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Template to a self-administered questionnaire on public's risk perception of man-made chemicals in the human body; perception, acceptability, knowledge, beliefs, perceived control, information use, needs and understanding

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1 Authors and acknowledgements

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This template to a risk perception questionnaire on man-made chemicals in the human body draws heavily on earlier. We gratefully acknowledge the contributions from variety of (international) projects on risk perception at RIVM, which were (in part) performed in the framework of the strategic research programme (https://www.rivm.nl/en/about-rivm/knowledge-and-expertise/strategic-programme-rivm). These include the project 'Non-specific physical symptoms in relation to the actual and perceived exposure to EMF and the underlying mechanisms; a multidisciplinary approach' (Baliatsas, 2015, 'Emphasis'), the more recent project 'Perceptions of Uncertain Risks in Societal Groups' (PurSa(n)g) (Jansen et al, 2018, Jansen et al, 2020, Jansen, 2020 in press) and the project 'Toolkit of instruments measuring and understanding risk perceptions' (TINBER, 2019).

2 Glossary

E-PVQ	Environmental Portrait Values Questionnaire
HBM	Human biomonitoring
LOT	Life Orientation Test
MHW	Modern Health Worries
PASA	Primary Appraisal Secondary Appraisal questionnaire
PC	Perceived control
REI-10	Rational-Experiential Inventory
SES	Socio-economic status

3 Abstract/Summary

This report presents the template to a self-administered questionnaire on public's risk perception of man-made chemicals in the human body. It is theory-based and founded on earlier work on risk perception, mainly within the Strategic Programme RIVM. From the literature, we observe that topics such as personal traits, beliefs about health impacts, trust in authorities, attitudes toward the chemicals themselves and toward dealing with uncertainty, are all relevant topics in the context of risk perceptions, information needs and need for further policy development. The template includes sections on risk perception, acceptability, knowledge, beliefs, perceived control, information use, needs and understanding.

The report outlines the background to the topic, the (lack of) literature specific to the study of perception targeted to man-made chemical in the human body, as measured through HBM. The report and questionnaire material is structured in four sections: A Demographics and perceived health; B Perception of risk of chemicals and chemical substances in body; C Explanatory factors for risk perception (general and personal); and D Information use, needs and understanding. The report provides origin, background and references to the questions and outlines possible approaches to the statistical analysis of collected materials. Proposed questions are listed in the annexes.

4 Introduction and background

In the initial Description of Activities of HBM4EU, under WP7, Task 7.3: Questionnaires development, it was foreseen that questions on risk perceptions of HBM would be included in the general questionnaire. Given the extensive length of the questionnaire and the absence of clear hypotheses about risk perception in relation to actual HBM values, it was decided not to include risk perception questions in the general questionnaire under Task 7.3. Nonetheless, the need was felt to have standard risk perception questions relevant in the HBM context available under WP7 for possible use by the partners in HBM4EU and in other (EU) projects, e.g. in exposome studies. This report provides a brief overview of backgrounds on risk perceptions, lay peoples mental models (values, beliefs, knowledge), elements of risk perception which might provide starting points for communication and policy debate and action. It also contains a core set of questions on these elements.

The general research question in the context of risk perception of Human Biomonitoring (HBM) in the general public is: How do people perceive the presence of man-made chemical substances in the human body as assessed by HBM, in terms of risks, perceived control, information use and needs, and overall acceptability and how do these aspects relate to underlying values, beliefs and knowledge (mental models)?

More specific questions are:

- What do people know and think of HBM and to what extent do they feel control over presence of man-made chemical substances in their body?
- How do personal characteristics (be it traits or states) like self-efficacy, trust, environmental health literacy and environmental values/ attitudes relate to risk perceptions in the general public?
- How do risk perceptions relate to behavioural intentions, information needs and need for policy interventions?

This questionnaire contains four sets of questions:

Part A: Demographics and perceived health

Part B: Perception of risk of chemicals and chemical substances in the human body

Part C: Explanatory factors for risk perception (general and personal)

Part D: Information (needs, use, and key channels and understanding of information

Where possible questions were derived from existing questionnaires and paraphrased toward man-made chemicals in the human body. To the degree possible, we maintained the original scales from existing questionnaires. As a consequence, questions have different answer scales, the advantage being optimal external comparability of results. Questions addressing perception of chemicals in the environment and questions from the Eurobarometer were adopted to allow internal and external comparison and reference. The questionnaire contains a set of modules. Depending on the research question, modules can be chosen form it. It is not advisable to make a selection at item level. (see also under section 4).

This operationalisation of risk perception draws from the body of literature on the topic as compiled and further developed in a variety of (international) projects on risk perception at RIVM, which were performed in the framework of the strategic research programme (https://www.rivm.nl/en/about-rivm/knowledge-and-expertise/strategic-programme-rivm). The literature is described in more detail in the following references. These include the project 'Non-specific physical symptoms in relation to the actual and perceived exposure to EMF

and the underlying mechanisms; a multidisciplinary approach' (Baliatsas, 2015, 'Emphasis'), the more recent project 'Perceptions of Uncertain Risks in Societal Groups' (PurSa(n)g) (Jansen et al, 2018, Jansen et al, 2020, Jansen, 2020 in press) and the project 'Toolkit of instruments measuring and understanding risk perceptions' (TINBER, 2019).

5 Risk perception: a short summary

The general public, concerned citizens, NGO's, professional groups and policy makers evaluate risks along different dimensions and tend to emphasize different aspects of the same risk. Perceptions of risk and coping with them differ per hazard as well as per societal group (Briggs 2011) and are only partly dependent on the type of risk. People think differently about the acceptability of risks depending on the values and views they hold. Some risks, especially when there is an external cause, may easily create public commotion (Petrie 2001). This would also apply to the case of man-made chemicals (Miles 2003, Eurobarometer_Special_314 2009).

From a risk-communication point of view it is important to study differences in perception in the general public of incomparable risks that are judged as voluntary versus un-voluntary, known or unknown, natural versus artificial, threatening versus not threatening etc. Perceptions of risks, perceived control over a risk and strategies to cope with risks and accompanying levels of acceptance vary across different risk problems. These perceptions are dependent on the characteristic of hazards themselves, but also on the social group one belongs to. Whether a risk is considered as acceptable is strongly culturally determined and dependent on the values of that group. Based on previous studies, we know what factors these different groups focus on when evaluating and interpreting the results of a risk assessment. Risk can be compared based on these factors and characteristics and this offers anchor-points for decisions on information needs in the general population. A good balance between these needs and the expert information is important for successful risk communication.

On top of the recent evaluation of the literature on risk perception within the context of the Pur Sang and TINBER projects an additional literature scan on risk perception targeted to human biomonitoring was performed in Scopus, using ("Risk perception" AND "human biomonitoring") as search terms, revealed only seven publications in October 2018. An update in July 2020 identified 19 publications. Most of these publications, however, were not focused on studying the risk perception in relation to HBM, and did not use the term but it showed up in the engineered keywords in Scopus and used the term HBM in a different context. Only three publications were specifically targeted at risk perceptions in the context of HBM studies. Neither of those directly addressed how people perceive *man-made chemicals in their body*. The first one concerned the Flemish Biomonitoring Programme and risk communication (Keune, Morrens and Loot 2008) and shares results and insights from a Belgian HBM study. The second one, Coi et al. (2016) explored risk perception in four areas with arsenic pollution in Italy. The third by Bena et al. (2019) assessed risk perception of people living near solid waste incinerator plants near Turin, prior to a health surveillance programme that would include HBM. Overall, the most pertinent publications focused more on perceptions about (local) environmental pollution and on trust and information needs in the context of an ongoing, or planned future HBM study. To our knowledge, no study has directly assessed our primary research question, i.e. "How do people perceive the presence of man-made chemical substances in the human body as assessed by HBM".

Possibly, some other targeted publications are available in the grey literature. To our knowledge, no multi-centre studies on cross-cultural differences exist on this topic. Nonetheless, such differences are likely to exist, based on cross-cultural differences in risk perception in general (Renn 2000) and more specifically in Europe as was shown by e.g. EuroBarometer studies (Jowel et al, 2007) and differences observed in 'environment concern' between European countries (Istamto, Houthuijs et al. 2014) (Brown et al, 2011).

In the Flemish Biomonitoring Programme, several questions on risk perception were presented to participants. These covered a range of topics and included questions about the perceived prevalence of environmental problems, the impact of these on the participant's health and their families, the levels of trust in authorities, participation in the debate, and willingness to participate in a risk perception study. (Keune, Morrens and Loots 2008). No questions were included on the perception of risk regarding the presence of man-made chemical substances in the human body.

The expected cross-cultural differences in Europe, combined with the absence of (multi-centre/multi-country) studies on the risk perception of the presence of man-made chemical substances in the human body as assessed by HBM, warrants further study in HBM4EU and in subsequent activities and other projects under Horizon Europe. To facilitate such studies, this report provides a set of questions pertinent to risk perception of chemical substances in the body and to determinants of risk perception.

6 The structure of the questionnaire

The template to a questionnaire on public's risk perception of man-made chemicals in the human body is set up as a self-administered questionnaire. We anticipate the use via online administration, possibly in existing panels. Online administration would involve adaptation of the layout of questions, suitable for web-based utilisation. This may include changes to the numbering of questions and items.

The questionnaire is theory-based and grounded in the general literature on risk perception. In the absence of literature on risk perception studies targeted to HBM, we adapted existing question frames to HBM. The template comprises four parts. The first covers standard demographic information and questions on perceived health. The second comprise questions on perception of chemicals in the direct environment and in the human body. The third part consists of questions addressing potential explanatory variables of perception. The fourth and final part covers use and understanding of risk information. The origin and background of the proposed questions are described in Section 7. The numbering of questions in A1 corresponds to initial numbering in HBM4EU Basic questionnaire from 2018[1]. Subsequent questions only carry item numbers (*Ix*), starting with *I12* in section A2.

6.1 PART A: Demographics and perceived health

A1: Personal Information [derived from HBM4EU's main questionnaire, numbering corresponds to main questionnaire numbering] Q1-11

A2: Self-reported health *I12-17*

[1] Note that later 'single substance questionnaires' use a different breakdown and numbering of questions and sections (c.f. https://www.hbm4eu.eu/online-library/?mdocs-cat=mdocs-cat-21&mdocs-att=null)

6.2 PART B: Perception of risk of chemicals and chemical substances in body

B1: Risk perception of chemical substances in the environment *I18-34*

B2: Appraisal (primary and secondary) of chemicals in the body *I35-50*

B3: Risk perception of chemicals in body *I51-67*

6.3 PART C: Explanatory factors for risk perception (general and personal)

C1: Modern health worries *I68-99*

C2: Trust in regulation of chemical substances by (national). *I100-111111*

C3: Environmental Portrait Values Questionnaire (E-PVQ *I112-128*

C4-5 Beliefs, knowledge and feelings about chemical substances; in general (C4) *I129-136* and in the body (C5) *I137-150*,
C6: Environmental sensitivity. *I151-158*

C7 Health literacy *I159-170*

C8: Self efficacy *I171-178*

6.4 PART D: Information use, needs and understanding

D1: Sources of information *I179-193*

D2: Need for cognition *I194-205*

D3. Understanding HBM risk information (An example text). *I206-215*

7 Origin and background of the questions

Most questions included are based on standard and validated indices. In case of standard questions and in view of comparability the wording as well as the direction of the scales were not altered. As a consequence, the direction in scaling (from positive to negative or reversed) differs between questions. Reversed questions are often included in multi-item instruments to avoid that people score "automatically" and to safeguard attention. Below, the origin of the questions or adapted questions are presented following the structure of the questionnaire.

7.1 Section A: Demographics and perceived health

7.1.1 A1: Demographics

The questionnaire includes questions on socio-demographic characteristics such as age, gender, ethnicity, education, occupational status, type of residence and home ownership status. These questions (1-4, 6, 7-9, 11) are derived from the initial HBM4EU Basic questionnaire from 2018. Note that later 'single substance questionnaires' use a different

breakdown and numbering of questions and sections (c.f. https://www.hbm4eu.eu/online-library/?mdocs-cat=mdocs-cat-21&mdocs-att=null).

7.1.2 A2: General health

General health is measured by the perceived health index of the Rand36. This index contains five questions related to general health and one added question about perceived health change. The general health questions of the RAND36 measure the subjective evaluation of the general health status. A low score on the scale indicates that a person evaluates his/her health as bad or expects that his/her health will deteriorate. In the last question people are asked to evaluate their current health with that of a year ago. Responses are provided on a 6 point Likert ranging from definitely true (0) to definitely false (5). The RAND36 questions can be applied modular and have a long history of proven reliability and validity. (Ware and Sherbourg, 1992)

7.2 Section B Perception of risk of chemicals and chemical substances in body.

The questions in this section are based on a questionnaire developed in PurSa(n)g project (Janssen et al, 2018, 2020) (Jansen, 2020) and enriched with questions from psychometric paradigm of Slovic (Fischhof et al, Slovic, 1980, 1981, 1987) and Keune, Morrens and Loots (2008, 2012), The Portrait Value Questionnaire for environmental issues by Bouman, Steg and Keirs (2018); and Primary and Secondary Appraisal Questionnaire by Gaab et al, (2009).

7.2.1 B1: Risk perception of chemical in the environment

A semantic differential based on Jansen 2020 concerning attitude towards chemicals in the environment and the key psychometric dimensions of Slovic et al. such as threat, fear, unknown, voluntary, controllable, fatal etc. (Fischhof et al, 1980); Slovic,et al, 1980, 1981, 1987) on a 5-point scale people can indicate their perception of risk related to chemical substances. These questions can be used for external reference and for internal comparison with the questions of B3 on risk perception of chemicals in the body.

7.2.2 B2: Primary and secondary appraisal of chemicals in the environment

Key concepts in the stress and coping models of Lazarus and Folkman (1984) are primary and secondary appraisal. Primary appraisal refers to the evaluation of a threat and secondary appraisal to the level of control one perceives. The PASA (Primary Appraisal Secondary Appraisal questionnaire by Gaab, 2009) measures these dimensions and consists of four situation-specific subscales assessing challenge (four items; example item: "The situation is important for me"; Cronbach's $\alpha = 0.36$[2]) and threat (four items; example item: "I do not feel threatened by the situation"; $\alpha = 0.82$), which form the primary appraisal subscale ($\alpha = 0.61$), in addition to self-concept of own competencies (four items; example item: "I know what I have to do in this situation"; $\alpha = 0.88$) and control expectancy (four

[2] Cronbach's alpha is a measure of internal consistency, that is, how closely related a set of items are as a group. It is considered to be a measure of scale reliability.

items; example item: "I can control a lot myself of what I can do in this situation"; α = 0.57), which form the secondary appraisal subscale (α = 0.66). From these questions a so called stress index can be derived by subtracting the secondary appraisal from the primary appraisal mean scores (see Gaab, 2009).

7.2.3 B3: Risk perception of chemicals in the body

Similar as in B1, a semantic differential was made based on Jansen 2020 concerning attitude towards chemicals in human body and key elements of Slovic' psychometric dimensions (1987) of fear, unknown, voluntary, controllable, fatal etc. on a 5-point scale people can indicate their perception of risk related to chemical substances.

7.3 Section C: Explanatory factors for risk perception (general and personal)

Section C consists of sets of questions known from the literature to cover covariates that are associated with and may affect risk perception. This will allow researchers to study associations of covariates with risk perception of chemicals in the body observed in their study population. Moreover, insight into e.g. 'health literacy' of study participants and its relation to risk perception of chemicals in the body may assist researchers in communication of information on HBM levels and associated risks to their target audience/study population.

7.3.1 C1: Modern Health Worries

A thirty two -item version of the Modern Health Worries (MHW) scale is proposed to assess participants' levels of MHW. (Petrie et al, 2001, 2005, Kaptein et al 2005). Answers are scored on a 5- point Likert scale ranging from 1 to 5. A higher score indicates increased MHW. A few items of the original Dutch version of the scale were adapted/simplified due to relevance and national characteristics. More specifically, the item "other environmental pollution" was replaced with "climate change/greenhouse effect" and the item "fluoridation of water" was omitted. Cronbach's alpha for this scale was 0.95 (Baliatsas et al, 2015).

7.3.2 C2: Trust in Government and others responsible

This 9 item index is based on Jansen et al, 2018, who compiled a set of questions from Poortinga and Pidgeon (2003), Kraus et al, (2000). On a 5-point scale people can indicate to what degree they agree with each of the statements.

7.3.3 C3: Environmental values

The Environmental Portrait Value Questionnaire (E-PVQ) consists of 17 items containing descriptions, which were based on the so called Environmental Schwartz Value Survey (E-SVS) content, of what another person (gender matched) thought was very important in life. Participants are asked to respond on a 7-point scale (1 not like me at all to 7 very much like me) how much the person in the description was similar to themselves. (Bouman, Steg and Kiers, 2018). While not all items refer to environment or nature, other original items are included here, to allow comparison with other studies.

7.3.4 C4-5: Beliefs: exposure, perception of chemicals (C4) and of chemicals in the body (C5).

A distinction is usually made between beliefs about the toxic nature of chemicals, beliefs about the personal exposure to chemicals and beliefs about the state of the knowledge about (the risk) of chemical substances. Here only the first two elements are considered as relevant. The beliefs about the toxic nature questions are based on the work of Miles and Frewer (2003,) and adapted by Jansen (2020). The belief about personal exposure is operationalised in two simple questions, adapted from Jansen, 2020.

In the Eurobarometer survey the public opinion on chemicals in the 28 EU Member States was monitored in 2010, 2012, 2016. The aim of the survey was to understand EU citizens' awareness and perceptions of chemical products. The survey includes comparisons (where appropriate) with similar surveys conducted in 2012 and 2010. The results are presented in more detail in the full report. Special Eurobarometer 456, 2017). The questionnaire includes eight questions derived from this survey (items *I129-136)*

In addition, concepts derived from the Myth of Nature (Dake, 1992) were adopted. Thus, four graphs from myth of nature (and cultural theory (Thompson et al, 1990)) were used, with modified labels to represent how the human body might respond to exposure to man-made chemicals in the view of respondents. (items *I147-150*)

7.3.5 C6: Environmental Sensitivity

To assess self-reported environmental sensitivity, a selection of eight items based on the Stansfeld questionnaire (1985) was used, representing perceived sensitivities to environmental stressors such as noise, light, specific materials, colour, smells, temperature changes, cold or warm environment. The answers are formatted in a 5-point scale ranging from strongly disagree (0) to strongly agree (4). The reference period is "during the previous week". A higher score indicates a higher perceived sensitivity.

7.3.6 C7: Health literacy

Health Literacy as defined by the Institute of Medicine (Sørenson et al 2012) is "the degree to which individuals have the capacity to obtain, process, and understand basic health information and services needed to make appropriate health decisions." Worldwide health literacy is considered as one of the most important determinants of health and socio-economic health differences (WHO, 2013). Individual-level environmental health literacy (EHL) was described as: (a) understanding the connection between environmental exposures and health; (b) representations of content knowledge, such as a score on a survey of environmental health knowledge or gains in content knowledge demonstrated with pre/ post-assessments; and, (c) behavior changes reported in response to environmental exposures (Gray, 2018).

7.3.7 C8: Self-efficacy and (locus of) control

Self-efficacy refers to an individual's belief in his or her capacity to execute behaviors necessary to produce specific performance attainments (Bandura, 1989, 1994, 1997). Perceived control (PC) is defined as the belief a person had in their capacity to control (feelings, behaviors, thoughts. Both self-efficacy and perceived control are important mediators in the process by which people cope with challenging or risky situations. While highly related, a distinction is made between perceived control and self-efficacy. The Self-efficacy index is based on a combined index used in the Emphasis project by Baliatsas et al (2011) and in the Frankfurt study (Scheckenberg et al, 2016), comprising a total of five items, adapted for chemicals)

Lack of Perceived Control was was measured by using two items from the Life Orientation Test (LOT, Scheier and Carver, 1985) "I am always optimistic about my future" and "I hardly ever expect things to go my way". An extra item was added "If I try I can influence the quality of my living environment", in order to enhance the individual sense of control that can lead to a positive outcome. The score on this 8 item index is rated on a 5-point Likert scale ranging from strongly disagree (0) to strongly agree (4)

7.4 Section D Sources and use of, and needs for information on man-made chemicals in the body.

Section D consists of questions addressed sources of information, trust in these sources, and need for information. Insight into these aspects and the relation of these to risk perception of chemicals in the body may assist researchers in communication of information on HBM levels and associated risks to their target audience/study population.

7.4.1 D1: Sources of Information

Section D1 addresses sources of information where people may obtain or seek information about environmental issues. The list was adapted and translated from Morens et al, 2012. For the different sources of information respondents can indicate the level of trust in the source and whether they would like to obtain information from that source.

7.4.2 D2: Need for Cognition

The Concept "need for cognition" is defined as the tendency for an individual to engage in and enjoy thinking". It is based on the work of Epstein et al (1996) and the Rational-Experiential Inventory of Norris et al (REI-10, 1998). Such information may assist in developing risk communication materials on HBM, e.g. by developing different forms of communication materials targeted to different 'need for cognition' audiences.

7.4.3 D3. Understanding risk information

In this part of the questionnaire people are confronted with a text on HBM. One or more text(s) can be selected by the Principal Investigator, or taken from the HBM4EU factsheets (https://www.hbm4eu.eu/result/factsheets/), or other HBM4EU texts targeting the general population. Translated HBM4EU factsheets are available in the languages of participating countries.

Respondents are asked to indicate on a semantic differential (5-point scale) about what their understanding is of the text. Dimensions used are Difficult(easy) to understand, (In)complete, (Un)trustworthy, (Un)common knowledge, (Un)surprising, Disturbing/Reassuring, Complex/Simple, Clarity/Vagueness, Alarmist/Positive, Politically coloured/ Scientific-Objective. This scale is again based on the work of Jansen et al 2020 and Greven, Claassen, Timmermans, Woudenberg, and Duijm (2013).

8 Proposed approaches to statistical analysis

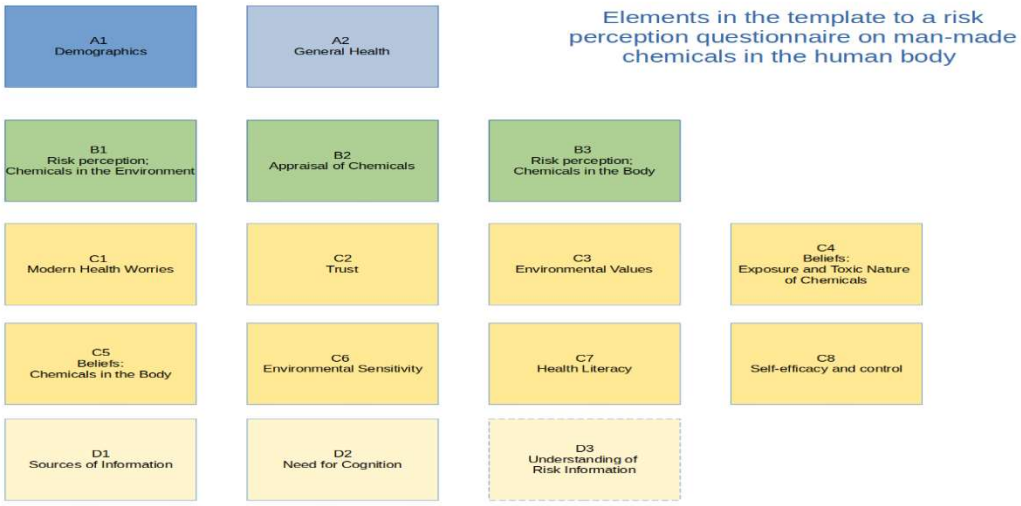
The user/researcher of this template to a self-administered questionnaire on public's risk perception of man-made chemicals in the human body is encouraged to perform a number of below statistical analyses of the collected data. To this end, the user/researcher may adopt their own syntax for the various instruments or refer to the underlying literature to adopt syntax from the literature for external reference.

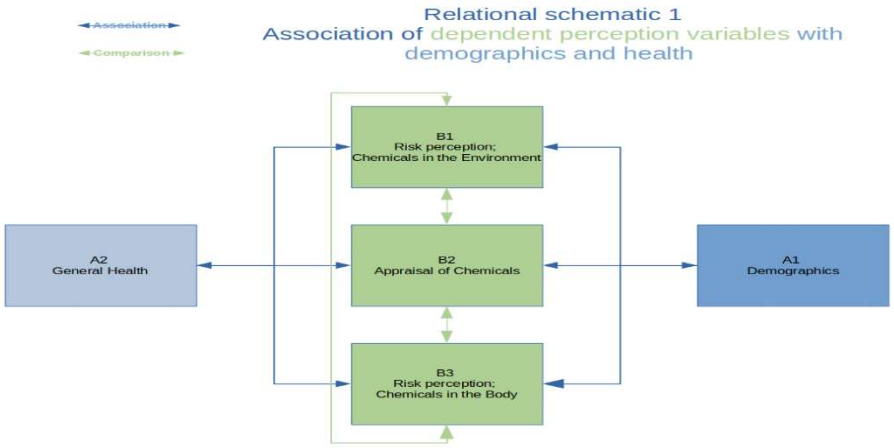
First step is of course an exploratory descriptive analysis of the distributions of scores on the items in the questionnaire. We suggest breakdowns of the descriptive analysis of section B by sex, age, SES information from section A1. A similar descriptive analysis of sections C and D is suggested. A further exploration of the distribution of section B scores would be breakdowns by health scores of section A2.

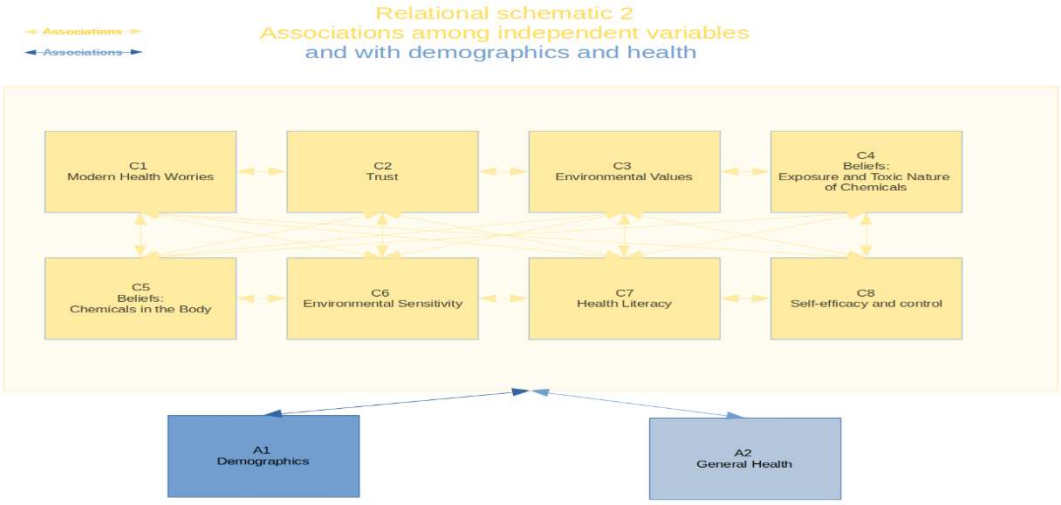
A second step would be the mutual comparison of scores on items of sections B1 and B3 so as to assess to what degree perceptions on chemicals in the human body – the main focus of this questionnaire - are rated similarly to or differently from chemicals in the environment. Also, the correlations structure between items in B1, B2 and B3 could be addressed through e.g. Spearman correlations, cluster, principal component or factor analysis (c.f. schematic 1 below). Network analysis may illustrate graphically the association structure among items in these instruments.
Similar analysis can be performed to explore associations among the items in section C (c.f. schematic 2 below).

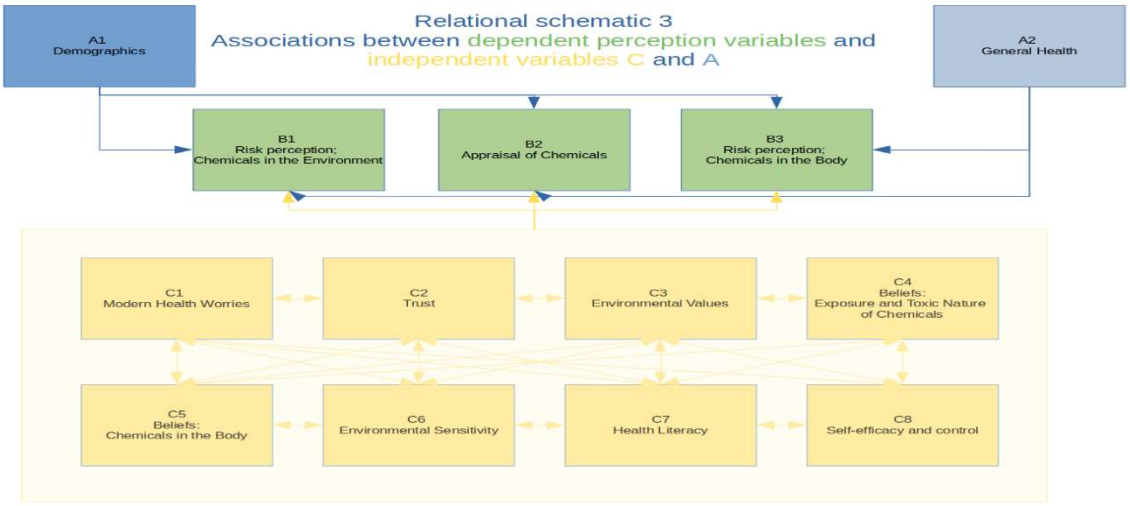
A more analytical approach is to analyse the associations of section B scores as dependent variables, with a covariate structure of section A, C and D scores. (c.f. schematic 3 & 4 below). Given the number of items in the independent covariates, an exploration of the associations amongst independent covariates is suggested (c.f. schematic 5 below).

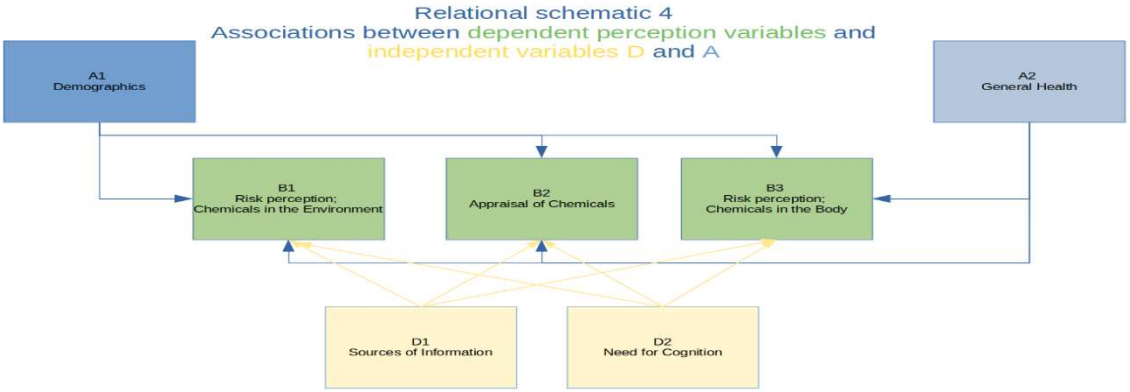
General schematics of items in the questionnaire template, followed by relational schematics for proposed statistical analysis.

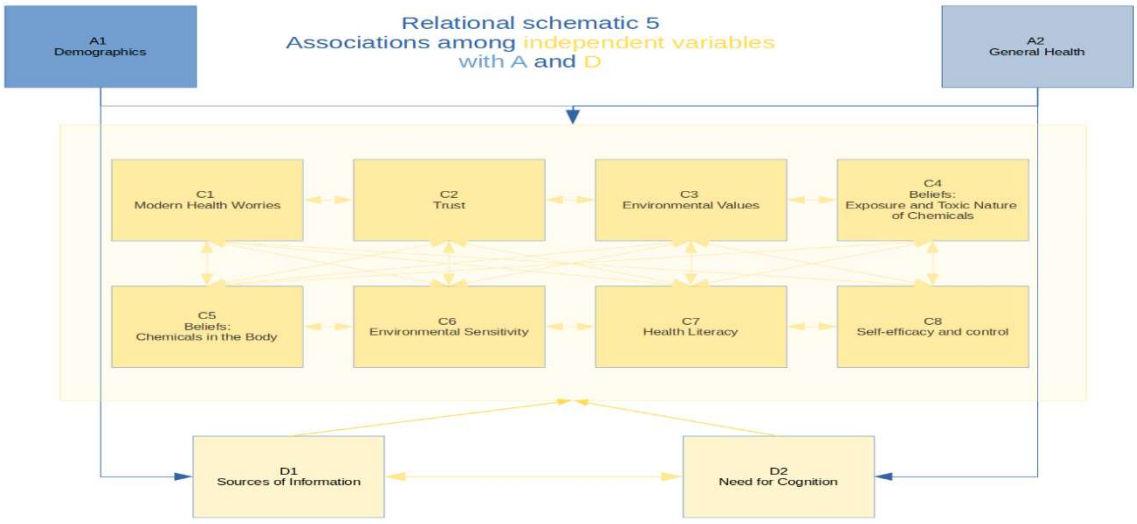












Responses on section D3 will depend in part on the actual example text used to evaluate. Interesting patterns to assess would include the associations of D3 items with A1 and section C items.

9 Closing remarks

While it is generally accepted that insights in risk perception are a prerequisite for effective risk communication, it appears that, to date, there has been little research into how people perceive the presence of man-made chemical substances in the human body as assessed by HBM, in terms of risks, perceived control and overall acceptability and how do these aspects relate to underlying values, beliefs and knowledge. To our knowledge, no multi-centre studies on cross-cultural differences exist on this topic. Nonetheless, such differences are likely to exist, based on cross-cultural differences in risk perception in general and more specifically in Europe as was shown by e.g. EuroBarometer studies and differences observed in 'environment concern' between European countries.

From the literature, we observe that topics such as personal traits, beliefs about health impacts, trust in authorities, attitudes toward the chemicals themselves and toward dealing with uncertainty, are all relevant topics in the context of risk perceptions, information needs and need for further policy development. Differences in such factors may (partly) explain differences between countries in a multi-country study.

We reiterate that the suggested set of questions in current form need to be tested in panel or pilot study. Before application, these questions need to be translated/back-translated and pre-tested on the target audience/respondents.

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ANNEXES

Annex 1: Cover letter to respondents

QUESTIONNAIRE ON RISK PERCEPTION OF MAN-MADE CHEMICALS IN THE HUMAN BODY

Introduction

The European joint project Human Biomonitoring for Europe (HBM4EU) is a collaboration between 30 countries in Europe, the European Environment Agency and the European Commission, and is co-funded under the European scheme Horizon 2020.

Human Biomonitoring is a scientific technique that allows us to assess whether and to what extent people are exposed to man-made chemicals and to what extent these substances have entered their bodies. It involves measurements of man-made chemicals or their reaction to products in biological samples such as blood, urine, hair, mother milk collected from people.

This questionnaire is part of the HBM4EU project (www.hbm4eu.eu) and is primarily aimed at finding out how people evaluate the risk of the presence of man-made chemical substances in the environment and in their body and the personal contextual, and situational determinants of these perceptions. The results will help to improve communication about the Human Biomonitoring studies and will help policy makers in the governance of chemicals.

The study is carried out by [institute Acronym] in collaboration with [Institute Acronym]

The questionnaire has four sections:
Part A on your personal details and your perceived health
Part B on the Perception of risks of man-made chemicals in the body
Part C on general and personal characteristics in relation to risk perception
Part D on information use and needs about chemicals in the body and understanding of this information.
Many questions were adapted from existing questionnaires, to allow comparison with other studies. Therefore, the wording, layout and scales may differ from one question to the other.

It is important that you let us know what you think about these issues and that you hereby choose the answer that best fits your opinion or experience. The first impression is often the best, there are no true or false answers. Your answers will be processed in an anonymous manner.

At the end of this questionnaire you can give your comments on this questionnaire or additional issues you would like to raise.

Thank you very much for your cooperation!

[Name and signature of principal investigator(s)]

Annex 2: Questionnaire items

QUESTIONNAIRE ON RISK PERCEPTION OF MAN-MADE CHEMICALS IN THE HUMAN BODY

QUESTIONNAIRE INFORMATION

ID (PARTICIPANT)	|__|__|__|__|__|
ID (INTERVIEWER)	|__|__|__|__|__|
DATE OF THE INTERVIEW	|__|__| |__|__| |__|__|__|__|
START TIME	|__|__| : |__|__|
END TIME	|__|__| : |__|__|
PLACE	

A1 Personal information [numbering refers to main HBM4EU questionnaire; note that items 5 and 10 of the main questionnaire are not relevant in this context and not included here]

PERSONAL INFORMATION

1. Name and surname initials:

Gender

1. Male	☐
2. Female	☐
3. Other	☐

2. What is your date of birth

Gender

a. Month	☐☐
b. Year	☐☐☐☐

3. Were you, your parents and grandparents born in this country, if not please specify where? (include the name of each country

	Here	In another country	Specify country
You	Yes☐ No☐ Don't know ☐	Yes☐ No☐ Don't know ☐	
Your Mother	Yes☐ No☐ Don't know ☐	Yes☐ No☐ Don't know ☐	
Your father	Yes☐ No☐ Don't know ☐	Yes☐ No☐ Don't know ☐	
Maternal grandmother	Yes☐ No☐ Don't know ☐	Yes☐ No☐ Don't know ☐	
Maternal grandfather	Yes☐ No☐ Don't know ☐	Yes☐ No☐ Don't know ☐	
Paternal grandmother	Yes☐ No☐ Don't know ☐	Yes☐ No☐ Don't know ☐	
Paternal grandfather	Yes☐ No☐ Don't know ☐	Yes☐ No☐ Don't know ☐	

4. Which language(s) do you speak at home

Please tick one box

a.	National Language(s) (Country)	☐
b.	Another Language	☐
c.	Specify Language (s) ……	

6. What is your highest education you completed? [

Please tick one box

a.	No formal education or below primary education (ISCED 0)	☐
b.	Primary education (ISCED 1)	☐
c.	Lower secondary education or second stage of basic education (ISCED 2)	☐
d.	Upper secondary education (ISCED 3)	☐
e.	Post-secondary non-tertiary education (ISCED 4)	☐
f.	Short-cycle tertiary education (ISCED 5)	☐
g.	Bachelor’s or equivalent level (ISCED 6)	☐
h.	Master’s or equivalent level (ISCED 7)	☐
i.	Doctoral or equivalent level (ISCED 8)	☐
j.	Don’t know	☐

7 What is your current main labour status?

Please tick one box

a.	Employee working full-time	☐
b.	Employee working part-time	☐
c.	Self-employed working full-time (including family worker)	☐
d.	Self-employed working part-time (including family worker)	☐
e.	Unemployed	☐
f.	Pupil, student, further training, unpaid work experience	☐
g.	Retired	☐
h.	Permanently disabled or/and unfit to work	☐
i.	In compulsory military community or service	☐
j.	Fulfilling domestic tasks and care responsibilities	☐
k.	Other namely: ……	☐

8 What description best fits your current working position

Please tick one box		Definitely true
a.	Manager Employee working full-time	☐
b.	Professional	☐
c.	Technician or associate professional	☐
d.	Clerical support worker	☐
e.	Service or sales worker	☐
f.	Skilled agricultural, forestry or fishery worker	☐
g.	Craft and related trade worker	☐
h.	Plant or machine operator or assembler	☐
i.	Elementary occupation	☐
j.	Armed forces occupation	☐
k.	Other categories \Specify……	☐

9 Could you provide the approximate range of your total household income? (It is referred to annual gross incomes from all members of your household) (Indicated by each country)

Income category		Income category	
No.1	☐	No.6	☐
No.2	☐	No.7	☐
No.3	☐	No.8	☐
No.4	☐	Don't know	☐
No.5	☐		

11. In what type of area is your home located (Tick only one answer)

		Definitely true
a.	City Centre	☐
b.	Near city centre	☐
c.	Suburb/metropolitan area	☐
d.	Industrial	☐
e.	Rural/Village	☐
f.	Other areas Specify area	☐
g.	Don't know	☐

A2 Your Health

The following statements concern what you think about your health. How TRUE or FALSE is each of the following statements for you?

Please indicate for each of the following statements to what degree this applies to your situation

		Definitely true	Mostly True	Don't Know	Mostly False	Definitely False
12.	I never worry about my health	☐	☐	☐	☐	☐
13.	I seem to get sick a little easier than other people	☐	☐	☐	☐	☐
14.	I expect my health to get worse	☐	☐	☐	☐	☐
15.	I am as healthy as anybody I know	☐	☐	☐	☐	☐
16.	My health is excellent	☐	☐	☐	☐	☐
17.	It is not possible to avoid all risks to my health	☐	☐	☐	☐	☐

B. Perception of risk of chemicals & chemical substances in your body

Below you find a set of statements about chemical substances and chemical substances in your body

B1: For chemical substances think of chemicals in environmental pollution, in household products, pesticides, in consumer products, paints, building materials, cosmetic products, food additives, chemicals in the workplace, etc.

B2, B3: For chemicals in the body think of the total and measurable amount of man-made chemicals that are present in the body of a human being, either from recent exposure, or accumulated over a lifetime.

B1 Risk perception of chemical substances in the environment

What do you think of chemical substances in *your immediate environment*?
Please tick the answer that best fits your opinion.

Chemical substances in the daily environment are: …

18.	1= Threatening	☐	☐	☐	☐	☐	5 = Not Threatening
19.	1 = Not frightening	☐	☐	☐	☐	☐	5 = Frightening
20.	1 = Acceptable	☐	☐	☐	☐	☐	5 = Unacceptable
21.	1 = Not worrying	☐	☐	☐	☐	☐	5 =Worrying
22.	1 = Not necessary	☐	☐	☐	☐	☐	5 = Necessary
23.	1 = Not Useful	☐	☐	☐	☐	☐	5= Useful
24.	1 = Bad	☐	☐	☐	☐	☐	5= Good*
25.	1 = Controllable	☐	☐	☐	☐	☐	5= Not Controllable
26.	1 = Known	☐	☐	☐	☐	☐	5 Unknown
27.	1 = New	☐	☐	☐	☐	☐	5= Old/Familiar
28.	1= Voluntary	☐	☐	☐	☐	☐	5= Involuntary
29.	1= Chronic	☐	☐	☐	☐	☐	5=Temporary
30.	1= Fatal	☐	☐	☐	☐	☐	5= Harmless
31.	1= Direct risk	☐	☐	☐	☐	☐	5= Delayed risk
32.	1= Visible	☐	☐	☐	☐	☐	5= Invisible
33.	1= Certain	☐	☐	☐	☐	☐	5=Uncertain
34.	1= Natural	☐	☐	☐	☐	☐	5= Artificial

B2 Appraisal of chemical substances in your body

The following statements concern toxic chemicals *in your body*.

For chemicals in the body think of the total and measurable amount of man-made chemicals that are present in the body of a human being, either from recent exposure, or accumulated over a lifetime.

Please indicate for each statement about to what degree this is applicable to your current situation regarding *chemicals in the body*

		Totally wrong	Fairly wrong	Rather wrong	Rather correct	Fairly correct	Totally correct
35.	I do not feel threatened by the situation	☐	☐	☐	☐	☐	☐
36.	The situation is important for me	☐	☐	☐	☐	☐	☐
37.	In this situation I know what to do	☐	☐	☐	☐	☐	☐
38.	It depends primarily on me whether I can cope with the situation	☐	☐	☐	☐	☐	☐
39.	This situation is very unpleasant for me	☐	☐	☐	☐	☐	☐
40.	This situation does not bother me	☐	☐	☐	☐	☐	☐
41.	I do not know how to deal with the situation	☐	☐	☐	☐	☐	☐
42.	The best thing for me is to take care of myself	☐	☐	☐	☐	☐	☐
43.	I am not worries because the situation does not pose a threat to me	☐	☐	☐	☐	☐	☐
44.	The situation is not a challenge for me	☐	☐	☐	☐	☐	☐
45.	In this situation I see many action alternatives	☐	☐	☐	☐	☐	☐
46.	In this situation I am in control	☐	☐	☐	☐	☐	☐
47.	The situation frightens me	☐	☐	☐	☐	☐	☐
48.	This situation relies very much upon me	☐	☐	☐	☐	☐	☐
49.	For this situation I can think of many solutions	☐	☐	☐	☐	☐	☐
50.	If I master the situation depends on my personal efforts in the first place	☐	☐	☐	☐	☐	☐

B3 Risk perception of chemical substances in your body (II)

What do you think of chemical substances *in your body*

Please tick the answer that best fits your opinion.

Chemical substances in my body are: …

51.	1= Threatening	☐	☐	☐	☐	☐	5 = Not threatening
52.	1 = Not frightening	☐	☐	☐	☐	☐	5 = Frightening
53.	1 = Acceptable	☐	☐	☐	☐	☐	5 = Unacceptable
54.	1 = Not worrying	☐	☐	☐	☐	☐	5 =Worrying
55.	1 = Not necessary	☐	☐	☐	☐	☐	5 = Necessary
56.	1 = Not Useful	☐	☐	☐	☐	☐	5= Useful
57.	1 = Bad	☐	☐	☐	☐	☐	5= Good
58.	1 = Controllable	☐	☐	☐	☐	☐	5= Not Controllable
59.	1 = Known	☐	☐	☐	☐	☐	5 Unknown
60.	1 = New	☐	☐	☐	☐	☐	5= Old /Familiar
61.	1= Voluntary	☐	☐	☐	☐	☐	5= Involuntary
62.	1= Chronic	☐	☐	☐	☐	☐	5=Temporary
63.	1= Fatal	☐	☐	☐	☐	☐	5= Harmless
64.	1= Direct Risk	☐	☐	☐	☐	☐	5= Delayed Risk
65.	1= Visible	☐	☐	☐	☐	☐	5= Invisible
66.	1= Certain	☐	☐	☐	☐	☐	5=Uncertain
67.	1= Natural	☐	☐	☐	☐	☐	5= Artificial

C Explanatory factors for risk perception (general and personal)

In this section you will find a set of statements about the degree in which you worry about factors in your living environment (C1), and your trust in the government when it concerns regulation of chemical substances (C2).

C1 Worry

Below you find a list of factors in your living environment. Could you indicate for each of them to what degree you are worried about their effects on your health by ticking the box.

Please tick one box per line		Strongly disagree	Disagree	Agree/nor disagree	Agree	Strongly agree
68.	Contaminated water supply	☐	☐	☐	☐	☐
69.	Mad Cow disease (CJD)	☐	☐	☐	☐	☐
70.	Bacteria in air conditioning systems	☐	☐	☐	☐	☐
71.	Viruses in air condition systems	☐	☐	☐	☐	☐
72.	Fluoridation of water	☐	☐	☐	☐	☐
73.	Vaccination	☐	☐	☐	☐	☐
74.	Bio-terrorism (e.g. anthrax poisoning)	☐	☐	☐	☐	☐
75.	Leakage from microwave ovens	☐	☐	☐	☐	☐
76.	Toxic chemicals in household products	☐	☐	☐	☐	☐
77.	Amalgam/ Dental fillings	☐	☐	☐	☐	☐
78.	Medical and dental X rays	☐	☐	☐	☐	☐
79.	Traffic fumes	☐	☐	☐	☐	☐
80.	Other environmental pollution	☐	☐	☐	☐	☐
81.	Air pollution	☐	☐	☐	☐	☐
82.	Depletion of the ozone layer	☐	☐	☐	☐	☐
83.	Pesticides	☐	☐	☐	☐	☐
84.	Noise pollution	☐	☐	☐	☐	☐
85.	Poor building ventilation	☐	☐	☐	☐	☐
86.	Nuclear radiation	☐	☐	☐	☐	☐

		Strongly disagree	Disagree	Agree/nor disagree	Agree	Strongly agree
87.	Hormones in food	☐	☐	☐	☐	☐
88.	Antibiotics in food	☐	☐	☐	☐	☐
89.	Additives in food	☐	☐	☐	☐	☐
90.	Pesticides in food	☐	☐	☐	☐	☐
91.	Genetically modified food	☐	☐	☐	☐	☐
92.	Radio or mobile phone towers	☐	☐	☐	☐	☐
93.	Mobile phones	☐	☐	☐	☐	☐
94.	High voltage power lines	☐	☐	☐	☐	☐
95.	Overuse of antibiotics	☐	☐	☐	☐	☐
96.	Drug resistant bacteria	☐	☐	☐	☐	☐
97.	Lyme Disease	☐	☐	☐	☐	☐
98.	Contaminated water supply	☐	☐	☐	☐	☐
99.	To be infected by the Corona Virus	☐	☐	☐	☐	☐

C2 Trust in regulation of chemical substances

Please indicate to what degree you disagree or agree with each of the following statements by ticking the box

		Strongly disagree	Disagree	Disagree/ nor agree	Agree	Strongly Agree
100.	The (national) government puts health of the citizens above economic interest	☐	☐	☐	☐	☐
101.	The government is too much influenced by industry regarding regulation of chemicals	☐	☐	☐	☐	☐
102.	The government is sufficiently competent to deal with regulation of chemicals	☐	☐	☐	☐	☐
103.	The government can protect the citizens against the potential harm of chemical substances	☐	☐	☐	☐	☐
104.	The government provides all relevant information about health risks of chemicals to the public	☐	☐	☐	☐	☐
105.	The government is acting in the public interest regarding regulation of chemicals	☐	☐	☐	☐	☐
106.	I feel the way the government is making decisions about regulation of chemicals is fair	☐	☐	☐	☐	☐
107.	National governments and the EU should regulate the exposures, set standards and reduce them to acceptable risk levels;	☐	☐	☐	☐	☐
108.	Industry has the responsibility to replace toxic chemicals by safer ones, regardless of government regulations	☐	☐	☐	☐	☐
109.	Out of self-interest, industry will limit exposures to safe levels for the population	☐	☐	☐	☐	☐

		Strongly disagree	Disagree	Disagree/ nor agree	Agree	Strongly Agree
110.	Regardless of regulations, technological improvements and innovations will automatically reduce body burden to chemicals;	☐	☐	☐	☐	☐
111.	Regardless of regulations, new technologies will lead to new exposures of unknown chemicals, increasing our body burdens of chemicals	☐	☐	☐	☐	☐

C3 Values

People have different values toward their environment and society.

Please indicate to what degree the following statements apply to what is important to you by ticking the box

	For me it is very important:	Not like me at all						Very much like me
112.	To prevent environmental pollution	☐	☐	☐	☐	☐	☐	☐
113.	To protect the environment	☐	☐	☐	☐	☐	☐	☐
114.	To respect nature	☐	☐	☐	☐	☐	☐	☐
115.	To be in unity with nature	☐	☐	☐	☐	☐	☐	☐
116.	That every person has equal opportunities	☐	☐	☐	☐	☐	☐	☐
117.	To take care of those who are worse of	☐	☐	☐	☐	☐	☐	☐
118.	That every person is treated justly	☐	☐	☐	☐	☐	☐	☐
119.	That there is no war or conflict	☐	☐	☐	☐	☐	☐	☐
120.	To be helpful for others	☐	☐	☐	☐	☐	☐	☐
121.	To have fun	☐	☐	☐	☐	☐	☐	☐
122.	To enjoy life's pleasures	☐	☐	☐	☐	☐	☐	☐
123.	To do thing that I enjoy	☐	☐	☐	☐	☐	☐	☐
124.	To have control over other's actions	☐	☐	☐	☐	☐	☐	☐
125.	To have authority over others	☐	☐	☐	☐	☐	☐	☐
126.	To be influential	☐	☐	☐	☐	☐	☐	☐
127.	To have money and possessions	☐	☐	☐	☐	☐	☐	☐
128.	To work hard and be ambitious	☐	☐	☐	☐	☐	☐	☐

C4 Beliefs, knowledge and feelings about chemical substances

Please indicate to what degree each of the following statements applies to you by ticking the box						
129.	In general, would you say that you are concerned about being exposed to hazardous chemicals in your daily life?	Yes, very much ☐	Yes, a little ☐	No, not really ☐	No, not at all ☐	Don't know ☐
130.	How informed do you feel about the potential dangers of the chemicals contained in products such as paints, detergents, household products, clothes, furniture, electronics and cosmetics?	Very well informed ☐	Rather well informed ☐	Not very informed ☐	Not informed at all ☐	Don't know ☐
131.	Do you think that the products containing chemicals that you can buy in your country are safe for human health and for the environment?	Yes, completely ☐	Yes, to some extent ☐	No, not really ☐	No, not at all ☐	Don't know ☐

132. Compared with 10 to 15 years ago, do you think that the safety of products containing chemicals that you can buy in your country has… Please tick one

1. Improved	☐
2. Stayed about the same	☐
3. Deteriorated	☐
4. Don't know	☐

133. Which of the following statements best reflects your opinion…? Please tick one

1. Products imported from countries outside the EU contain safer chemicals than products manufactured in the EU Improved	☐
2. Products manufactured in the EU contain safer chemicals than products imported from countries outside the EU Stayed about the same	☐
3. All of them are safe	☐
4. None of them are safe	☐
5. Don't know	☐

134. Today, in the EU, do you think that the safety of the chemicals contained in products such as paints, detergents, household products, clothes, furniture, electronics and cosmetics is ensured by…? (Multiple answers possible)

• Authorities of the European Union	☐
• National authorities	☐
• Manufacturers themselves	☐
• Other namely	☐
• Other namely	☐
• Nobody	☐
• Don't know	☐

135. And in the EU, who do you think should be responsible for ensuring the safety of the chemicals contained in products such as paints, detergents, household products, clothes, furniture, electronics and cosmetics? (Multiple answers possible)

• Authorities of the European Union	☐
• National authorities	☐
• Manufacturers themselves	☐
• Other namely……	☐
• Other namely……	☐
• Nobody	☐
• Don't know	☐

136. In order to protect human health and the environment from hazardous chemicals, do you think that the current level of regulation and standards in the EU is… Please tick one

• Sufficiently high and could even be lower Improved	☐
• At the right level and should not be lowered or increased	☐
• Not high enough and should be increased	☐
• Don't know	☐

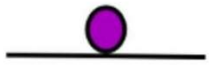
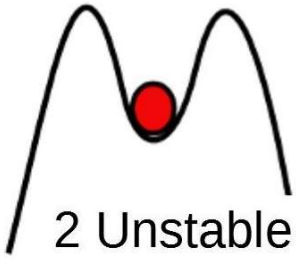
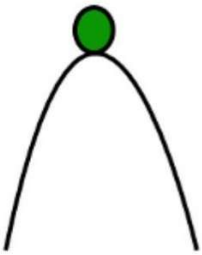
C5 Chemical substances *in your body*; beliefs, knowledge and feelings

Please indicate to what degree you agree or disagree with each of the following statements by ticking the box

		Strongly agree	Agree	Agree nor disagree	Disagree	Strongly disagree
137.	I am aware that a lot of different chemicals are in the tissues of my body	☐	☐	☐	☐	☐
138.	Given our modern lifestyle it is unavoidable that we are exposed to different chemicals that enter our body	☐	☐	☐	☐	☐
139.	I think that we should avoid any chemicals from entering our body	☐	☐	☐	☐	☐
140.	I think most chemicals in my body come from the environment	☐	☐	☐	☐	☐
141.	I think most chemicals in my body come from my food	☐	☐	☐	☐	☐
142.	I think most chemicals in my body come from my work environment	☐	☐	☐	☐	☐
143.	I think most chemicals in my body come from my lifestyle	☐	☐	☐	☐	☐
144.	Given my lifestyle, occupation and living environment, the amount of chemicals in my body is well below average	☐	☐	☐	☐	☐
145.	I sometimes think about the presence of chemical substances in my body, but overall it does not worry me	☐	☐	☐	☐	☐
146.	I can limit my exposure to these chemicals by personal lifestyle choices (diet, use of consumer products, cosmetics);	☐	☐	☐	☐	☐

Response of the human body to exposure to man-made chemical substances

The response of the human body to exposure of man-made chemical substances can be symbolized by a ball in a landscape (see figures below). The landscape symbolizes the vulnerability of the body; the ball symbolizes response to exposure. Within each landscape, the ball starts in equilibrium. ***Which single picture best describes how you think the human body will respond to man-made chemicals? Please tick the appropriate box (only one box)***

147.	The response of the body to chemicals is unpredictable	 1 Unpredictable	☐
148.	The body can tolerate chemicals, but only within limits	 2 Unstable equilibrium	☐
149.	The body is robust and maintains a stable equilibrium when exposed to chemicals	 Stable equilibrium 3	☐
150.	The body maintains a precarious delicate balance; the least exposure to chemicals may lead to disastrous consequences	 Precarious balance 4	☐

C6 Environmental Sensitivity

The following statements are about the way you experience your environment, using the experiences during the previous week as point of reference.

Please indicate to what degree each of the following statements applies to you

		Not at all	Not really	Undecided	Somewhat	Very much
151.	I am sensitive to chemical substances	☐	☐	☐	☐	☐
152.	I am sensitive to noise	☐	☐	☐	☐	☐
153.	I am sensitive to smells	☐	☐	☐	☐	☐
154.	I am sensitive to colours	☐	☐	☐	☐	☐
155.	I am sensitive to what I eat and drink	☐	☐	☐	☐	☐
156.	I have a low pain threshold	☐	☐	☐	☐	☐
157.	I am sensitive for temperature changes	☐	☐	☐	☐	☐
158.	I do not like it when I feel too hot or too cold	☐	☐	☐	☐	☐

C7 Health literacy

Chemical substances *in your body* may sometimes cause health complaints or diseases.

Please indicate to what degree you agree with each of the following statements.

Whether a chemical substance can cause disease depends on…….		Fully agree	Agree	Agree nor Disagree	Dis agree	Fully disagree
159.	The characteristics of the substance such as structure or composition	☐	☐	☐	☐	☐
160.	The features of the substance such as colour or smell	☐	☐	☐	☐	☐
161.	The amount of the substance in the immediate environment	☐	☐	☐	☐	☐
162.	How often the substance enters your body	☐	☐	☐	☐	☐
163.	How much of the substance enters your body each time you are exposed	☐	☐	☐	☐	☐
164.	The duration of exposure	☐	☐	☐	☐	☐
165.	Your weight	☐	☐	☐	☐	☐
166.	How healthy you are	☐	☐	☐	☐	☐
167.	How sensitive you are	☐	☐	☐	☐	☐
168.	Your genetic make up	☐	☐	☐	☐	☐
169.	Your gender (male/female)	☐	☐	☐	☐	☐
170.	Your ethnicity	☐	☐	☐	☐	☐

C8 Perceived control

With the following questions we would like to ask how much control you think you have over exposure to chemicals and how you experience your environment and how you deal with it

Please indicate to what degree you agree or disagree with each of the following statements

		Strongly agree	Agree	Agree nor disagree	Disagree	Strongly disagree
171.	I am always optimistic about my future	☐	☐	☐	☐	☐
172.	I do never expect things to happen as I want them	☐	☐	☐	☐	☐
173.	I have control over the health risks from my living environment	☐	☐	☐	☐	☐
174.	If I make an effort I can influence the quality of my living environment	☐	☐	☐	☐	☐
175.	I can protect myself well against chemicals	☐	☐	☐	☐	☐
176.	Sometimes I feel I am at the mercy of the chemicals around me	☐	☐	☐	☐	☐
177.	If I make an effort I can reduce the health risks from my environment	☐	☐	☐	☐	☐
178.	I know how to reduce the health risks from my living environment	☐	☐	☐	☐	☐

D1 Use of Information

Now we would like to ask you from which source do you obtain or seek information about environmental issues in your immediate environment or life (left column), the degree in which you trust this source of information (2-4th column) and what source would you prefer to obtain information from (5th column)

1. **Please tick yes if you use this source of information (no = no tick)**
2. **Please indicate to what degree you trust this source**
3. **Which source would you prefer to obtain information from (no information wanted=no tick)**

		I use this source	I trust this source			Would like to get information from
	Do you use this source of information?	Yes	A little	Moderate	Very much so	Yes
179.	Municipality	☐	☐	☐	☐	☐
180.	Regional Government	☐	☐	☐	☐	☐
181.	National Government	☐	☐	☐	☐	☐
182.	Local press(paper, TV, radio)	☐	☐	☐	☐	☐
183.	National Press(paper, TV Radio)	☐	☐	☐	☐	☐
184.	Internet	☐	☐	☐	☐	☐
185.	Scientific literature	☐	☐	☐	☐	☐
186.	A company	☐	☐	☐	☐	☐
187.	My General Physician (GP)	☐	☐	☐	☐	☐
188.	Political Party	☐	☐	☐	☐	☐
189.	My Employer/School	☐	☐	☐	☐	☐
190.	Family, Friends	☐	☐	☐	☐	☐
191.	Environmental Organisation	☐	☐	☐	☐	☐
192.	Action-stakeholder Group	☐	☐	☐	☐	☐
193.	Other, namely……	☐	☐	☐	☐	☐

D2 Need for cognition

Please indicate to what degree you disagree or agree with each statement below

		Strongly disagree	Disagree	Agree nor disagree	Agree	Strongly agree
194.	I am likely to seek information about the health effects of chemicals and biomonitoring	☐	☐	☐	☐	☐
195.	I am capable to understand scientific information very well	☐	☐	☐	☐	☐
196.	I trust my first impression	☐	☐	☐	☐	☐
197.	If I have to choose I prefer complex above simple	☐	☐	☐	☐	☐
198.	I trust my intuition	☐	☐	☐	☐	☐
199.	Thinking is not my idea of having a good time	☐	☐	☐	☐	☐
200.	My first impression often proofs to be right	☐	☐	☐	☐	☐
201.	Prefer doing things that challenge my thinking skills than activities which require no thinking	☐	☐	☐	☐	☐
202.	I only trust my gut feelings	☐	☐	☐	☐	☐
203.	I do not like situations which require thinking	☐	☐	☐	☐	☐
204.	I can usually sense whether someone is right or wrong	☐	☐	☐	☐	☐
205.	I do not like to weigh my decisions thoroughly	☐	☐	☐	☐	☐

D3 Example text

Please insert a text here for the respondent to evaluate. Select from https://www.hbm4eu.eu/result/factsheets/ were translated versions are available for HBM4EU countries, or insert text from principal investigator.

What do you think about the information you just read on Human Biomarker Monitoring
Please select the answer that best fits your opinion.

		I find the information…					
206.	1 = Difficult to understand	☐	☐	☐	☐	☐	5 =Easy to understand
207.	1 = Incomplete	☐	☐	☐	☐	☐	5 = Complete
208.	1 = Untrustworthy	☐	☐	☐	☐	☐	5 = Trustworthy
209.	1 = Common knowledge	☐	☐	☐	☐	☐	5 = Informative and new
210.	1 = Unsurprising	☐	☐	☐	☐	☐	5 = Surprising
211.	1 = Disturbing	☐	☐	☐	☐	☐	5 = Reassuring
212.	1 = Complex	☐	☐	☐	☐	☐	5 = Simple
213.	1 = Vague	☐	☐	☐	☐	☐	5 = Clear
214.	1 = Too alarmist	☐	☐	☐	☐	☐	5 = Too positive
215.	1 = Politically coloured	☐	☐	☐	☐	☐	5 = Scientific/Objective

If you want to add any comments about this questionnaire, please use space below:

Space for comments:

Thank you for participating!