HBM4EU science and policy for a healthy future

HORIZON2020 Programme
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Revised report on national needs, objectives of a long-term HBM4EU inventory of funding mechanisms and recommendations for a sustainable HBM initiative in Europe and its organisation

Deliverable Report

D6.4

WP6 - Sustainability and Capacity building

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2 Glossary

AT	Austria
BE	Belgium
BG	Bulgaria
CH	Switzerland
CY	Cyprus
CZ	Czechia
DE	Germany
DK	Denmark
DFI	Federal Office of Public Health
DOMG	Department Omgeving
EE	Estonia
EEA	European Environment Agency
Eionet	Environment information and observation network
EL	Greece
EPA	Environment Protection Agency
ES	Spain
EU	European Union
FI	Finland
FR	France
HBM	Human Biomonitoring
HU	Hungary
HR	Croatia
IE	Ireland
INSA	National Institute of Health Dr. Ricardo Jorge (Instituto Nacional de Saúde Ricardo Jorge), Portugal
INSERM	French National Institute of Health and Medical Research (Institut national de la santé et de la recherche médicale)
IS	Iceland
IT	Italy
LT	Lithuania
LU	Luxembourg
LV	Latvia

MK	North Macedonia
MOH-CY	Ministry of Health - Cyprus
MS	Member States
MT	Malta
NFP	National Focal Point
NH	National Hub
NHCP	National Hub Contact Point
NL	The Netherlands
NO	Norway
NRC	National Reference Centre
PT	Portugal
SE	Sweden
SI	Slovenia
SK	Slovakia
SLR	Systematic literature review
TR	Turkey
UK	United Kingdom
WP	Work Package

3 Abstract/Summary

This report aims to provide a revision on the **national needs (T6.1), the funding mechanisms (T6.2) and the long-term sustainability of HBM4EU (T6.3)**. Therefore, this report is divided in the three above-mentioned sections, for which the different tasks within work package 6 (WP 6) provided input.

Concerning **national needs**, a survey is conducted annually by the national hub (NH) coordinator to monitor and evaluate the progress and development of all National Hubs involved in HBM4EU. With 2020 being the fourth year of the HBM4EU project, the survey followed many of the questions of previous years. Most NHs are satisfied with their current HBM4EU involvement, but have expressed their concerns regarding the communication, funding and lack of direct involvement. The follow-up to HBM4EU, PARC, was mentioned and the necessary involvement of all countries as well as the importance of communication between NHs and National Hub Contact Points (NHCPs) was highlighted.

Inclusivity of smaller countries seems to be a problem through both lack of funding and adequate tasks.

Regarding **funding mechanisms**, the initial list of financing mechanisms in the HBM and environmental health area at national and international level was updated and is available on the HBM4EU website under the "Funding Opportunities" tab. This intends to be an inventory that can be used not only by the HBM4EU consortium but by the entire scientific community to provide an overview of existing funding sources. It comprises of **a set of targeted strategies** for identification and dissemination of funding which are explained in further detail in section 6 Funding mechanisms. A systematic literature review was also undertaken to understand what the primary funding source of projects in HBM was. The results are not available yet.

As part of T6.3 on the **long-term sustainability**, a citizen survey was developed together with T4.1 – mapping of needs. This survey was initially used for focus groups to better understand their awareness and concerns of chemical exposure and Human Biomonitoring. It was updated to harvest more EU-wide results including chemical exposure during the COVID-19 pandemic.

The survey took place between September 2020 and February 2021 and the results were organised to cover the same regions as the aligned studies to allow for the organisation of results in a similar way for coherence. In order to produce a short report summarising the outcome of the survey, the questions were grouped for quicker analysis.

The majority of the respondents considers HBM a tool that produces important results on human exposure to chemicals and that it should be performed more often and in a more coordinated way.

This was a non-representative survey and future work should focus on wider dissemination in other population groups and on understanding how perceptions change over time.

The survey's answers were also distributed to the NHs, so they can produce internal communication briefs on their own data for further dissemination.

4 Introduction

As part of the long-term sustainability of HBM4EU, this report comprises a revision of the national needs (T6.1), the funding mechanisms (T6.2) and the long-term sustainability of HBM4EU (T6.3).

Concerning **national needs**, a survey is conducted annually by the NH coordinator to monitor and evaluate the progress and development of all National Hubs involved in HBM4EU. The survey is meant to assess and track the engagement of the NHs. Therefore, it focusses on it the NH's needs to consolidate the work at national level and to build support by increasing HBM4EU's outreach.

The inventory developed for the **funding mechanisms** aims at being used by the entire scientific community in order to provide an overview of existing funding sources. This is also a key contribution to capacity building and sustainability of Human Biomonitoring (HBM)-related initiatives. Specific targeted strategies were identified to access funding and may be found in more detail below:

- Subscription of RSS/feeds and newsletters,
- Definition of alerts/automatic notifications,
- Identification of resources/platforms that publicise project calls, prizes, scholarships,
- Map of entities that fund research projects.

The challenge, however, is to provide information on national or regional funding calls. Different countries have distinct funding cultures that can suit specific project goals. Hence, it is important to consider where to submit the project while preparing the proposal, since it will affect how the proposal is written according to the distinct nature and scope of each funding source.

As part of T6.3, **a citizen survey** was developed together with T4.1 – mapping of needs. This survey was initially used for the focus groups to better understand their awareness and concerns of chemical exposure and Human Biomonitoring. It was updated to harvest more EU-wide results including chemical exposure during the COVID-19 pandemic.

The survey took place from 14th September 2020 to 3rd February 2021. An initial analysis of the overall results has been done and a further refined analysis will be performed and presented soon in the form of a scientific publication. EU-wide results are provided, along with results organised by EU regions for some of the questions. For consistency, the same regions as the aligned studies were used but we have included Israel in the Southern Europe countries:

- Northern Europe (DK, FI, SE, IS, NO, LV, LT, IE, UK, EE)
- Western Europe (AT, BE, NL, FR, DE, CH, LU)
- Southern Europe (HR, CY, EL, IT, PT, Sl, ES, MK, IL)
- Eastern Europe (CZ, PL, SK, HU).

5 National needs

5.1 National Hubs

5.1.1 Introduction

A survey is conducted annually by the national hub coordinator to monitor and evaluate the progress and development of all National Hubs involved in HBM4EU. 2020 is the fourth year of the HBM4EU project, the survey followed many of the questions of previous years.

The HBM4EU is a 5-year, joint project, that encompasses 30 countries, co-funded by Horizon 2020. The principle is to coordinate and evolve HBM across Europe. The project will assess the actual exposure to chemicals, and the possible health effects, to citizens.

One responsibility of the national hub coordinator in work package (WP) 6 is to deliver an annual progress evaluation, this is partially done through a survey sent out to all NHs, as well as meetings and communication between the NHs. The annual NHCPs survey is designed to assess and track the engagement of the NHs over the passing year. It will "…focus the needs of the NHCP to consolidate the national hub networks and capabilities"; thus "…building support amongst key institutional actors and stakeholders for a long-term, sustainable HBM initiative".

This chapter details the responses of said survey and consolidates the results in terms of focussing the NH networks and capabilities of HBM4EU; thus, improving the sustainability and longevity of a combined HBM initiative across Europe.

5.1.2 Methodology

The survey was created using Microsoft Forms.

National Hub Consultation HBM4EU Annual Survey 2020.

This survey was emailed to 30 countries' NHs and 21 responses were made by the deadline of 17th December. An extension was given to the remaining 9 for a week after the Christmas break (until 11. January), of which 1 NH responded. Another email was sent with an extension to 22. January and 4 further responses were received.

5.1.3 Results and discussion

The responses of the survey are detailed below in Figure 1:

26 of the 30 NHs responded to the survey as detailed below.

Figure 1: National Hub response to the survey

5.1.3.1 Hub activity

In 2020, the average activity of the NHs was higher than in 2019, with 11 NHs reporting more activity, 6 NHs reporting less and 8 saying it was the same.

5.1.3.2 National Hub/National stakeholder meetings

17 NHs organised an average of 2 NH/National stakeholder meetings in 2020, but 8 NHs had no meetings in 2020. Figure 2 shows the percentage of NHs having 0 to 9 stakeholder meetings.

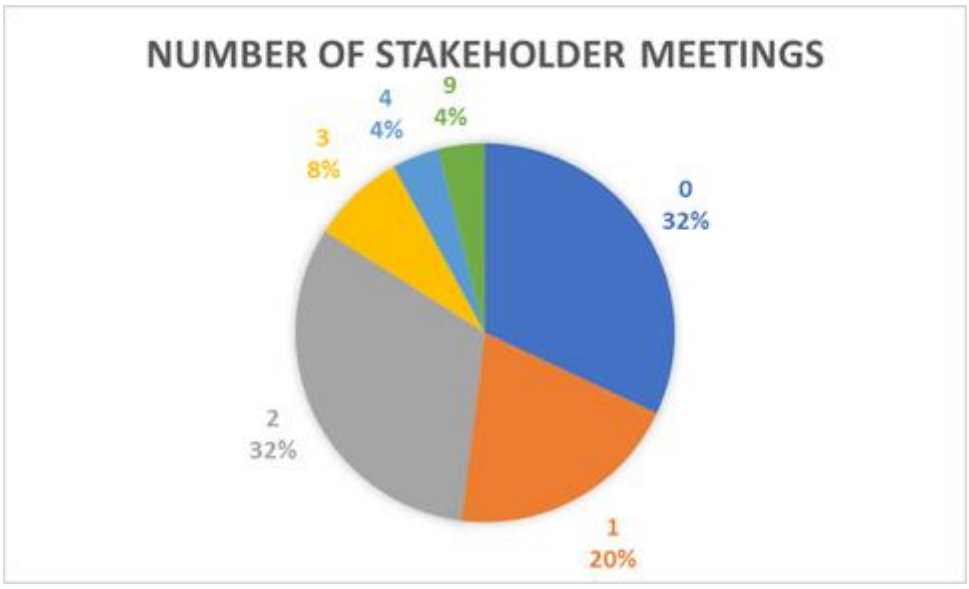

Figure 2: Number of NH/National stakeholder meetings within each NH

Figure 3 shows the distribution of number of attendees in the NH stakeholder meetings. There was an average number of 22 attendees to these meetings.

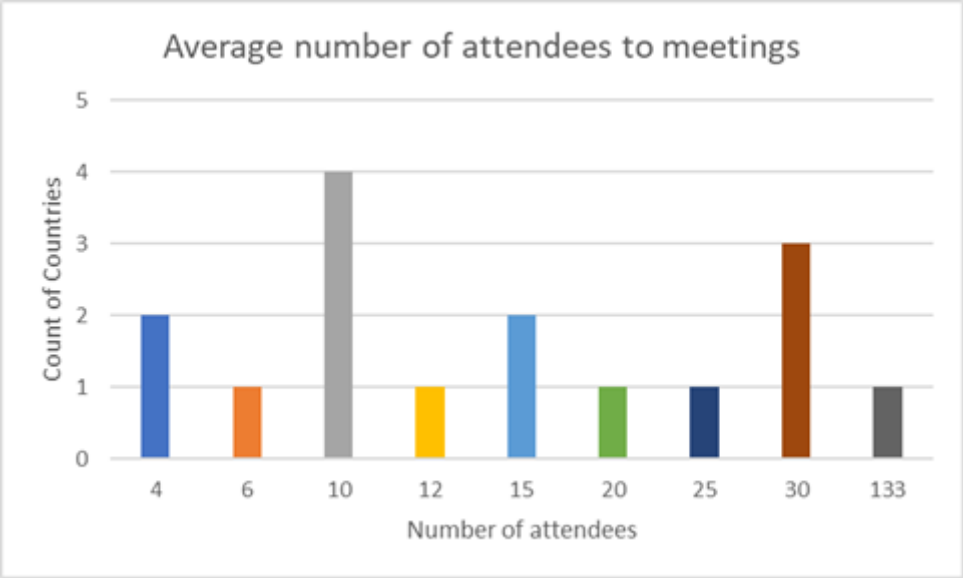

Figure 3: Average number of attendees to NH meetings within each NH

Attendees mostly included scientists, policy makers (civil servants), governmental organisations and health professionals, the percentage of each can be seen below in Figure 4.

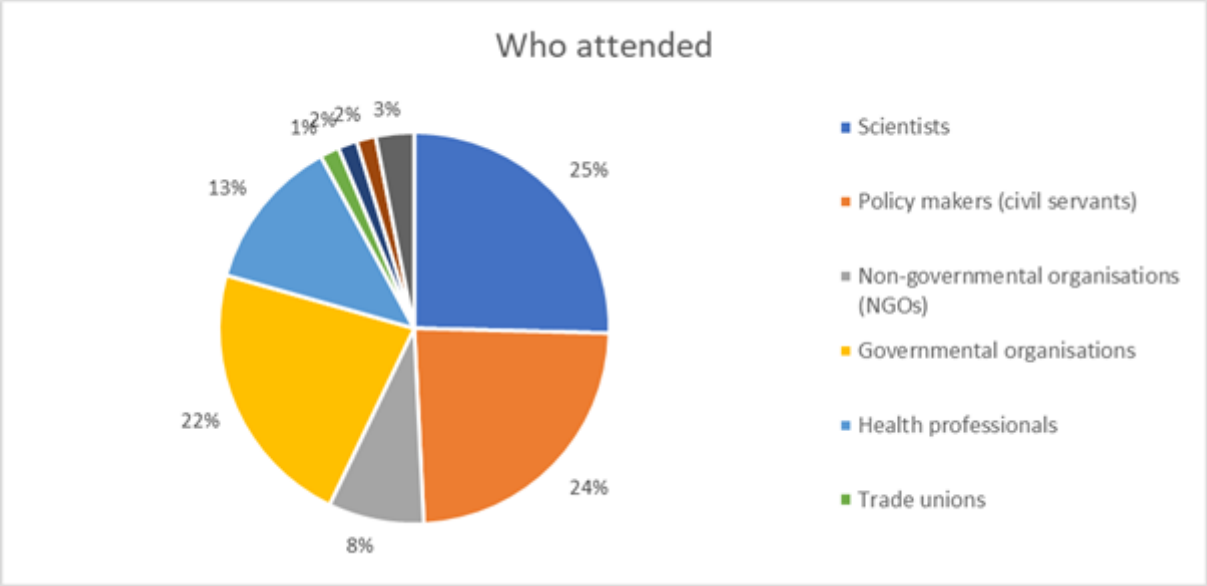

Figure 4: Pie chart of the background of distribution of different attendees across the NH meetings

The survey results showed that in these meetings the topics addressed mainly included the research approach of HBM4EU, the research results of HBM4EU, a sustainable HBM program in Europe, the policy uptake of research results e.g. conclusion/suggestions for policy or co-production of policy options, and the reviewing of factsheets.

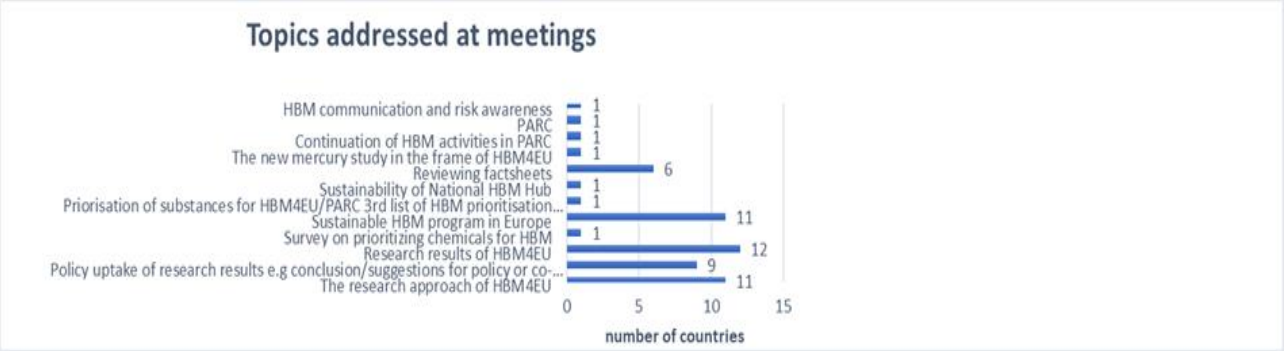

Figure 5: Bar chart depicting the number of countries mentioning each topic within NH meetings

Concerns raised in the national hub meetings showed a focus on the Partnership for the Assessment of Risk from Chemicals (PARC), finances, and the sustainability and integration of HBM in their own countries. A full list is detailed in Table 1.

Table 1: Table of all concerns raised at NH meetings

National Hub	Concerns
Denmark	No National program and no support of such from the agencies.
Sweden	Financial issues within the project (between Grant Signatories (GS) and Linked Third Parties (LTPs) and between the sample owners and labs). The national contributions to the project are of interest in these meetings. There is also an interest to discuss more results e.g. of the aligned studies, so this will be done more in the future.
Israel	Purpose of meeting was to update the national hub on HBM4EU, PARC, the prioritisation survey and the National Program in Israel.
Spain	Sustainability, prioritisation, implementation of National Environmental Health Plan and National HBM Hub.
Cyprus	Exploitation of expertise / results from HBM4EU, needs/opportunities/obstacles for sustainable European/national HBM based on HBM4EU and other experiences so far and PARC development (e.g. streamlining objectives, securing funding, appropriate governance, simplified management, etc), uncertainties – obstacles - conflicting priorities due to COVID-19.
Slovenia	The extensiveness of the future PARC activities, the COVID19 obstacles in performing HBM sampling, the scarcity of resources, lack of staff.
Latvia	Development of HBM system in Latvia in the future (planning period 2021 - 2027). Inclusion of HBM in the national research program for next planning period. Development of priorities set for the national HBM program, strategical planning.
Belgium	How to participate in PARC + how to feed priorities into PARC?
Estonia	The stake holders meeting was the conclusion of our preliminary project for HBM in Estonia, people were informed of the HBM4EU national hub that is overseen by us, since we joined this year.
United Kingdom	Long-term framework to maintain HBM was the main issue. Obviously, this is reflected in a need to have a stable funding stream. The policy leads are keen to start to receive results. The Industry associations were pleased to have been involved in the discussion and would like to maintain contact as things develop in the UK.

National Hub	Concerns
Norway	How to obtain co-funding for PARC.
Portugal	Policy uptake of HBM results into chemicals regulatory actions (risk assessment and risk management) and public health advice. Sustainability of HBM.
Croatia	Sustainability of HBM program in Croatia.
Greece	Integration of HBM with other environment and health and chemical safety initiatives within the framework of the Green Deal and Sustainable and Innovative Development.

5.1.3.3 HBM to develop National Chemical policy or to monitor the efficacy of an established policy.

Out of the 26 responders 12 of them have used HBM for development of national chemical policy or to monitor existing policy. Examples given are shown in the table 2 below.

Table 2: Examples given of HBM use in policy

Examples of HBM use in policy
HBM data was not used for national policy; however, HBM itself yes. • "Establishment of national HBM programme." was added in the national strategy on public health (2019) (planned – no decision) • "Establishment of national HBM programme." was added in the strategy on actions to decrease male infertility (2020) (planned – decision soon)
HBM data has been used in risk assessments and intake calculations of different substances in food and drinking water. E.g. HBM data has been compared with the new EFSA risk assessment on dioxin-like substances and PFAS.
Data on pesticide exposure was effective in raising awareness among policy makers on exposure with focus on children's exposure. Data on urinary cotinine in children (exposure to environmental tobacco smoke) during COVID-19 submitted to Parliament.
Esteban French HBM study has triggered the development of a new strategy on Endocrine disruptors in France.
CY presented some examples in the NHCP regional meeting back in June 2020. Since then, CY is in contact with the competent authority for the Minamata Convention on Mercury for exploitation of the HBM4EU work
Mainly the data were used to raise awareness of general public and to help NGOs in their campaign (e.g. impact of plastics on health and environment)
Flemish PFAS action plan Flemish and national plans for endocrine disruptors
Our national HBM report (compilation of studies and activities) was presented at a National Council Meeting /the parliament. All political parties expressed their interest and stressed the importance and the scientific quality of the activities and the report. The HBM report will be published every second year from now on.
Currently, the public health officials have proposed the reduction of the Lead action level from 10 down to 5 micrograms per decilitre (ug/dL). Reference to Welsh and other international initiatives has been used. The HBM data across Europe has been referenced.

Examples of HBM use in policy
Following major incidents there was a call for the use of HBM data to determine public exposure to PAHs and other pollutants released form fires. Due to the lack of background (reference) data this was not initiated. However, the need for reference values has subsequently received a lot of political interest. There are other national research projects where HBM has been used.
Awareness of HBM-data from Norway has led to increased focus on the need for surveillance of human exposure to chemicals in policy documents. HBM data has been used to evaluate exposure in hot spot areas and further to issue local recommendations.
HBM4EU is used to establish National HBM Committee and start organising National HBM infrastructure.
HBM data on PFAS were used.
Water contamination (drinking) with Cr6+ in the Asopos river basin. Definition of pesticide application distances in agricultural applications nearby residential areas.

The NH members added in 2020 mostly included ministries, the different members are detailed in Figure 6.

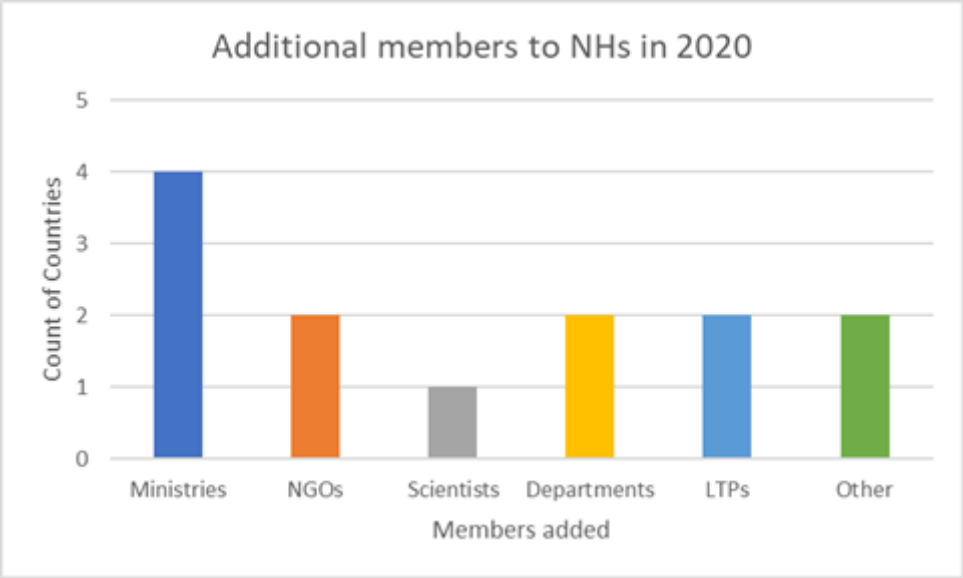

Figure 6: Details of the different members additionally added to NHs in 2020

5.1.3.4 Satisfaction of involvement in HBM4EU

The average satisfaction of the involvement of the NHs in HBM4EU was 7/10.

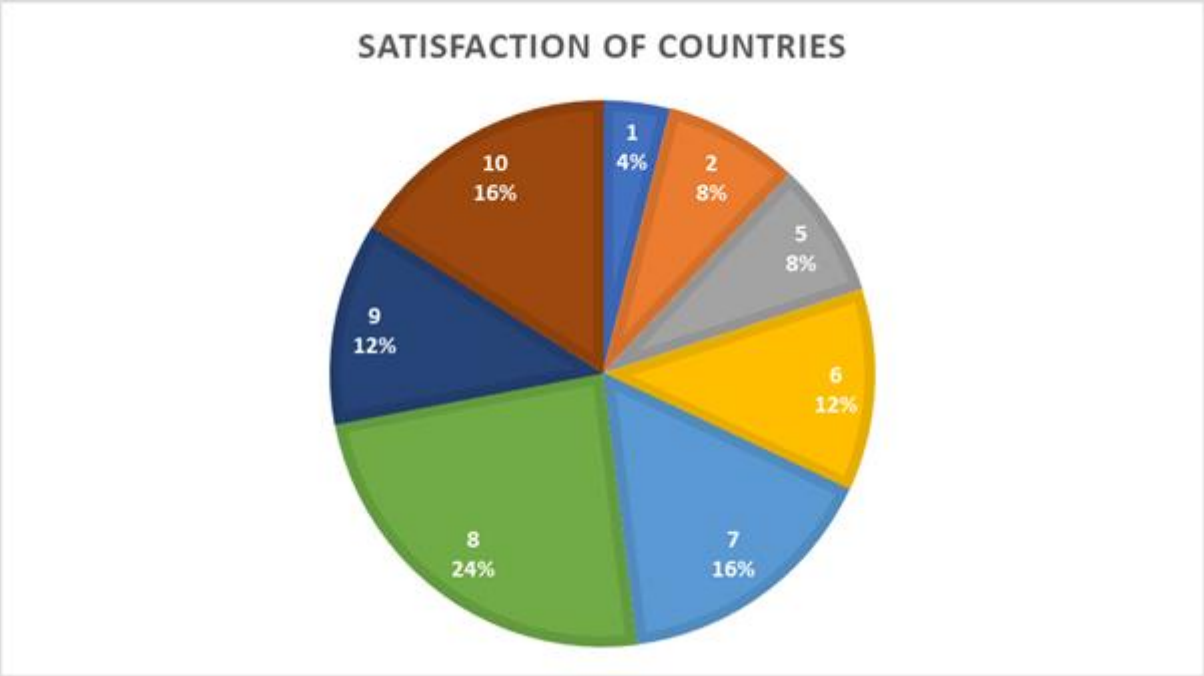

Figure 7: Satisfaction (out of 10) of the NHs with their involvement in HBM4EU

As shown in Figure 7,68 % of NHs were satisfied (7+) with their involvement in HBM4EU, 3 of the NHs were dissatisfied with their involvement (1-2), and the remaining 5 NHs were passive (5-6) about their involvement. Dissatisfaction was due to many factors including the effects of COVID-19, the communication of WP leaders, and lack of direction/adequate tasks.

Improvements to the HBM4EU were suggested and shown below; these suggestions included better communication (including more transparency of data and decision making, as well as early consultation and involvement of experts on HBM4EU documents), it was also stated that within PARC a harmonised study is needed involving all countries throughout the entire process.

Table 3: All suggested improvements to HBM4EU

More transparency and more discussion amongst more than the Management Board
It would be helpful to hear about any concrete questions or themes to discuss with the hub - e.g. questions that the different WPs would like to consult with the national hubs etc. The national hubs are a great resource (of knowledge and insight spanning over different fields) and it could be utilised more :) but this of course assumes that there is a need for it.
Less bureaucracy.
New, harmonised study across Europe is needed for full engagement of all countries, harmonisation on this scale will never work.
More flexibility in finance of national hub activities.
Within PARC a harmonised study should take place involving the countries from the very beginning of study design and sampling. Also, smaller countries with no HBM programme should have the possibility to participate.

More transparency and more discussion amongst more than the Management Board
As the project has progressed the NHs have received more focus. their essential role in the project has been recognised by the MB and the coordinator.
Hopefully in 2021 the communication with WP coordinators will be improved.
Better communication tools, in order to reach potential partners and achieve our national HBM-Platform and increase the Science to Policy Interface. The HBM should be used to define priorities at different sectors (environment, health, agricultural…).
Early consultation and involvement of experts selected by national hubs for HBM4EU documents.
Less bureaucracy, more straightforward management and transparency of data and decision-making processes.

5.1.3.5 Engagement of HBM within the country

18 NHs (72 %) stated that there are regular exchanges with relevant national ministries on HBM4EU or general HBM; however, 7 NHs do not have regular exchanges.

21 NHs (84 %) are discussing an interest in a long-term HBM European programme; 4 NHs are not.

Many initiatives are organised by the NHs to engage the Governing Board to promote HBM4EU such as national hub meetings, HBM4EU posters, HBM event (however cancelled due to COVID-19), direct contact with the top hierarchy (Ministry of Health), information of project activities broadcast on national radio, information pages, workshops and regular contact.

5.1.4 Comments

Additional comments were made in the end of the survey and are detailed below.

Table 4: Additional comments to the survey

Additional comments
Involvement in HBM4EU has been helpful in building our national capacity - both an HBM lab and a national program. We have gained tools and knowledge on HBM but also a very valuable network of experts to consult with.
We hope that we will succeed to establish an effective and cooperating hub in the PARC that we will continue and upgrade present results in the future.
We would like to stress the importance of national hubs, national hub contact points and a national hub coordinator (as member of the MB) in PARC.
In general, information flow could be harmonised and improved in terms of ongoing activities, participation and results. The information flow in different work packages is very diverse. Specifically, in some work packages/tasks guidance or communication through the task leader is lacking, which makes it difficult to work and cooperate efficiently.
If possible, the system to declare HBM4EU related expenses should be explained better, I am having a hard time finding out which documents are needed to justify costs to the network
Main issue is the need to ensure the NHs are well represented and integrated into any future work. They are the means to get national engagement and without this there will be a real risk to PARC and the stability of HBM in Europe.
It looks that our National Hub did not have any visible activity in 2020 (except active participation on the Consortium meeting in September and work on Citizens' survey). Unfortunately, it happened that our

Additional comments
Institute was the leading health institution in dealing with Covid-19 pandemic in the country, so all the capacities (human and technical) were fully engaged with that. We expect that to be changed in 2021 and HBM4EU finally to start giving results in North Macedonia.
The fact that no HBM4EU budget was planned for NH activities affects its dynamics and capacity to organize more/wider initiatives to engage stakeholders.
Given the on-going COVID epidemic and considering the front-line role of the Ministry of Health in its management, an in-deep discussion with the Ministry (which is the reference institution for HBM4EU) on future nation-wide HBM activities had to be postponed.

5.1.5 Conclusion

Overall, it seems that many NHs are satisfied with their current HBM4EU involvement, however there are concerns with the communication, funding and lack of direct involvement.

There was a strong number of responses with only 4 from 30 not responding (including 2 NHs that did not respond the previous year), but reminders were necessary.

COVID-19 has delayed much of the project, both communication and events have been disrupted as well, this needs to be addressed throughout the final year.

PARC was widely referenced; it was stated involvement of all countries is necessary as well as the importance of NHs and NHCPs to keep communication up.

Inclusivity of smaller countries seems to be a problem through both lack of funding and adequate tasks.

6 Funding mechanisms

6.1 Identification and dissemination of funding mechanisms in the HBM and environmental health area from national, regional, European and international origin

The initial list of financing mechanisms in the HBM and environmental health area from national, regional, European and international origin was updated. The information was integrated in the HBM4EU website, in a tab that was created named “Funding Opportunities”.

This intends to be an inventory that can be used not only by the HBM4EU consortium but by the entire scientific community to provide an overview of existing funding sources. The idea is to present the identified funding opportunities for national capacity building in the area of Human Biomonitoring through a perspective of assuring further support for the HBM4EU Initiative.

The following targeted strategies for identifying such funding mechanisms and resources have been used:

- Subscription of RSS/feeds and newsletters. One of the strategies used for the identification of funding opportunities was the subscription of feeds and newsletters in the areas of the HBM4EU Initiative. Several specific keywords in this field were defined to delimit the search domain (e.g., call, scholarship, prize, grant, funding AND health, environmental health, public health, Human Biomonitoring, chemicals, environment, toxicology, environmental monitoring, surveillance, risk assessment, health risks, biomarkers, cohorts, health surveys, chemical mixtures). This way, any new funding opportunity related to Human Biomonitoring, environment or chemicals will be identified through the generation of an alert.

- Identification of resources/platforms that publicise project calls, prizes, scholarships. The identification and regular visit of resources/platforms that publicise project calls, prizes, grants or scholarships was also used to map funding opportunities.
- Map of entities that fund research projects. Finally, the identification of public and private entities that fund research projects and initiatives was also used. After mapping these entities, regular visits to each entity webpage were programmed in order to identify new funding opportunities.

The challenge, however, is to provide information on national or regional funding calls. Different countries have distinct funding cultures that can suit specific project goals, being important to consider where to submit the project while preparing the proposal since the decision will affect the type of writing given the distinct nature and scope of each funding source.

6.2 Systematic literature review on the primary funding sources of projects in the area of HBM

A systematic literature review (SLR) on the primary funding sources of projects in the area of HBM is being undertaken. The review aims to identify the current funding mechanisms of the studies published in the area of Human Biomonitoring in Europe. More specifically, the SLR intended to assess the relationship between the funding mechanisms (e.g. public, private, corporations) and a) the geographic level of implementation of the study/project (i.e. regional, national and/or international) and b) the substances under study, with a special focus on the prioritised substances of the HBM4EU initiative.

The SLR follows the guidelines suggested by the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA)[1].

Eligibility criteria

Only empirical studies were considered eligible for this review. Given the main aim of the review of identifying the current funding mechanisms of the studies published in the area of HBM, only studies published in the last five years were considered. Also, only studies written in the English language were included.

Commentaries, editorials, letters, case reports, reviews, and study protocols were excluded. These formats will be used to hand search for additional papers not covered by the initial review.

Information sources

PubMed, Web of Science and Scopus electronic databases were searched. Additional relevant papers will be hand-searched in the reference lists of each paper included for data extraction and the literature reviews identified during the screening process.

[1] Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, Shamseer L, Tetzlaff JM, Akl EA, Brennan SE, Chou R, Glanville J, Grimshaw JM, Hróbjartsson A, Lalu MM, Li T, Loder EW, Mayo-Wilson E, McDonald S, McGuinness LA, Stewart LA, Thomas J, Tricco AC, Welch VA, Whiting P, Moher D. The PRISMA 2020 statement: An updated guideline for reporting systematic reviews. Syst Rev. 2021;10(1):89. PMID: 33781348

Search

The keywords used in the search were defined by the research team. The focus was on HBM and on the two groups of prioritised substances within the HBM4EU initiative.

Biological monitoring (Mesh)	Aniline family
Biomonitoring	Bisphenols
Environmental exposure	Cadmium
Occupational exposure	Chromium VI
Human exposure	Chemical mixtures
Chemical exposure	Emerging substances
Biomarker of exposure	Flame retardants
exposome	Polycyclic Aromatic Hydrocarbons
	*fluorinated compounds
	Phthalates
	Hexamoll® DINCH
	Acrylamide
	Aprotic solvents
	Arsenic
	Diisocyanates
	Lead
	Mercury
	Mycotoxins
	Pesticides
	Benzophenones

Study selection

Titles and abstracts are being independently screened for eligibility by two researchers. Final decisions on eligibility will be discussed by the two researchers to reach a consensus. In case of disagreements, a third researcher of the team will be consulted to decide.

So far, 10359 papers were identified. The screening of the titles and abstracts is being done.

Data collection process

Information from each selected study will then be independently extracted by two researchers. Extracted data will be compared and disagreements will be reviewed and discussed for reaching consensus. When necessary, a third researcher will be consulted for a final decision. Information on title, author, publication date, journal, geographic level of implementation (e.g., regional, national, international), number of institutions involved, chemical substance(s) under study and funding (including type of funding: public, private or both) will be extracted into a standardised table.

In addition to the reviewing data provided in the papers, the corresponding authors of each paper will be asked to provide further details on funding by answer a short online questionnaire to be prepared.

The results of the SLR will allow us to have a better perspective of the origins of the main funding sources of the HBM studies and the identification of gaps in geographical terms.

7 Citizen survey in HBM4EU partner countries

Under HBM4EU, a citizen survey was developed as part of T6.3 on the long-term sustainability together with T4.1 - mapping of needs. This survey was initially used for the focus groups to better understand their awareness and concerns regarding chemical exposure and Human Biomonitoring. Since the citizen survey was developed in 2020, it was updated to harvest more EU-wide results including chemical exposure during the COVID-19 pandemic.

During summer, the survey was sent out to the NHs in English for translation. The translations took longer than anticipated as this was a very busy period for some institutions that had to shift their focus as a consequence of the COVID-19 pandemic. As such, a few translations had to be done by the EU translation services and checked by the NHs. The EN version of the survey may be found in Annex 1: Citizen Survey.

The survey was then implemented on the HBM4EU website (Figure 8) with a specific link to the survey for each of the countries. The collaboration of the NHs was requested for the dissemination of the survey.

The survey for the 2020's focus groups (NL, CY, HU and DK) was linked to the AGES website, who had uploaded it first to match the date of their focus groups. Therefore, these countries had their surveys opened from September.

Figure 8: HBM4EU website page for the citizen survey

The survey took place from 14th September 2020 to 3rd February 2021. An initial analysis of the overall results has been done and a further refined analysis will be performed and presented soon in the form of a scientific publication. The results are presented for the overall sample and for some variables also organised by EU regions. For consistency, the same regions as the aligned studies were used, with Israel included in the Southern Europe countries:

- Northern Europe (DK, FI, SE, IS, NO, LV, LT, IE, UK, EE)
- Western Europe (AT, BE, NL, FR, DE, CH, LU)
- Southern Europe (HR, CY, EL, IT, PT, Sl, ES, MK, IL)
- Eastern Europe (CZ, PL, SK, HU).

7.1 Participants' characterisation

We received in total 5391 responses to the survey. The full survey is in Annex 1: Citizen Survey.

In this section, the characterisation of the participants in the survey is provided in Tables 5 and 6. A high number of responses was obtained from the Netherlands, Portugal, Latvia, Spain, Hungary, Denmark, Sweden and Republic of North Macedonia (82.0 %), followed by Norway, Germany and Cyprus with more than 100 replies. Responses from the remaining 19 participating countries were below 100 replies (Table 5). The Netherlands and Denmark had professional help for outreach, although in Denmark's case that system did not produce the intended outcome.

Table 5: Number of respondents and population* by participant's country of residence

Country	Number of respondents	Country's representation in survey (%)	Country's population (millions of people)*	Country's population proportion (%)	Region
Austria	25	0.5	9 044 400	1.7	Western Europe
Belgium	63	1.2	11 626 839	2.3	Western Europe
Croatia	63	1.2	4 086 908	0.8	Southern Europe
Cyprus	132	2.4	1 213 876	0.2	Southern Europe
Czech Republic	76	1.4	10 723 579	2.1	Eastern Europe
Denmark	375	7.0	5 807 232	1.1	Northern Europe
Estonia	47	0.9	1 327 189	0.3	Northern Europe
Finland	6	0.1	5 547 042	1.1	Northern Europe
France	84	1.6	65 379 706	12.8	Western Europe
Germany	137	2.5	83 981 234	16.4	Western Europe

Country	Number of respondents	Country's representation in survey (%)	Country's population (millions of people)*	Country's population proportion (%)	Region
Greece	4	0.1	10 386 055	2.0	Southern Europe
Hungary	511	9.5	9 642 457	1.9	Eastern Europe
Iceland	7	0.1	342 883	0.1	Northern Europe
Ireland	6	0.1	4 978 946	1.0	Northern Europe
Israel	11	0.2	8 757 304	1.7	Southern Europe
Italy	1	0.0	60 396 854	11.8	Southern Europe
Latvia	622	11.5	1 871 194	0.4	Northern Europe
Lithuania	8	0.1	2 695 088	0.5	Northern Europe
Luxembourg	1	0.0	633 642	0.1	Western Europe
Netherlands	1015	18.8	17 162 748	3.3	Western Europe
Norway	138	2.6	5 452 700	1.1	Northern Europe
Poland	2	0.0	37 816 301	7.4	Eastern Europe
Portugal	669	12.4	10 175 033	2.0	Southern Europe
Republic of North Macedonia	306	5.7	2 083 311	0.4	Southern Europe
Slovakia	50	0.9	5 461 581	1.1	Eastern Europe
Slovenia	35	0.6	2 079 147	0.4	Southern Europe
Spain	552	10.2	46 678 053	9.1	Southern Europe
Sweden	368	6.8	10 145 876	2.0	Northern Europe
Switzerland	39	0.7	8 701 551	1.7	Western Europe
United Kingdom	38	0.7	68 149 530	13.3	Northern Europe

*Total population by country as stated in https://www.worldometers.info/world-population/ (accessed: 26/03/2021)

Based on the clustering of participating countries in the four general regions (Northern, Southern, Eastern or Western Europe), 30 % of the responders resided in "Northern Europe", 33 % in "Southern Europe", 12 % in "Eastern Europe" and 25 % in "Western Europe".

Table 6: Percentage of answers per region

EU region (n=4560)	**Number of respondents**	**Percentage (%)**	**Population (millions of people)***	**Percentage of population (%)**
Eastern Europe	639	11.9	63 643 918	12.5
Northern Europe	1615	30.0	101 338 734	20.0
Western Europe	1364	25.3	196 530 120	38.7
Southern Europe	1773	32.9	145 856 541	28.7

*Total population by country as stated in https://www.worldometers.info/world-population/ (accessed: 26/03/2021)

A larger share of responses was obtained from females (63.3 %, Table 7), which is a tendency frequently observed in surveys. The majority of respondents had a university degree (72.5 %) and between 25 - 64 years old.

Table 7: Overall participant's characterisation

	Number	**Percentage (%)**
Gender (n=5372)		
Male	1871	34.8
Female	3400	63.3
Prefer not to answer	101	1.9
Age Group (n=5310)		
15-24	400	7.5
25-34	1000	18.8
35-44	1262	23.8
45-54	1201	22.6
55-64	959	18.1
+65	488	9.2
Highest level of education (n=5309)		
Compulsory school completed	51	1.0
Vocational school completed	259	4.9
Vocational/trade school without diploma-qualification for university entrance	600	11.3
High school diploma–general qualification for university entrance	470	8.9
University degree	3905	73.6
Other level of education	24	0.5

	Number	Percentage (%)
Current work situation (n=5353)		
Self-employed	352	6.6
Employee	1845	34.5
Civil servant	1511	28.2
Worker	207	3.9
Farmer	24	0.4
Homemaker	87	1.6
Pension/retirement	402	7.5
In education/training	421	7.9
Job search	150	2.8
Other situation	354	6.6
Size of the town (n=5391)		
Less than 5.000 inhabitants	575	10.7
5.001 to 20.000 inhabitants	1007	18.7
20.001 to 100.000 inhabitants	1230	22.8
100.001 to 500.000 inhabitants	1043	19.3
More than 500.000 inhabitants	1192	22.1
I don’t know	344	6.4

Regarding the level of education, the description varied from country to country, therefore the answers were recoded onto the same categories to allow comparisons.

7.2 Perceptions on the sources of exposure to chemical substances

Question 1 enquired on the knowledge of the European citizens about the different sources for chemical substances to enter the body (Figure 8).

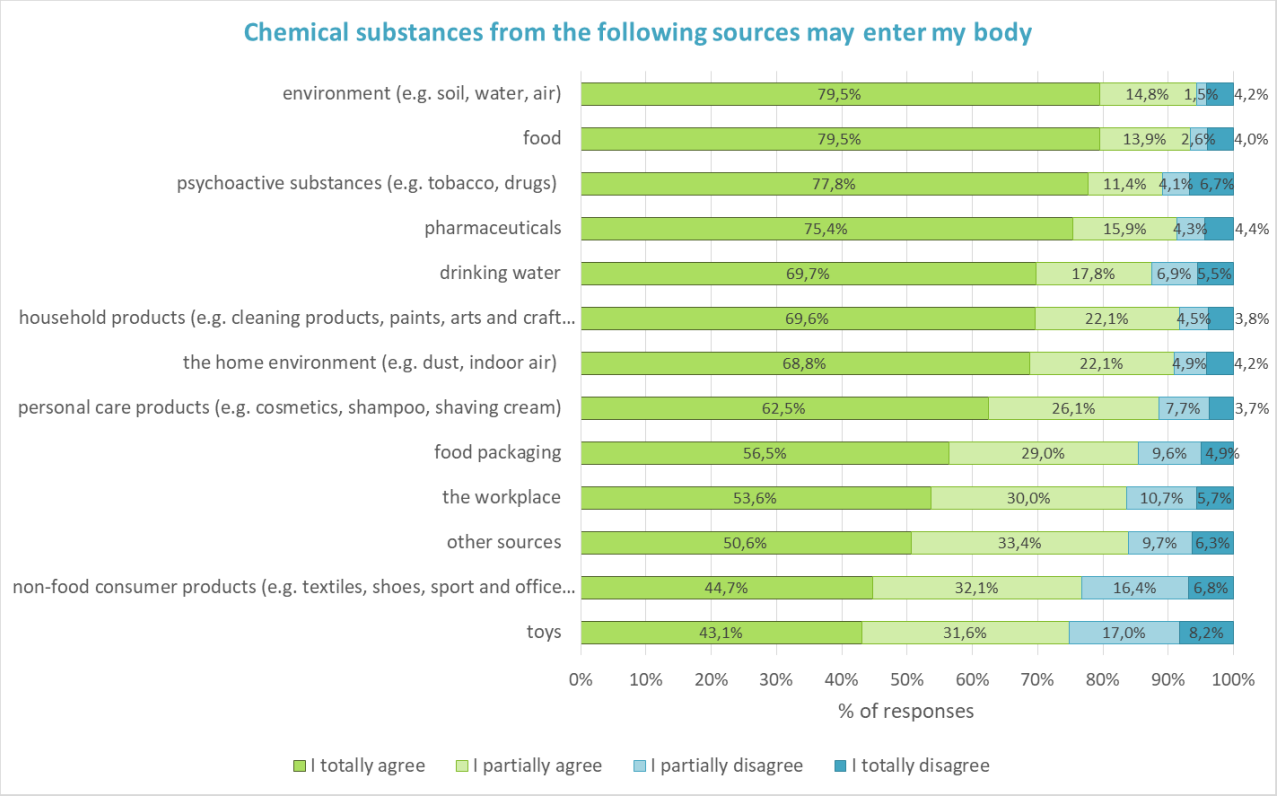

Figure 9: Overall answer distribution on sources of chemical substances that may enter the body

Food and the environment were marked as the most important sources (more than 90 % agrees), but overall the participants agreed (totally or partially) that all of the nominated sources are important.

7.3 Issues of higher concern regarding chemical exposure

In question 2 (see Annex 1: Citizen Survey) the survey participants were requested to choose three issues of most concern among a given set of sources of chemical exposure. For analysis, each of the answers received equal weight and, in the figures below, the sources are ranked by highest number of nominations. Figure 10 shows the overall distribution of answers, and Figures 10 to 12 show the regional breakdown.

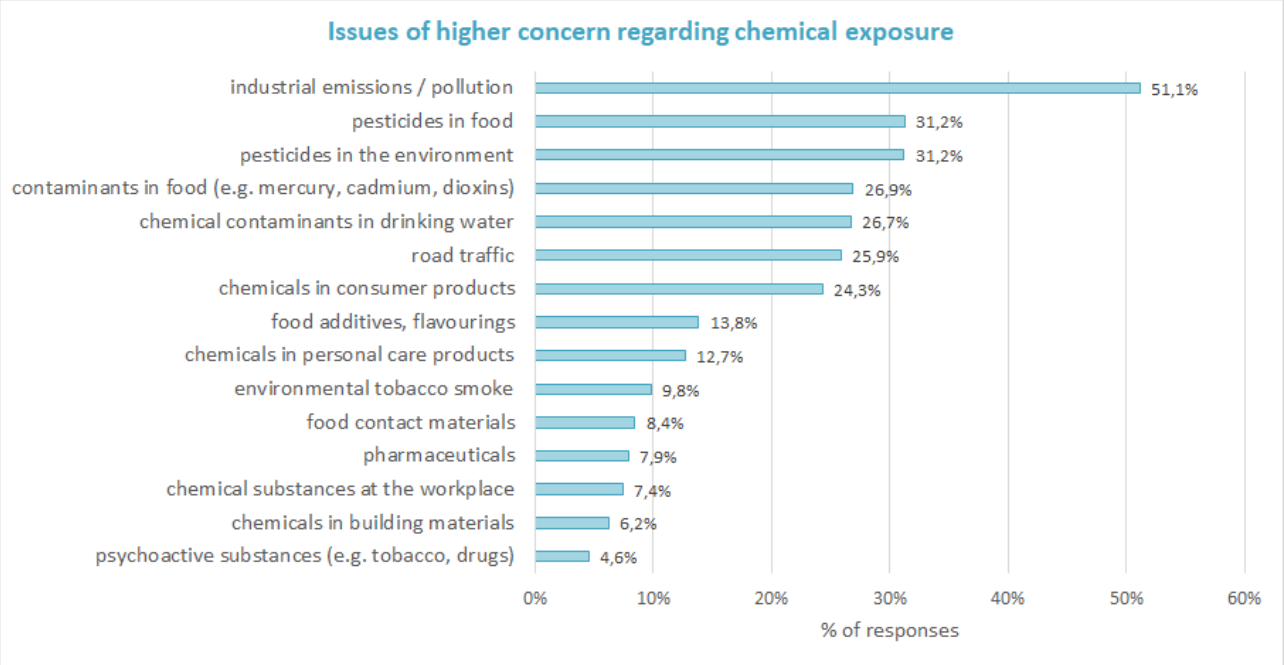

Figure 10: Overall answer distribution on issues of higher concern regarding chemical exposure

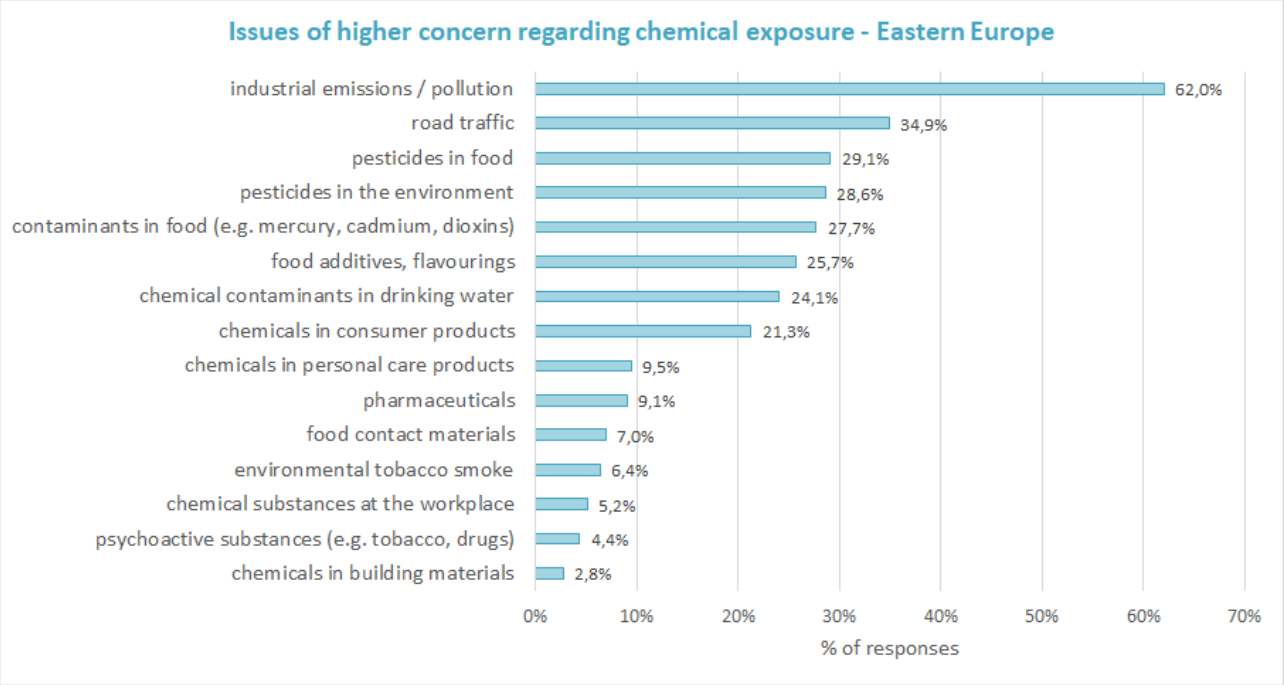

Figure 11: Eastern Europe's distribution on issues of higher concern regarding chemical exposure

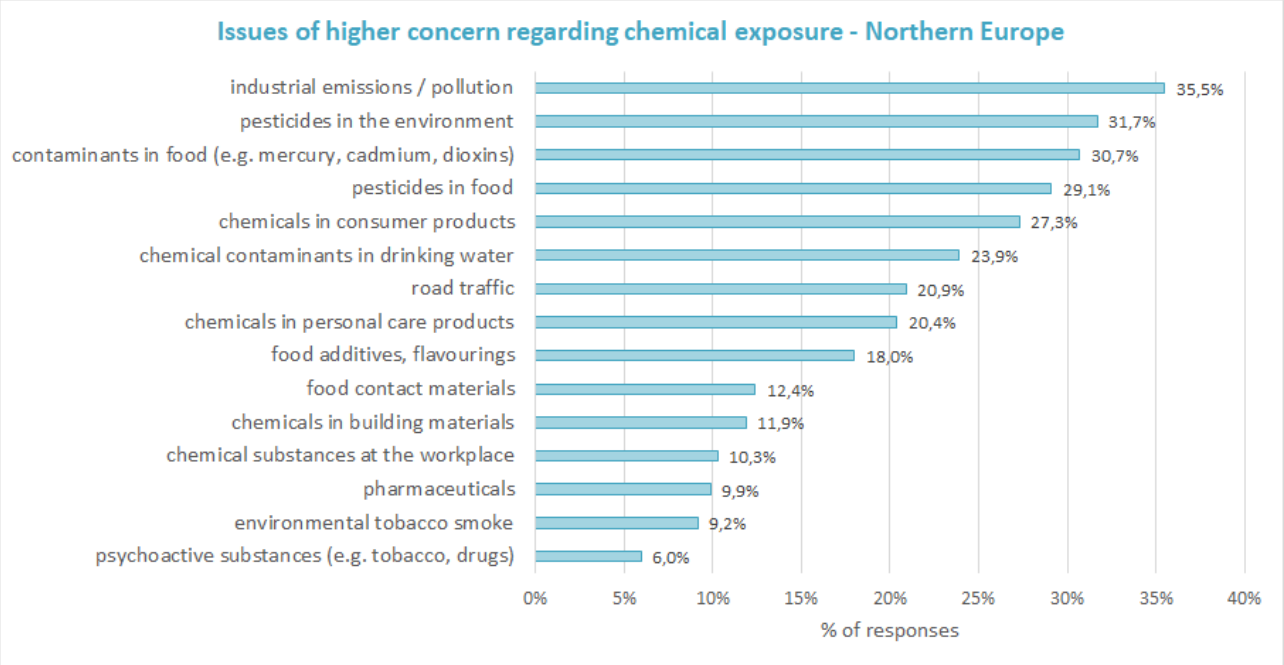

Figure 12: Northern Europe's distribution on issues of higher concern regarding chemical exposure

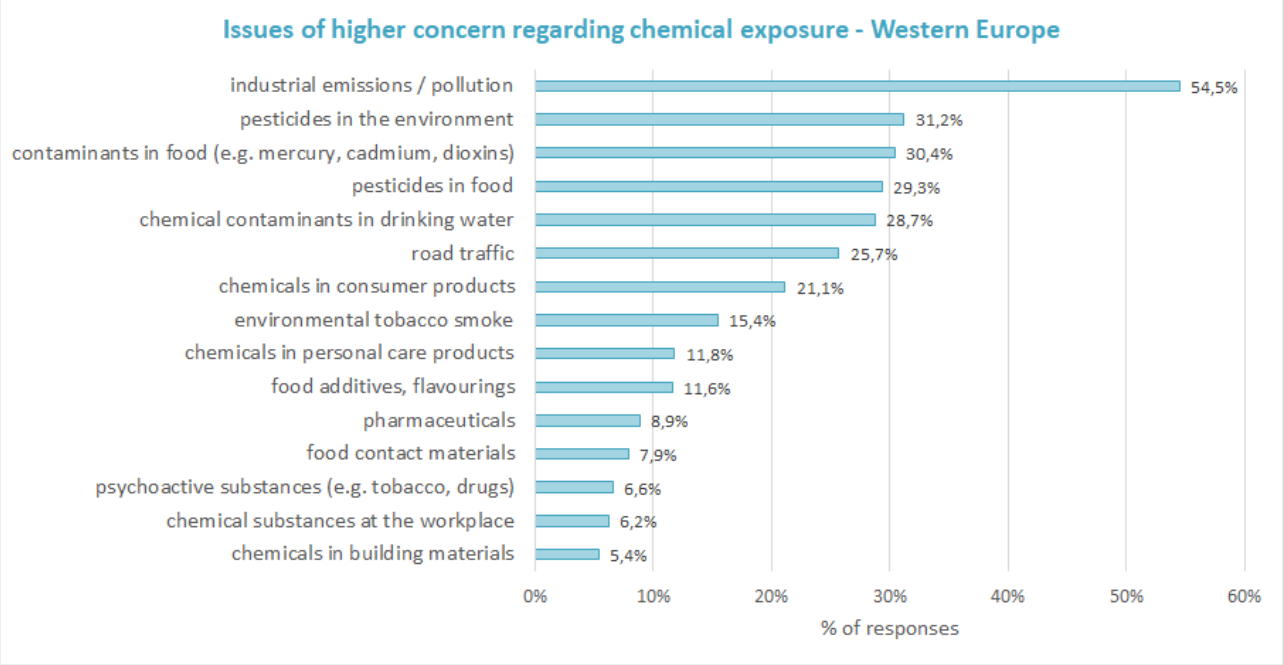

Figure 13: Western Europe's distribution on issues of higher concern regarding chemical exposure

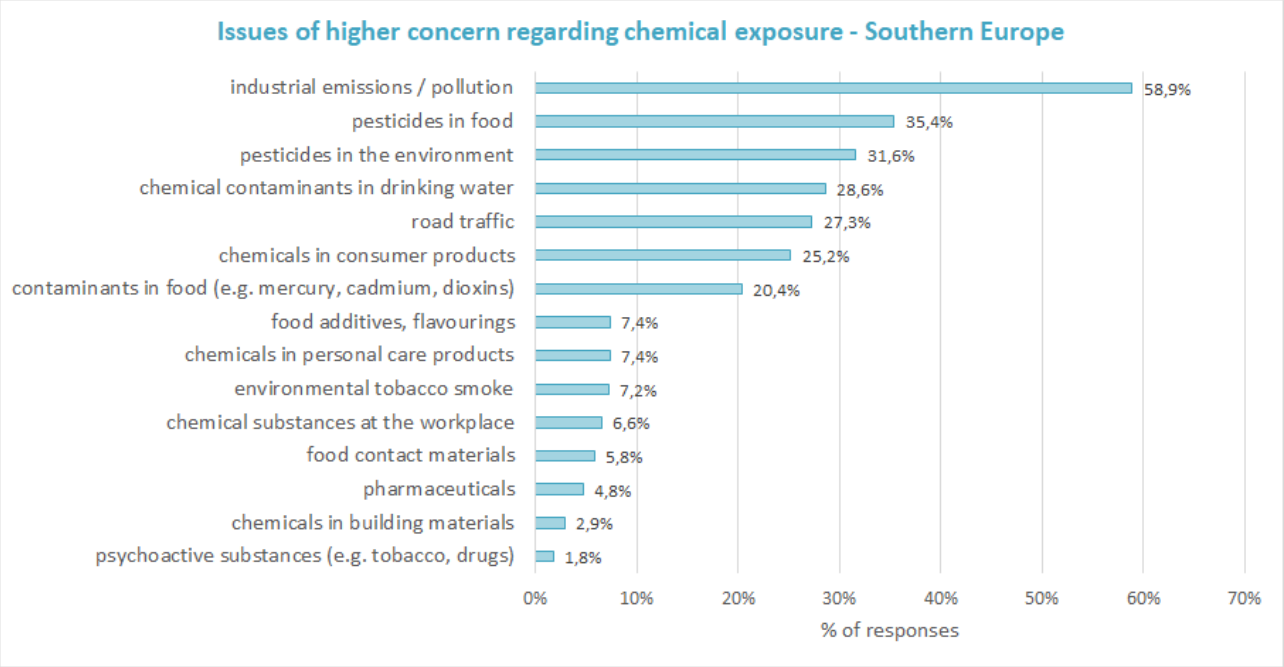

Figure 14: Southern Europe's distribution on issues of higher concern regarding chemical exposure

In all regions, **industrial emissions and pollution were ranked the highest,** with the distance to the next-highest source smallest for Northern Europe and largest for Eastern Europe. **Pesticides in food and in the environment were ranked second and third for overall answers**. **Contaminants in drinking water and food** were also of high concern.

Road traffic was perceived as more relevant in Eastern Europe compared to the other regions, with a second rank compared to 6th rank for the overall population. Psychoactive drugs, including tobacco were perceived as of lesser concern, as well as chemicals in building materials and chemical substances at the workplace (occupational exposure).

7.4 Perceptions on hazard of chemical exposures

Question 3 of the survey was related to the many ways that we can become exposed to a chemical compound. Participants should indicate the exposures that they considered more or less dangerous, out of a list of the following: environment (e.g. soil, water, air); the home environment (e.g. dust, indoor air); food; food packaging; drinking water; psychoactive substances (e.g. tobacco, drugs); pharmaceuticals; household products (e.g. cleaning products, paints, arts and craft supplies); non-food consumer products (e.g. textiles, shoes, sport and office items); toys; personal care products (e.g. cosmetics, shampoo, shaving cream); the workplace; other source(s). A distribution per answer is available in Figure 15.

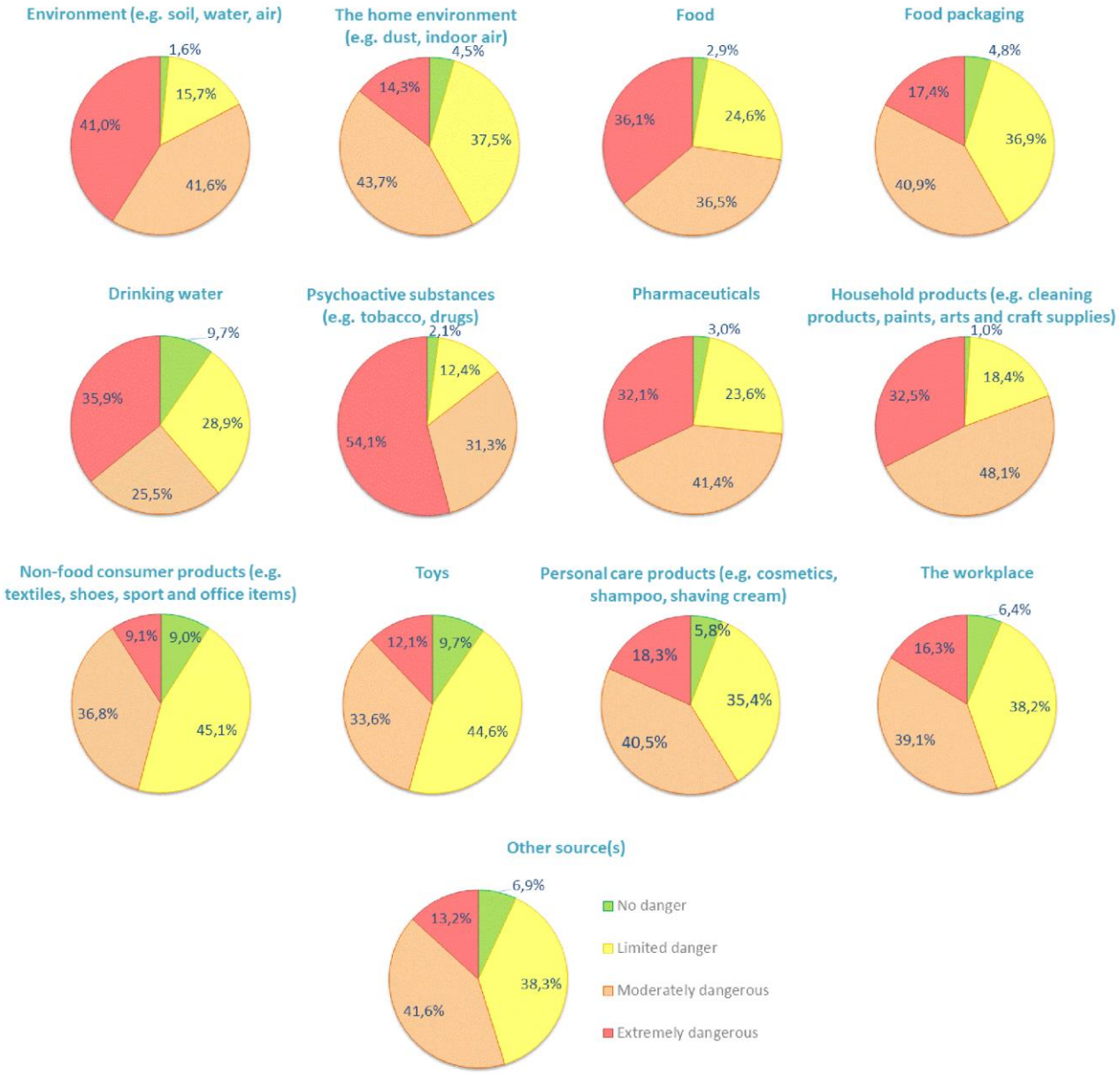

Figure 15: Citizens' perception of danger levels associated to chemical exposure

It becomes apparent that **psychoactive substances and environment** were considered as **extremely dangerous sources of chemical exposure**, followed **by food, drinking water, pharmaceuticals and household products**.

From the survey analysis, the answers did not vary significantly between EU regions therefore it was not relevant to add the regional graphical distribution.

7.5 Perceptions on variation of exposure to chemicals, possible health consequences and concern about mixture effects

In question 4 of the survey, participants were asked to reflect on whether they agreed or disagreed on the following statements:

- Exposure to chemicals has decreased in the last decades.
- The number of chemicals in the indoor and outdoor environment has decreased in the last decades.
- Exposure to multiple chemicals (mixtures) may influence their potential health consequences.
- I am concerned about cocktail effects (mixture effects) of chemicals.

The responses presented in Figure 16, reveal that **most participants do not agree that the exposure to chemicals, in general or in indoor and outdoor environment, has decreased in the last decade**, but a **significant part of the participants partially agreed with these sentences**.

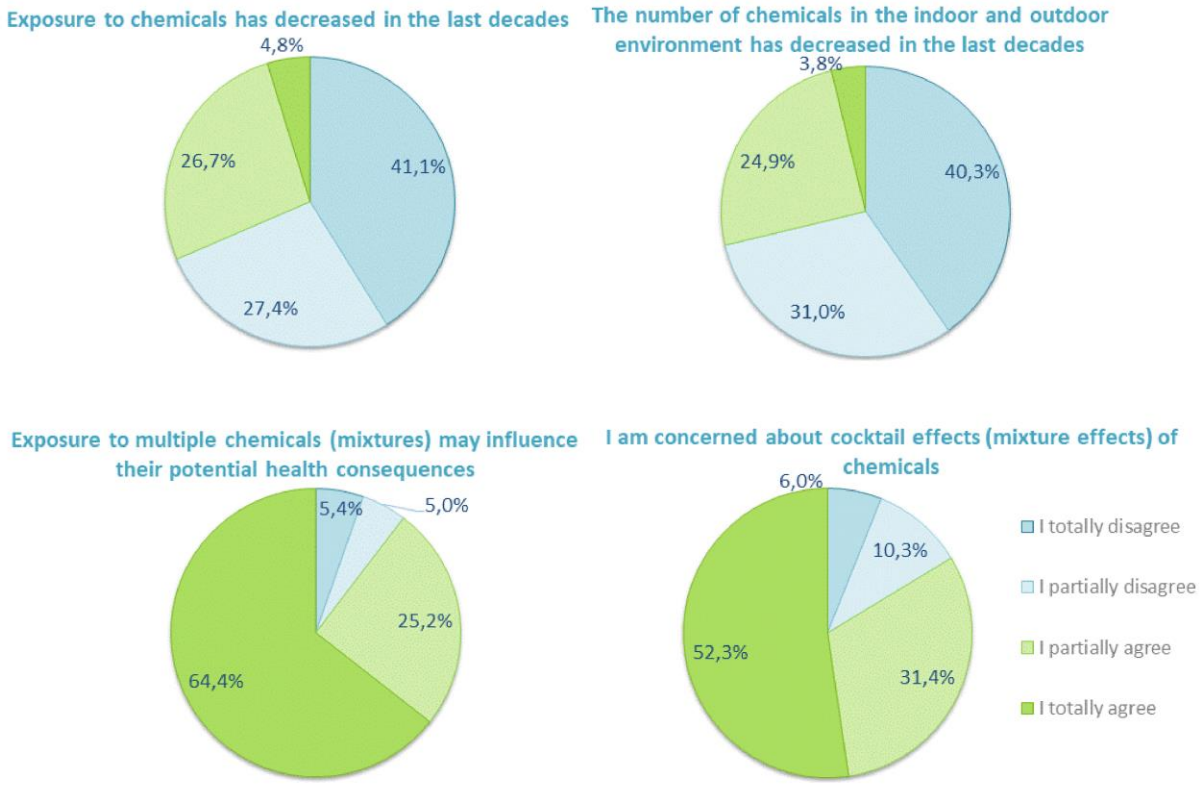

Figure 16: Perception of participants about chemical exposure and mixture exposure

Over 2/3 of the survey respondents disagreed (totally and/or partially) with the statements that exposure to chemicals as well as the number of chemicals in the indoor and outdoor environment have decreased in the last decades. Only a small minority totally agreed with both statements. A very large majority of the participants agreed (totally and/or partially) on their awareness of mixture effects and concerns about cocktail effects of chemicals. Only a small minority expressed their total disagreement with both statements.

7.6 Perceptions on the influence of COVID-19 in the exposure to chemicals

This survey took place from October 2020 – February 2021, which coincided with the months after the first wave of the COVID-19 pandemic in Europe and the second wave of the pandemic, which started to affect some countries. During this period, citizens had already experienced lockdowns, prompts to use personal hygiene and disinfection protects at an increased rate and personal protection equipment, such as gloves and facial masks. Some sources of public information (e.g. news on television, radio and the internet) had provided information about decreased air pollution as a result of the lockdowns and restricted travels.

In this frame, the survey included two questions (Question 5a) and 5b)), aiming to assess European citizens' perceptions about: 1) the effect of the COVID-19 pandemic on their interest in exposure to chemicals overall and 2) if they believed that exposures from specific sources changed during the pandemic. The results are shown in Figure 17 and Figure 18, respectively.

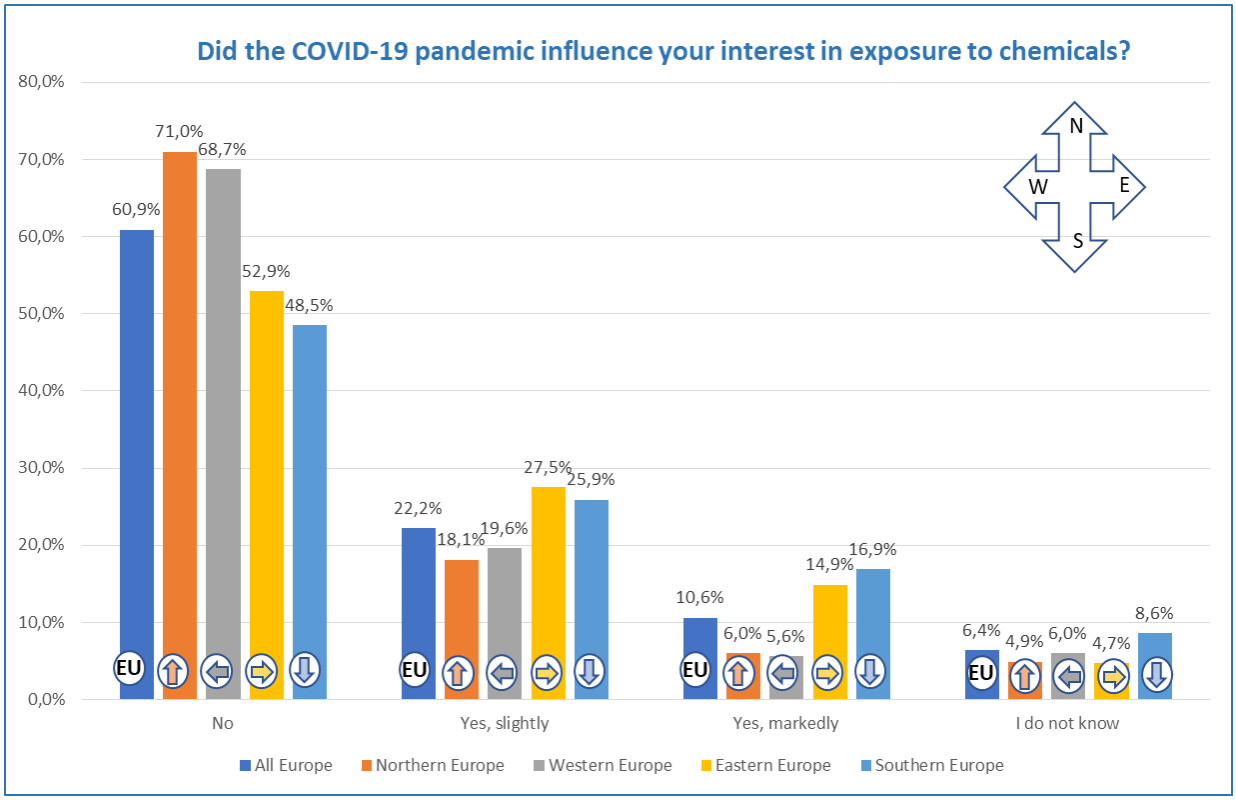

Figure 17: Answer distribution to the influence of the COVID-19 pandemic on the interest of European citizens in exposure to chemicals

The large majority of citizens throughout Europe (ranging from 71.0 % in Northern Europe to 48.5 % in Southern Europe) responded that the **pandemic did not influence their interest in chemical exposures**. Of the citizens that responded that the pandemic increased their interest, **most resided in Southern (42.8 %) and Eastern (42.4 %) Europe.**

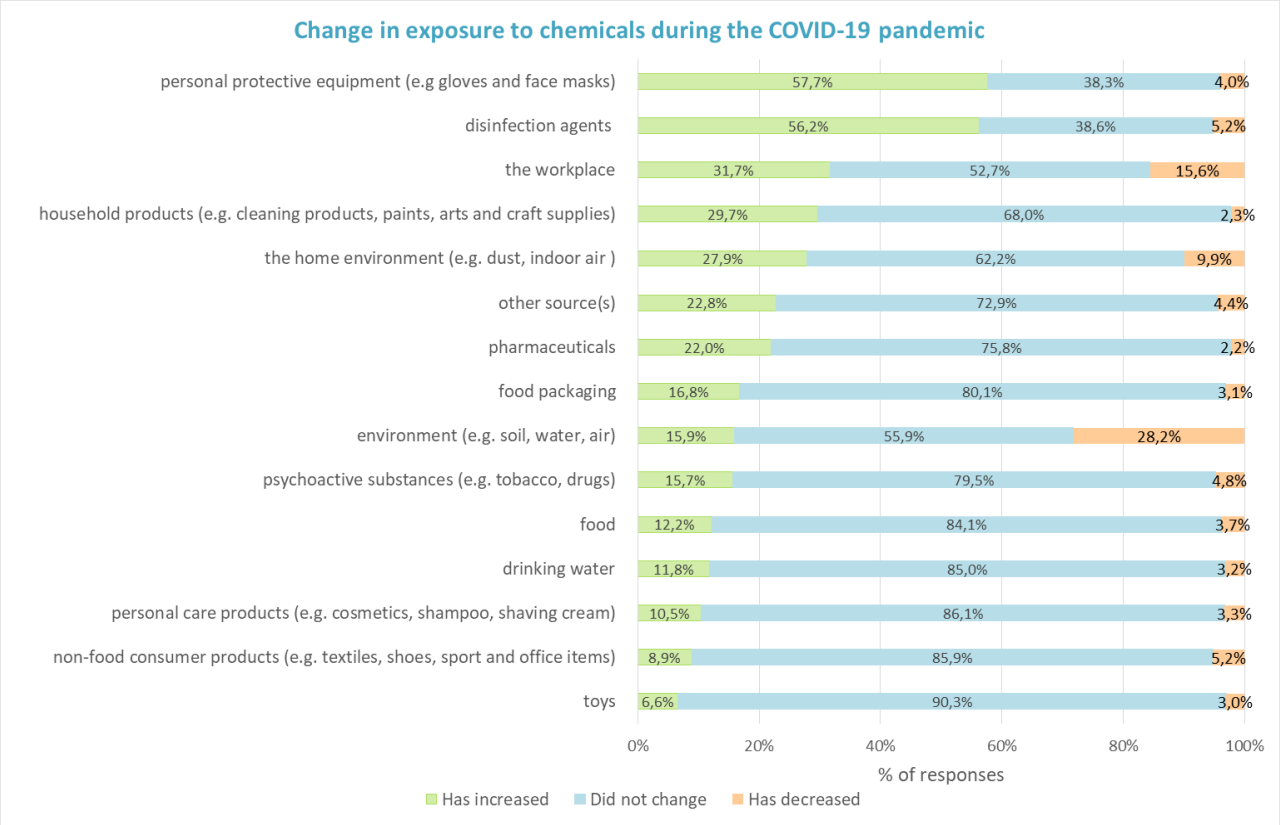

Figure 18: Beliefs of European citizens as to whether exposure to chemicals from different sources increased, decreased or did not change during the COVID-19 pandemic

With regards to citizens' beliefs as to whether people's exposures to chemicals from different sources changed during the pandemic, the sources with the highest perceived increases were personal protective equipment and disinfection agents (57.7 % and 56.2 % respectively).

The source with the third highest perceived increase was the workplace. Household products and the home environment were the sources with the fourth and fifth highest perceived increases in chemical exposure during the pandemic (29.7 % and 27.9 % respectively). Nevertheless, the **majority of the responders did not think that exposures from the home environment (62.2 %) and household products (68.0 %) changed during the pandemic**. This is noteworthy, **since people normally spent most of their time indoors and this was markedly further increased due to the pandemic.** It would be **interesting to assess if citizens are aware about possible sources of exposure to chemicals in home settings and from household cleaning agents**, which presumably had increased use due to the pandemic.

Despite the fact that several sources of public information provided data about remarkable decrease of outdoor air pollution in many regions due to lockdowns and restrictions in industrial operations and in travels, around 56 % of the responders did not feel that there was any change in exposures from the environment. It must be noted however, that this source had by far the highest perceived decrease (by 28.2 % of the responders).

7.7 Perceptions on ways to reduce exposure to dangerous chemical substances

When asked on how to reduce exposure to dangerous chemical substances most participants supported the proposed strategies (Figure 19).

Around 70 % considered improving pollution controls to industrial activities and imported products, as well as ensuring better control of existing chemicals regulation compliance as the most relevant of the proposed measures for exposure reduction. Near 60 % of the respondents considered improving our understanding of human exposure to chemicals and its consequences on health as well as informing the public on the results also necessary to reduce exposure to dangerous chemicals. Promoting campaigns to reduce personal exposure to hazardous substances received lower support.

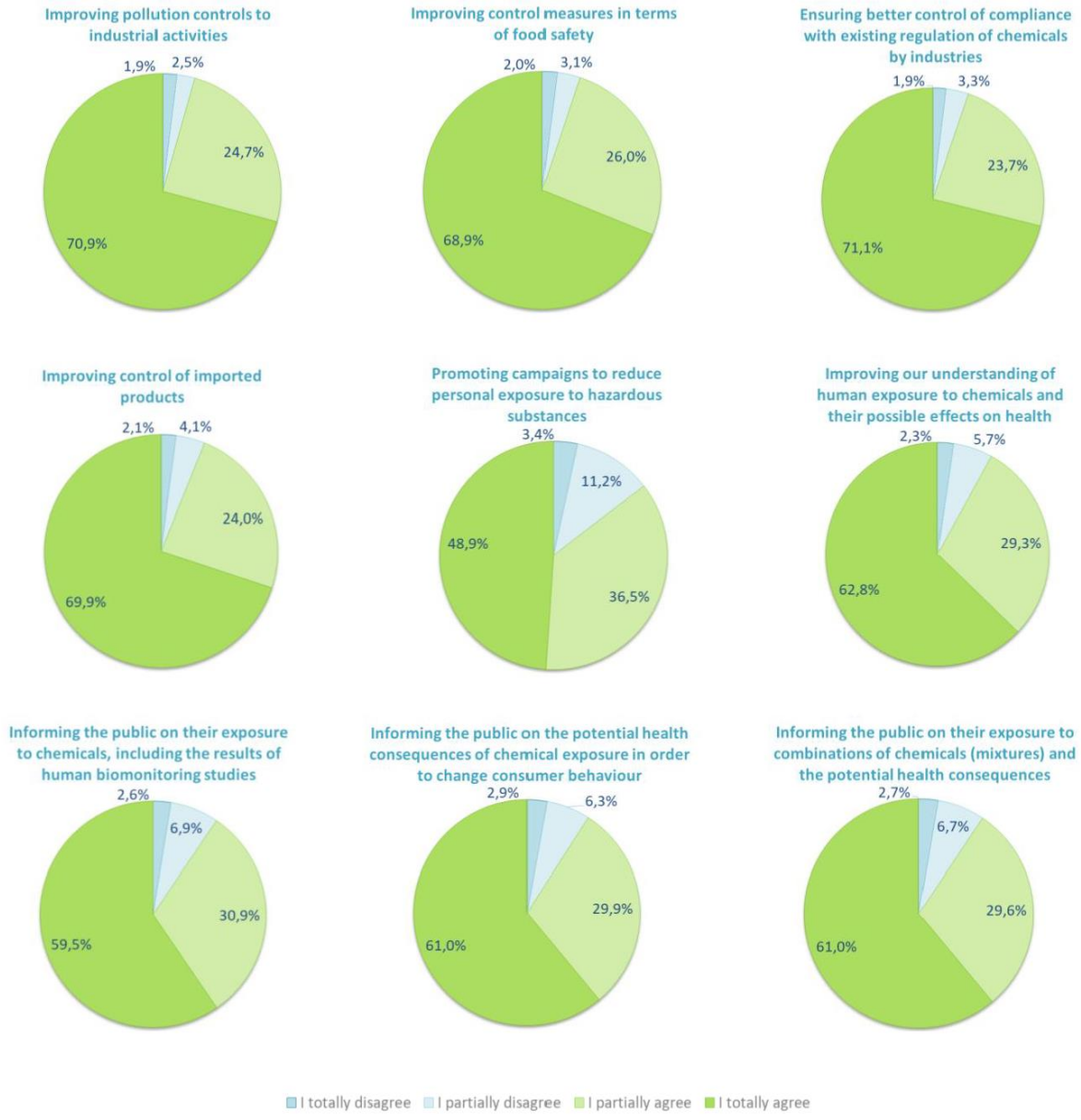

Figure 19: How to reduce exposure to dangerous chemical substances

7.8 Perceptions on areas of chemical exposure that should be a priority of Human Biomonitoring studies

In question 7 (see Annex 1: Citizen Survey) the survey participants were requested to choose up to 4 priority areas for Human Biomonitoring studies among a given set of areas. For analysis, each of the answers received equal weight and in Figure 20, the sources are ranked by highest number of nominations.

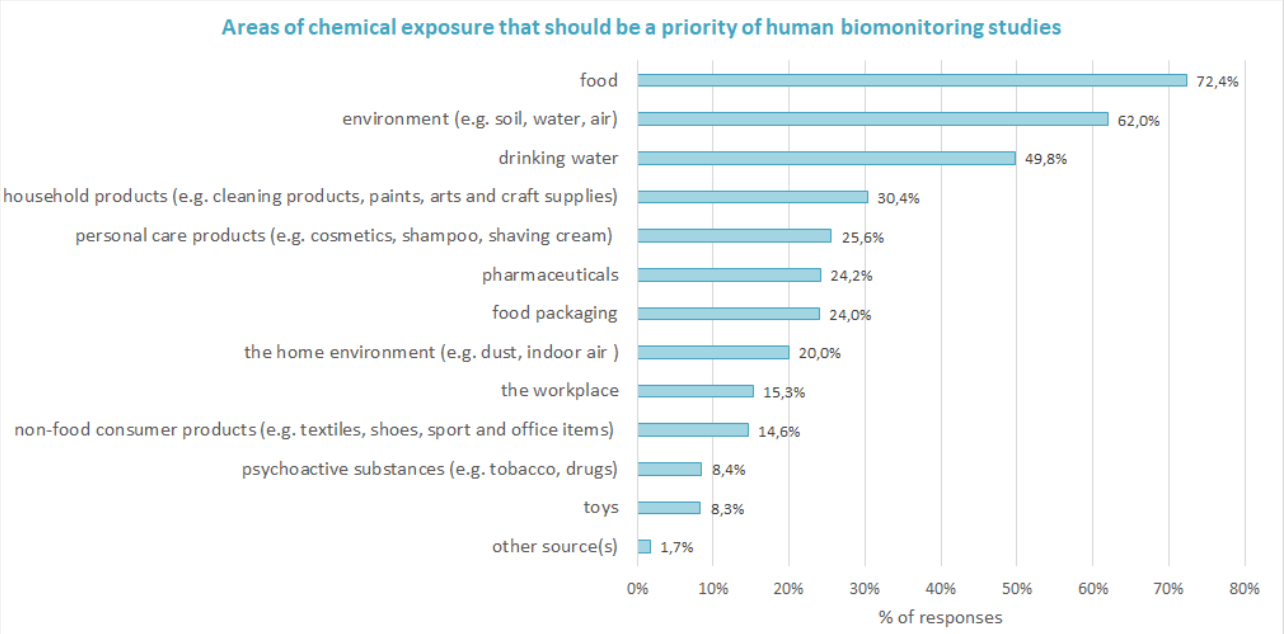

Figure 20: Priority areas in Human Biomonitoring

In accordance with the answers for question 2, which asked for areas of most concern early on in the survey, the highest priorities were given to food, environment and drinking water. Other sources were given the smallest priority. Also, non-food consumer products such as textiles and toys, as well as psychoactive substances and workplace exposures received a lower ranking.

7.9 Opinion on the utility, value and strategies to develop Human Biomonitoring studies

When asked about Human Biomonitoring (HBM) usefulness, its value and the adequate strategies for its use, most participants supported their use (Figure 21). Approximately 50 % consider it is reliable and should be undertaken as regularly as food and water quality tests. Half of the respondents considered that it should be coordinated more at European level, and also at national level. Near 60 % consider it should be included in the National Health Surveys. These results may be due to the education level of the survey participants as most of them had higher education and may have knowledge on HBM.

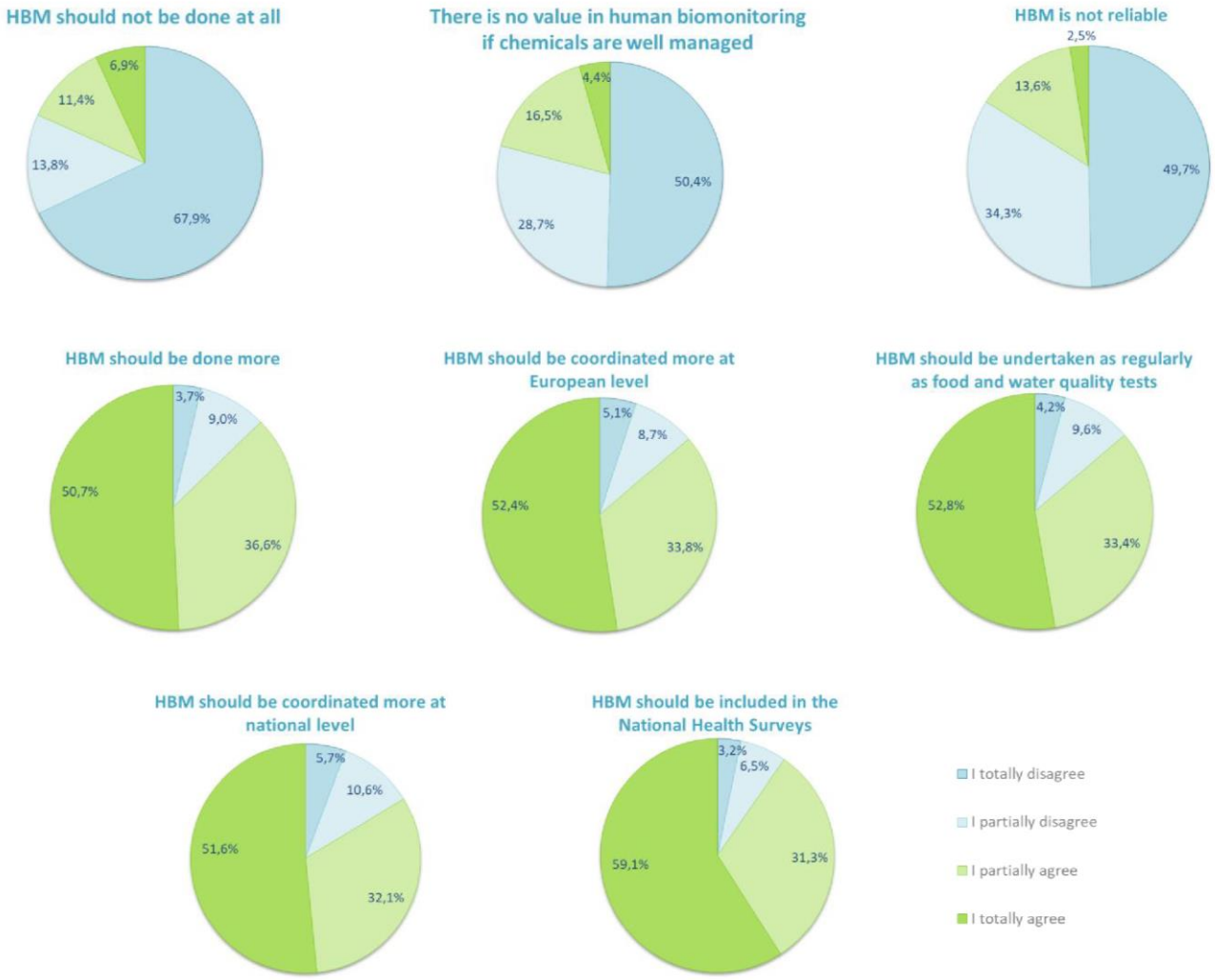

Figure 21: Perceptions on the utility, value and strategies to develop Human Biomonitoring studies

Overall, the participants supported the usefulness and the added value of HBM.

7.10 Perceptions on the importance of results from Human Biomonitoring studies

A **majority (more than 65 %) totally agreed on the importance of HBM studies** for the purposes of: **evaluating chemical exposure of the population**, study the health impacts of chemical exposure, the development of health policy that promote the safe use of chemicals, to support occupational health policies and the safe use of chemicals at work, to raise awareness/understanding the impact of chemical exposure amongst the population and to raise awareness/understanding of the impact of chemical exposure amongst health professionals and policy makers (Figure 22). Out of these 6 statements, the **one most citizens totally agreed was "study the health impacts of chemical exposure"** (73 %) thus showing their preoccupation with the topic. This was followed by "evaluate chemical exposure of the population" (70 %) and "the development of health policy that promote the safe use of chemicals" (69 %).

Figure 22: Importance of HBM results

7.11 Perceptions on chemicals to be addressed in Human Biomonitoring studies

The chemical names mentioned the most were pesticides, heavy metals, PFAS, food additives, phthalates, and bisphenols (Figure 23). Colour code is randomly attributed by the software.

Figure 23: Chemicals mentioned as chemicals of concern

7.12 Perceptions on ways to improve outreach to citizens regarding information on the European Human Biomonitoring Programme (HBM4EU)

A few more questions were added at the end, to understand the best way to improve HBM4EU's outreach. In the top-4 we have the traditional press, followed by social media, the website and citizen's dialogue and events (Figure 24).

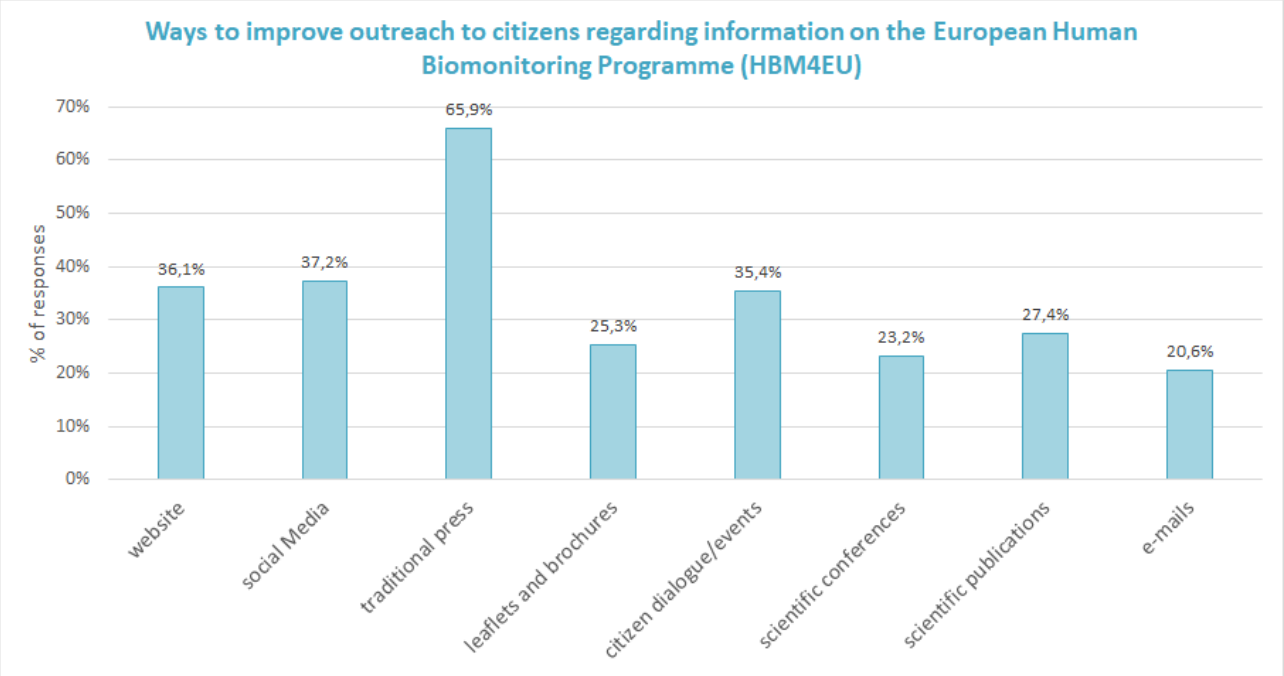

Figure 24: Ways to improve outreach to citizens regarding information on HBM4EU

Perceptions of the citizens on ways to improve outreach varied by European region mainly for the website and social media (Figure 25), with the population of the Eastern and Western Europe attributing a higher importance to the website and social media than the population of the Southern and Northern Europe.

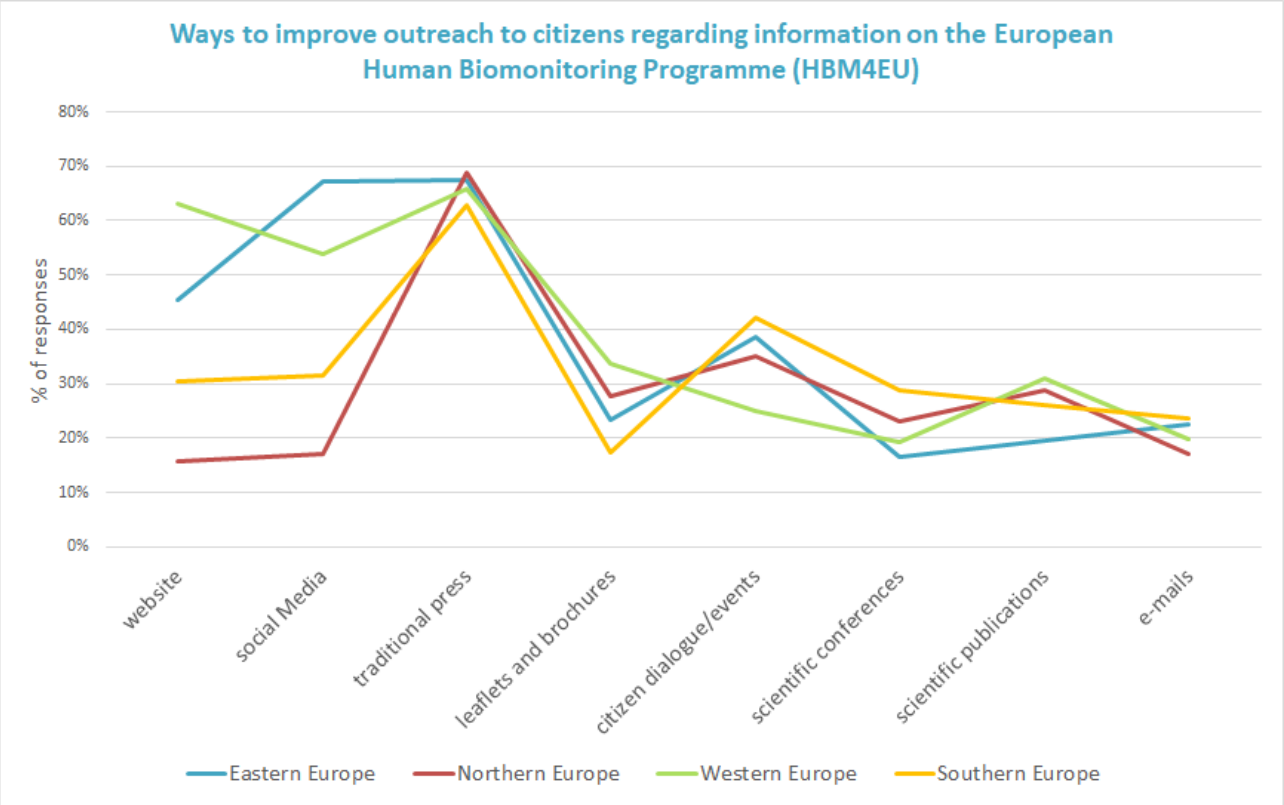

Figure 25: Ways to improve outreach to citizens regarding information on HBM4EU by European region

8 Overall conclusions

Concerning the NHs, many of them are satisfied with their current HBM4EU involvement, despite their concerns with the communication, funding and lack of direct involvement.

Concern was also expressed with the COVID-19 pandemic and the related delays, both in communication and in events. This will need to be addressed throughout the final year.

The follow-up partnership to HBM4EU, the Partnership for the Assessment of Risk from Chemicals (PARC), was widely referenced. It was mentioned that involvement of all countries is necessary as well as the importance of NHs and NHCPs to keep communication up.

Including smaller countries seems to be a problem through both lack of funding and adequate tasks.

Regarding the funding mechanisms, despite a well-thought and organised process for identification of dissemination of funding mechanisms, the challenge is to provide information on national or regional funding calls. This is related to the fact that different countries have different funding entities and processes, and hence different purposes. Therefore, careful consideration of where to submit a proposal needs to be considered.

In terms of the SLR, this process is still on-going but once it is finished it will allow for a better perspective of the origins of the main funding sources of the HBM studies and the identification of gaps in geographical terms.

Concerning the non-representative citizen survey, a very high number of responses were obtained, even though the representativity of the EU may be hampered by the low response rate from Eastern EU region. In addition, the majority of the respondents had a university degree, thus the less educated population is not captured in this survey. This may be due to the fact that this survey was disseminated by the NHs, which are mainly research institutions for which their networks are also scientific. Sharing this type of surveys on social media also helps to reach out to a wider audience, but if these institutions are only followed by their peers in social media, the lay person will not be reached. Seeing that citizen surveys will be picked up by the PARC, strategies for a wider dissemination of the survey in the involved countries would be crucial to have a more comprehensive view of the populations' perceptions on HBM and chemical exposure.

In terms of the sources of chemical substances, food and the environment were on the top priority of answers. The three issues that most concern the citizens in terms of chemical exposure are industrial emissions and pollution, followed by pesticides in food and in the environment. Respondents believe the most dangerous ways of being exposed to a chemical substance is via a psychoactive substance, and environment (extremely dangerous), followed by food, drinking water, pharmaceuticals and household products.

Globally, a considerable awareness and concern on chemical exposure, including mixtures exposure, was revealed by EU citizens.

Regarding the COVID-19 pandemic having influenced their interest in chemical exposure, the large majority of citizens (ranging from 71.0 % in Northern Europe to 48.5 % in Southern Europe) responded that it did not influence their interest.

Not surprisingly, slightly more than **half of the responders think that exposure from chemicals due to use of disinfection agents and use of personal protective equipment increased during the pandemic** (56.2 % and 57.7 % respectively). On the other hand, the majority

considered that exposure at home from household products and in-home environment did not change (68 % and 62.2 % respectively). It would be **interesting to assess if citizens are aware about possible sources of exposure to chemicals in home settings and from household cleaning agents, which presumably had increased use due to the pandemic**.

Most respondents (70 %) think that improving pollution controls to industrial activities and imported products, as well as ensuring better control of existing chemicals regulation compliance as the most relevant of the proposed measures for exposure reduction. Near 60 % of the respondents considered improving our understanding of human exposure to chemicals and its consequences on health as well as informing the public on the results also necessary to reduce exposure to dangerous chemicals.

The highest priority areas in terms of HBM studies were given to food, environment and drinking water.

European citizens were supportive of the use of HBM as an important and reliable tool for chemical safety, that could be used not only at EU level, but also nationally coordinated.

Concerning the importance that HBM studies may have, the **one sentence most citizens totally agreed with was "study the health impacts of chemical exposure"** (73 %), followed by "evaluate chemical exposure of the population" (70 %) and "the development of health policy that promote the safe use of chemicals" (69 %). All of these high ranked answers show their opinion on the relevance of HBM studies' contribution to key aspects of health impact and policy.

The chemical names mentioned the most as being of concern were pesticides, heavy metals, PFAS, food additives, phthalates, bisphenols.

The overwhelming majority of the surveyed European citizens considers HBM as valuable for public health policies on chemicals management, believes it should be done more often and that it should be coordinated at both national and at European level.

Results and conclusions from this HBM4EU citizen survey are also aligned with some of the findings from the focus groups developed under WP4. In the recent publication "Chemical Exposure: European Citizens' Perspectives, Trust, and Concerns on Human Biomonitoring Initiatives, Information Needs, and Scientific Results", one of the main findings included citizens' clear articulation on pathways of exposure. Validated and trustful communication is perceived as key to empowering citizens to act. The results can be used to facilitate decision-making and policy development, and feed into the awareness needs of similar and future projects in Human Biomonitoring. Furthermore, it also brings to light ideas and concepts of citizens' in shaping collaborative knowledge between citizens', experts, scientists, and policy makers on equal terms.

According to the Special Eurobarometer 456 on "Chemical Safety" from 2017, although with a considerable variation by Member State, 65 % of the citizens of the 28 European Union (EU) Member States were a little or very much concerned about being exposed to chemicals in their daily life, while 45 % of the respondents felt well informed about the potential dangers of the chemicals included in consumer products. Perceptions regarding the safety of consumer products containing chemicals were divided, with 46 % of the EU citizens answering either 'not really' or 'not at all', and 49 % tending to agree to some extent with the safety of these products.

The Eurobarometer 314 on „Europeans attitudes toward chemicals in consumer products: Risk perception of potential health hazards" (2009) which assessed the Europeans' attitudes toward chemicals in consumer products, reported that European citizens place the greatest trust in the

European Union (35 %), followed by the national authorities (32 %) and the industry (21 %). Public trust towards industry and regulators has been declining since the 1980s, which impairs the risk communication.

The lack of trust in industry may be seen in the answers in question 2 in this citizen survey - issues of higher concern regarding chemical exposure. In all regions, **industrial emissions and pollution were ranked the highest.** This was followed by **pesticides in food,** and **pesticides in the environment** which were ranked second and third for overall answers. **Contaminants in drinking water and food** were also of high concern.

Future work should focus on strengthening citizens' voice in European HBM through stronger representation of different population segments in future surveys and through focused citizen awareness and educational actions.

It would also be interesting to align some of the questions in the future citizen surveys, to the ones in the Eurobarometer so we could have a basis of comparison.

A further detailed analysis of this survey will be done in the near future and provided to the NH for outlining future work on citizen awareness in their countries and a scientific publication is foreseen.

9 Annex 1: Citizen Survey

Make your opinion count for safer chemicals management in Europe Please take part in a short citizen survey on "Human Biomonitoring in Europe"

In our daily lives, we are exposed to chemical substances that are widely used in food and consumer products, among others. Human Biomonitoring is a method, which allows us to measure chemicals or their early biological effects inside our bodies. Results can be useful to reduce exposure and to improve public health.

The European Human Biomonitoring Programme (HBM4EU, www.hbm4eu.eu), a joint effort of 30 countries, the European Environment Agency and the European Commission, is conducting an EU citizen survey on Human Biomonitoring. HBM4EU´s objective is to inform policy making in Europe and at national level with sound scientific results on citizens' exposure to chemical pollutants and possible effects on health.

The survey is coordinated by the European Environment Agency; in [name of your country] the survey is distributed by [name of the organisation/NHCP who will distribute it in your country].

Since the exposure to chemicals is something that concerns us all, we would like to gain an understanding of what EU citizens know and think about Human Biomonitoring, as well as what are their needs, concerns and questions about this topic.

Therefore, we would like to invite you to answer this short questionnaire that will take you approximately 15 minutes. By answering the following questions, you will help us to better answer the needs of the European citizens.

The information, which will be collected will be anonymous and will be treated confidentially according to the requirements of the General Data Protection Regulation (GDPR). The anonymised data will be processed by the research partners of HBM4EU and the results of the survey will be published online at https://www.hbm4eu.eu/result/.

If you decide to stop your participation, you may choose to do so at any time, without any consequences.

Thank you!

1) **Chemical substances from the following sources may enter my body**

   I totally disagree / I partially disagree / I partially agree / I totally agree

- environment (e.g. soil, water, air)
- the home environment (e.g. dust, indoor air)
- food
- food packaging
- drinking water
- psychoactive substances (e.g. tobacco, drugs)
- pharmaceuticals
- household products (e.g. cleaning products, paints, arts and craft supplies)
- non-food consumer products (e.g. textiles, shoes, sport and office items)
- toys
- personal care products (e.g. cosmetics, shampoo, shaving cream)
- the workplace
- other source(s)

2) **From the following list, please choose up to three issues that concern you the most regarding chemical exposure:**

- industrial emissions / pollution
- road traffic
- pesticides in the environment
- environmental tobacco smoke
- chemical contaminants in drinking water
- chemicals in building materials
- chemicals in consumer products
- chemicals in personal care products (e.g. cosmetics, shampoo, shaving cream)
- pharmaceuticals
- psychoactive substances (e.g. tobacco, drugs)
- pesticides in food
- contaminants in food (e.g. mercury, cadmium, dioxins)
- food additives, flavourings
- food contact materials (e.g. food packaging, kitchenware and tableware)
- chemical substances at the workplace

3) **There are many ways we can become exposed to a chemical compound. In your opinion, which of the following exposures are particularly dangerous?**

No danger / limited danger / moderately dangerous / extremely dangerous

- environment (e.g. soil, water, air)
- the home environment (e.g. dust, indoor air)
- food
- food packaging
- drinking water
- psychoactive substances (e.g. tobacco, drugs)
- pharmaceuticals
- household products (e.g. cleaning products, paints, arts and craft supplies)
- non-food consumer products (e.g. textiles, shoes, sport and office items)
- toys
- personal care products (e.g. cosmetics, shampoo, shaving cream)
- the workplace
- other source(s)

4) **Please tell us how much you agree or disagree with the following statements:**

I totally disagree / I partially disagree / I partially agree / I totally agree

- Exposure to chemicals has decreased in the last decades
- The number of chemicals in the indoor and outdoor environment has decreased in the last decades.
- Exposure to multiple chemicals (mixtures) may influence their potential health consequences.
- I am concerned about cocktail effects (mixture effects) of chemicals

5) **Did the COVID-19 pandemic influence your interest in exposure to chemicals?**

- Yes, markedly / Yes, slightly / No / I do not know
- In your opinion, do you feel that exposure to chemicals has changed during the COVID-19 pandemic? Please specify the change for each of the following exposure sources.

has increased /did not change/ has decreased

- environment (e.g. soil, water, air)
- the home environment (e.g. dust, indoor air)
- food
- food packaging
- drinking water
- psychoactive substances (e.g. tobacco, drugs)
- pharmaceuticals
- household products (e.g. cleaning products, paints, arts and craft supplies)
- non-food consumer products (e.g. textiles, shoes, sport and office items)

- toys
- personal care products (e.g. cosmetics, shampoo, shaving cream)
- disinfection agents
- personal protective equipment (e.g gloves and face masks)
- the workplace
- other source(s)

6) Levels of exposure to dangerous chemical substances can be reduced by

I totally disagree / I partially disagree / I partially agree / I totally agree

- improving pollution controls to industrial activities
- improving control measures in terms of food safety
- ensuring better control of compliance with existing regulation of chemicals by industries
- improving control of imported products
- promoting campaigns to reduce personal exposure to hazardous substances
- improving our understanding of human exposure to chemicals and their possible effects on health
- informing the public on their exposure to chemicals, including the results of Human Biomonitoring studies
- informing the public on the potential health consequences of chemical exposure in order to change consumer behaviour
- Informing the public on their exposure to combinations of chemicals (mixtures) and the potential health consequences

7) Human Biomonitoring is a method, which allows us to measure chemicals or their early biological effects inside our bodies.

In your opinion, what areas of chemical exposure should be a priority of Human Biomonitoring studies

From the following list, please choose up to 4 issues

- environment (e.g. soil, water, air)
- the home environment (e.g. dust, indoor air)
- food
- food packaging
- drinking water
- psychoactive substances (e.g. tobacco, drugs)
- pharmaceuticals
- household products (e.g. cleaning products, paints, arts and craft supplies)
- non-food consumer products (e.g. textiles, shoes, sport and office items)
- toys
- personal care products (e.g. cosmetics, shampoo, shaving cream)
- the workplace
- other source(s)

8) Human Biomonitoring is a method, which allows us to measure chemicals or their early biological effects inside our bodies.
Human Biomonitoring:

I totally disagree / I partially disagree / I partially agree / I totally agree

- should not be done at all
- there is no value in Human Biomonitoring if chemicals are well managed
- is not reliable
- should be done more
- should be coordinated more at European level
- should be undertaken as regularly as food and water quality tests
- should be coordinated more at national level
- should be included in the National Health Surveys

9) Results of Human Biomonitoring studies are important for the following purposes:

I totally disagree / I partially disagree / I partially agree / I totally agree

- to evaluate chemical exposure of the population
- to study the health impact of chemical exposure
- for the development of health policy that promote the safe use of chemicals
- to support occupational health policies and the safe use of chemicals at work
- to raise awareness/understanding the impact of chemical exposure amongst the population
- to raise awareness/understanding of the impact of chemical exposure amongst health professionals and policy makers

10) Please list chemicals you are concerned with and which should be addressed in Human Biomonitoring studies:

- Individual chemicals:_____
- Mixtures of chemicals
- None

11) HBM4EU is a European Programme which aims to generate evidence of the actual exposure of citizens to chemicals and the possible health effects in order to support policy making. Do you have any comments or suggestions in the context of Human Biomonitoring and/or the European Human Biomonitoring Programme (HBM4EU).

- yes, please specify:_____
- no

12) Would you like to receive further information about the European Human Biomonitoring Programme (HBM4EU)?

- Yes
- No

13) In order to improve our outreach to citizens regarding information on the European Human Biomonitoring Programme (HBM4EU), which options should be provided? Please select at maximum 4.

- website (https://www.hbm4eu.eu)
- social Media (Twitter:@HBM4EU, Facebook: HBM4EU, LinkedIn: HBM4EU – Human Biomonitoring for Europe)
- traditional press (newspaper, TV)
- leaflets and brochures
- citizen dialogue/events
- scientific conferences
- scientific publications
- e-mails

Part II- personal information

1) **In which country do you live in?**

- Estonia
- Hungary
- Luxembourg
- Portugal
- Poland
- Latvia
- Italy
- Israel
- Ireland
- Greece
- Croatia
- United Kingdom
- Switzerland
- Slovenia
- Norway
- Netherlands
- Iceland
- Germany
- France
- Czech Republic
- Cyprus
- Austria
- Spain
- Slovakia
- Lithuania
- Finland
- Denmark
- Belgium
- Sweden
- Republic of North Macedonia

2) What is your city/town of residence?

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3) Please indicate the approximate number of inhabitants of the city/town you reside in:

- less than 5.000 inhabitants
- 5.001 to 20.000 inhabitants
- 20.001 to 100.000 inhabitants
- 100.001 to 500.000 inhabitants
- more than 500.000 inhabitants
- I don't know

4) You are:

- male
- female
- prefer not to answer

5) How old are you?

---------- (years)

6) In total how many years of school did you finish with success?

Please count from the moment when you entered in primary school. Do not consider the unsuccessful years of school (if that was the case).

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7) What is your highest level of education?

- compulsory school completed
- vocational school completed
- vocational/trade school without diploma-qualification for university entrance
- high school diploma –general qualification for university entrance
- university degree

8) Current profession:

- self-employed
- employee
- civil servant
- worker
- farmer
- homemaker
- pension/retirement
- in education/training
- job search
- other (which?) _____