

Regulatory implementation of mixture risk assessment using human biomonitoring data

PARC T6.2.3 Real-life mixtures

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PARC



EU Chemicals Strategy for Sustainability



Legal provisions to take account of unintentional mixtures are needed in the relevant legislation, such as REACH, cosmetics, toys, food contact materials, food additives

- Introducing mixture assessment factor(s) for the chemical safety assessment of substances under REACH*
- Further development of more specific and targeted methodologies for specific policy areas*



European
Commission

What are the knowledge and data gaps described in the Chemical Strategy for Sustainability?

1. No exposure data covering all routes of exposure (aggregated exposure)
2. The European IPCHEM database is in place, but until now it is not filled with appropriate human biomonitoring data for risk assessment
Limited number of data sets and only summary statistics. For risk assessment you may wish to use all individual data.
3. Hazard data and particular toxic properties addressing mixture effects is lacking

Exposure assessment and kinetics

Consumption



Occurrence



Determinants of exposure



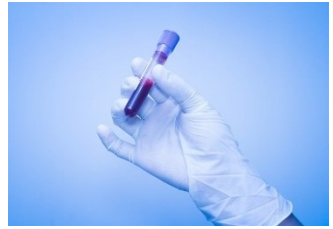
Dietary Exposure

Non- dietary Exposure

Aggregated External Exposure

Internal Exposure

Human Biomonitoring



Reverse Dosimetry

Forward Dosimetry

What is PARC?

- A public-public **Partnership** under Horizon Europe
- An initiative where the **European Union**, prepared with early involvement of **Member States and Associated Countries**, together with public partners (EU and National Risk Agencies, Universities, Public Research Organisations), commit to **jointly support the development and implementation of a programme** of research and innovation activities in relation with **the assessment of risk of chemicals**.

PARC

HORIZON
EUROPE

Public-Public

Co-Fund Budget

EU 50/50 MS, AC
400 M€

Started : 01/05/2022

Duration : 7 years

~200 Partners

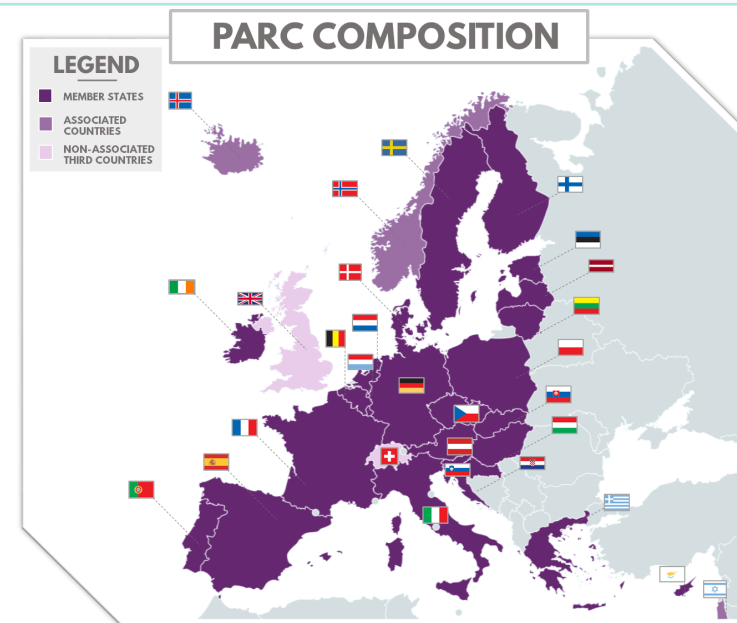
29 countries

24 Member States: Austria (AT), Belgium (BE), Croatia (HR), Cyprus (CY), Czech Republic (CZ), Denmark (DK), Estonia (EE), Finland (FI), France (FR), Germany (DE), Greece (EL), Hungary (HU), Ireland (IE), Italy (IT), Latvia (LV), Lithuania (LT), Luxembourg (LU), Netherlands (NL), Poland (PL), Portugal (PT), Slovakia (SK), Slovenia (SI), Spain (ES), Sweden (SE)

3 Associated countries: Iceland (IS), Israel (IL), Norway (NO)

2 Non-associated Third countries: Switzerland (CH), United Kingdom (UK)

3 European Agencies :



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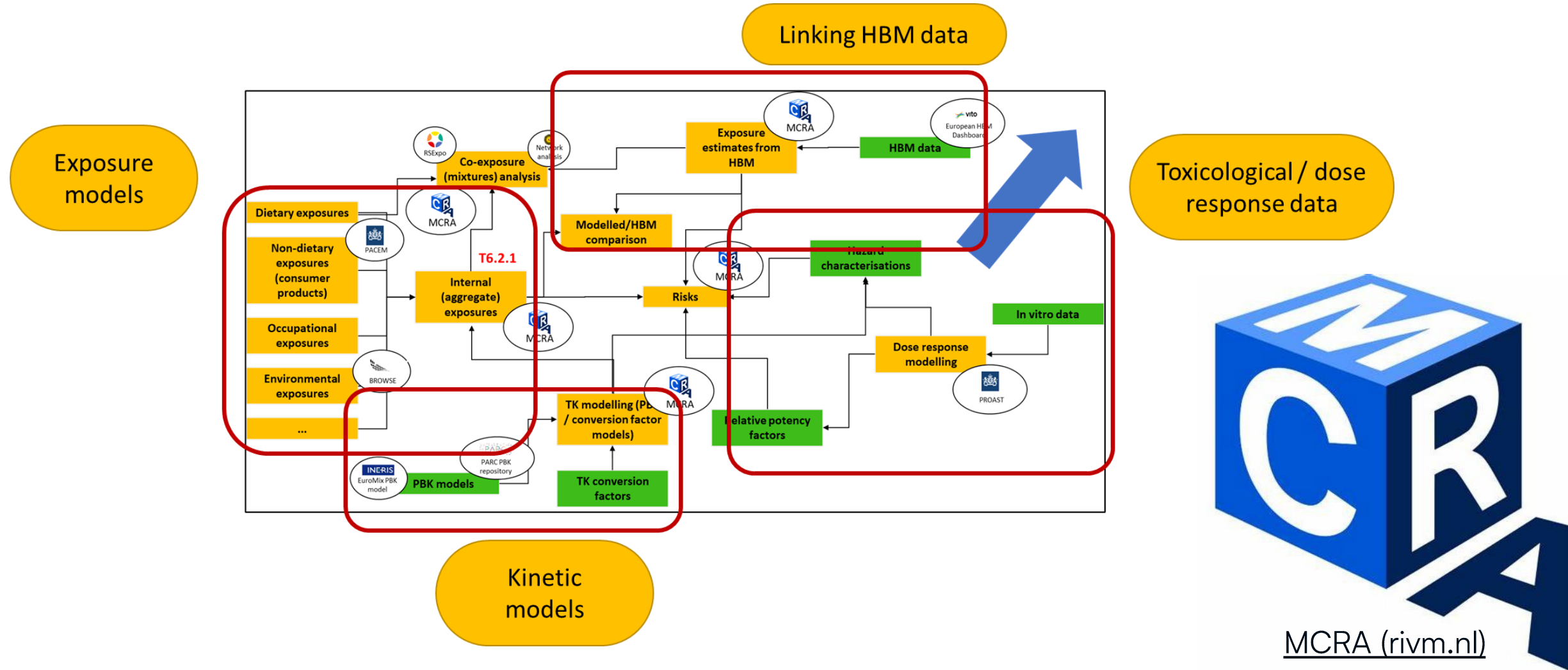
- 35 institutes from 20 countries
- Performing mixture risk assessments using HBM data

WG1: Organisation of HBM data

- HBM data inventory
- Data harmonisation and validation
- Uploading into MCRA



Monte Carlo Risk Assessment (MCRA) platform



[MCRA \(rivm.nl\)](http://rivm.nl)

Existing HBM data collected in HBM4EU

The screenshot shows the 'EUROPEAN HUMAN BIOMONITORING DASHBOARD' with the subtitle 'Population distribution of internal exposure levels'. The interface includes a navigation bar with 'EXPOSURE', 'TIME PATTERNS', and 'HEALTH RISK' tabs, and a 'vito' logo. Below the navigation bar are links for 'EXTRA INFO', 'DISCLAIMER', and 'ACKNOWLEDGEMENTS'. The main area is divided into several sections: a 'HIDE SELECTION BOX' button, a 'PROJECT' dropdown menu set to 'All', 'STRATIFI...' and 'STRATA' dropdowns set to '(No st...)' and '(None)', 'COUNTRY' and 'POPULATION' dropdowns set to '(None)', and a 'SAMPLING PERIOD' slider ranging from 1991 to 2,021. The main content area is divided into four columns: 'BIOMARKER SELECTION BOX' with instructions, 'SELECT SUBSTANCE GROUP(S)' with a list of substance groups and checkboxes, 'SELECT BIOMARKER', and 'MATRIX' with sub-sections for 'MATRIX TYPE' and 'UNIT'.

- Coordinating and advancing HBM in Europe
- 5-year project (2017-2021)
- 30 countries, the European Environment Agency and the European Commission, and co-funded under Horizon 2020
- Aggregated data are publicly available
 - Data is limited to 18 HBM4EU priority substances

<https://www.hbm4eu.eu/what-we-do/european-hbm-platform/eu-hbm-dashboard/>

HBM data are subject to EU Privacy Regulation

- DC-DP agreements arranged between the RIVM and each HBM study owner
- Legal departments involved from both sides
- Conducted according to the European General Data Protection Regulation (GDPR)
- 85% signed (12/14 institutes)

▼B ↓

REGULATION (EU) 2016/679 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

of 27 April 2016

on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC (General Data Protection Regulation)

(Text with EEA relevance)

CHAPTER I

General provisions

Article 1

Subject-matter and objectives

1. This Regulation lays down rules relating to the protection of natural persons with regard to the processing of personal data and rules relating to the free movement of personal data.
2. This Regulation protects fundamental rights and freedoms of natural persons and in particular their right to the protection of personal data.
3. The free movement of personal data within the Union shall be neither restricted nor prohibited for reasons connected with the protection of natural persons with regard to the processing of personal data.

Article 2

Material scope

1. This Regulation applies to the processing of personal data wholly or partly by automated means and to the processing other than by automated means of personal data which form part of a filing system or are intended to form part of a filing system.
2. This Regulation does not apply to the processing of personal data:
 - (a) in the course of an activity which falls outside the scope of Union law;
 - (b) by the Member States when carrying out activities which fall within the scope of Chapter 2 of Title V of the TEU;
 - (c) by a natural person in the course of a purely personal or household activity;
 - (d) by competent authorities for the purposes of the prevention, investigation, detection or prosecution of criminal offences or the execution of criminal penalties, including the safeguarding against and the prevention of threats to public security.
3. For the processing of personal data by the Union institutions, bodies, offices and agencies, Regulation (EC) No 45/2001 applies. Regulation (EC) No 45/2001 and other Union legal acts applicable to such processing of personal data shall be adapted to the principles and rules of this Regulation in accordance with Article 98.
4. This Regulation shall be without prejudice to the application of Directive 2000/31/EC, in particular of the liability rules of intermediary service providers in Articles 12 to 15 of that Directive.

Article 3

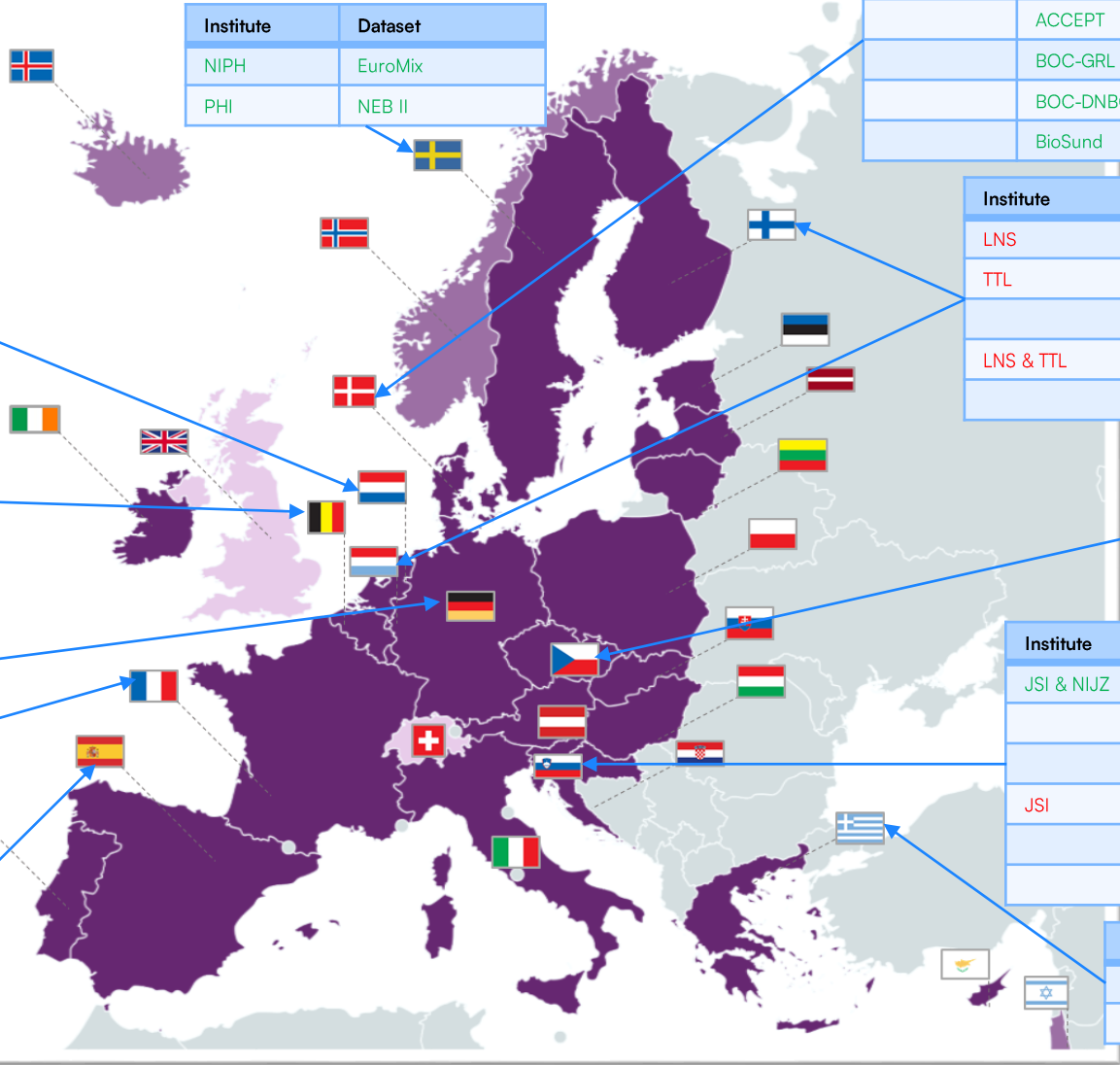
HBM data collected in MCRA

PARC COMPOSITION

70% uploaded
(26/38 datasets)

LEGEND

- MEMBER STATES
- ASSOCIATED COUNTRIES
- NON-ASSOCIATED THIRD COUNTRIES



Institute	Dataset
NIPH	EuroMix
PHI	NEB II

Institute	Dataset
AU-PH	ABC/FETOTOX
	ACCEPT
	BOC-GRL
	BOC-DNBC
	BioSund

Institute	Dataset
RIVM	DCS
	SPECIMEn-NL

Institute	Dataset
VITO	FLEHS 1
	FLEHS 2
	FLEHS 3
	FLEHS 4
	3xG

Institute	Dataset
UBA	GerES V
	ESB

Institute	Dataset
ANSES	ESTEBAN

Institute	Dataset
ISCIH	BEA
	BIOAMBIENT.ES
	DEMOCOPHES
FINBA-IDAEA	INMA-Asturias
IISPV	EXHES

Institute	Dataset
LNS	HBM4EU Lux
TTL	FIOH LIMS
	CHROMATE
LNS & TTL	HBM4EU E-waste
	HBM4EU Chromium

Institute	Dataset
RECETOX	CELSPAC
	CELSPAC-SPECIMEn
	CELSPAC-FIREexpo

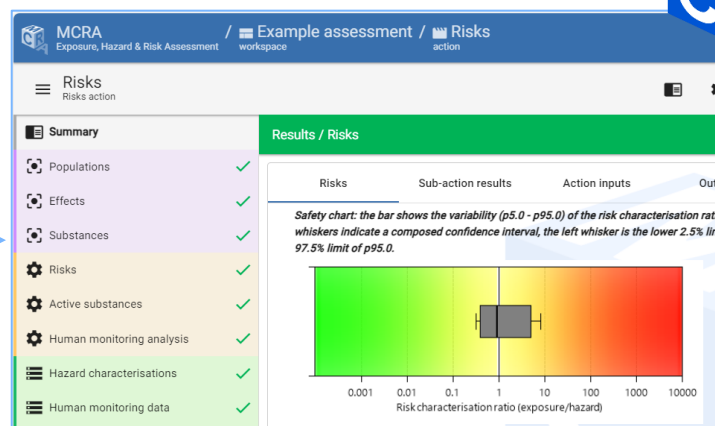
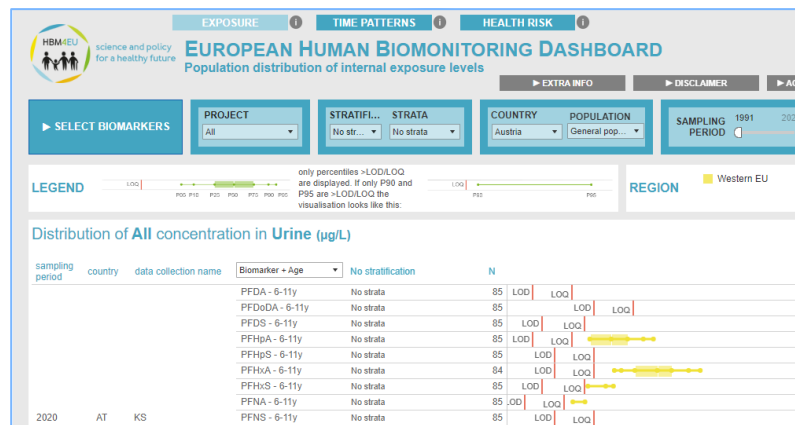
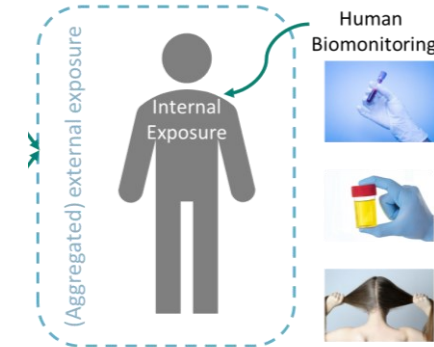
Institute	Dataset
JSI & NIJZ	SLO-HBM-I
	SLO-HBM II
	SLO-CRP
JSI	DEMOCOPHES
	SLO-CROME
	SLO-PHIME

Institute	Dataset
AUTH	EXHES
	CROME

Data per Case Study

PFAS — Immunotoxicity	Metals — Nephrotoxicity	Metals — Developmental Neurotoxicity	Pesticides — CAG NAM & NAN
1. France: ESTEBAN	1. France: ESTEBAN	1. France: ESTEBAN	1. France: ESTEBAN
2. Spain: BEA, BIOAMBIENT.ES	2. Netherlands: DCS	2. Spain: BEA, BIOAMBIENT.ES, DEMOCOPHES	2. Netherlands: SPECIMEn-NL
3. Czech Republic: CELSPAC, CELSPAC-FIREexpo	3. Spain: BEA, BIOAMBIENT.ES, DEMOCOPHES	3. Czech Republic: CELSPAC	3. Spain: BIOAMBIENT.ES
4. Denmark/Greenland: ABC/FETOTOX, ACCEPT, BOC-GRL, BOC-DNBC, BioSund,	4. Czech Republic: CELSPAC, CELSPAC-FIREexpo	4. Denmark/Greenland: ABC/FETOTOX, ACCEPT, BioSund,	4. Czech Republic: CELSPAC-SPECIMEn
5. Norway: EuroMix, NEB II	5. Denmark/Greenland: ABC/FETOTOX, ACCEPT, BOC-GRL, BioSund,	5. Norway: EuroMix, NEB II	5. Denmark/Greenland: ABC/FETOTOX, ACCEPT, BOC-GRL, BioSund,
6. Belgium: FLEHS, 3xG	6. Norway: EuroMix, NEB II	6. Belgium: FLEHS, 3xG	6. Norway: EuroMix
7. Germany: GerES V, ESB	7. Belgium: FLEHS, 3xG	7. Germany: GerES V, ESB	7. Belgium: FLEHS, 3xG
8. Greece: CROME	8. Germany: GerES V, ESB	8. Greece: EXHES	8. Germany: GerES V, ESB
	9. Greece: EXHES	9. Slovenia: SLO-HBM-I	
	10. Slovenia: SLO-HBM-I		

Mixture risk assessment based on HBM data

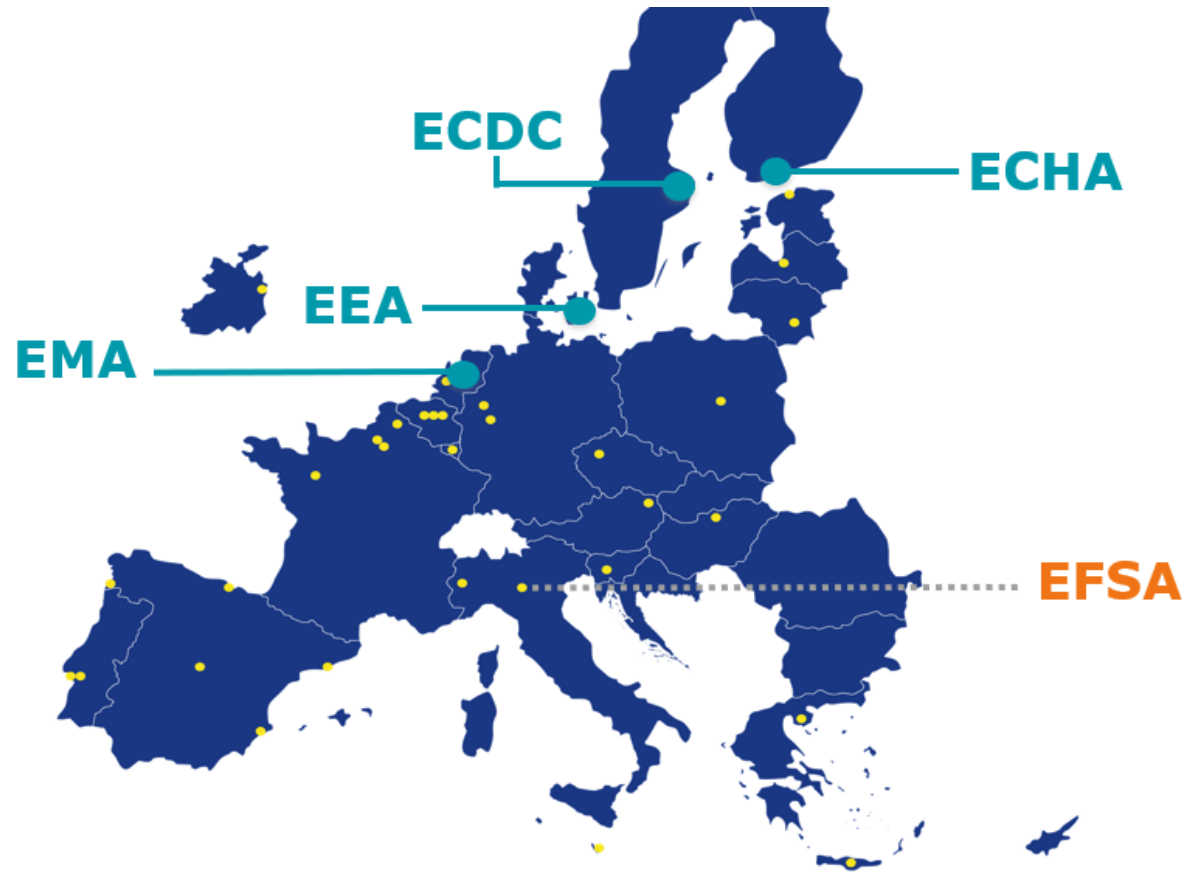


- Common data standard for HBM
- Harmonized data collection in Europe

- Harmonized analyses in MCRA
- Implementation of scientific models for practical application
- Broad applicability
- Build on “broad” platform
- Links to other modeling tools
- Capacity building / training in EU
- Towards regulatory implementation

- Regulatory intervention possibilities

Expected impact and training for European Agencies



PARC Task 6.2
Training 19th March

- Hands-on experience for EFSA - staff
- Risk assessment using HBM data
- Mixtures of PFAS, Pesticides and Heavy metals



Or send mail to Anne.Zwartsen@rivm.nl

PARC Task 6.2 deliverables and news items



36 institutes from 16 Member States

[Building the road for assessing aggregate human exposure to chemicals, covering different sources, routes and environments | Parc \(eu-parc.eu\)](#)



21 institutes from 10 Member States

[An inventory of physiologically based kinetic models for assessing lifetime internal exposure is now available | Parc \(eu-parc.eu\)](#)

PARC Task 6.2 deliverables and news items



35 institutes from 20 Member States

[PARC will improve human mixture risk assessment using human biomonitoring data | Parc \(eu-parc.eu\)](#)



25 institutes from 10 Member States

[Calculating the burden and cost of chemical exposure | Parc \(eu-parc.eu\)](#)

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Thank you for your attention