

# 1 Prioritised substance group: Arsenic- NOT UPDATED

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## 1.1 Policy-related questions

The following policy-related questions relate to commitments under this frame.

1. What is the current exposure of the EU population to arsenic?
2. What biomonitoring and exposure (environmental and occupational) data on arsenic, relevant to the European population, are currently available?
3. What is the geographic spread of the current exposure and how does it relate to different exposure sources (environmental; dietary sources)?
4. Which population groups are most at risk?
5. What factors (genetic polymorphisms) make people more susceptible or not to the risk of health effects due to arsenic exposure? How is the best and more sensitive biomarkers for identification of reliable arsenic exposure and to link to potential adverse health-effect?
6. What are possible health effects resulting from chronic low exposure to arsenic from food consumption?
7. What is the safe intake level for arsenic that is without any appreciable health risk in the general European population?
8. What are the best analytical methods should allow for differentiating species in urine?
9. How can harmonised, validated and comparable information be collected to support and evaluate current policies?
10. How can transfer of knowledge & technology be facilitated to support current policies?
11. How can HBM4EU results support European policy decisions?

## 1.2 Research Activities to be undertaken

**Table 1 Research activities research activities to be carried out to answer the policy questions for arsenic**

Policy question	Substance	Available knowledge	Knowledge gaps and activities needed
What is the current exposure of the EU population to arsenic?	As	Human exposure and effects data are limited.	Mapping and / or updating existing biomonitoring / exposure data - collection, comparison, evaluation and integration into IPChem - identification of knowledge gaps - prioritisation of research needs WP 7/8/9/10
What biomonitoring and exposure (environmental and occupational) data on arsenic, relevant to the European population, are currently available?	As	Publications on occupational exposure are available, but the data is rather old and some exposures are not relevant anymore. Publications on environmental exposure are available, but the data is rather not EU population exposures and not included dietary sources (excluded water)	Mapping / updating existing toxicological/biomonitoring data collection, comparison, evaluation and integration into IPChem identification of knowledge gaps WP 7/8/9/10
What is the geographic spread of the current exposure and how does it relate to different exposure sources (environmental; dietary sources)?	As	Human exposure and effects data are limited.	Mapping of existing data on arsenic content in food and water including geographical variations in Europe. The term daily intake of arsenic depending on the geographic region and dietary habit. Use of existing data to assess the determinants of exposure, including geographic variations and their causes (e.g. environmental exposures, diet) identification of knowledge gaps
Which population groups are most at risk?	As	Studies in vulnerable populations and studies for a better understanding of the health effects of inorganic arsenic in the population at exposure levels in EU are greatly needed.	Establish European arsenic biomonitoring program covering broad population groups (children and adults).
What factors (genetic polymorphisms) make people more susceptible or not to the risk of health effects due to arsenic exposure? How is the best and more sensitive biomarkers for identification of reliable arsenic exposure and to link to potential adverse health-effect?	As	Human exposure and effects data are limited. Publications on influence of genetic polymorphisms on arsenic metabolism are available, but the data is rather not EU population exposures.	Mapping of existing capacities - Explore the possible use of existing cohorts for the investigation of the adverse health effects due to chronic exposure to low levels of arsenic including the identification and possibly validation of markers of susceptibility - Identification of reliable biomarkers (biochemical and/or molecular biology markers) of arsenic exposure and to link to potential adverse health-effect
What are possible health effects resulting from chronic low exposure to arsenic from food consumption?	As	Human exposure and effects data are limited.	- Identification of groups at risk of exceeding health-based guidance values, based on existing information (e.g. by age, gender, diet, geography, co-exposures, hot-spots in Europe) - To determine whether current or expected exposure levels of as are of concern for health in the general population.

Policy question	Substance	Available knowledge	Knowledge gaps and activities needed
What is the safe intake level for arsenic that is without any appreciable health risk in the general European population?	As	The EFSA Panel on Contaminants in the Food Chain (CONTAM Panel) assessed the risks to human health related to the presence of arsenic in food, but human exposure and effects data are limited.	Preparation of a core study to assess: <ul style="list-style-type: none"> <li>- (a) the current exposure of Europeans to arsenic and the associated risk and to facilitate the assessment of temporal trends with regards to the effectiveness of policies (b) the contributions of different sources (dietary, environmental,) to the body burden, with the aim to elaborate HBM threshold levels for Europe and safe upper limits for different types of foodstuff</li> </ul>
What are the best analytical methods should allow for differentiating species in urine?	As	Recently developed HBM analytical methods should allow for differentiating species in urine, resulting from inorganic arsenic exposure, including As III, As V and twomethylated metabolic products, DMA and MMA.	Mapping of existing capacities <ul style="list-style-type: none"> <li>- cost-effective, reliable analytical methods capable of speciation analysis</li> <li>- standard procedures for quality-controlled sampling</li> <li>- qualified laboratories for sample analysis as result of the QA / QC program established in HBM4EU</li> <li>- Arsenic different chemical form of should be included (speciation analysis). Laboratories that will apply for the determination of arsenic in biological material should be verified preceded by participation in the QA / QC program established by HBM4EU.</li> <li>- Establishment of unified methods of biological material collection, storage and shipping procedures to centres, which will determine arsenic concentrations.</li> </ul>
How can harmonised, validated and comparable information be collected to support and evaluate current policies?	As		<ul style="list-style-type: none"> <li>- Preparation of an inventory of current relevant national strategies in European countries</li> </ul>
How can HBM4EU results support European policy decisions?	As		<ul style="list-style-type: none"> <li>- Identification of stakeholders</li> <li>- Mapping, prioritising and addressing stakeholder needs, starting with policy makers and scientists</li> <li>- Describe previous studies identifying the impact of EU legislation</li> <li>- Establish permanent European arsenic biomonitoring as support of arsenic European policies</li> </ul>