



EUROPEAN HUMAN BIOMONITORING INITIATIVE (HBM4EU) INDICATOR LEAFLETS

EXPOSURE DISTRIBUTIONS AND EUROPEAN REFERENCE VALUES

Indicator 2.1 Number of biomarkers for which exposure distributions and/or reference values are calculated within HBM4EU

SPECIFIC GOAL 2: Developing a common methodology for the interpretation and use of HBM data in policy making

RESPONSIBLE: Flemisch Institute for Technological Research (VITO), Belgium **WORK PACKAGE:** 10 (VITO)

KEY MESSAGES







- **Exposure distributions and European Reference values (ERVs)** represent the exposure levels of European citizens to chemicals.
- **The first exposure distributions have been calculated and reported in 2019 (D6.10).**
- **No ERVs** have been calculated yet. First ERVs based on new HBM4EU data expected in 2020.
- Due to data gaps not feasible to calculate exposure distributions or ERVs for all prioritised substances in all age groups.
- **Exposure distributions and ERVs** can be **combined with** Human Biomonitoring - Guidance values (**HBM-GV**) to create **health impact indicators**.

WHY

- 1 Knowledge gap on internal chemical exposure levels of European citizens
- 2 Collect existing and new HBM data to calculate exposure distributions and/or reference values to demonstrate the chemical exposure of EU citizens.
- 3
 - Exposure distributions demonstrate a more detailed exposure profile of a specific study population
 - Reference values provide a reference point which can be used to compare exposure levels between geographical regions and to monitor time trends
- 4 Results can support policy makers to identify priorities and evaluate policies

RESULTS

 Reference ranges not available in a region  Reference ranges available in a region  Number of exposure distributions available

EXPOSURE DISTRIBUTIONS	ERVs	North	East	South	West	EXPOSURE DISTRIBUTIONS	ERVs	North	East	South	West
Phthalates						DINCH					
2017		X	X	X	X	2017		X	X	X	X
2018		X	X	X	X	2018		X	X	X	X
2019	 27	✓	✓	✓	✓	2019	 1	X	X	X	✓
2020	 27	✓	✓	✓	✓	2020	 1	X	X	X	✓
2021	 27	✓	✓	✓	✓	2021	 1	X	X	X	✓





EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Bisphenols						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	15	✓	✗	✓	✓	
2020	15	✓	✗	✓	✓	
2021	15	✓	✗	✓	✓	

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
PFASs						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	15	✓	✗	✓	✓	
2020	15	✓	✗	✓	✓	
2021	15	✓	✗	✓	✓	

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Brominated FR						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	12	✓	✓	✗	✓	
2020	12	✓	✓	✗	✓	
2021	12	✓	✓	✗	✓	

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Organophosphorus FR						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	2	✓	✗	✗	✓	
2020	2	✓	✗	✗	✓	
2021	2	✓	✗	✗	✓	

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Cadmium						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	37	✓	✓	✓	✓	
2020	37	✓	✓	✓	✓	
2021	37	✓	✓	✓	✓	

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Chromium VI						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	0		✗	✗	✗	✗
2020	0		✗	✗	✗	✗
2021	0		✗	✗	✗	✗

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
PAHs						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	10		✗	✗	✓	✓
2020	10		✗	✗	✓	✓
2021	10		✗	✗	✓	✓

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Anilines						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	1	✓	✗	✗	✗	
2020	1	✓	✗	✗	✗	
2021	1	✓	✗	✗	✗	





EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Lead						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	19	✓	✓	✗	✓	
2020	19	✓	✓	✗	✓	
2021	19	✓	✓	✗	✓	

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Mercury						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	27	✓	✓	✓	✓	
2020	27	✓	✓	✓	✓	
2021	27	✓	✓	✓	✓	

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Acrylamide						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	0		✗	✗	✗	✗
2020	0		✗	✗	✗	✗
2021	0		✗	✗	✗	✗

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Mycotoxins						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	0		✗	✗	✗	✗
2020	0		✗	✗	✗	✗
2021	0		✗	✗	✗	✗

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
UV-filters						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	5	✓	✗	✗	✓	
2020	5	✓	✗	✗	✓	
2021	5	✓	✗	✗	✓	




EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Diisocyanates						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	0		✗	✗	✗	✗
2020	0		✗	✗	✗	✗
2021	0		✗	✗	✗	✗

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Pesticides (Glyphosate / AMPA)						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	1		✗	✗	✗	✓
2020	1		✗	✗	✗	✓
2021	1		✗	✗	✗	✓

EXPOSURE DISTRIBUTIONS		ERVs	North	East	South	West
Pesticides (Pyrethroids)						
2017			✗	✗	✗	✗
2018			✗	✗	✗	✗
2019	2		✗	✗	✗	✓
2020	2		✗	✗	✗	✓
2021	2		✗	✗	✗	✓





EXPOSURE DISTRIBUTIONS	ERVs	North	East	South	West
Pesticides (Organophosphorus)					
2017		X	X	X	X
2018		X	X	X	X
2019  6		✓	X	X	✓
2020  6		✓	X	X	✓
2021  6		✓	X	X	✓

EXPOSURE DISTRIBUTIONS	ERVs	North	East	South	West
Pesticides (fipronil)					
2017		X	X	X	X
2018		X	X	X	X
2019 0		X	X	X	X
2020 0		X	X	X	X
2021 0		X	X	X	X

EXPOSURE DISTRIBUTIONS	ERVs	North	East	South	West
Arsenic					
2017		X	X	X	X
2018		X	X	X	X
2019  11		✓	X	✓	✓
2020  11		✓	X	✓	✓
2021  11		✓	X	✓	✓

Exposure distributions displayed in the figure are cumulated over the years
Last update 19/12/2019

ON TRACK

- Due to heterogeneity of existing European HBM data, it was decided to calculate exposure distributions for these data instead of ERVs. A strategy and R-script was developed to determine and visualize exposure distributions.
- First exposure distributions were reported in 2019 in Deliverable D10.6.

WORK IN PROGRESS

- European reference values (ERVs) will only be calculated for homogeneous HBM data. A strategy to derive ERVs was developed and will be further elaborated in the statistical analysis plan for the aligned studies of task 8.1 (D10.10).
- A script will be developed to calculate the ERVs. First ERVs based on new HBM data generated within HBM4EU expected in 2020.





METHODOLOGY

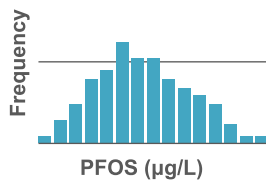
Collect existing and new European HBM data

Evaluate homogeneity¹:

Calculations performed by statistical working group according to SAP² developed:

Available data collections not homogeneous

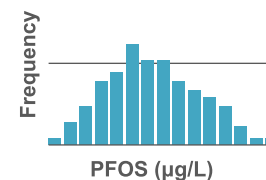
EXPOSURE DISTRIBUTIONS³



Individual data collections

Homogeneous data collections available

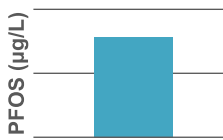
EXPOSURE DISTRIBUTIONS³



Individual or pooled data collections

ERVs³

■ ERV



Pooled data

Deliverable



WP5

Exposure distributions and ERVs can be combined with HBMGV to create health impact indicators

¹ Homogeneity; compatibility in terms of time period, population (age, gender,..etc.), analytical comparability (matrix, LOD/LOQ, ...), etc. addressed in the data collections.

² Statistical analysis plan

³ Graphs are for illustrative purpose only, figures are fictive.

Deliverable 10.2, Deliverable D10.6

