

Summary

This study aimed at setting the scene for the development of human biomonitoring (HBM) indicators for Environmental Report Flanders (MIRA). Several foreign HBM campaigns were screened to gather useful information. A literature survey of already existing indicators from the US, Canada, Sweden and the WHO was performed. Based on these indicators (factsheets) and on the lacunas therein, useful criteria were gathered for the development of the Flemish indicators. Documents summarizing criteria on how a good indicator should look like were also screened (methodological, biological and social relevance). One of the lacunas of the HBM indicators from abroad, was the absence of health based benchmarks and how the HBM data relate to these. Based on this comparison, a health risk evaluation can be made. In the scientific literature health based benchmarks can be found or can be derived for some chemicals based on toxicological, epidemiological data.

For the development of the Flemish indicators, only those pollutants were selected for which measurements took place in more than one campaign, with the result that the evolution in time could be discussed, and for which health based benchmarks could be derived or if not, corresponding HBM data was available in foreign HBM campaigns to put the Flemish measurements in perspective. Six (according to scope) indicators were developed:

- 1) Perfluorooctanoic acid in cord serum of newborns
- 2) Cadmium in blood of adolescents
- 3) Lead in cord blood of newborns
- 4) Polychlorinated biphenyls (PCB's) in serum of adolescents
- 5) Hexachlorobenzene in serum of adults
- 6) Arsenic in urine of adolescents

For the selected pollutants, relevant health based benchmarks (HBBs) (based on BE or biomonitoring equivalents or German HBMI & HBMI values or toxicological/epidemiological data) were selected/derived in case data were available. In a first version of this report (January 2016), it was stated that a broad discussion with experts and policymakers about the chosen health based benchmarks would be necessary. An expert consultation was held in September 2016 to discuss the selection of HBBs and the graphical representation of the indicators. The results of this consultation were reported in a separate note (Cornelis *et al.*, 2016). The decisions taken were incorporated in the current version of the report.

For each indicator a description of the exposure and possible health effects is given. The evolution in time of the HBM data is drafted and the health risks discussed according to the relation to the health based benchmarks, when available. If no health-based benchmark is available, data can be compared with international results. The policy framework for each indicator was also shortly discussed.

In addition to these six selected indicators, other HBM data are available that are interesting to translate into indicators. These were not yet developed due to insufficient data on time trends, technical complications or scientific uncertainties concerning source relevance or health impact.