

Group 3 National Hub Template (HBM data for policy development)

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Narrative estimation: 2-3 pages

Introduction:	
<p>Background information on the evolution and status of your National HBM programme in your country. Include year of establishment - Who pays for the programme of work? Give web links.</p>	<p><i>300 words maximum for only the Introduction.</i></p> <p>The Swedish EPA (SEPA) is a governmental agency with the overall responsibility for coordinating the national and regional environmental monitoring. Monitoring of the environment have been ongoing since the late 1970s and consists of ten program areas which includes the physical, biological and chemical environment. Chemicals are regularly monitored in several biotic and abiotic matrices. In the early 1991 the Swedish parliament decided that there should be a program that includes the connection between the environmental and the human health (1). The Institute for Environmental Medicine at the Karolinska Institute developed a structure for the program in 1992 (2) and in 1993 the national program for Health related environmental monitoring started. Human biomonitoring (HBM) is a part of this program which also includes exposure to air pollution and noise. The purpose of the program is to monitor on a long term basis environmental factors that can affect human health and follow indicators of human exposure by measuring environmental pollutants in human matrices. In the yearly appropriation directions (3), the government states that SEPA budget should be used for the Health related environmental monitoring and the annual budget for this is about 1,3 million Euros.</p> <p>The Swedish HBM program is conducted through assignments between the SEPA and universities, research institutes and other agencies that have a structure and organization for sample collection, biobanking and are included in a lab network for chemical analysis. Breast milk, blood or serum, urine and hair are monitored on a regular basis.</p>
Main text - Results and Discussion	
ENSURE YOUR NARRATIVES ARE REFERENCED AS FAR AS POSSIBLE	
<ul style="list-style-type: none"> Describe which ministries (Environment, Health etc.)/policy makers and 	<p>The Swedish HBM-program is financed by the government and is coordinated by the SEPA (under the Ministry of Environment). The Swedish Food Agency (SFA, under the</p>

<p>stakeholders involved/steering/financing the HBM programme.</p> <ul style="list-style-type: none"> • Involvement with HBM and Steps/processes used in involving policy makers. • Is HBM included in their business/strategic/action plan. • State which ministry is HBM data reported to or it is being utilized. 	<p>Ministry of Enterprise and Innovation) performs cross-sectional dietary surveys of the general population, on behalf of the government. In these surveys, the SEPA partly finances the generation of HBM data, which is used within the work of risk analysis for prioritisation of chemicals at SFA (4). The SEPA is coordinator of the 16 Swedish environmental quality objectives set out by the government in 1999. HBM data is used for the follow-up of the environmental quality objective for a "non-toxic environment", which lies within the responsibility of Swedish Chemicals Agency (5). The Toxicological Council, coordinated by the Swedish Chemicals Agency, is an expert organisation established to facilitate the rapid identification of chemical substances that can be harmful to human health or the environment (6). Projects within the HMB program contribute to the scientific base used by the Toxicological Council to identify chemical risks that are annually reported to SamTox, which is a coordination group between national authorities working to prevent and manage chemical risks in society.</p> <p>A steering board is connected to the HBM-program and includes the following members; the Swedish Chemicals Agency, the Swedish National Food Agency, the Public Health Agency of Sweden, the County Administrative Board, the National Board of Housing, Building and Planning and the Karolinska Institute. The steering group has an advisory function and meet on a regular basis 4 times per year.</p> <p>All data generated by the national environmental monitoring programs is an important societal resource and is as part of the public environmental information supply in Sweden, maintained by different data hosts. The task for the data hosts is to provide the information so it effectively can be used by different actors for their work regarding environmental policy and for national and international reporting. Commissioned by the SEPA, the Institute of Environmental Medicine (IMM) at the Karolinska Institute is the host for data generated within the HBM-program (7).</p>
<ul style="list-style-type: none"> • Describe barriers e.g funding; challenges e.g. participant recruitment; opportunities e.g. enhancing cross government working and linking of env data with exposure measurements currently at play in your country with regards to HBM or other things of note. 	<ul style="list-style-type: none"> - Resources. It is expensive to collect human samples and perform chemical analysis. - Decreasing participation rate. - Statistical power is often too low for detailed statistical analyses due to the limited sizes of the study groups. - The equity perspective. An underrepresentation of populations groups with lower socioeconomic status is likely. - Biobanking. Lack of national infrastructure to store samples collected within the HBM-program. - The connection between HBM and health effects. Requires large population groups and access to medical documentation - The level of chemicals in the body is a result of the total exposure from all sources. More information on specific

<ul style="list-style-type: none"> • Have any of these barriers been addressed by HBM4EU? If yes - describe. 	<p>sources is needed to make the right measures to reduce the exposure level.</p> <ul style="list-style-type: none"> - It is also a challenge to identify new threats. Banned chemicals are replaced by new ones with similar properties, and it is a challenge knowing what to look for. Also, we often study chemicals one by one, but we are exposed to mixtures, and we need more knowledge to understand how that affect human health
<ul style="list-style-type: none"> • Elaborate on issues which propelled the establishment and sustainability of your HBM programme. 	<p><i>Please see the introduction section for establishment of the program.</i></p> <p>Sustainability:</p> <ul style="list-style-type: none"> -Several time trends are included in the HBM-program, following chemical exposure in different populations groups (7). -The Swedish environmental quality objectives set out by the government in 1999 use HBM data for the follow-up of the environmental quality objective for a "non-toxic environment" (5) -The government stated, through the proposition "Towards a non-toxic everyday life - platform for chemical policy" (8), that the need for the HBM program. -The Stockholm convention. Sweden uses HBM data for the National Implementation Plan. -The Arctic Monitoring Assessment program needs HBM data on a regular basis for assessment reports (9). -HBM4EU was supported by the government, which resulted in an extended budget for the national program health related environmental monitoring, from the year 2017.
<ul style="list-style-type: none"> • Detailed information of HBM priority substance used for policy development e.g. disaster, pollution, incidence/prevalence of a health-related issue. • Give examples where the work has led to policy implementation, monitoring, or control of chemical exposures etc • Have HBM or other monitoring activities been linked or adapted. Give examples in detail. 	<p>Following examples are where data from the HBM-program has been used, financed by the SEPA:</p> <ul style="list-style-type: none"> - Time trends generated by the HBM-program can be used to detect emerging chemicals of concern, indicated by increasing levels. Time trends can also be used to follow the efficiency of regulatory measures for e.g. lead, PFAS and phthalates. - Levels of chemicals (PCBs, PFAS, PNDE, DDE, PCDD/F) in mothers' milk and blood are used as indicators in the follow-up of the Swedish environmental quality objective "Non-toxic environment" (5, 10). - A time trend of PFAS in breast milk of first time mothers showed increasing levels of PFHxS, which led to the discovery of exposure from the municipal drinking water. As a result, measures were taken for treatment of the water (11, 12) - Sampling of blood was initiated among employers at an airport when it was discovered that the drinking water was contaminated by PFAS (13). <p>Data from the Swedish HBM-program has not been the sole driving factor for Swedish regulatory proposals under REACH legislation but have been used as supportive scientific evidence</p>

	<p>for human exposure in e.g. REACH restriction Annex XV reports and risk management option analyses. For example;</p> <ul style="list-style-type: none"> - Several studies of PFAS, time-trends as well as snapshot studies (11, 14-20) were used in the REACH Annex XV restriction reports for PFHxS (21) and C9-C14 PFCAs (22). - Monitoring data from several studies, including the Swedish HBM-program (23), were used in the risk management option analysis of bisphenol F (BPF). Although BPF is not registered under REACH, these studies have detected BPF in urine, thus demonstrating that exposure to humans occurs. As one of several bisphenol A analogues, BPF is currently subject to ongoing work on regulatory measures. In addition, monitoring data in dust (24) was used in the risk management option analysis for bisphenol AF (BPAF) as evidence of the occurrence of BPAF in European indoor environments. - In the REACH Annex XV report to identify lead as a Substance of Very High Concern (SVHC), time trend studies of lead in blood of children (1978-ongoing) (25, 26) and adults (1990-2014) (27) were used to illustrate the positive effect of banning lead in petrol. The data also showed that other sources of lead contribute to the exposure, and that lead levels in blood are still high in the general population (28). <p>Linkage between HBM or other monitoring activities:</p> <ul style="list-style-type: none"> - The connection between blood levels of PFAS in adolescents and exposure from their drinking water was studied, showing that low levels in drinking water may be an important source of exposure among children (29). - Temporal trends of POPs were evaluated using data from the HBM program and data from the aquatic monitoring program (i.e. guillemots and herring) with the aim to study the relations between regulatory actions and changes in temporal trends (30). The importance of chemical regulation was clearly shown.
<ul style="list-style-type: none"> • Other players who would be beneficial in the continued support of HBM at a governmental level and working together to promote HBM in your country. • Have you used HBM4EU data e.g newsletter, videos to support policy? 	
Future Plans	

<ul style="list-style-type: none"> • Ways/process used in maintaining the programme • What are your future plans? • Do you think PARC will be crucial to the sustainability of your HBM programme? 	<p>PARC is not crucial for the sustainability of the Swedish national HBM-program. However, there is an ongoing discussion within the steering group about the need for an extended HBM-program where also a health examination survey could be included. A national infrastructure for data collection would be beneficial, leading to less fragmentation and a better way to join aligned studies in projects as HBM4EU and PARC.</p>
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