ISES-Europe 2019 (http://ises-europe.org/events/ises-europe-2019)
Instructions for Session Chairs, Co-Chairs, and Rapporteurs

Contents

1. ISES-Europe 2019 workshop objectives and expected outcome

Workshop aim and objectives: ISES Europe 2019 aims at finalizing all steps and key actions for creating a European Exposure Science Strategy by 2020 with an implementation roadmap and goals for 2020-2030.The ISES-Europe 2019 workshop aims at progressing toward a European Exposure Science Strategy by defining a roadmap 2020-2030. ISES Europe 2019 has 3 goals:

1. Finalise the thematic action plans as input to complete the European Exposure Science Strategy.
2. Define ISES Europe working group actions plans and roadmaps for several exposure sub-themes.
3. Discuss strategy implementation and way forward for ISES Europe to support European policy & research agendas.

The outcomes of this workshop will be published in an ISES Europe report. In addition, it is expected that each theme and working group specific theme will provide a contribution for the special issue that will be dedicated to the European Exposure Science Strategy to be planned for publishing in 2020-2021.

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4-5 July 2019 | RIVM, Bilthoven (Netherlands)

2nd European Exposure Science Strategy Workshop
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Bilthoven, The Netherlands

Workshop themes and sessions:

On **Day 1**, Science-to-Strategy sessions are organized discussing global and European trends and needs and translating them into Thematic Actions Plan (TAP) and a Roadmap for Exposure Science in Europe. Related thematic breakout sessions with moderators are:

  (1) **Exposure Data Generation & Storage** (moderator: Natalie von Goetz, FOPH, Switzerland)
  (2) **Exposure Assessment Methods & Tools** (moderator: Peter Fantke, DTU, USEtox, Denmark)
  (3) **Regulatory Exposure Assessment Science** (moderator: Yuri Bruinen de Bruin, EC JRC, Italy)

On **Day 2**, Action Plan Working Group sessions are organized to develop Working group-Specific Actions Plan (SAP) that will be part of the Roadmap for Exposure Science in Europe. Related working group breakout sessions with moderators are:

  (1) Working group **Exposure Data Production: Human Data** (Working Group chair and moderator: Maryam Zare Jeddi, University of Padova, Italy)
  (2) Working group **Exposure Models** (Temporarily Working Group chair and moderator: Urs Schlüter, BAuA, Germany)
  (3) Working group **Data Repositories and Analytics** (Working Group chair: Stylianos Kephalopoulos, DG JRC, Italy; moderator: Jos Bessems, VITO, Belgium)
  (4) Working group **Integrated Frameworks and Efficiency Enhancement Across Policies** (moderator: Peter Fantke, DTU, Denmark)

  In additional, two sessions are organized to discuss two aspects related to the sustainability of this strategy. Related breakout sessions with moderators are:

  (5) **Strategy Implementation and Institutionalization** (moderator: Celia T. Gonzalo, ECHA, Finland)
  (6) **European Policy and Research Priorities** (moderator: Manolis Kogevinas, ISGlobal, Spain)

Expected workshop outcome: The identification of specific aligned activities for each thematic and working group area in support of a successful completion and implementation of the European Exposure Science Strategy with roadmap 2020-2030. The workshop outcome should be structured along the roadmap templates presented as '**Error! Reference source not found.**' at the end of the present document.

2. Breakout sessions – organization and preparation

Session organization: Each of the breakout sessions listed above has an organization committee consisting of a chair, co-chair, rapporteur, and moderator. The roles of the organization committee are as follows:

Chair: Coordinates and prepares together with the co-chair and moderator the session contributions and discussions; leads and moderates the discussions in the session, ensures that the discussion is targeted to support the development of the exposure science strategy, reports back the session findings to the workshop wrap-ups and also supports the writing of the special issue.

Co-chair: Supports the coordination activities of the chair on the session contributions and discussion; reports back or supports the reporting back of the session findings to the plenary, supports writing of special issue.

Rapporteur: Takes notes and coordinates with chair, co-chair and moderator the session output to be presented at the end of each day; provides special issue input prepared together with the moderator.

Moderator: Instructs the chair/co-chair/rapporteur about the expected contribution of the session to the strategy and the roadmap template in which the outcome should be presented to be useful for further development of the exposure science strategy; ensures overall alignment between session and workshop focus; moderators are the main contact for session-related questions. The moderator also supports the contribution for the special issue prepared in collaboration with the rapporteur.

Session preparation: For each session, the ISES Europe board has formulated a set of initial questions based on results from the stakeholder priorities consultation held prior and during the need assessment workshop of 2018. The initial questions for each session are presented as 'Appendix I – initial session questions' at the end of the present document. These initial questions form the starting point for a discussion of priorities and possible ways to move toward a European Exposure Science Strategy during the workshop. However more important is to use the roadmap template in which needs and actions were identified during last the workshop of 2018 and which can be amended and completed with specific tasks, suggested (lead) stakeholders and timelines (see Appendix II).

3. Breakout sessions – structure and implementation during the workshop

Session structure: Each breakout session is organized as follows:

Day 1 – **Science to Strategy** sessions (11:15 – 12:55):
Invited speakers:
Abstract 1: 20 min
Abstract 2: 20 min
Abstract 3: 20 min
Abstract 4: 20 min
Wrap up of the section: 20 min on refinements of currently defined needs as part of the strategic cycle

Day 1 – **Action Plan** sessions (13:55 – 15:55):
Outcomes Need Assessment workshop 2018: 10 min
Translation of 2018 and morning sessions needs/trends into actions and projects/tasks: 40 min
Prioritization of actions (e.g. working group formation) and projects/tasks & timelines): 30 min
Assessing timelines until 2030 for actions and projects/tasks: 20 min
Wrap up presenting draft action plan and roadmap: 20 min

Day 2 – **Working Groups Action Plan** sessions (10:30 – 12:00):
Invited speakers:
Abstract 1: 15 min
Abstract 2: 15 min
Translation needs/trends of working group topic into Action Plan/Roadmap 2020-2030 (prioritization actions and projects/tasks - and timelines): 50 min
Wrap up presenting draft action plan and roadmap: 10 min

Day 2 – Session on **Strategy Implementation and Institutionalization** (12:00 – 13:00):

What makes this strategy successful? Discussion and provision of guidance on criteria and key recommendations on how stakeholders can best implement and institutionalize the strategy

Day 2 – Session on **European Policy and Research Priorities and the role of ISES Europe** (12:00 – 13:00):
Platform presentation: 15 min
Discussion on
1. DG JRC research priorities for the next Commission
2. Foresight and trend assessment
3. Exposure Platform as a tool to set the European policy and research agenda
4. Assessment of the role of ISES Europe within the policy and research context

Session implementation: The moderators will introduce each session; then the chair and co-chair guide the process of framing of discussions and formulation of actions and tasks with suggested stakeholders and timelines. The chair and co-chair will provide input to the rapporteur for the preparation of the summary presentations, which will be presented by the chair/co-chair, at the end of each day.

4. Breakout sessions – follow-up after the workshop

The workshop output will be used to compile a European Exposure Science Strategy dedicated special issue that will be used as basis for a communication paper/editorial to set the stage for a European exposure science roadmap 2020-2030. Each Working Groups will deal with the respective implementation activities of the key goals, needs and building blocks. Related to the workshop outcomes, future agendas will need to be assessed specifically for each working group. It is expected that the Working Groups will deliver their own strategic paper comprising the state of the art, needs, building blocks, guidance/recommendations and roadmap. All papers will be part of the special issue foreseen to be published in a special issue of the Journal of Exposure Science and Environmental Epidemiology.

Appendix I – initial session questions need assessment workshop 2018

Based on the stakeholder consultation priorities, a set of initial session questions was built. The initial questions for each session are presented in the following table.

Data Repositories & Analytics
1. How could a good designed data repository best feed the policy-making process and facilitate selection and prioritization of upcoming exposure fields/questions related to science and policy?
2. What would be the basic requirements to store and connect different exposure data in order to best analyse the impact on human and environmental wellbeing and to best inform stakeholders involved being decision-makers, practitioners, researchers and citizens?
3. What is the current and future role of data storage and analytics in improving wellbeing at population, individual and ecosystem level?
4. What is the role of text mining, artificial intelligence and deep learning within the development of future-proof data repositories?
5. How can exposure data repositories and analytics best facilitate the completion of the exposure spectrum?
6. What information is needed to have a complete understanding of exposure (exposure spectrum)?
7. What are the threats/risks of data repositories and analytics and which safety/security measures should be respected?
8. How can efforts on data repositories and analytics be funded?

Regulatory Exposure Assessment Science
1. What is the current status of the EU regulation and what does it address in terms of exposure information?
2. How can we integrate a holistic view of exposure into regulation and who are the main actors and responsibilities?
3. What can be done to reach an efficiency enhancement across different policies?
4. Can the current European regulation contribute to the completion of the exposure spectrum?
5. How can European regulation address data ownership/protection?
6. How can efforts on regulatory exposure science be funded?

Exposure Data Production & Monitoring
1. Which exposure data are needed to cover the exposure spectrum and connect it to human and ecological improvement of wellbeing, costs and what are the key indicators when it is successful?
2. What is the role of ISES-Europe in the completion of the exposure spectrum for exposure data production and monitoring?
3. How can we make best-use of existing and novel monitoring technologies/networks?
4. How can efforts on exposure data production and monitoring be funded?

Exposure Assessment Methods & Tools
1. What are the requirements in terms of methods and tools to facilitate the completion of the exposure spectrum in Europe?
2. What can upcoming tools such as text mining, artificial intelligence and deep learning mean for the future of exposure science? What are the challenges?
3. What are the requirements for exposure assessment methods and tool in order to be implemented by actors working in decision-making and health care?
4. How can existing and new exposure assessment methods and tools best be linked to existing and emerging data generation efforts?

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5. What exposure science methods and tools are needed in Europe to work toward related targets of the UN Sustainable Development Goals?
6. What methods/tools focus on or can be linked to biodiversity?
7. How can efforts on exposure assessment methods and tools be funded?

Exposure Science Education, Training & Communication
1. How can we define/understand exposure science in European education?
2. What are the skills needed to strengthen exposure science education and training in Europe?
3. How can we develop a European exposure science curriculum?
4. What is the role of ISES-Europe as exposure science education/training facilitator?
5. How can exposure science education help to build relationships/acceptance with academia/authorities/other societies/industry?
6. How can exposure communication facilitate the use of exposure information/spectrum in improved and cost saving health care?
7. How can efforts on exposure science education, training and communication be funded?

Appendix II. Roadmap template containing Actions, specific tasks, suggested lead and supporting stakeholders and priorities for Thematic and Working Group sessions

The tables hereafter describes the actions identified using the NAQ, the specific tasks to be performed in order to achieve objectives. They list the lead and supporting agencies involved in their implementation, as well the implementation timeframe.

1. Regulatory Exposure Assessment Science

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Organisation of common framework focusing on efficiency enhancement across policies using exposure sciences	1. Harmonisation of terms and vocabulary throughout EU-legislation (ISES to provide starting point for implementation in existing legislation) 2. Harmonised template for model documentation and reporting; Common framework for model acceptance 3. Characterisation of differences in exposure science needs across regulations 4. Harmonisation of models across and within regulations 5. Development of a more common understanding how safety assessment under REACH and work place risk assessment/management under OSH could work together	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Setting up Working Groups on "transparency/ reliability/ uncertainty"	1. Rules and guidance for uncertainty analysis and examples how to address uncertainties in decision making 2. Criteria or scoring system for reliability of measured and modelled data 3. Transparency in assessments to better share knowledge and methods 4. Read-across of available data 5. Guidance to identify and describe contextual information for exposure information and data (e.g. measurement method, use information, duration …)	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Setting up Working Group on "Model development"*	1. Further develop models/methods for mixtures, release from articles and aggregate exposure 2. Ensure development of tools until their regulatory readiness, including validation, user-interface and transparent documentation 3. Develop guidance on what tool/model to use in different situations ensuring the complexity for being used in regulatory context is at acceptable level 4. Setting up a business model ensuring long-term maintenance of models	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Setting up Working Group on "Communication"	1. Acceptance of risk levels based on quantitative exposure data 2. Improvements in supply chain communication on uses, use-conditions and related exposure 3. Improving exposure scenarios beyond use descriptors resulting in higher usefulness for practical risk management 4. Influence the EU-framework project agenda 5. Regulatory harmonisation and acceptance 6. Success stories and 30 seconds messages 7. Establish communication channels between different stakeholders (industry, decision-makers, grant holders, academic, risk assessors and disseminators)	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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2. Exposure Data Generation & Storage

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Establishment of a roadmap 2020-2030 on data repositories (and analytics) *Natalie: This sounds like it should be treated in the WG on data repositories*	1. Setup an inventory of existing data sources, models and already undertaken case studies which have been used in EU and beyond linking environmental exposure and health data with specific health outcomes. 2. Identify critical gaps in terms of data, methods, models and barriers in their use (e.g. constraints relating to geographical level of coverage and detail, time window, interoperability among distributed data and information platforms). 3. Prioritise actions to fill in the identified critical gaps within respective timelines (short, medium, long-term) for defining and undertaking new case studies of high relevance for EU and MS policies and for advancing science. 4. Map the state of the art exploitation of technologies related to text mining and analysis, machine learning, artificial intelligence, interconnection of big data domains, visualisation tools with the aim of bridging the gap from data to knowledge. 5. Promote harmonisation of terms, controlled vocabularies, templates for data and metadata documentation and reporting, standardisation of data collection methods and development of indicators for data quality and comparability across exposure relevant policy domains and regulations. 6. Establish common principles and framework for data sharing and use/re-use among stakeholders while respecting protection of intellectual property rights and personal (sensitive) data. 7. Pooling together and sharing best practices for data integration and interpretation, standardised and harmonised datasets, tools, models and performance indicators that are used in policy making, exposure and health risk assessments, surveillance and monitoring activities, evaluation of intervention measures and health information systems. 8. Setup a stakeholders community for data repositories and analytics	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Handbook of best practice covering all aspects of exposure science including data production and monitoring.	1. Start with mapping what is there 2. Separate by exposure science related fields, collect standards/harmonisation efforts in these fields 3. Define which contextual information should be 4. available in connection with samples Develop quality rating scheme (Q-factors like in ConsExpo fact sheets?)	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Working Group on "Common standards in safety and security-driven exposure data production and monitoring" may be established *Natalie: WG data repositories?*	tbd	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
A working group or a project on "A data base for exposure factors in Europe" (building on national handbooks, JRC ExpoFacts or ConsExpo Fact sheets) *Natalie: WG data repositories?*	1. Revitalisation of European exposure factor collection including: ➢ Definition of needs, hosting and quality requirements ➢ Use of existing formats, like ConsExpo fact sheets or OECD harmonised template OHT301 ➢ Setting up a Committee that derives standard default values in specific areas Preparation of and requesting funding for a COST action project	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Establishment of Working Group on Exposure Data Production – Human Data *Natalie: done*	tbd	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Establishment of a Platform/portal	1. Standardised model for data collection 2. Data quality assurance 3. Meta templates documentation 4. Controlled vocabularies	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Setting up Working Group on Data Repositories (and analytics) *Natalie: already done*	Mapping relevant models, data sources, exposure relevant determinants prioritising on harmonised/standardised/ widely used SOPs/templates in EU and beyond	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Setting up Working Group on Extending data use *Natalie: not clear for me what that would be*	1. Enable structured communication for each WG (Yammer, wiki, SharePoint, etc.) 2. Memorandum of understanding between involved stakeholders; transparency; scope, recognition of ownership, rights and responsibilities	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Setting up Working Group on "Harmonisation" *Natalie: Too general, needs to be more specific*	1. Harmonisation (interoperability; control vocabularies, nomenclatures, data model and metadata templates	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Setting up Working Group on "Interoperability"	1. Data sharing principles/data provision incentives 2. IT technologies, distributed systems, platforms	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Setting up Working Group on "Quality Assurance"	1. Setting up QC/QA procedures	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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3. Exposure Assessment Methods & Tools

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Develop integrated frameworks for exposure assessment	1. Map multiple different stressors (chemical mixtures) and over the different regulatory domains (aggregate exposure) 2. Evaluate REFIT effort results 3. Creating consistent integrated multi-tier tools 4. Identify main contributors (e.g. associations) 5. Define common exposure aspects across regulations 6. *Develop/align methods with emerging toxicity data and models (e.g. in-vitro testing)* 7. Establish linkages with common framework of regulatory exposure assessment science and the development of the IT platform/portal	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Setting up Working Group on "User information" *Peter: This topic is really about user requirements incl. harmonization and standardisation of terms → not sure if this should be a separate working group though*	1. Inventory existing information tools/templates 2. Identify user needs across domains 3. Harmonisation of vocabulary/results reports 4. Define limits, scope, applicability domain, etc. across available methods and tools 5. Build common, consistent structures to inform users about exposure methods and tools	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Setting up Working Group on "Model evaluation" *Peter: different tiers/levels/aspects of model evaluation are needed, incl. for example comparison of different (types of) models, comparison of models against measurements, evaluation of applicability (domain) for certain questions/purposes/contexts, …*	1. Identification of (applicability) gaps and inform on needs for new data generation 2. Develop methods for evaluation of models 3. Define uncertainty factors for default values	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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4. Building partnerships and collaboration

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Building Partnerships to promote the creation and development of European networks and related activities in Exposure science	1. Networking among key stakeholders and key groups/projects, like HEAdhoc, REEG groups, and HBM4EU 2. Development, identification, promotion and exchange of best practices 3. Provide technical and capacity development support to each other 4. Preparation, development and implementation of education and training modules and tools aiming to increase multidisciplinary collaboration 5. Raising awareness of the added value of exposure science 6. Promoting synergies between science, health, regulator, consumers	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Setting up Working Group on "Partnerships"	1. Making inventory of stakeholders from the Workshop's participants 2. Making inventory of individuals who can provide links to stakeholders (e.g., people with current memberships of other societies) 3. Creation of success stories representing who we are and what we can offer (guidelines, best practices, movies), featuring different success stories for different stakeholders	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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5. Exposure Science Education, Training & Communication

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Develop a certified tiered ISES Europe approach to ES education with ECTS (European Credit Transfer System) equivalent points/credits	1. Description of type of course (Short term – online course, Intermediate term – specialised workshops, Long term goal – postgraduate course) 2. Identify possible cost actions to fund course/programme development and delivery 3. Identify potential sources of funding from industry	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Setting up Working Group on Working Group/Advisory panel on "Exposure Science Education, Training and Communication"	1. Propose short courses during conferences (e.g. SETAC pre-conference 1-day short courses) 2. Seek participation from all relevant stakeholders including representatives of ISES Europe, Industry, Policy-makers, Academia, Insurers, and other Professional Societies 3. Provide a list of the identified academic programmes on the ISES Europe website (informative – not accredited). 4. Explore potential role of ISES as a training course approver or accrediting body 5. Define EES career paths that reflect career options within each stakeholder group, publish on the ISES website 6. Creation of a Syllabus on Exposure Science 7. understand stakeholder needs and requirements for education/training 8. Identify academic programmes with ES components and check the guidelines (ECTS) for credit requirements 9. Liaise/collaborate with professional/scientific societies representing related professions (e.g. BOHS, SETAC, EUROTOX)	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

6. Working Group on Frameworks for Integrated Exposure Sciences and Policy Efficiency

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
The setting up of a platform/network for exchanging about principles, methods and models used under different chemical regulations to better understand the: *a. common ground communalities, overlaps and differences in terms of type of use and exposure information required under the different regulatory contexts of safety, security and sustainability assessments,* *b. consistency of use- and exposure assessment principles across regulatory frameworks* *c. approaches for avoiding duplication of assessment efforts* *d. enhance knowledge on the application of models, tools, and successful approaches across regulatory frameworks aiming to bridge gaps in exposure information and methods*	1. Creation of a platform/network in which principles, methods and models can be stored used under different regulatory frameworks on chemicals. This platform should store and accommodate the following: a) Mapping of the different chemical regulatory frameworks and their scope (e.g. safety, security, sustainability) that make use of exposure information b) Creation of a template in which the different regulatory exposure requirements comprising the use of the chemicals, models, and methods c) Analysis of the templates to assess the consistency and successful approaches of the use - and exposure assessment principles required by the different regulatory frameworks	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Provision of key recommendations on harmonisation of exposure information, methods and knowledge exchange available for different chemical actors and sectors comprising policy-makers, practitioners, scientists and citizens.	tbd	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Translation of key recommendations comprising those from other exposure thematic areas and working groups into needs and opportunities for new research programmes/projects available for research developers and implementers active in European Commission and Authorities, National Authorities, Industry and Academia	tbd	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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7. Working Group on Exposure data production – Human data

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Fit-to purpose and efficient activities with strategic partnership bridging science and policy making	1. Creation of a platform accessible by regulatory agencies, industry and academia for exchanging information, latest developments, key recommendations, research needs, etc. in different domains of exposure science	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Continuation of exposure science-human biomonitoring initiative in compliance with the UN Sustainable Development Goals (SDGs) that is proactive, vigilant, anticipatory, adaptive, and resilient	1. Creating a multifaceted infrastructure that facilitates anticipation, interaction, engagement, sharing of knowledge, creation of incentives, and implementation (**lessons learned and best practice**) 2. The role of a use-case on how HBM can accelerate the implementation of the UN SDG's in relation to human health	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Promote uptake of HBM data into regulatory processes	1. Developing an EU level guidance on the use of HBM in regulatory risk assessment a) Criteria for consideration in the application of HBM data in human health risk assessment b) Approach for interpreting the HBM data for policy implementation c) Potential uncertainties in the use of HBM data in regulatory decision making	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Application of HBM as an exposure assessment tool in Occupational Safety and Health (OSH)-related regulations for single and priority mixtures of chemicals	1. Developing of guidance for using the HBM in risk assessment in OSH-related Regulation as an exposure assessment tool for risk assessment and risk management.	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Explore biomarkers of effect, biomarkers of susceptibility, cancer-related biomarkers for single and priority mixtures of chemicals		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Suspect Screening and Non-Target Analysis for Human Biomonitoring for single and priority mixtures of chemicals	1. Developing a EU level guidance on the application of Non-target screening (pros and cons)	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Improve and optimise shared sustainable primary database for human data for single and priority mixtures of chemicals	1. Mapping of the different databases and frameworks and their scope (IPCHEM etc)	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Advancing integration of human biomonitoring data from epidemiological studies for risk assessment	1. Developing an EU level guidance document for the best use of epidemiological data and on interpretation of epidemiological studies in risk assessment	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Focusing on toxicokinetic in humans to better use and interpret HBM data for single and priority mixtures of chemicals		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Develop effect and exposure biomarkers for nanomaterials	1. Drafting a review on how advance we are in this topic	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Creating an online library to optimise human biomonitoring study designs and standardisation of research protocols		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
The convergence of human health and artificial intelligence	1. Mapping the advantages and risks of the use of AI within human health care (it is already done by Google!). Think of power of insurance companies, think of misuse in terms of deliberate provision of wrong medicines. But also think of really gain situations. 2. Developing text mining tools for exposure information	☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Application of Exposome data for long-term exposure assessment		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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8. Working Group on Data repositories and Analytics

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Setup an inventory of existing data sources, models and already undertaken case studies which have been used in EU and beyond linking environmental exposure and health data with specific health outcomes		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Identify critical gaps in terms of data, methods, models and barriers in their use (e.g. constraints relating to geographical level of coverage and detail, time window, semantic and technical interoperability among distributed data and information platforms)		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Prioritise actions to fill in the identified critical gaps within respective timelines (short, medium, long-term) for defining and undertaking new case studies of high relevance for EU and MS policies and for advancing science		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Map the state of the art exploitation of technologies related to text mining and analysis, machine learning, artificial intelligence, interconnection of big data domains, visualisation tools with the aim of bridging the gap from data to knowledge		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Promote harmonisation of terms, controlled vocabularies, templates for data and metadata documentation and reporting, standardisation of data collection methods and development of indicators for data quality and comparability across exposure relevant policy domains and regulations		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Establish common principles and framework for data sharing and use/re-use among stakeholders while respecting protection of intellectual property rights and personal (sensitive) data		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Pooling together and sharing best practices for data integration and interpretation, standardised and harmonised datasets, tools, models and performance indicators that are used in policy making, exposure and health risk assessments, surveillance and monitoring activities, evaluation of intervention measures and health information systems		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

9. Working Group on Exposure Models

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Develop guidance on what tool/model to use in different situations ensuring the complexity for being used in regulatory context is not too high a. mapping of relevant models, b. define applicability domains, c. identify/develop good modelling practice		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Identification of (applicability) gaps and inform on needs for new data generation / model developments. Further develop models/methods for a. mixtures, b. release from articles, c. aggregate exposure d. nanomaterials e. oral or dermal exposure		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Develop criteria for reliability of modelled data a. Scoring system for reliability of modelled data b. Develop methods for evaluation of models c. Define uncertainty factors for default values in models		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Development of innovative methods/approaches in exposure modelling (e.g. big data, machine learning, 3D input data, artificial intelligence, neural networks etc.)		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Develop models that link external and internal exposure		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Develop methods to address the inter-user variability in exposure modelling		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Detailed look on model parameters (e.g. activity, vapour pressure) and how they are coded for exposure modelling purposes. Further analysis on parameters that may have to be included in models but are still missing (e.g. turbulence).		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Harmonized template for model documentation and reporting across and within regulations,		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

Action	Specific Tasks	Suggested Lead Stakeholder (not necessarily workshop participants).	Suggested Specific Supporting Stakeholders(not necessarily workshop participants)	Priority	Timeline
Proposal for a common framework for model acceptance across and within regulations,		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Best practices for modelling (e.g. as a chapter for a handbook covering all aspects of exposure science),		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030

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Contribution to the development of tools until their regulatory readiness, including validation, user-interface, transparent documentation and user-group testing with case studies,		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030
Contribution to a business model ensuring long-term maintenance of models.		☐ European Agency ☐ European Commission ☐ National Authority ☐ Industry (association) ☐ Academia ☐ Scientific Society ☐ Other		☐ H ☐ M ☐ L	☐ 2020-2022 ☐ 2022-2024 ☐ 2024-2026 ☐ 2026-2028 ☐ 2028-2030