HBM4EU

science and policy
for a healthy future

HBM4EU advancing human biomonitoring in Europe

Greet Schoeters

VITO

International Conference on Integrated Problem-Solving Approaches to Ensure Schoolchildren's Health- Budapest,
23-24 May 2019

Chemicals and children

Exposure:

Starting at the beginning of life: POPs, PFASs, As, Hg, Pb…
Plastic toys, foodpackaging and drinkbottles
Indoor pollution
Soil contamination

Chemicals and children

High vulnerability:
High uptake per kg body weight
Kinetics and metabolism
Growth and development

Adverse effects associated with pollutants:

- Neurodevelopment: Hg, Pb, As, organohosphate pesticid
  PCBs
- Immune effects: PFASs
- Obesity: BPA
- Sexual development: phthalates

Human biomonitoring

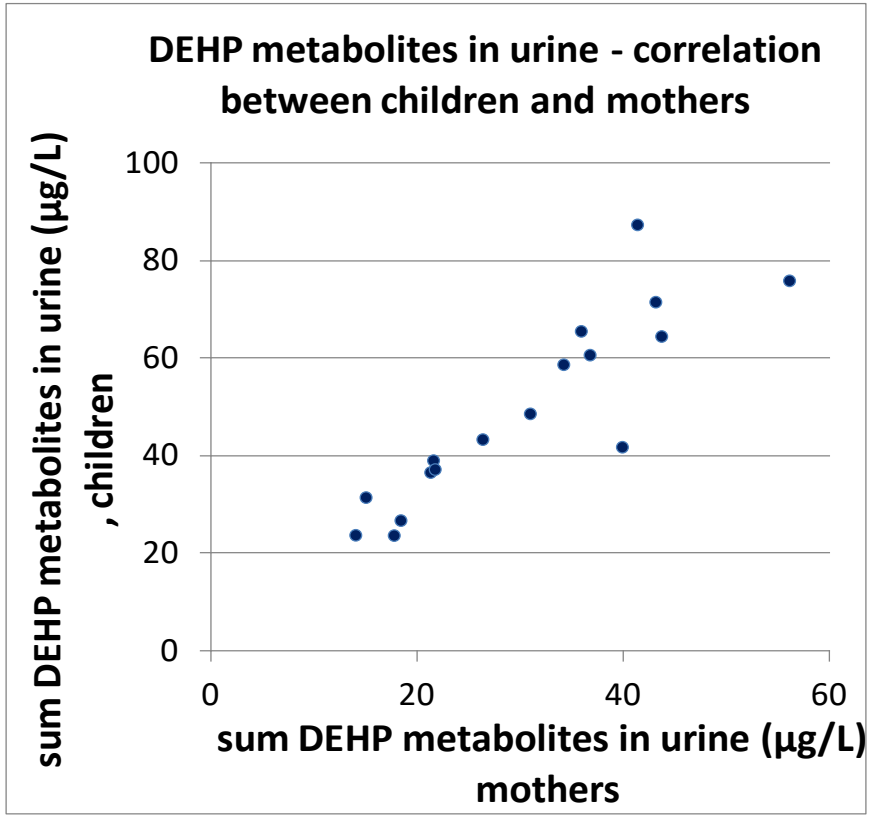
measures chemicals, their metabolites or reaction products in human tissues

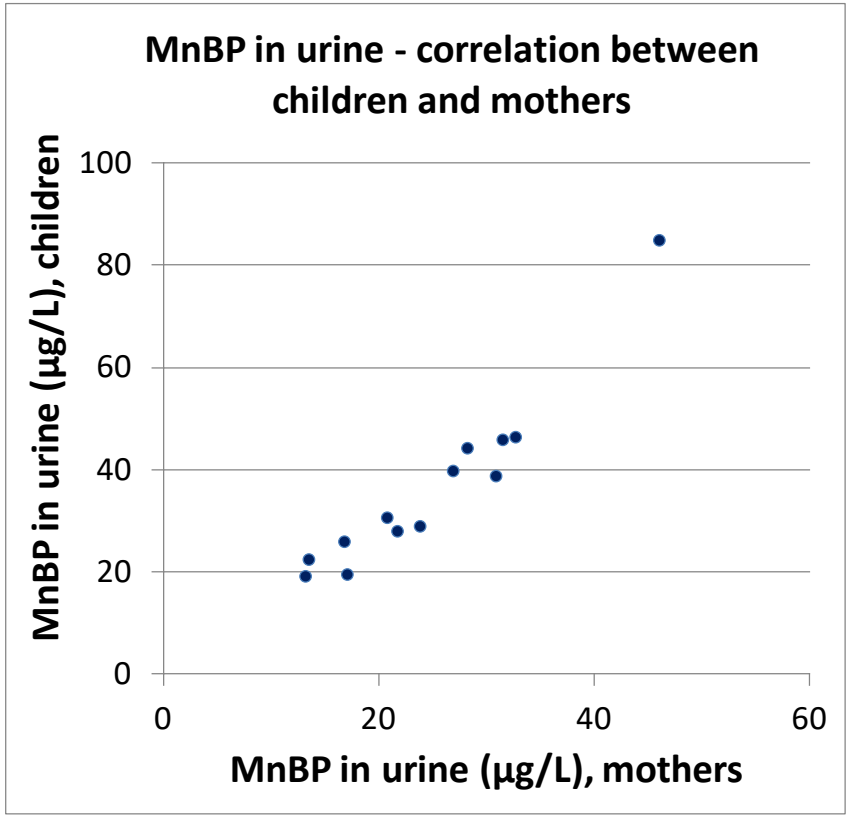
BIOMONITORING MAKES POLLUTION PERSONAL

Dose=f (C environment , behaviour, kinetics, personal characteristics)

Phtahalate metabolites

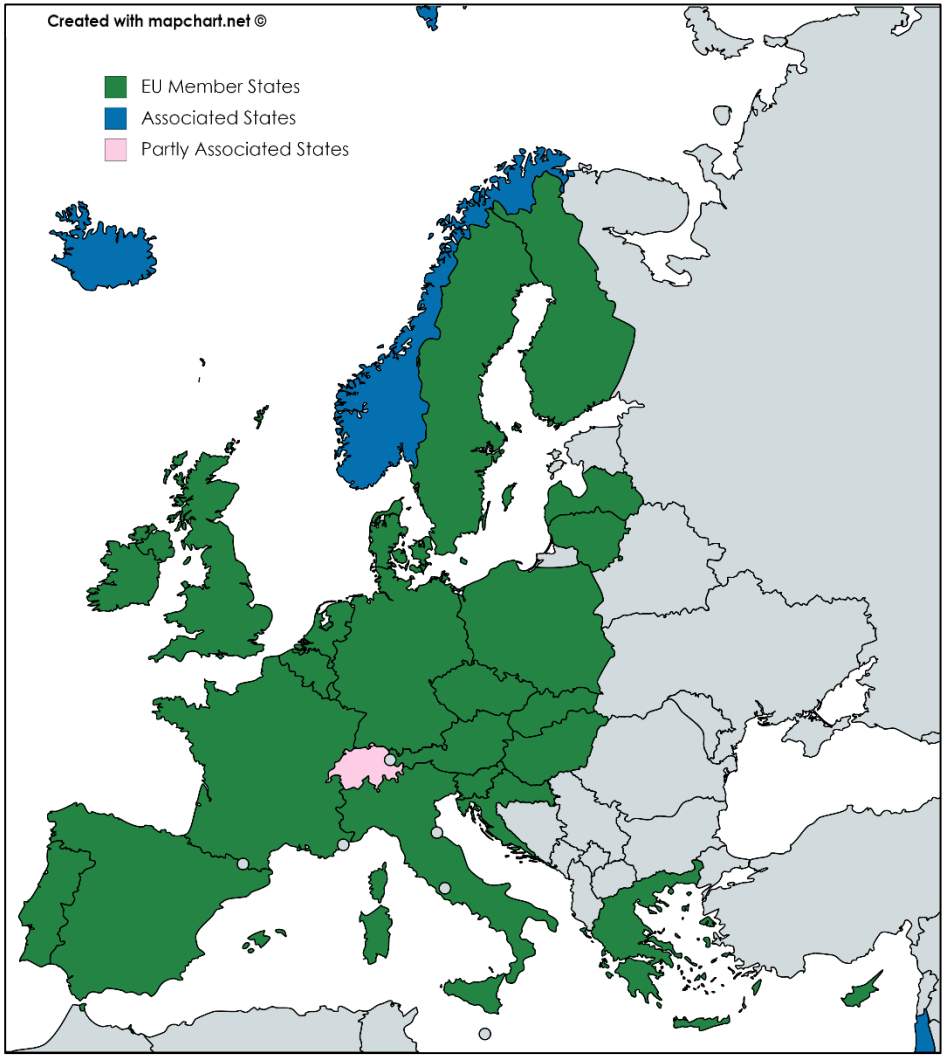
Experience from the DEMOCOPHES project





1844 children (7-10 yrs)
1844 mothers (3(-42 yrs)

Human Biomonitoring for Europe (HBM4EU)



Timeframe and budget:

- 5 years (2017-2021)
- European Joint Programme under Horizon 2020
- Total budget: € 74 million

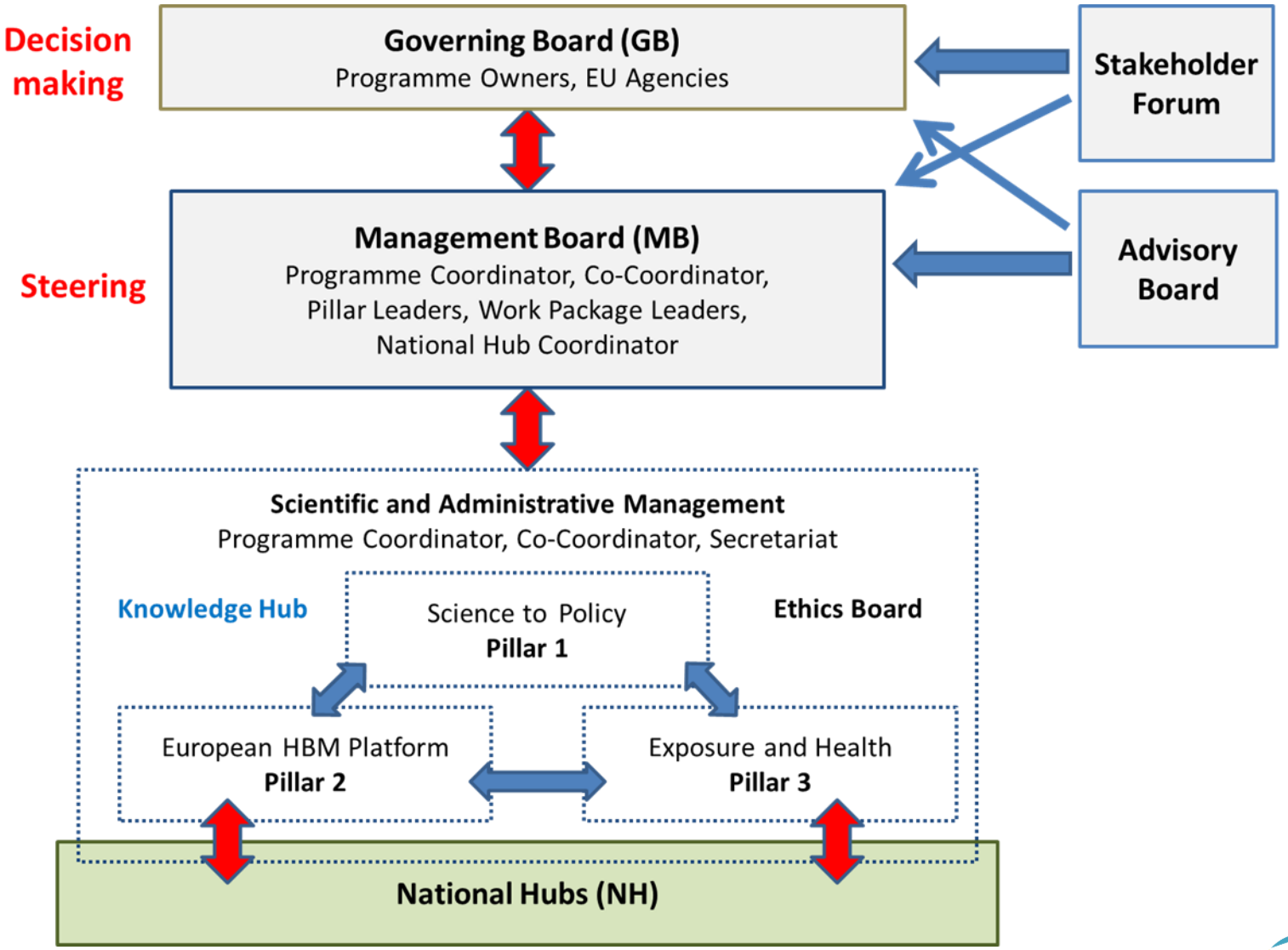
28 countries and the European Environment Agency:

- 24 EU Member States
- 3 associated countries
- Switzerland

Coordinated by the German Environment Agency (UBA)

Umwelt Bundesamt

Governing Structure of HBM4EU



Work packages clustered under three pillars

Pillar 1: Science to Policy

- WP4: Prioritisation and input to the annual work plan
- WP5: Translation of results into policy
- WP6: Sustainability and capacity building

Pillar 2: European HBM Platform

- WP7: Survey design and fieldwork preparation
- WP8: Targeted field work surveys and alignment at EU level
- WP9: Laboratory analysis and quality assurance
- WP10: Data management and analysis

Pillar 3: Exposure and Health

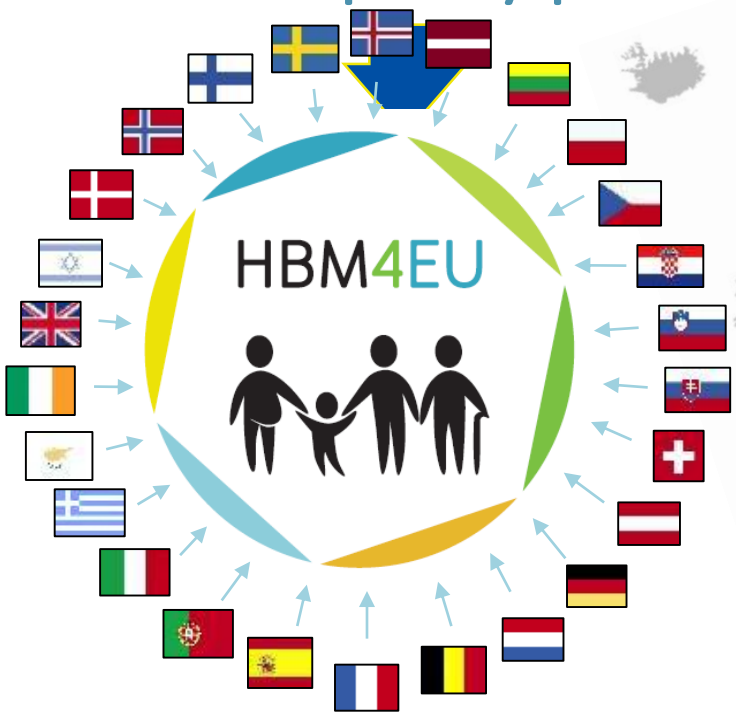
- WP11: Linking HBM, health studies, and registers
- WP12: From HBM to exposure
- WP13: Establishing exposure health relationships
- WP14: Effect Biomarkers
- WP15: Mixtures, HBM and human health risks
- WP16: Emerging Chemicals

- WP3: Internal Calls
- WP17: Ethics Requirements
- WP2: Knowledge Hub
- WP1: Programme management and coordination

Scientific and Administrative Management

National and EU Stakeholders; Advisory Board

Science to policy pillar: goals



science and policy
for a healthy future

Answer open policy relevant questions as defined by EU Services and partner countries

Give policy makers a fast and easy access to results and data

Bridge the gap between science and policy

A unique science policy interface to capture different perspectives

EU level

DG ENV

DG RTD

DG GROW

DG Sante

DG EMPLOY

JRC
scientific and technical support

ECHA
REACH regulation

EEA
environment data, information, assessment

EFSA
risk assessment for food and feed

HBM4EU

National hubs

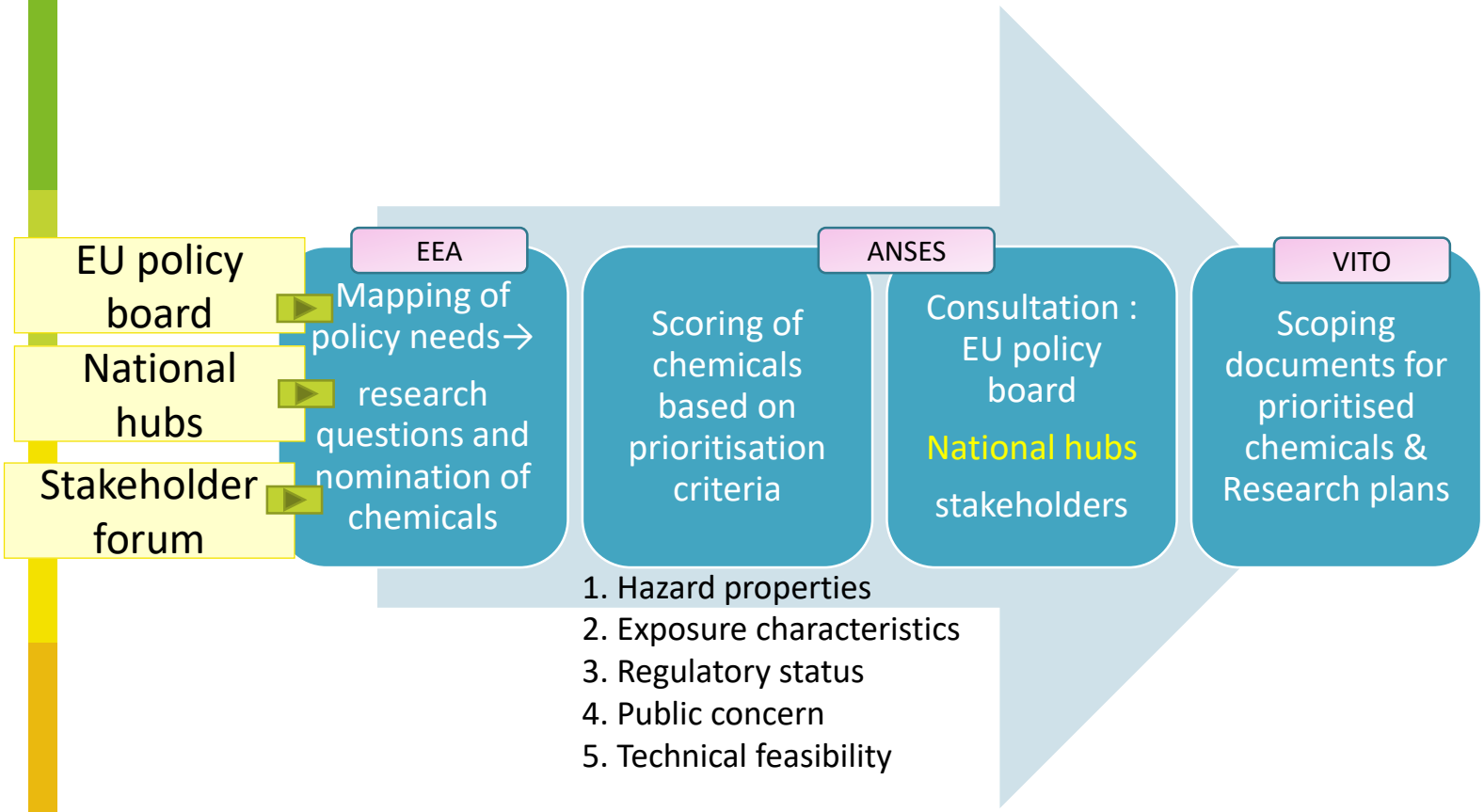
Ministeries
Policy makers

Stakeholders:
Citizens
National NGOS, Industry representatives

Research institutes:
National Expertise

From policy to science: prioritising chemicals

Transparancy and participation



First round

Priorisation 2016

9 substance groups:

1. Phthalates/DINCH
2. Bisphenols
3. Per-/Polyfluorinated compounds
4. Flame Retardants
5. Cadmium & Chromium
6. PAHs and air pollutants
7. Anilin family: MOCA
8. Chemical mixtures
9. Emerging chemicals

Second round

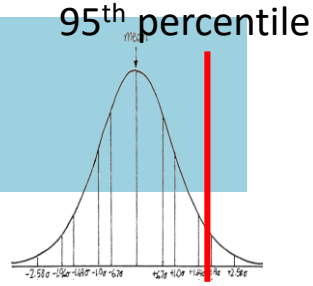
Priorisation 2018

9 substance groups:

1. Acrylamide
2. Aprotic solvents
3. Arsenic
4. Diisocyanites
5. Lead
6. Mercury
7. Mycotoxines
8. Pesticides
9. UV filters

Policy questions

What is the level of internal exposure to chemicals of EU population?



Are " safe " limit values exceeded?

Monitor spatial trends

Monitor time trends

Assess the impact of policy measures in EU

- Restricted use of BPA
- Restricted use of phthalates: DEHP, DnBP, BBzP, DiNP, DnOP, DiDP in toys
- Restriction of per-fluorinated compounds: PFOA and PFOS

From science to policy

Translation of science into policy advice

1. Health Based Guidance Values for exposure biomarkers:

2. Improve risk assessment strategies

3. HBM based indicators to follow spatial and time trends

4. Participative and deliberative process to translate results in policy options

European HBM Platform: comparable HBM data

HBM platform

Survey design

- Map existing HBM data and identify gaps
- Protocols for field work, questionnaires, informed consents,
- biobanking and sample exchange

Ulrike Fiddicke

Umwelt Bundesamt

Targeted fieldwork surveys

- Aligning current studies
- New targeted surveys
- Analysis of biobanked samples

Ovnair Sepai

Public Health England

Protecting and improving the nation's health

Lab analysis and quality assurance

- Networks of laboratories
- Quality assurance and quality control
- Develop new analytical methods
- Harmonised analysis of biomarkers

A. Castaño&M.Esteban

cnsa Centro Nacional de Sanidad Ambiental

isc Instituto de Salud Carlos III

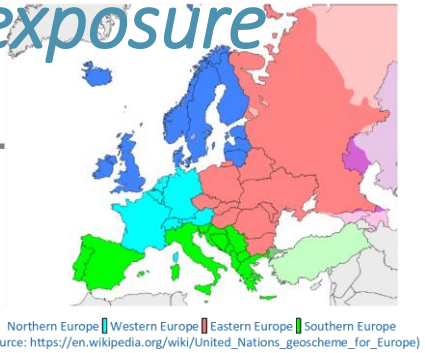
Data management and analysis

- Data management and statistical analysis
- Derive EU-wide reference exposure values
- Make HBM data available via IPCHEM

G. Schoeters & E. Govarts

vito

Generate new harmonized data on recent exposure (2014-2018)



27 European countries- 497 Million inhabitants

2 - 3 sampling units selected per region

North - 21% | West - 41% | South – 28% | East-11%

10-11 PSU selected
300 participants per PSU

	~2950 Children 6-11 y			
Phthalates DINCH	NO DK	**FR** **DE** NL	IT SL EL	HU SK PL
	~2900 Teenagers 12-18 y			
Phthalates DINCH	NO **SE**	**FR** **DE** BE	**ES** SL EL	CZ PL SK
	~3165 Adults 19--39 y			
Bisphenols	DK FI **IS**	**FR** CH **DE** LU	**PT** HR	CZ PL

Geographical coverage: Children 6-11 years

Targeted analysis

- ✓ Phthalates + DINCH
- ✓ Flame retardants

Country coverage

North 21%
-Norway
-Denmark

East 11%
-**Hungary**
-Slovakia
-Poland

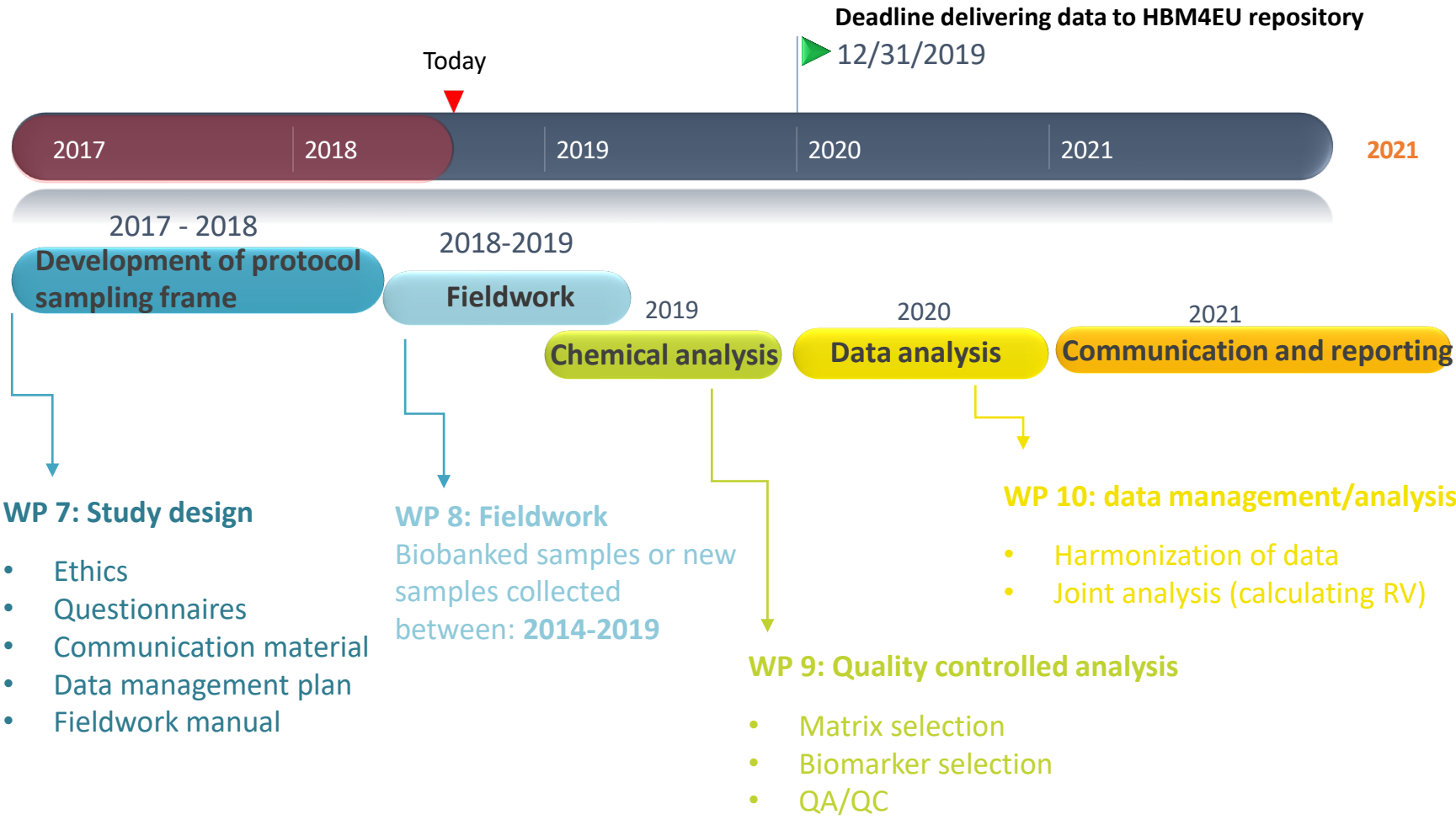
South 28%
-Slovenia
-Greece
-Italy

West 40%
-France
-Germany
-The Netherlands

Sample size

2950

Time line: Alignment of studies



New harmonized data on recent exposure in EU 2014-2018

Descriptive information:

- **What is the average exposure level?**
- **What are the higher exposure levels? (95th percentile)**
- **Stratify according to sex, age, EU region, population density, education level**

Main drivers of exposure: diet, occupation, environment, consumer behaviour?

- **Substance specific information from the questionnaires (WP7)**
- **Linkage to environmental/ indoor monitoring data? (WP12/IPCHEM)**

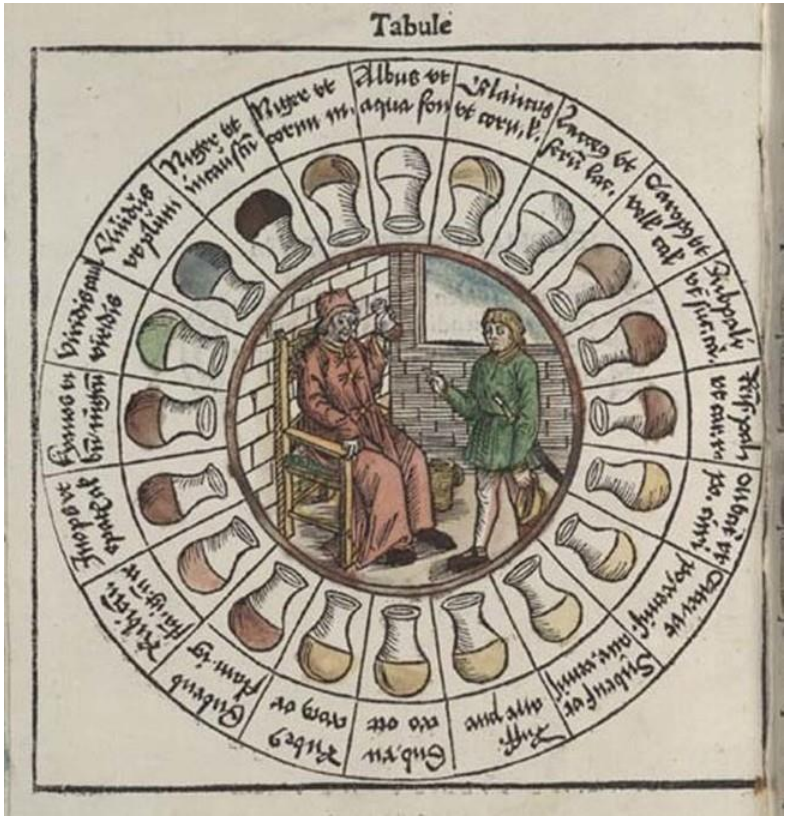
Link to health:

- **Measure additional -adverse outcome based- effectbiomarkers in the samples (WP13 & WP14)**
- **% of the population above "safe values" (EU wide HBM - HBGVs) -WP5**
  → Concern for Health Risk

Quality and comparability of the analytical results

HBM platform

- **Inventory of laboratories in Europe with experience in HBM analysis**
- **Laboratories for organising the QAQC**
- **Laboratories for analysis of HBM samples**
- **Laboratories for development of new methods**



HBM platform

Comparable HBM data in Europe

Alignment of sampling and field work protocols

Quality and comparability of the analytical results

Sharing data

HBM4EU Repository

Pseudonymous data

Metadata
Aggregated data
Anonymous data

Data to be findable and centralized in (IPCHEM)

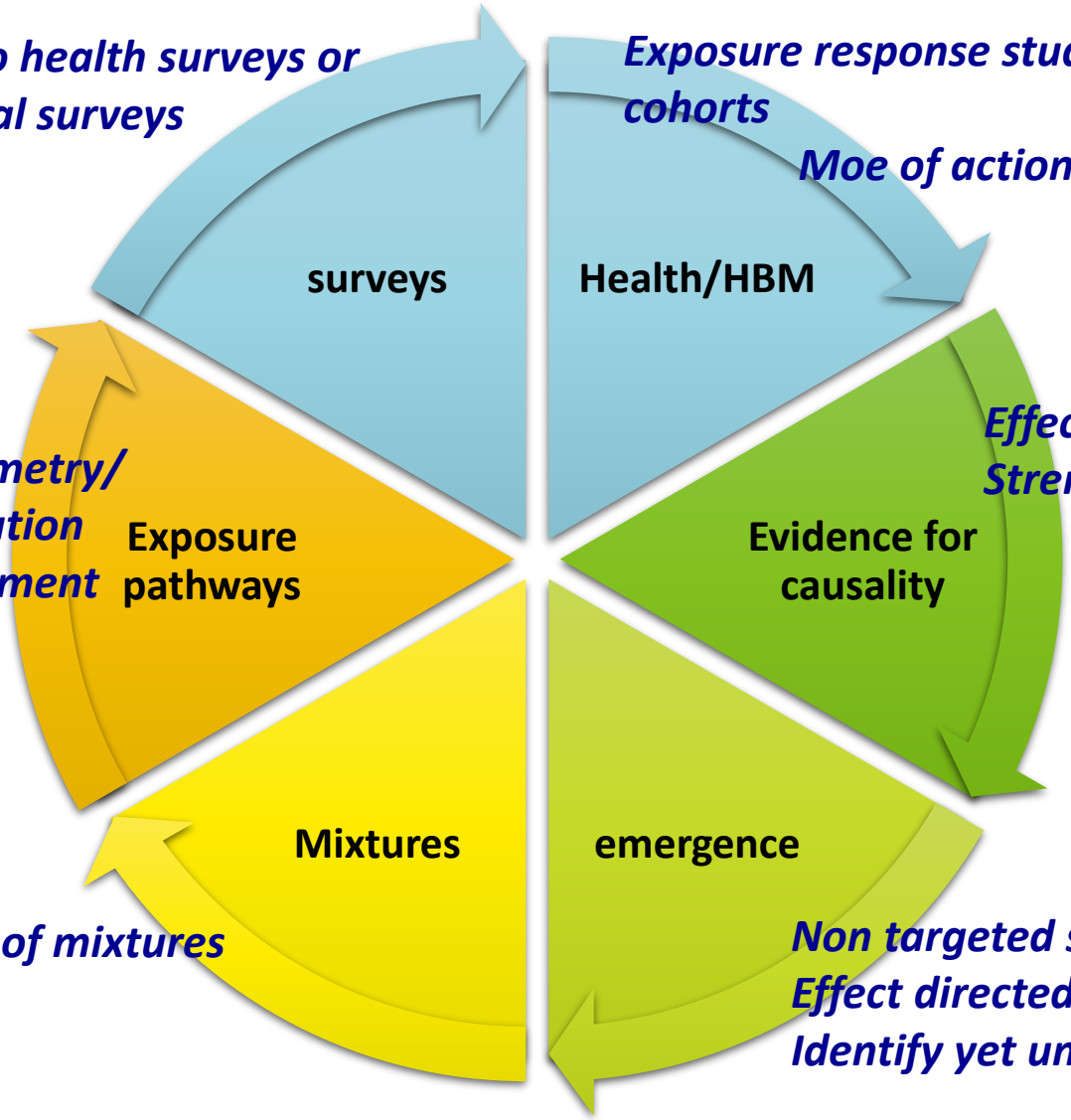
The Information Platform for Chemical Monitoring

- *The European Commission's reference access point for searching, accessing and retrieving chemical occurrence data collected and managed in Europe*
- *Different access levels possible*
  - *EU commission and Agencies*
  - *National bodies*
  - *HBM4EU consortium*
  - *Public*

https://ipchem.jrc.ec.europa.eu

From exposure to health effect

Research



Linking to health surveys or nutritional surveys

Exposure response studies in longitudinal cohorts

Moe of action Adverse outcome pa

Effect biomarkers

Strengthen weight of evi

Non targeted screening

Effect directed screening

Identify yet unknown hazards

Capture real exposures

Inform regulation of mixtures

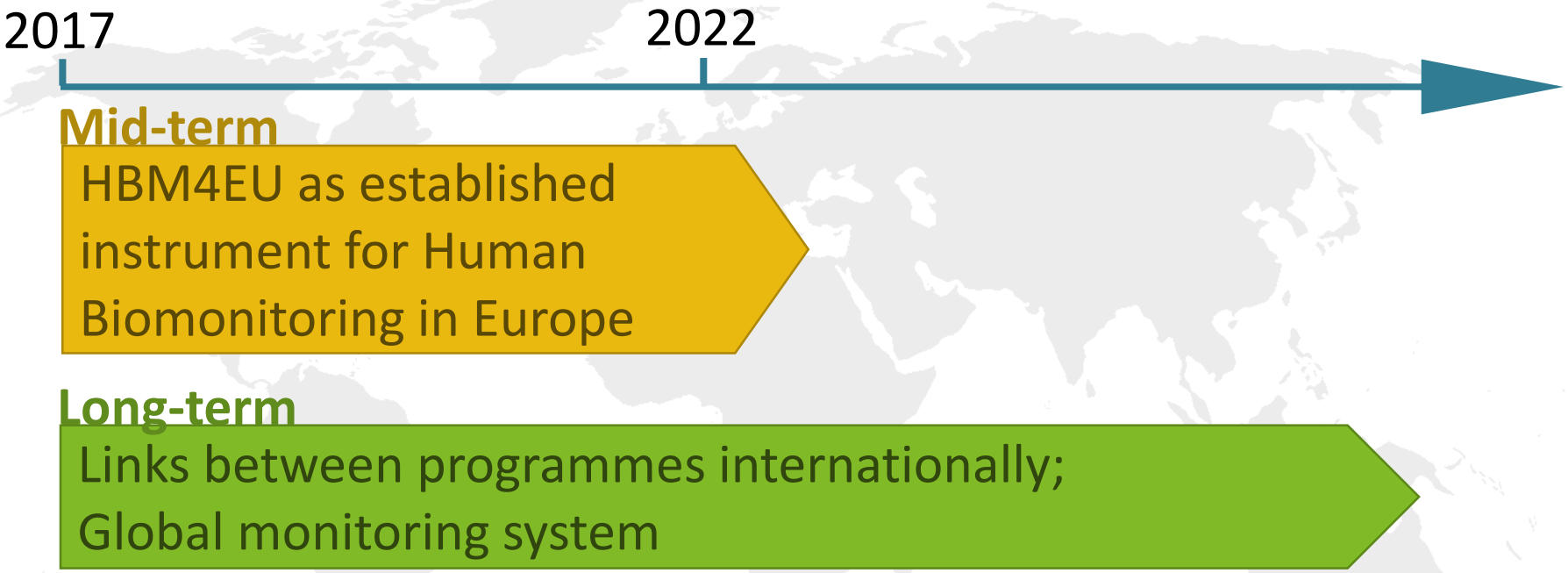
Modelling

PBTK/ reverse dosimetry/ integrating information

Improve risk assessment

HBM4EU – International Level?

Various international programmes to cooperate with



Prerequisites: harmonization, quality assurance, data sharing

Thank you

HBM4EU is coordinated by the German Environment Agency,

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co-coordinated by VITO
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https://www.hbm4eu.eu/

https://ipchem.jrc.ec.europa.eu/RDSIdiscovery/ipchem/index.html

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