EUROPEAN HUMAN BIOMONITORING INITIATIVE (HBM4EU) INDICATOR LEAFLETS

EXPOSURE DISTRIBUTIONS AND EUROPEAN EXPOSURE VALUES

Indicator 2.1 Number of biomarkers for which exposure distributions and/or exposure 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)

KEYMESSAGES

- **Exposure distributions and European Exposure values** (EEVs) represent the exposure levels of European citizens to chemicals.
- **The first exposure distributions have been calculated and reported in 2019 (D6.10) and updated in 2021 (D10.9) and can be found in the HBM4EU dashboard.**
- EEVs are calculated for Cd, bisphenols, PAHs, phthalates and DINCH and PFAS.
- Due to data gaps it is not feasible to calculate exposure distributions or EEVs for all prioritised substances in all age groups.
- **Exposure distributions** and **EEVs** 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 exposure values to demonstrate the chemical exposure of EU citizens.
3.
   - Exposure distributions demonstrate a more detailed exposure profile of a specific study population
   - European exposure 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

This project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 733032.

For more information please contact:
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RESULTS

- European exposure values (EEVs) are calculated on data from the HBM4EU Aligned Studies.
- EEVs are available for Cd, Bisphenols (BPA, BPS, and BPF) and PAHs (1-napthol, 2-napthol, 2-hydroxyfluorene, 1-hydroxyphenanthrene, 3-hydroxyphenanthrene, 1-hydroxypyrene) in adults, PFASs (PFOS, PFOA, PFNA, PFHxS) in teenagers and phthalates (BBzP, DiBP, DnBP, DEP, DiNP, DiDP, DEHP) and DINCH in children and teenagers (separate EEVs derived for children 6-11 yrs, and teenagers 12-18 yrs).
- EEVs are only calculated when data from all 4 EU regions is available (North, East, South and West) and if the detection frequency is >60%

✗ Reference ranges not available in a region ✓ Exposure distributions avalaible in a region

Number of exposure distributions available

Number of new exposure distributions from Aligned studies

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
Phthalates					
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019		✓ 27	✓	✓	✓
2020		✓ 31	✓	✓	✓
2021		✓ 31	✓	✓	✓
2022	7	✓ 33	✓ 23	✓	✓

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
DINCH					
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019		✗ 1	✗	✗	✓
2020		✓ 5	✗	✓	✓
2021		✓ 12	✗	✓	✓
2022	1	✓ 12	✗ 23	✓	✓

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
Bisphenols					
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019		✓ 15	✗	✓	✓
2020		✓ 17	✗	✓	✓
2021		✓ 21	✓	✓	✓
2022	3	✓ 22	✓ 11	✓	✓

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
PFAS					
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019		✓ 15	✗	✓	✓
2020		✓ 17	✓	✓	✓
2021		✓ 19	✓	✓	✓
2022	4	✓ 20	✓ 9	✓	✓

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
Brominated FR					
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019		✓ 12	✓	✗	✓
2020		✓ 15	✓	✗	✓
2021		✓ 16	✓	✗	✓
2022	0	✓ 17	✓ 4	✓	✓

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
Organophosphorus FR					
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019		✓ 2	✗	✗	✓
2020		✓ 4	✗	✗	✓
2021		✓ 8	✓	✓	✓
2022	0	✓ 8	✓ 7	✓	✓

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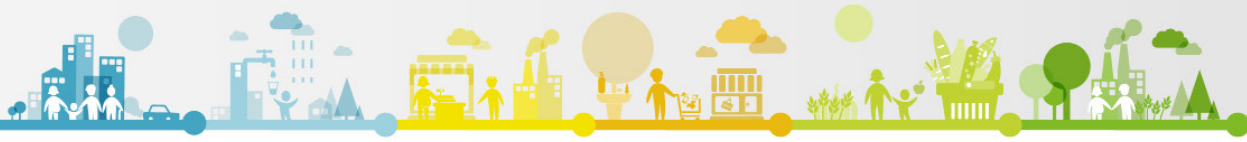

Cadmium

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019	37	✓	✓	✓	✓
2020	40	✓	✓	✓	✓
2021	41	✓	✓	✓	✓
2022	41 9	1 ✓	✓	✓	✓

Chromium VI

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019		✗	✗	✗	✗
2020		✗	✗	✗	✗
2021		✗	✗	✗	✗
2022	0	✗	✗	✗	✗

PAHs

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019	10	✗	✗	✓	✓
2020	13	✓	✗	✓	✓
2021	18	✓	✓	✓	✓
2022	19 10	6 ✓	✓	✓	✓

Anilines

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019	1	✓	✗	✗	✗
2020	1	✓	✗	✗	✗
2021	1	✓	✗	✗	✗
2022	1	0 ✓	✗	✗	✗

Lead

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019	19	✓	✓	✗	✓
2020	21	✓	✓	✓	✓
2021	23	✓	✓	✓	✓
2022	24	0 ✓	✓	✓	✓

Mercury

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019	27	✓	✓	✓	✓
2020	29	✓	✓	✓	✓
2021	31	✓	✓	✓	✓
2022	32	0 ✓	✓	✓	✓

Acrylamide

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019		✗	✗	✗	✗
2020		✗	✗	✗	✗
2021	1	✗	✗	✓	✓
2022	2 9	0 ✓	✗	✓	✓

Mycotoxins

EXPOSURE DISTRIBUTIONS	EEVs	North	East	South	West
2017		✗	✗	✗	✗
2018		✗	✗	✗	✗
2019		✗	✗	✗	✗
2020		✗	✗	✗	✗
2021	1	✓	✗	✗	✓
2022	2 6	0 ✓	✓	✓	✓

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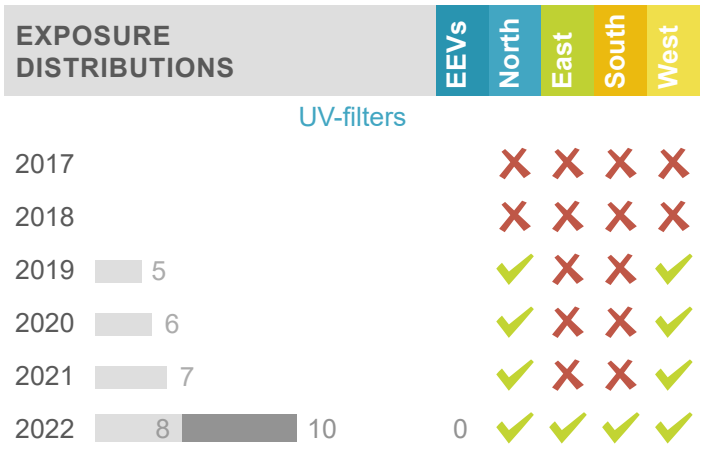

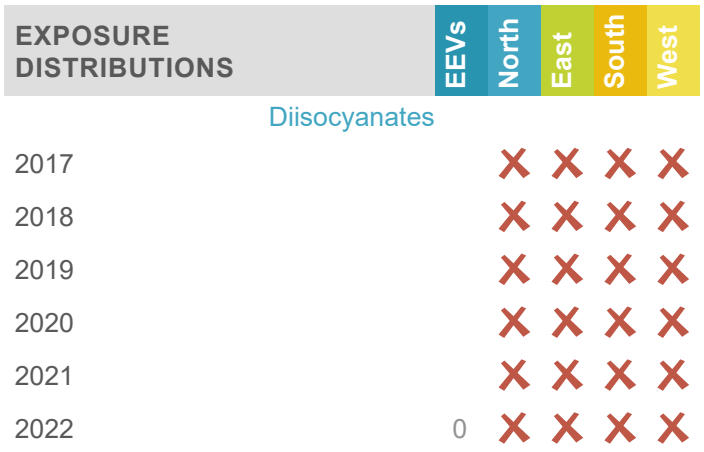

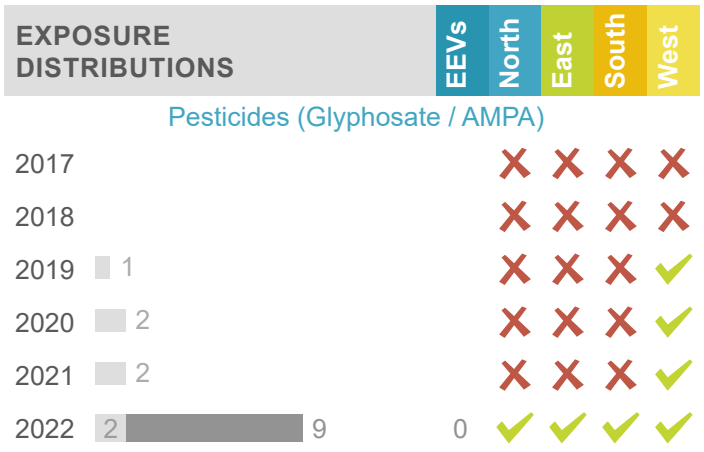

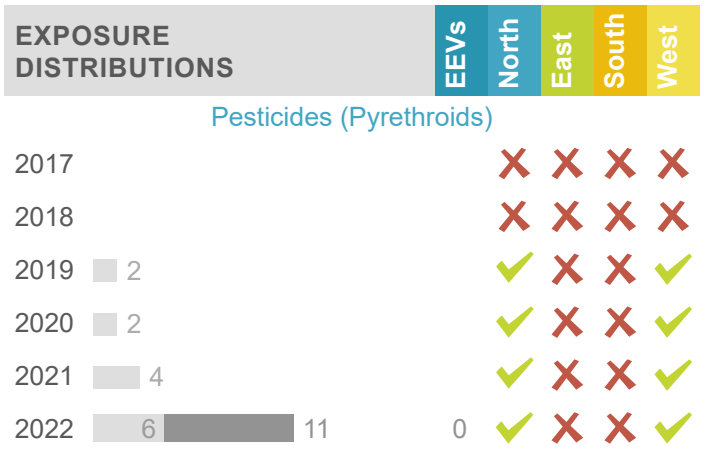

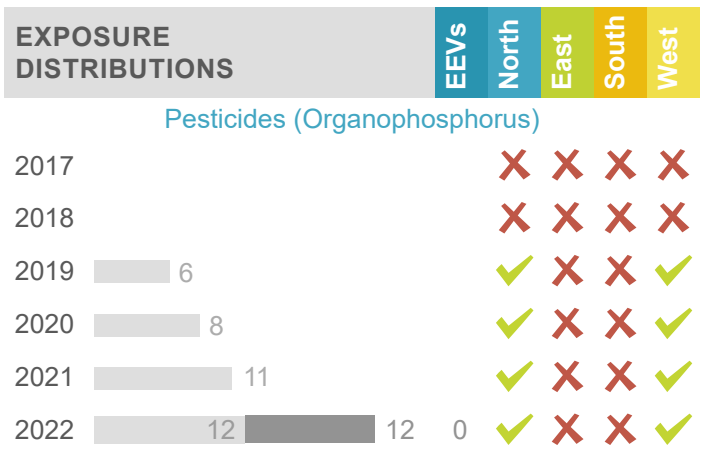

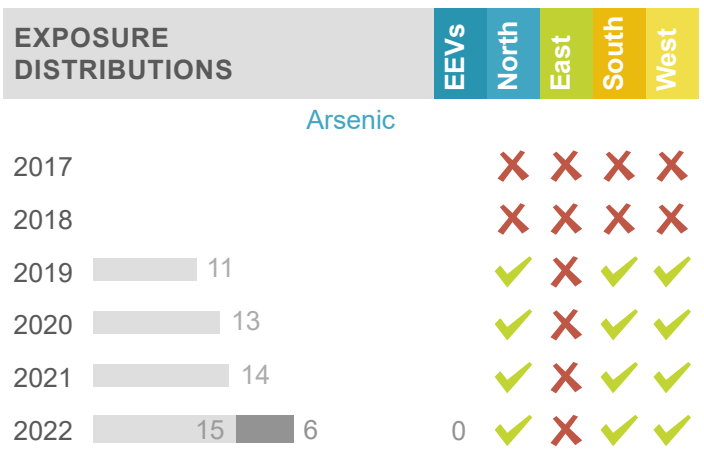

Exposure distributions displayed in the figure are cumulated over the years. **Last update 29/06/2022**

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.
- Exposure distributions can be consulted in the online **HBM dashboard**

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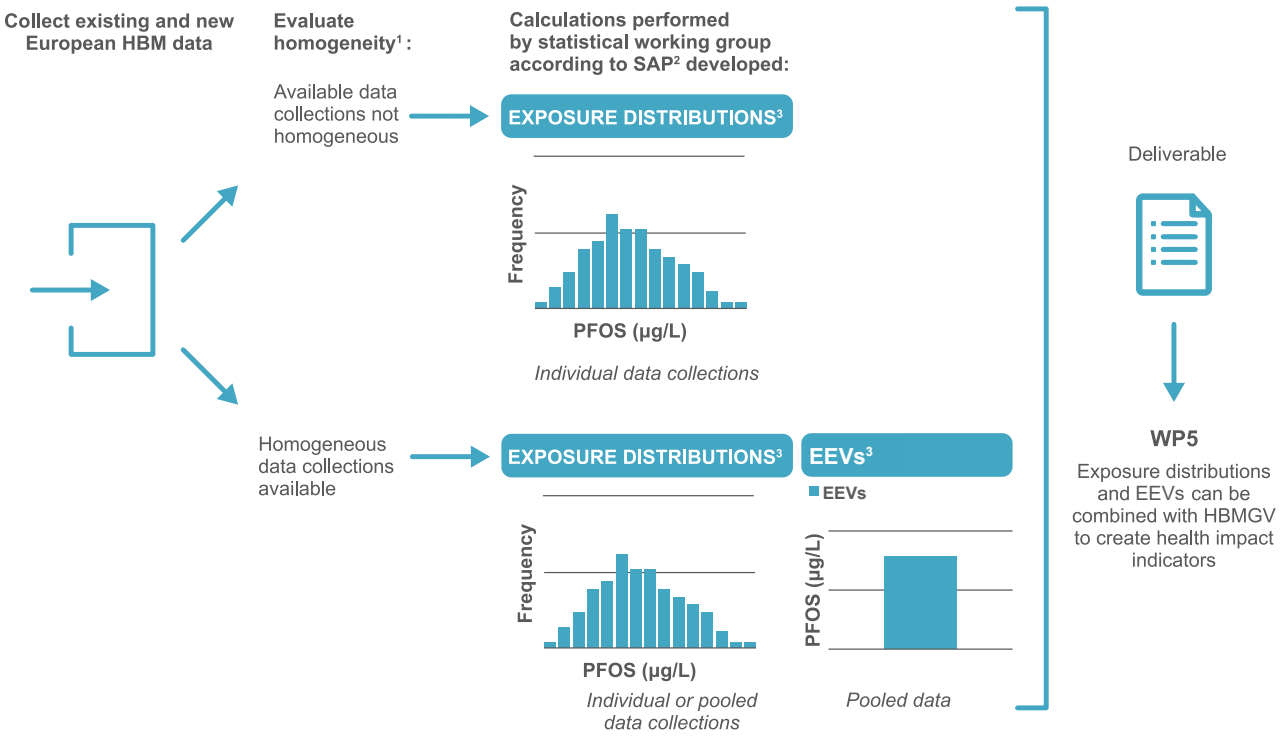
METHODOLOGY



[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
HBM Dashboard

Last version 29/06/2022

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