

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

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Narrative estimation: 2-3 pages

<b>Introduction:</b> 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.	The French HBM programme at the population level started initially as a component of the nutritional and health survey. It has therefore been embedded in a wider monitoring of the French population health, nutritional behaviour and exposure. More targeted studies were designed in the context of workplace or accidents assessments.  In France, the National Nutrition and Health Survey (ENNS) was conducted in 2006–2007 to meet the objectives on biomonitoring, chronic disease surveillance and nutritional surveillance. Thereafter, the Grenelle I Act (No, 2009–967 of August 3, 2009) led to the development of a more sustainable French National Biomonitoring programme, in which two distinct studies were designed: 1) Esteban: the Health Study on Environment, Biomonitoring, Physical Activity and Nutrition, a nationwide cross-sectional survey and 2) the ELFE birth cohort (Longitudinal Study from Childhood) (Balicco et al., 2017; Dereumeaux et al., 2016; Fillol et al., 2014; Fréry et al., 2012, Ougier et al., 2021).  The French biomonitoring program is funded by the ministry of health and is coordinated by the national public health agency, Santé Publique France.  Looking forward, Santé Publique France is charged with preparing proposals for the next French Human Biomonitoring study. It will be inspired by the achievements of HBM4EU, in particular by implementing research activities in parallel to the assessment of internal exposure.
<b>Main text - Results and Discussion</b> <b>ENSURE YOUR NARRATIVES ARE REFERENCED AS FAR AS POSSIBLE</b>	
<ul style="list-style-type: none"><li>Describe which ministries (Environment, Health etc.)/policy makers and stakeholders</li></ul>	The French National Hub includes representatives of the ministries of health, environment, research and education and scientists, as well as stakeholders- from industry and

<p>involved/steering/financing the HBM programme.</p> <ul style="list-style-type: none"> <li>• Involvement with HBM and Steps/processes used in involving policy makers.</li> <li>• Is HBM included in their business/strategic/action plan.</li> <li>• State which ministry is HBM data reported to or it is being utilized.</li> </ul>	<p>non-governmental organisations- and meets four times per year to coordinate HBM activities.</p> <p>Although it started with the ENNS study, biomonitoring in France is enshrined in the <a href="#">Grenelle I Act</a> (No, 2009–967 of August 3, 2009), which provides in its Article 32 for the preparation of a second National Environmental Health Plan (PNSE) a strong recommendation for a French National Biomonitoring programme. Hence, the <a href="#">second PNSE plan</a> (2009-2013) includes the launch of a multi-annual biomonitoring program of the French population coupled with a broader health survey and the dosage of emerging pollutants.</p> <p>Following the 2009 law, the National Biomonitoring Program (PNBS) has been led by the French Public Health agency Santé publique France. In addition, as part of the 3rd National Occupational Health Plan (<a href="#">PST 3</a>), Santé publique France promotes the human biomonitoring on occupational exposure. (Rambaud et al. 2020).</p> <p>The subsequent <a href="#">PNSE3</a> (2015-2019) incorporates challenges on exposure knowledge, their effects and levers for action to reduce them, with a large section dedicated to human biomonitoring. To further support such a goal under <a href="#">PNSE4</a> (2021-2025), a French National funding research instrument - the priority research programme and equipment (PEPR) - focusing on exposome, will integrate the development of infrastructures to support the biomonitoring of human populations.</p> <p>The different National Environmental Health Plans (PNSEs) have been developed jointly with the ministries of health and environment, and in association with the Environmental Health Group (GSE), which brings together representatives of ministries, agencies, scientists, associations (NGOs, unions) and economic actors (industry). The human biomonitoring studies are coordinated by Santé publique France but several ministries, agencies and research institutes are involved in its preparation and exploitation.</p> <p>In the French National Biomonitoring programme, the chemicals' prioritisation process relies on members of government agencies and institutes to validate an initial list of pollutants and on a group of French-speaking and international HBM experts to establish the selection criteria, to rate the chemicals using a graded score and to review, validate and establish a provisional final list (Delphi process). The final list is reviewed, revised and recommended by an “emerging risk” group of the National Environmental Health Plan (PNSE) (Ougier et al., 2021).</p>
<ul style="list-style-type: none"> <li>• Describe barriers e.g funding; challenges e.g.</li> </ul>	<p>While there has been a general agreement that human biomonitoring campaigns should be run regularly in</p>

<p>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.</p> <ul style="list-style-type: none"> <li>• Have any of these barriers been addressed by HBM4EU? If yes - describe.</li> </ul>	<p>France, the actual start of the campaign has been highly dependent on secured funding. For this reason there were some delays. With the perspective of European programmes, it is expected that the national and European programmes will be aligned.</p>
<ul style="list-style-type: none"> <li>• Elaborate on issues which propelled the establishment and sustainability of your HBM programme.</li> </ul>	<p>Human biomonitoring studies (HBM) have been conducted in France since 1981 focused on specific populations or pollutants to gain a better understanding of exposure to environmental chemicals, to help regulators reduce environmental exposure and to monitor existing policies on specific concerns. These French HBM studies have been implemented to better understand: 1) the influence of living near an incinerator on serum dioxin and polychlorinated biphenyl (PCB) levels (2005-2007), 2) the influence of consuming river fish contaminated by PCBs on serum PCBs of fishermen (2009-2011), and 3) the evolution of blood lead levels in children from 1 to 6 years old since 1995 (2008-2011) (Fréry et al., 2012).</p> <p>The multipollutant, large population approach began with a national population-based biomonitoring survey, the French National Nutrition and Health Survey - ENNS (2006-2007). It provided the first reference values for the French population exposure to a series of pollutants (metals, pesticides, NDL-PCBs) (Fréry et al., 2012).</p> <p>Building on ENNS, as part of the French HBM program, the Health Study on Environment, Biomonitoring, Physical Activity and Nutrition – Esteban was conducted in 2014-2016. This cross-sectional survey was based on a representative sample of the French population (6-74 years old; 1104 children and 2503 adults). More than one hundred chemicals (pesticides, metals, phthalates, bisphenols, polycyclic aromatic hydrocarbons (PAHs), parabens, brominated flame retardants (BFRs), perfluorinated compounds (PFCs), etc.), as well as biomarkers of nutritional state and chronic diseases, have been analysed (Balicco et al., 2017; Fillol et al., 2014).</p> <p>In 2011 the perinatal component of French HBM program, the ELFE cohort (French Longitudinal Study since Childhood) was started. Exposure to Bisphenol A (BPA), and some metabolites of phthalates, pesticides (mainly</p>

	<p>pyrethroids), dioxins, furans, polychlorobiphenyls (PCBs), BFRs, PFCs and metals, were analysed in French pregnant women at delivery (n = 4145). (Dereumeaux et al., 2016).</p>
<ul style="list-style-type: none"> <li>• Detailed information of HBM priority substance used for policy development e.g. disaster, pollution, incidence/prevalence of a health-related issue.</li> <li>• Give examples where the work has led to policy implementation, monitoring, or control of chemical exposures etc</li> <li>• Have HBM or other monitoring activities been linked or adapted. Give examples in detail.</li> </ul>	<p>The population surveys (ENNS, Esteban and ELFE) have highlighted the exposure of the French population to a variety of environmental contaminants. In particular it showed large exposure to endocrine disruptors. It therefore contributed to trigger the strategy on endocrine disruptors in France which led to stricter regulation of some of these compounds.</p> <p>In the French West Indies, HBM study was conducted in 2013- 2014 with focus on chlordcone, a legacy pesticide used in the past (until 1993) for treatment of banana trees. A total of 1725 adults and 483 children were included in the KANNARI study to update the information on general population exposure to chlordcone. Results suggest that exposure to chlordcone is persistent and widespread. Chlordcone impregnation appears to have decreased between 2003 and 2013 for the majority of the population. However, various subgroups of the population remain highly exposed mainly through consumption of contaminated foodstuffs, like fresh fish (all species combined). Supply habits, in particular those from informal channels, are also associated with exposure to chlordcone. (Gudlner et al., 2010; Dereumeaux et al., 2020).</p> <p>Since 2002, the Ministry of Health and the Ministry of the Overseas Territories have mobilized significant resources, in the framework of the <a href="#">Chlordcone Action Plans</a>, which have led in particular to the awareness and protection of the population (including several HBM studies: KANNARI, HIBISCUS, TIMOUN, KARUPROSTAT), the support of impacted professionals but also the improvement of knowledge on this substance.</p> <p>In Southern France the use of HBM combined with community involvement was implemented to manage polluted soils with lead, arsenic and cadmium in the surroundings of closed metal mines (2015-2017). To better understand sources and modes of exposure in neighbouring populations, a biomonitoring study was conducted in the general population (651 adults and children) including a questionnaire on dietary habits and lifestyles, environmental samples in gardens soils and house dust. A multidisciplinary external advisory committee comprising experts in exposure science, biostatistics, nutrition, epidemiology, anthropology and toxicology, translated the study results into appropriate operational measures. The committee involved the community, through consultation of various stakeholders, to adapt proposals to the local context (Cochet et al., 2020).</p>

	<p>More recently, following the fire in Lubrizol and NL Logistique plants in Rouen on September 26, 2019, the Directorate General of Health asked Santé publique France for a proposal on a methodology for the assessment of the medium-term health impact of the population concerned. Among the different measures proposed, the relevance of implementing a biomonitoring study of population exposures several weeks or even months after the fire arose, in the absence of an emergency biomonitoring system available in France. The substances that may be included in such a HBM study are persistent organic pollutants, like dioxins and PAHs; lead could be included if it is found to have been released during the fire. Other substances, such as zinc, perfluorinated compounds, phthalates and BTEX (some volatile organic compounds), were not found to be relevant. The report concluded with the recommendation to implement a post-accident biomonitoring system in future health-environmental accidents in order to determine the contamination of potentially exposed population (Fréry et al. 2021).</p>
<ul style="list-style-type: none"> <li>• 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.</li> <li>• Have you used HBM4EU data e.g newsletter, videos to support policy?</li> </ul>	<p>There is now a general agreement on the benefits of HBM in France. This support stems in particular from the Environmental Health Group (GSE) led by a French deputy, which monitors progress in the environment and health fields in France. Support to HBM is widespread within the GSE.</p>
<b>Future Plans</b>	<p>The participatory organisational framework of HBM4EU, as well as in the French National Hub, is particularly inspiring for continued French National Biomonitoring programme as foreseen from January 2023 onwards. Santé publique France will be at the centre of the design and management of population surveys to produce future French biomonitoring data, that will help achieve the public health objectives set out in the agency, and also continue supporting French and European research, risk assessors and managers, occupational prevention experts, and policy makers (Rambaud et al. 2020). It will coordinate the inputs from other agencies and research institutes.</p> <p>The next European Partnership for the Assessment of Risk from Chemicals (PARC) will ensure the follow-up of the HBM4EU biomonitoring platform and this is essential for exposure assessments of the European population.</p>

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