






EUROPEAN HUMAN BIOMONITORING INITIATIVE (HBM4EU) INDICATOR LEAFLETS

EMERGING CHEMICALS SCREENED IN HUMAN SAMPLES

Indicator 8.1 Number of emerging (mixtures of) chemicals screened in human samples

-  **SPECIFIC GOAL 8:** Identifying chemicals of concern through novel screening methods for the holistic analysis of HBM samples and improving the use of HBM data in assessing exposure to and the risks of chemical mixtures
-  **RESPONSIBLE:** University of Antwerp (UAntwerpen), Belgium / Institut National de la Recherche Agronomique (INRA), France
-  **WORK PACKAGE:** 16 (INRA)

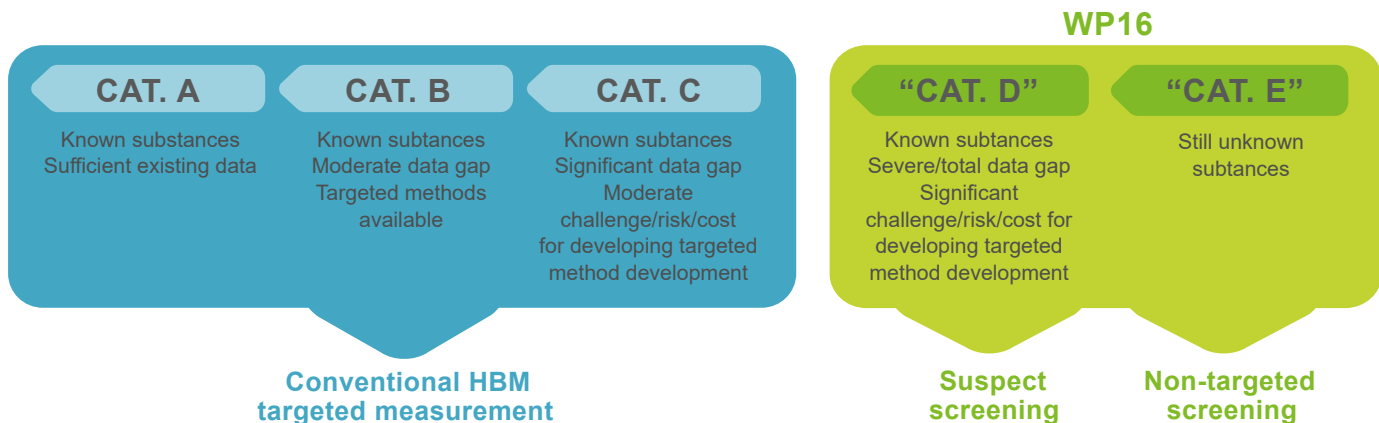
KEY MESSAGES

- Suspect screening (SS) and non-targeted screening (NTS) are new large-scale open methodological approaches for characterizing human exposure to emerging chemicals.
- HBM4EU has:
 - built the basis of an EU network of partners with advanced capacities in the field of SS/NTS applied to human matrices;
 - developed and conducted several proof-of-concept studies illustrating the usefulness and applicability of these approaches.
- Overall, these efforts resulted in more than 3000 analysed samples and several 100s of detected exposure markers.

WHY

- 1 Emerging chemicals are currently a major concern for the scientific community, societal actors, and public authorities
- 2 High need to produce relevant information on emerging chemicals (new compounds or chemicals of new concern)
- 3 Current targeted methods cannot assess the simultaneous exposure to the wide variety of existing chemicals, and do not allow capturing not yet identified markers of exposure
- 4 Suspect and non-targeted screening approaches have already been developed in the environmental or food safety areas, but are in the current state less mature in the HBM field
- 5 Significant medium to long-term analytical and network development work is needed to reach the ambition promised by these new screening approaches

Positioning of the WP16 related work within the HBM4EU substance categorisation process:





RESULTS

Network

The network developed resources and tools:

CECSscreen open access EU database on chemicals of emerging concern:

- > 70.000 parent compounds
- > 300.000 simulated metabolites

Haloseeker (v2.0):

- open access software for non-targeted screening (NTS) of halogenated markers of exposure through high resolution MS chemical profiles
- > user friendly facilitating resource for implementing NTS

QA/QC and harmonization:

- a set of provisions and criteria for increased consistency and comparability of SS data generated from human matrices (major output of the Specimen Study (5 labs/countries involved))
- > basis for extension to environment-food-HBM continuum (PARC).

- facilitates large-scale detection of chemicals in exposome research
- coupled to mass spectrometry (MS) reference library to increase the confidence level with regard to the identity of the detected exposure markers during the annotation process.

Real Case Applications

1. Non targeted screening studies:

- 100 human milk and placenta samples analyzed.
- 30 exposure markers identified out of 300 detected



2. Suspect screening studies:

- 600 human urine/blood samples analyzed by individual partners for multi-class suspect screening analyses.
- 200 markers identified out of 1200 detected (+ 2000 samples for Specimen study)

3. Non targeted screening/Effect-directed analysis studies:

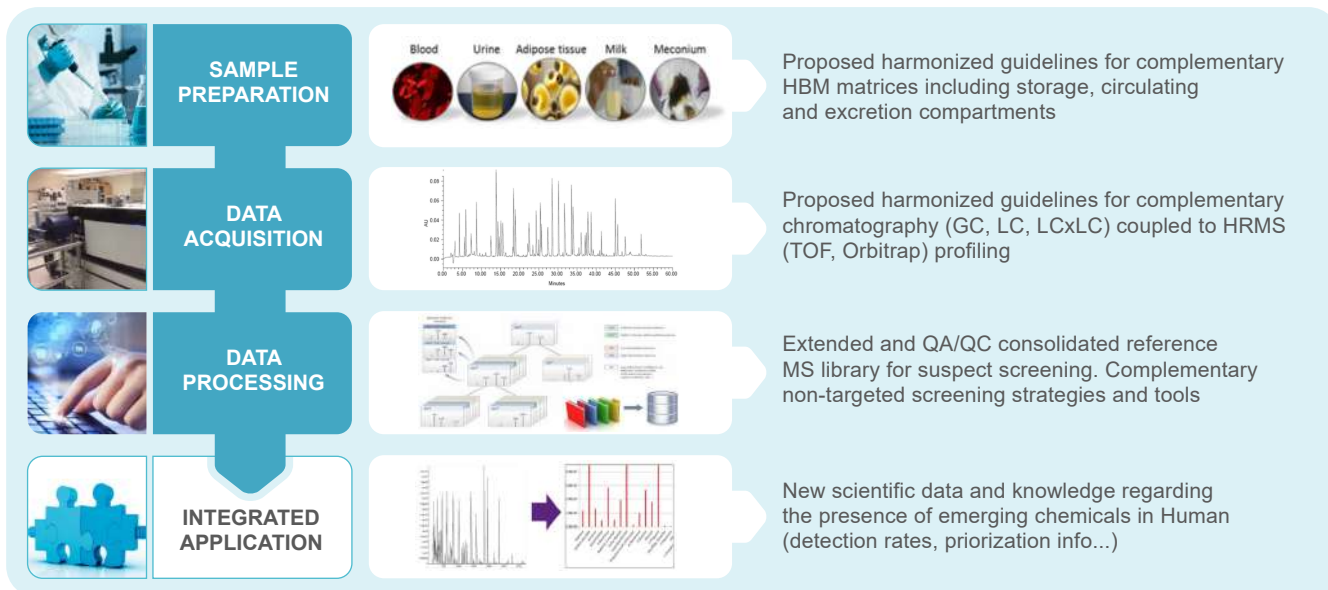
- proof-of-concept of chemical profiling coupled to effect directed analysis for revealing CECs of exposure and toxicological concern



FUTURE PERSPECTIVES

- A number of limitations associated to SS/NTS were identified, in particular the bottleneck associated to the identification of the exposure markers detected by the large-scale approaches.
- Medium term (PARC): Network extension and conceptual/ technical consolidation
- Long term (EIRENE): large scale implementation and conceptual/ technical validation

METHODOLOGY



GC = gas chromatography, LC = liquid chromatography, TOF = time of flight, QA/QC = Quality assurance Quality control, HRMS = high resolution mass spectrometry



HBM4EU deliverables: D16.1, D16.2, AD16.1, AD16.2, AD16.3, AD16.4, D16.3, D16.4, D16.5, AD16.1, AD16.5 and AD16.6

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