

## **Abstract**

As of 2026, Human Biomonitoring (HBM) has transitioned from a specialized research tool to a cornerstone of global public health surveillance. By measuring chemicals and/or their metabolites in matrices such as blood, urine, and breast milk, HBM provides the most accurate assessment of internal dose and aggregate exposure. Such data serve as a vital "reality check" for chemical regulations, enabling the establishment of reference values for approximately 300 substances and facilitating the longitudinal tracking of population-level concentrations.

European initiatives, notably the HBM4EU project and the current Partnership for the Assessment of Risks from Chemicals (PARC), have provided critical insights into the chemical body burden of vulnerable groups, including children and teenagers. Longitudinal data revealed a significant downward trend in regulated substances, such as the phthalate DEHP and the "forever chemical" PFOS, validating the impact of REACH restrictions. However, these successes are frequently offset by the emergence of substitute chemicals—such as DINCH or shorter-chain PFAS—reflecting industrial shifts toward unregulated or less-studied alternatives.

Because key exposure determinants are rooted in the individual exposome—ranging from contaminated drinking water and food to personal care products—HBM is increasingly integrated in the exposome concept. This holistic approach is essential for deciphering the health impacts of daily exposure to complex chemical mixtures. By unravelling the interface between chemical risk assessment and the environmental burden of disease, exposomics allows researchers to move beyond single-substance assessment.

In line with the EU Chemicals Strategy for Sustainability, HBM provides now the empirical evidence required to trigger timely policy interventions. By translating exposure and toxicity data into health-relevant metrics, HBM acts as a critical guardian of public health, driving the global transition toward a non-toxic environment and ensuring a measurable reduction in the human chemical body burden.

## **Biography**

Prof. dr. Celine Gys is currently an assistant professor and senior researcher in the Toxicological Centre of the University of Antwerp. Celine is a pharmacist and obtained her PhD in pharmaceutical sciences from the University of Antwerp in 2020.

During her doctoral research, she studied biomonitoring of bisphenols and other emerging contaminants in humans, including Flemish adolescents in the frame of the 4th cycle of the Flemish Environment & Health Study.

She actively participates also in the current 5th cycle of the Flemish biomonitoring program and is involved in several research projects on the application of mass spectrometry for characterization of the human exposome.

As such, she is affiliated to the Exposome Centre of Excellence, of which the Toxicological Centre is the leading research group.