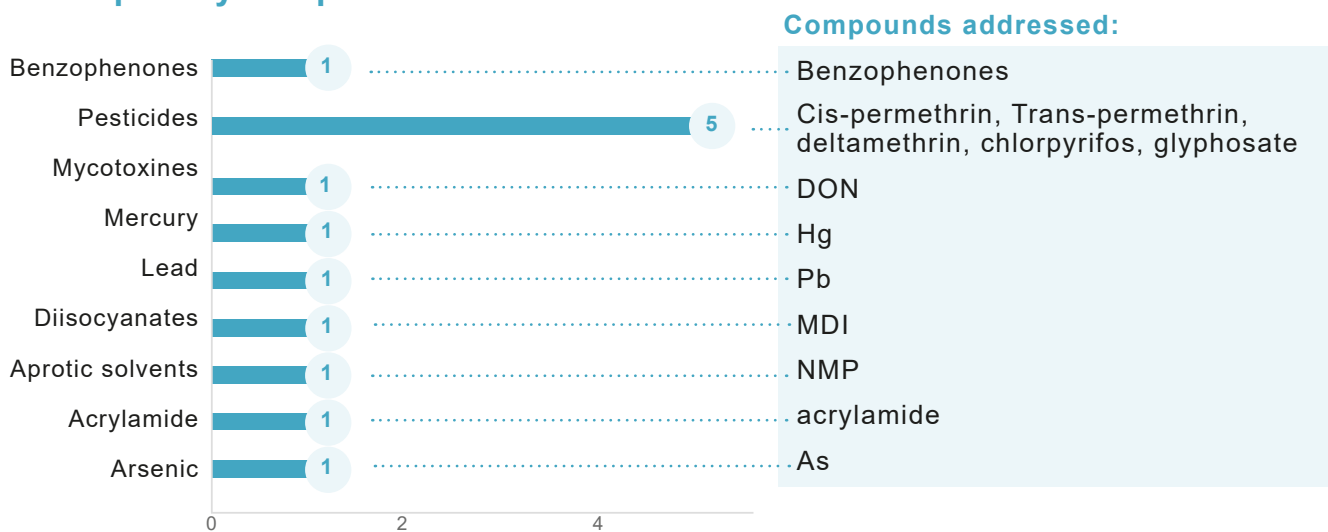
## Results

Number of priority chemicals for which integrated external and internal exposure models have been parameterized and validated

### 1<sup>st</sup> set of priority compounds



### 2<sup>nd</sup> set of priority compounds



### Our results show that:

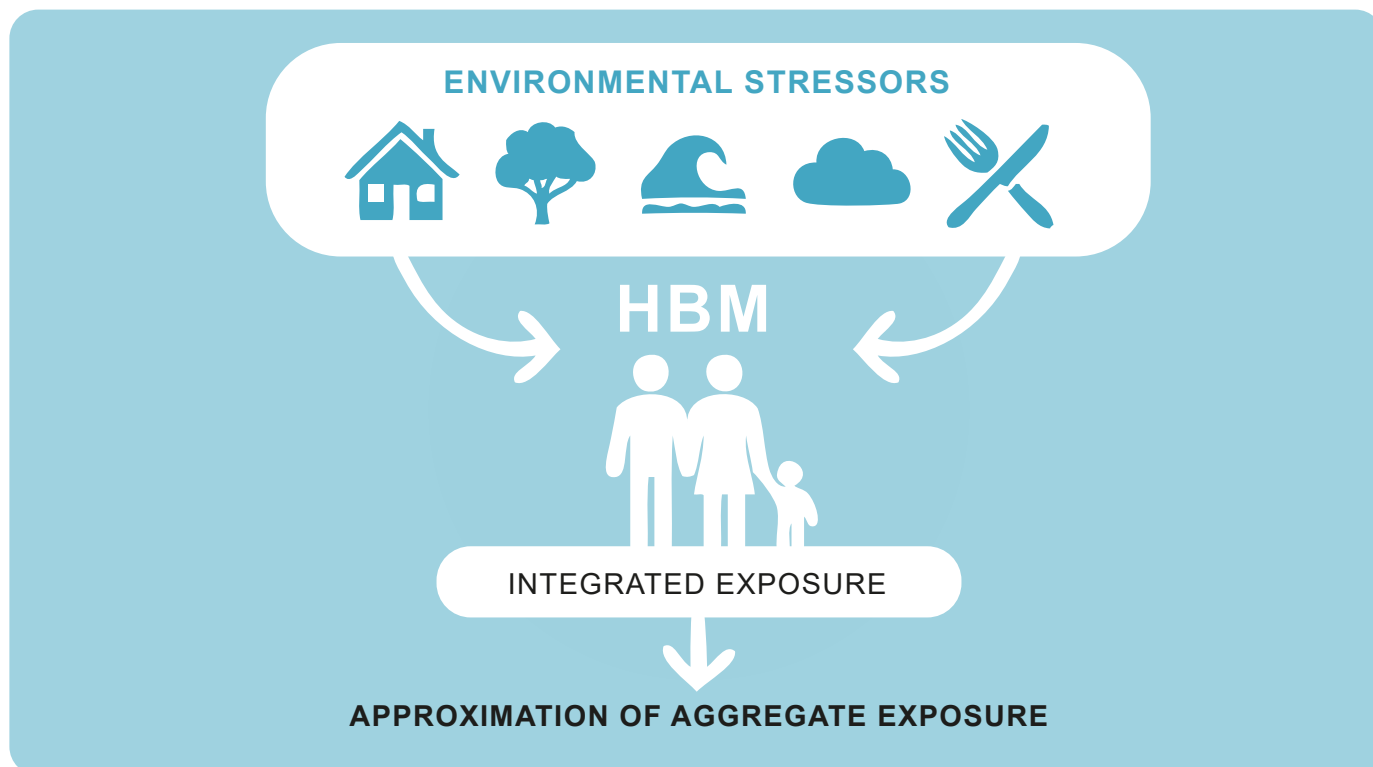
- Average external exposure is below the current regulatory safety thresholds for most of the assessed 1<sup>st</sup> set priority chemicals.
- Outliers are BBzP, PFOS and Cd, of which the daily intake is close to the tolerable daily or weekly intake and ortho-toluidine, of which the mean daily intake would result in a cancer risk on the order of  $10^{-4}$  i.e. a non-acceptable level on EU population level.





## Methodology

HBM4EU integrated exposure modelling platform



### Exposure reconstruction (Reverse dosimetry) AD12.5, D12.8

Contribution of different pathways and routes of exposure will be identified

Better insight into potential sources

Allows development of more informed and appropriate risk reduction strategies

Determination of risk characterisation ratios and evaluation of new regulatory thresholds for HBM4EU priority compounds (D12.5, D12.10)

*PBTK = physiologically based toxicokinetic*

### Refined PBTK modelling D12.4, D12.9

PBTK models describe the behaviour and fate of environmental chemicals following exposure. HBM data reflect individual absorption, distribution, metabolism and excretion (ADME) characteristics of chemicals, HBM data offer an excellent opportunity for the refinement and validation of PBTK models.

Estimation of internal dose in relevant target tissues and biological fluid levels could be used to establish quantitative AOPs



HBM4EU WP12 database, <https://www.hbm4eu.eu/deliverables/>

