



science and policy
for a healthy future

HBM4EU project

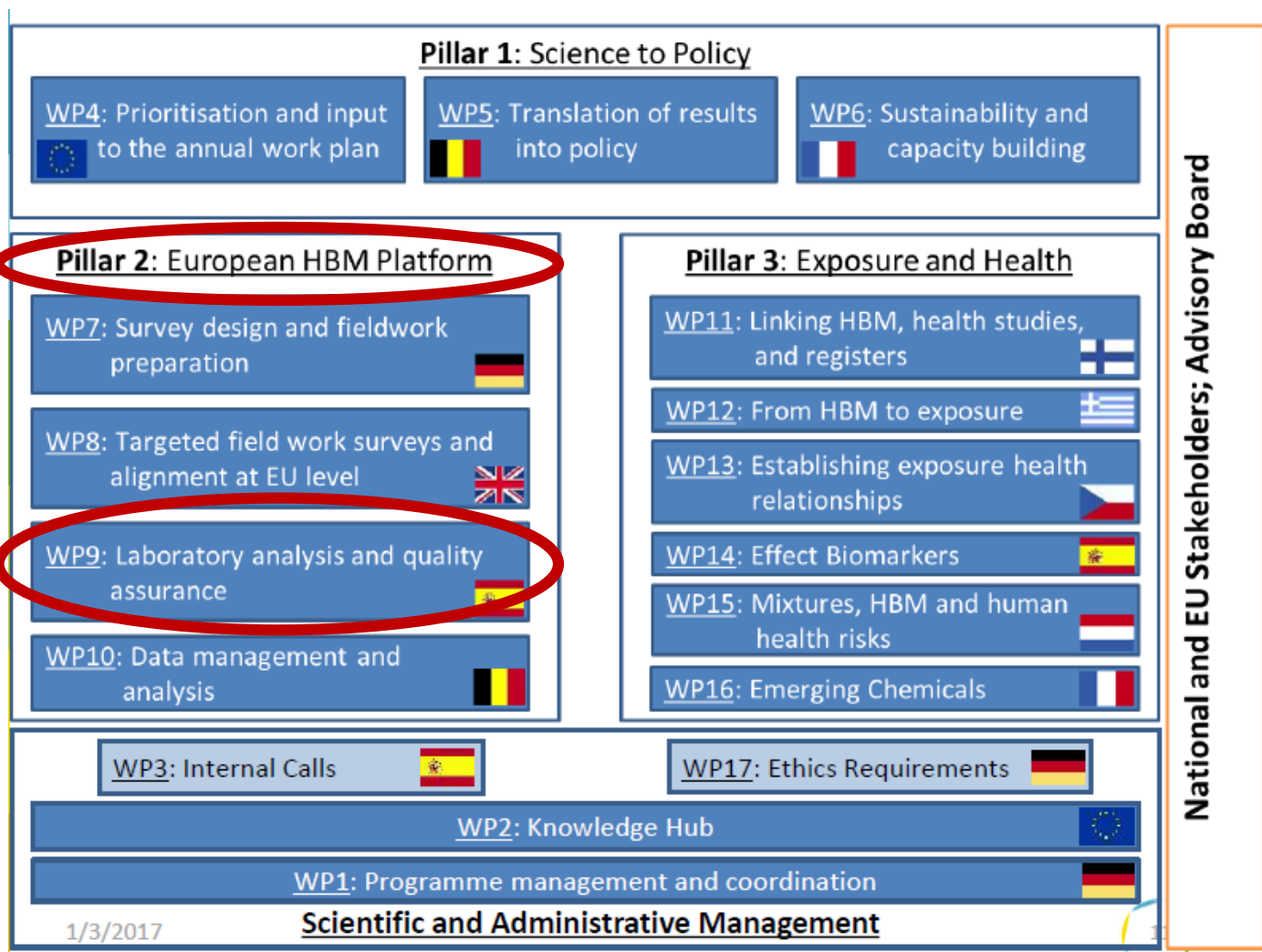
HBM4EU Laboratory Quality
Assurance Programme

Holger M. Koch

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1st HBM4EU Training School 2018



WP 9 Laboratory analysis and quality assurance

WP leader. Argelia Castaño & Marta Esteban.

Task 9.1. Inventory of best suited biomarkers, matrices and needs for new analytical methods

Catherine Thomsen, NIPH, Norway

Task 9.2. Network of Reference HBM laboratories for performing biomarker analysis, developing new methods and supporting the QA/QC program at EU level

Marta Esteban, ISCIII, Spain

Task 9.3. Developing new methods

Holger Koch, IPA, Germany

Task 9.4. Quality assurance

Thomas Göen, IPASUM, Germany



The Quality Assurance Unit (QAU)

Core: ISCIII, IPA, IPASUM and VSCHT
Associated members: RIKILT, INRA, MU
UAntwerpen and ISS

Task 9.5. Analytical phase

Katrin Vorkamp, AU, Denmark

Task 9.6. Helpdesk

Jana Hajslova, VSCHT, Czech Republic

WP 9 Laboratory analysis and quality assurance

WP 9 provides **support** for conducting HBM **analyses** and **identifies** the **analytical needs**



WP 9 Laboratory analysis and quality assurance

WP 9 **connects EU laboratories** and paves the way for **harmonized** chemical analysis



T 9.2

WP 9 Laboratory analysis and quality assurance

WP 9 **ensures** the **quality** and **comparability** of the analytical results

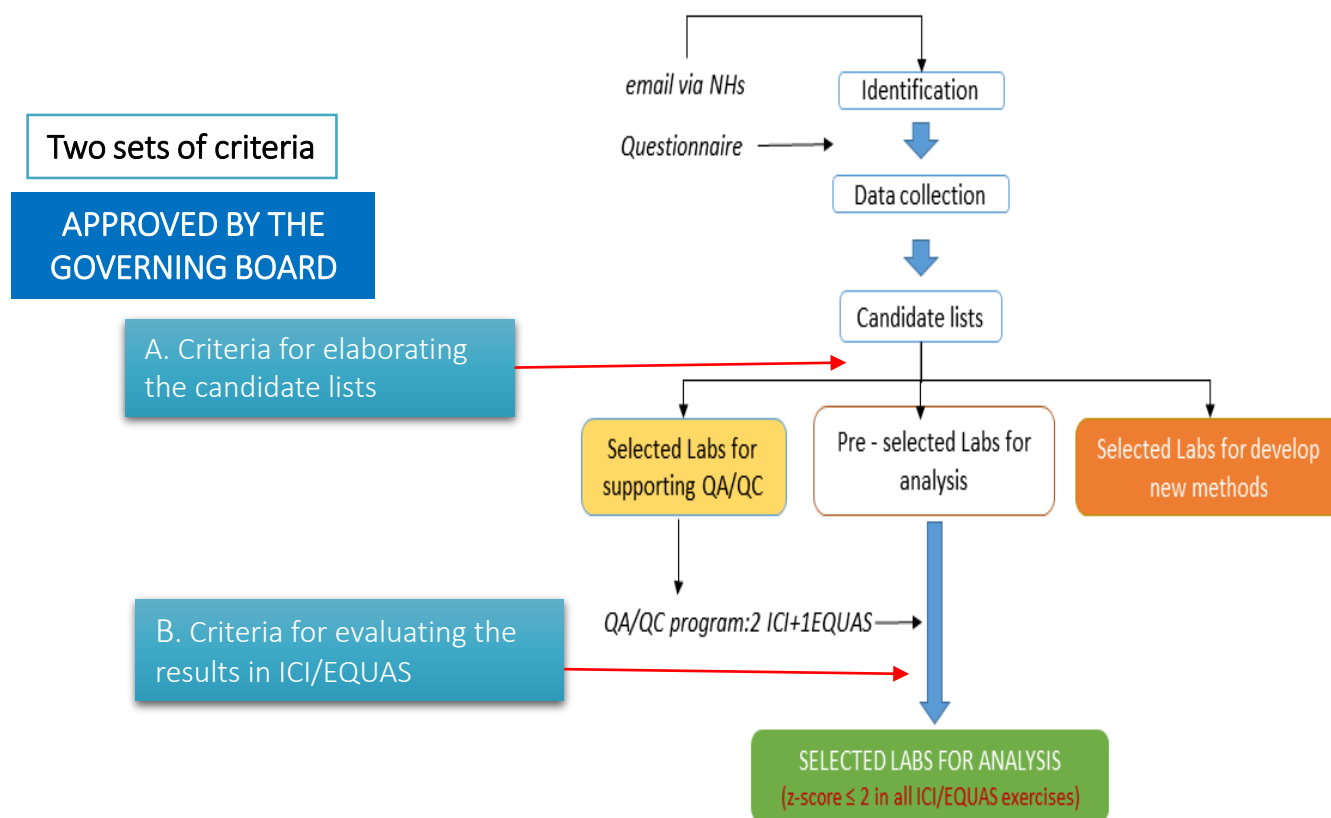


- ✓ Definition of the criteria for selecting candidate laboratories
- ✓ List of candidate laboratories to perform the analysis of HBM samples, to develop new methods and to support the QA/QC activities in HBM4EU
- ✓ Definition of the QA/QC program for HBM4EU

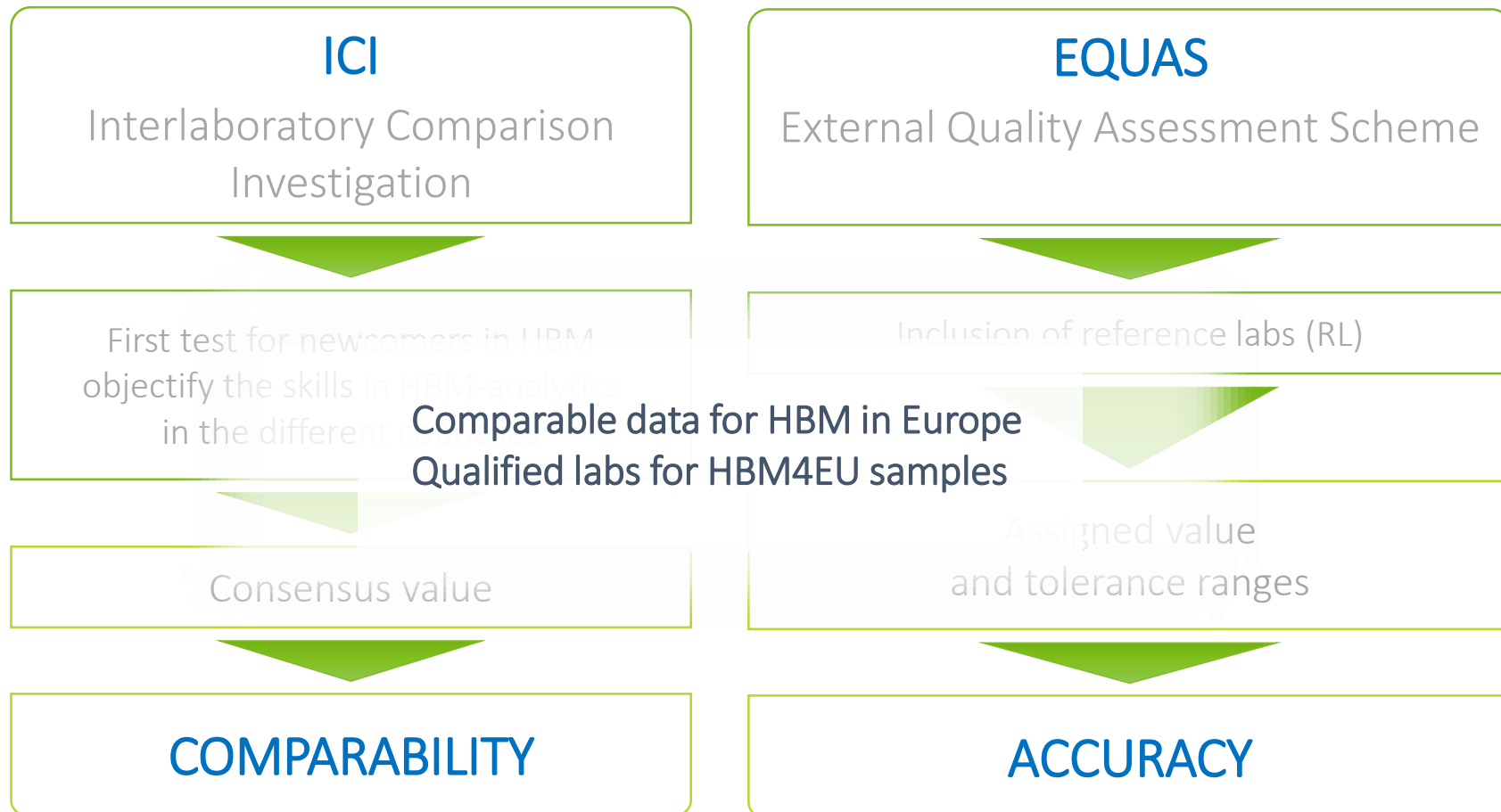
Analytical laboratories in HBM4EU

Selection of laboratories:

step by step approach to guarantee the **harmonization** and the **quality** of the chemical analysis human samples.



The WP9 QA/QC Scheme in HBM4EU



The SAME value

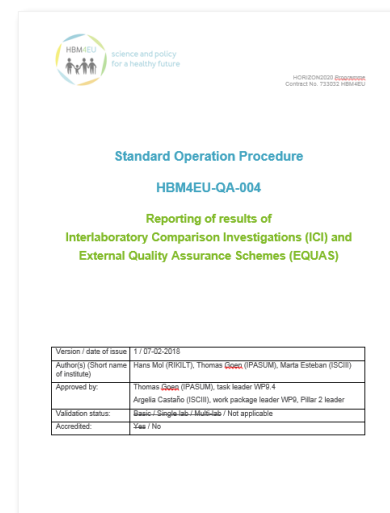
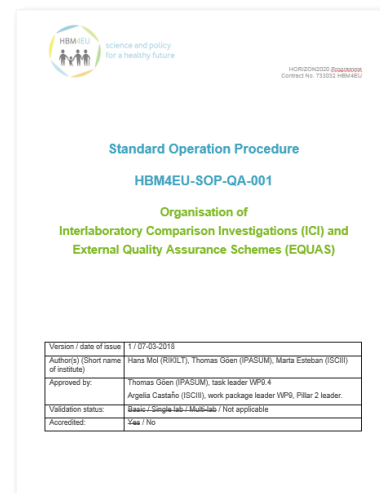


Approx. of the TRUE value

The WP9 QA/QC Scheme in HBM4EU

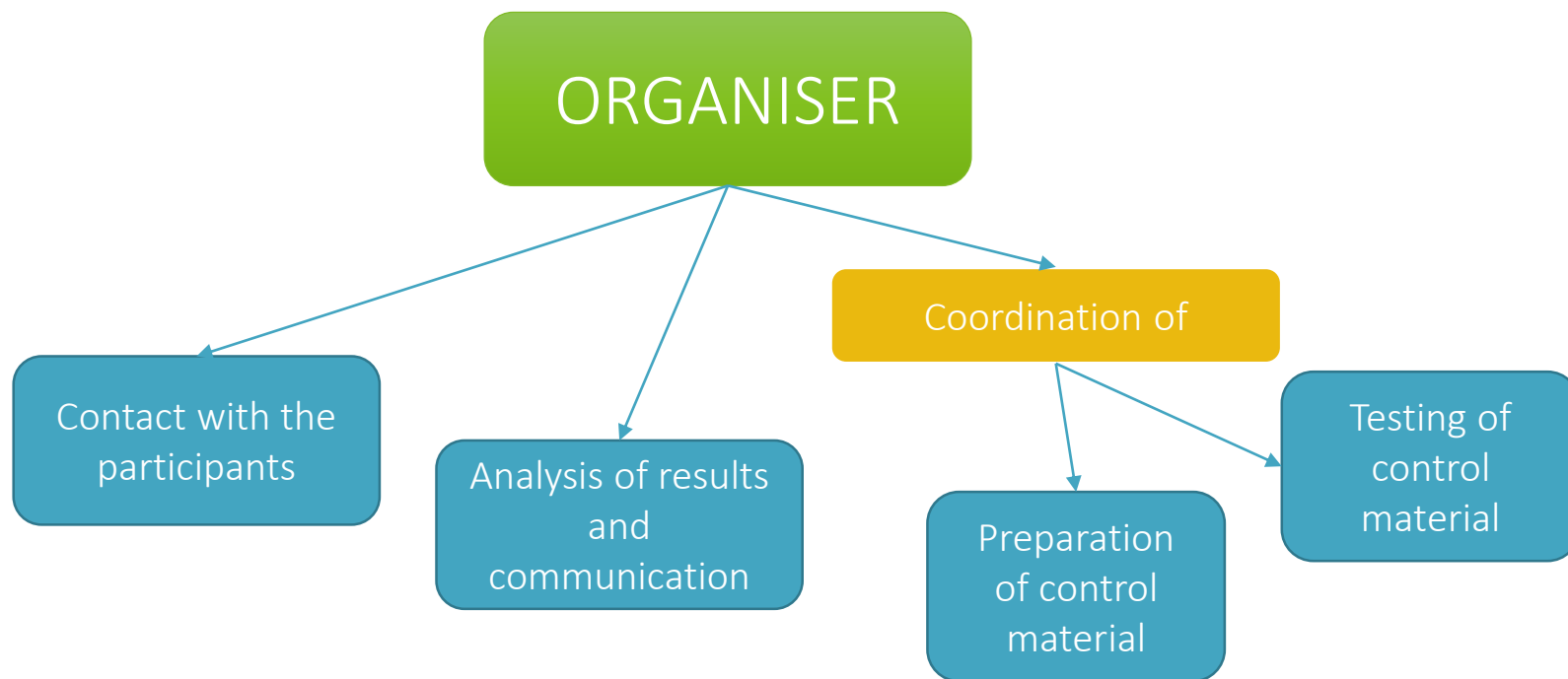
Standard Operating Procedures

- **HBM4EU-SOP-QA-001:** Organisation of Interlaboratory Comparison Investigations (ICI) and External Quality Assurance Schemes (EQUAS)
- **HBM4EU-SOP-QA-002:** Preparation of control materials for Interlaboratory Comparison Investigations (ICI) and External Quality Assurance Schemes (EQUAS)
- **HBM4EU-SOP-QA-003:** Evaluation of results from Interlaboratory Comparison Investigations (ICI) and External Quality Assurance Schemes (EQUAS)
- **HBM4EU-QA-004:** Reporting of results of Interlaboratory Comparison Investigations (ICI) and External Quality Assurance Schemes (EQUAS)
- **ICI / EQUAS REPORT**



The WP9 QA/QC Scheme in HBM4EU

- In parallel for the different groups of substances: 72 parameters
- 2 ICIs and 1 EQUAS in 2018
- 6 laboratories involved in the organization



Round 1 of the ICIs

Phthalates

Matrix: Urine

Compounds: MEP, MBzP, MiBP, MnBP, MCHP, MnPeP, MEHP, 5OH-MEHP, 5oxo-MEHP, 5cx-MEPP, MnOP, OH-MiNP, cx-MiNP, OH-MiDP, cx-MiDP

Organiser: RIKILT

Responsible of CM preparation: RIKILT

Responsible of CM testing: IPA

1st round ongoing

DINCH

Matrix: Urine

Compounds: OH-MINCH, cx-MINCH

Organiser: RIKILT

Responsible of CM preparation: RIKILT

Responsible of CM testing: IPA

1st round ongoing

Round 1 of the ICLs

Bisphenols

Matrix: Urine

Compounds: BPA, BPF, BPS

Organiser: INRA

Responsible of CM preparation: INRA

Responsible of CM testing: INRA

1st round ongoing

PFAS

Matrix: Serum

Compounds: PFPeA, PFHxA, PFHpA, PFOA, PFNA, PFDA, PFUnDA, PFDoDA, PFBS, PFHxS, PFHpS, PFOS (sum of all isomers)

Organiser: IPASUM

Responsible of CM preparation: IPASUM

Responsible of CM testing: IPASUM

1st round finished

Round 1 of the ICIs

PAHs

Matrix: Urine

Compounds: 1-hydroxynaphthalene, 2-hydroxynaphthalene, 1,2-dihydroxynaphthalene, 2-FLUO, 3-FLUO, 9-FLUO, 1-hydroxyphenanthrene, 2-hydroxyphenanthrene, 3-hydroxyphenanthrene, 4-hydroxyphenanthrene, 9-hydroxyphenanthrene, 1-PYR, 3-hydroxybenzo(a)pyrene

Organiser: IPASUM

Responsible of CM preparation: IPASUM

Responsible of CM testing: VSCHT

1st round finished

Flame retardants

Matrix: Serum and urine

Compounds: BDE-47, BDE-153, BDE-209, α -HBCD, γ -HBCD, DPHP, BDCIPP, BCEP, BCIPP, TBBPA, Syn-DP, Anti-DP, DBDPE, 2,4,6-Tribromophenol

Organiser: VSCHT

Responsible of CM preparation: VSCHT

Responsible of CM testing: VSCHT and IPASUM

1st round ongoing

Round 1 of the ICIs

Aromatic amines

Matrix: Urine

Compounds: MDA, MOCA, Aniline, p-aminophenol, N-acetyl-4-aminophenol, p-PDA, o-toluidine, 2,4-TDA, 2,6-TDA

Organiser: External lab

Responsible of CM preparation: External lab

Responsible of CM testing: External lab

1st round in preparation

Cadmium

Matrix: Blood and urine

Organiser: IPASUM

Responsible of CM preparation: IPASUM

Responsible of CM testing: IPASUM

1st round finished

Chromium

Matrix: RBC, urine and plasma

Organiser: IJS

Responsible of CM preparation: IJS

Responsible of CM testing: IJS

1st round in preparation

Example: Cadmium 1st round ICI 2018

23/02/2018 – Invitation to the candidate laboratories

03/04/2018 – Shipment of the samples

09/04/2018 – Samples received

01/05/2018 – Deadline for submitting the results

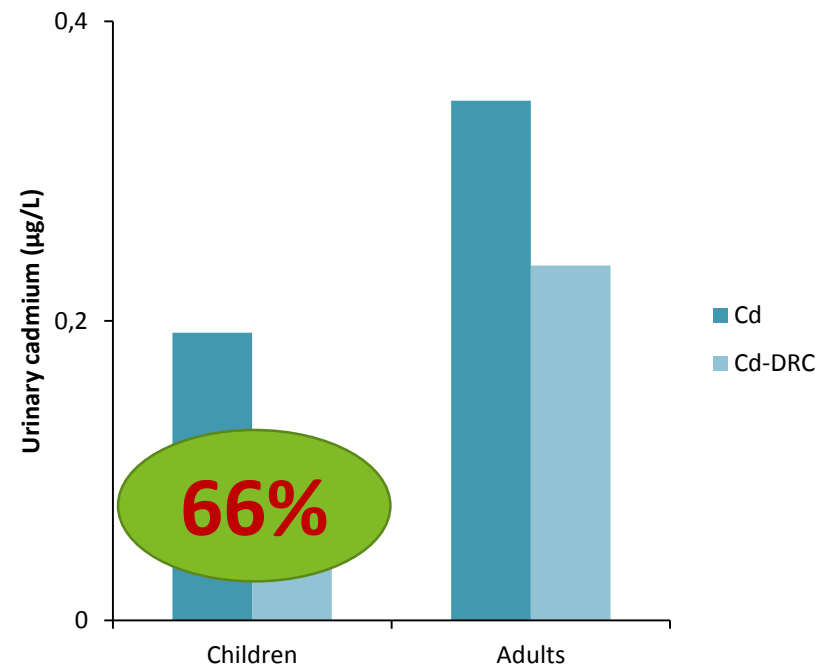
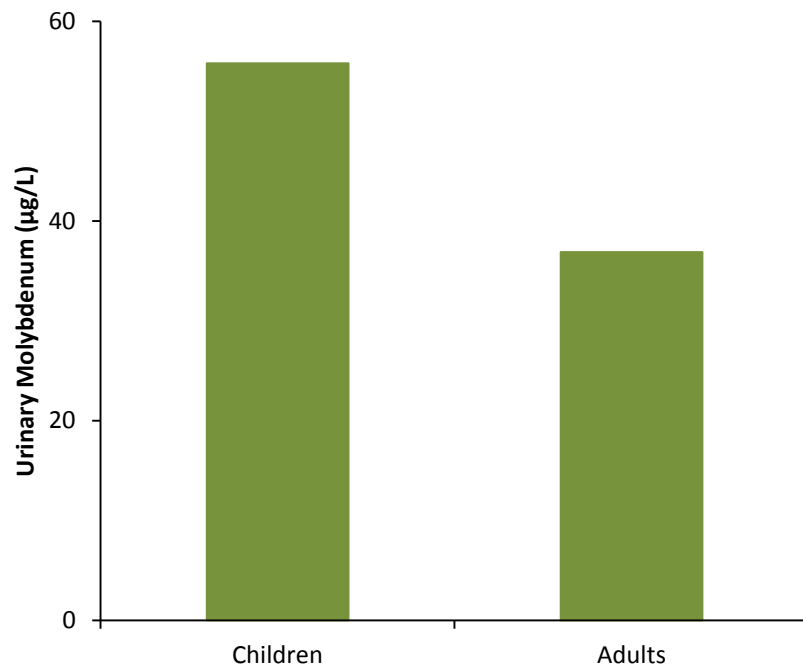


The value of these schemes: examples from DEMOCOPHES experience

- Capacity building was successful
 - recognizing the benefits of human biomonitoring
 - analytical know-how
- Only strict Quality assurance and Quality control will guarantee comparable and reliable results
- The analysis of the real samples analysis showed the necessity of strict criteria for lab selection and the importance of achieving LOQs, specially for children

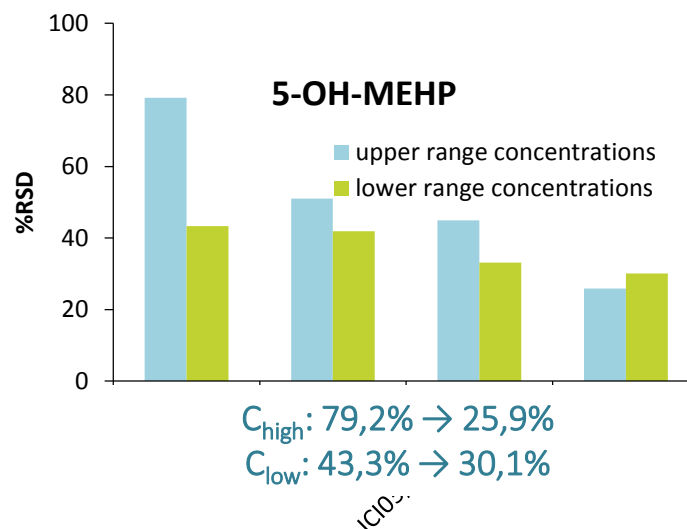
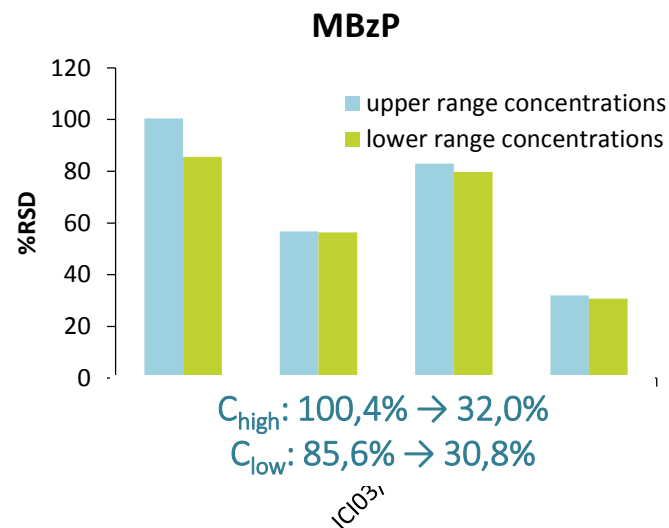
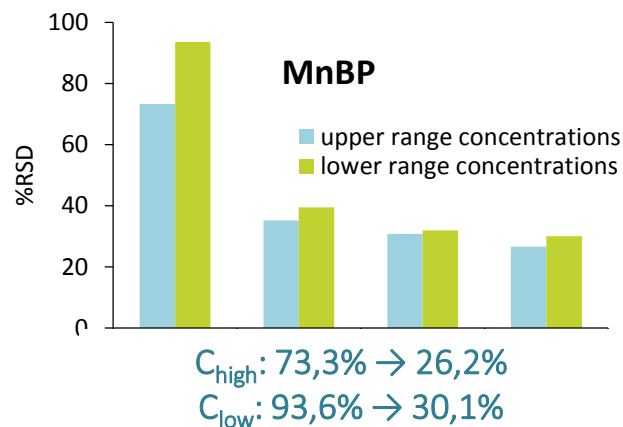
Cadmium – the challenge of correcting for Mo, Sn

- Correction for Mo interferences necessary for the real samples
- Children have higher Mo concentration



Phthalate metabolites – RSD% improvement

- Low number of labs, able to quantify phthalate metabolites
- Huge differences between the number of phthalate metabolites analyzed
- Strict control of blank values necessary for some metabolites



The WP9 QA/QC Scheme in HBM4EU

Main Challenges

- High number of compounds (2nd prioritization list will add more!)
- Time pressure for selecting the qualified laboratories to analyse the samples in HBM4EU and to obtain the results in the time-frame of the project
- Not enough capacity (laboratories available) to organise the ICI/EQUAS



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Marta Esteban López PhD works as scientific researcher at the National Centre for Environmental Health of the Instituto de Salud Carlos III. She has a University Degree in Biochemistry and obtained her PhD in Epidemiology and Public Health. In HBM4EU she is the leader of task 9.2 and coleader of WP9. She also participate actively in tasks of WP7 dealing with sampling and the preanalytical phase.



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