D6.1 – HR Development Strategy

WP6 – Development of Human Resources

Horizon Europe

Project: 101079789

Lead Beneficiary:	ORU
Due Date:	March 2024
Type:	Document/report
Dissemination level:	Public

Funded by the European Union

Grant Agreement Number	101079789	**Acronym**	EIRENE PPP
Full title	EIRENE PPP		
Project URL	https://www.eirene-ri.eu/		
Project Officer	Andreas Holtel, Andreas.HOLTEL@ec.europa.eu		

Delivery date	**Contractual**	31/03/2024	**Actual**	31/03/2024
Status		~~Draft/~~Final		
Nature		DEC		
Dissemination level		~~Confidential/~~Public		

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Document History

Institution	Date	Version
ORU	March 2024	v.01

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Introduction

The development of a human resource strategy for EIRENE RI (Research Infrastructure for EnvIRonmental Exposure assessmeNt in Europe) builds on identification of services offered within the infrastructure. Accordingly, methods and technologies must be identified as services within EIRENE and to be complemented by understanding of the present human resources (HR) available for the research infrastructure (RI) and foresight of its development. The HR workforce can be developed by aligning the human capital with the strategic objectives of the RI. This involves ensuring that the right people with the right skills are positioned in the RI to meet the needs but also to foster engagement, sustainability, and scientific progress.

EIRENE RI, prioritized in the 2021 Update of the ESFRI Roadmap, fills the gap in the European infrastructural landscape and pioneers the first EU infrastructure on human exposome (environmental determinants of health). It aims to consolidate European research infrastructures enabling the development of advanced technologies and complementary services on the characterization of complex environmental exposures and their impact on the European population. This will promote European excellence in Environment & Health research by providing European researchers with transnational and/or virtual access to harmonized capacities, unique services, and comprehensive data addressing the current and future needs of public authorities.

The EIRENE RI Vision is to mediate an open access to the infrastructures supporting a world-class research expanding the scientific knowledge in the area of human exposome, supporting the development of new technologies and translation of the research results to the daily lives of citizens via public-private (industry, spin-offs) or public-public (policy-making) partnerships in order to tackle issues of non-genetic factors behind the development of chronic health conditions and to improve population health. The EIRENE RI mission is to establish a sustainable research infrastructure enabling the advancement of exposome research in Europe by bringing together complementary capacities available in the member states, harmonizing them, and upgrading to address current scientific and societal challenges in the areas of exposures and population health.

The contribution of EIRENE RI to the European Research Area (ERA) includes high-quality HR practices built on openness, transparency, respect, equality, and cooperation, and must be maintained at all EIRENE RI levels. This includes ensuring that HR needs at all levels of EIRENE RI (in terms of expertise, skills, type, and number of positions) are fulfilled to cover different phases of the EIRENE RI life cycle including implementation and operation. Information about current and future human resources is needed to estimate the economic impact of setting up and maintaining the RI, especially in the implementational phase. An EIRENE RI strategy plan for developing human resources in relation to methods, technology and services is therefore needed.

HR strategies can differ significantly due to their distinct structures, goals, and dynamics. A network organization, like EIRENE RI, comprises resources across multiple partners and disciplines, that collaborate or complement each other to achieve common goals. It is also clear that each partner within the RI retains autonomy over its HR policies and practices. EIRENE HR strategies therefore need to accommodate diverse cultures and values across different partners and disciplines. The strategy should facilitate synergies among RI partners to ensure that the appropriate technologies and services can be offered. In the network, HR strategies may involve more fluid approaches that focus on identifying and leveraging expertise and resources from diverse partners within the network to support collaborative projects, shared infrastructure, and to progress research development. The HR strategy also needs to include the RI´s vision and recognizing the need of adaptability in a changing research landscape. Several components are therefore important for a RI strategy for human resources including a description of the HR pool capable of driving development and

achieving research objectives effectively, the skills and expertise needed, and an overview of the resource allocations and positions within the RI. The HR strategy can then be used to identify training and development programs, career pathing, synergetic professional development, and be a component for budget planning.

Aim with the report

The aim of the EIRENE HR strategy report is to provide a basis for the roadmap of developing personnel-centric solutions and human resources to achieve the implementation and goals of EIRENE RI. The objectives were to make an inventory of human resources available for the identified exposome services within the EIRENE network today, and to understand the vision and needs for HR development for EIRENE RI and it´s support and contribution to research projects.

Methodology of the HR inventory survey

A survey was devised to assess the existing resources within EIRENE and to outline the envisioned requirements for the implementation phase of the RI. The initial stage of this survey involved identifying the fundamental services essential for the EIRENE RI, as detailed in Table 1. WP2 and WP6 in the EIRENE preparatory phase project agreed on their interdependence to identify and present a coordinated questionnaire on services and human resources. Accordingly, a meeting was held (Stockholm, January 2023) to discuss the content of the questionnaire to be prepared. Eight core services, denoted as (1-8), were formulated to encapsulate the objectives and mission of EIRENE. Additionally, two supplementary services were incorporated: one for relevant training offerings and another for partners to propose additional services. Subsequently, human resources were classified based on expertise (primarily subject knowledge and educational background) and skills (such as function and specialty). These categories encompass the quantity of experts to provide services within EIRENE RI, the expertise and quantity of technical staff, other personnel crucial for executing service requests, and the required skills. Responding partners were expected to provide a vision of the estimated number of experts, technical staff, and support team members needed throughout the EIRENE RI implementation phase spanning five years.

The concept of services and human resources was first tested in a pilot survey by selected partners from Sweden, The Netherlands, and Austria. After further refinement and confirmation by the national node leaders in EIRENE PPP, a final survey was prepared and discussed with the EIRENE PPP Management Board, as well as the annual Consortium meeting in December 2023 before a refined and digital survey was launched for all EIRENE PPP node leaders and national node partners in total 21 countries. A word-file of the web-based survey (using Qualtrics) is shown in Appendix 1. The survey opened December 20, 2023, and closed on January 31, 2024, after an extension of the response period. A digital workshop open for all associated partners was held before the end of the survey period, to allow for clarifications and discussions to avoid misinterpretations and to prevent incorrect data being added.

Subsequently, the national node leaders were provided with summary statistics of their respective country´s result and corrections and additions of missing data was allowed for a short period of time before the results were considered finalized. In total 16 out of the invited 21 countries submitted information. The number of national partner institutions varied among the countries (institutions): Austria (AUT) 3, Belgium (BEL) 5, Cyprus (CYP) 1, Czech Republic (CZE) 1, Denmark (DEN) 1, Finland (FIN) 1, France (FRA) 1, Germany (GER) 1, Greece (GRE) 11, Italy (ITA) 3, Luxembourg (LUX) 4, Norway (NOR) 2, Slovakia (SVK) 2, Slovenia (SVN) 5, Sweden (SWE) 6, The Netherlands (NLD) 10.

Table 1. Identified core services for the mission of EIRENE RI

EIRENE SERVICES
1. Collecting and providing samples (including bio, environmental, and specimen banks) to determine exogenous substances
2. Access to cohort study or survey data on an individual level
3. Measurements of exogenous substances including target and nontargeted measurements of chemical mixtures (or other pollutants) as well as parent and transformation exposure markers in humans and the environment
4. Omics-based analysis of markers of biological response (separate: metabolomics, lipidomics, adductomics, (epi)genomics, metagenomics/microbiomics, transcriptomics, proteomics, phenomics)
5. Quantification/determination of toxicity (human- and ecological), pathways and modes of action (in-vivo, ex-vivo, in-vitro, in-silico)
6. Biostatistical and/or bioinformatics tools and platforms to investigate the exposome and human health interactions
7. Databases and exposure maps on environmental factors (e.g. pollutants, temperature, noise, socio-economic, lifestyle)
8. FAIR cataloging of exposome data (e.g. cohorts, algorithms)
9. Training offerings in the field of exposome research (e.g. academic courses and programs, summer schools, tailored trainings, workshops) and Training needs
10. Additional service(s)*

* Partners could add additional services for evaluation if they fit the EIRENE core mission

Results and reflections of current HR inventory

FTE and expertise

The inventory aimed at assessing the available HR capacity that can be dedicated specifically to EIRENE, by formulating questions like “What personnel do you have currently available for the services with regards to collecting and providing samples?” (see Appendix 1 for the specific questions). The result shows that the responding EIRENE RI partners, spanning 16 countries and 57 institutions, encompasses a total of 910 full-time equivalents (FTE) dedicated specifically to core services 1-8 (Figure 1). Training offerings included 110 FTE and 39 FTE were reported for additional services. A minimum of seven countries are represented in each core service (1-8), indicating a robust number of available facilities in Europe. The largest pool of human resources (HR) is allocated to Service 3: Measurements of exogenous substances (240.5 FTE), while the smallest numerical allocation is for Service 7: Databases and exposure maps (48.4 FTE), and Service 8: FAIR cataloging of exposome data (58.1 FTE).

The expertise level of HR was assessed based on education level, while factors like know-how were evaluated based on HR skills. Participants reported education levels as PhD, MSc, BSc, and "Other," the latter encompassing different roles or functions within an organization, such as administrator or technician. An overall high level of expertise was reported for EIRENE core services, with a significant portion of FTE resources holding a PhD, particularly within Services 4, 5, and 6. Additionally, Services 3 and 1 show a high proportion of FTE with PhD qualifications, although there is also a substantial contribution from MSc expertise, likely due to the laboratory-intensive nature of these services. Training offerings within exposome (Service 9) are projected to be delivered with 110 FTE primarily composed of PhDs.

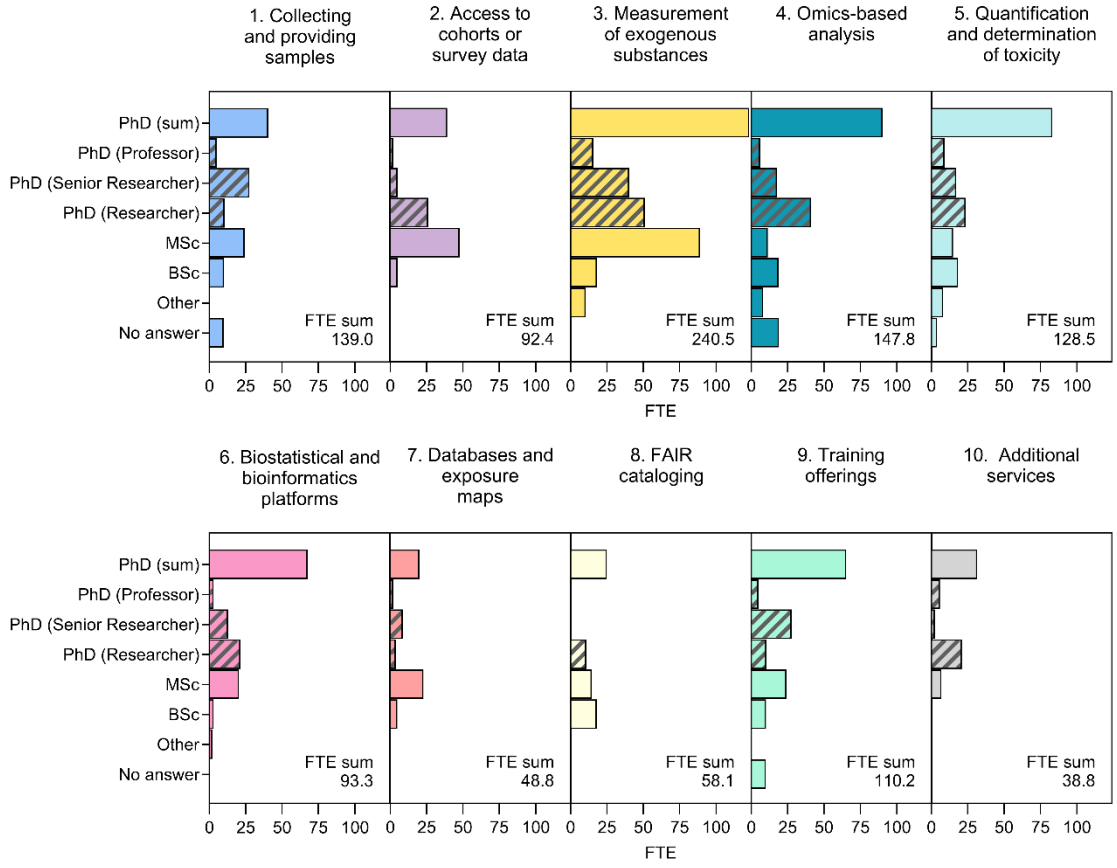

Figure 1. Human resources and number of full-time equivalents (FTE) in EIRENE RI, divided into different services offered and level of education/expertise. Notes: "Other" sums up answers without education, and "No answers" represents missing answers. PhD is shown as both sum and divided in expertise categories (striped bars).

For additional services (Service 10), 39 FTE are reported, covering advanced or customized data analysis, model development and application, and research related to stakeholders or citizens. Some additional services complement the core services 1-8, including advanced data analysis for exposomics, wastewater-based epidemiology, high-throughput Effect-Directed Analysis, electrosensibility tests, and analysis of endogenous substances like mycotoxins.

The FTE inventory provides an understanding of the scale and scope of EIRENE RI, though it is based on partner self-estimations without a requirement for historical performance. Partners were instructed to provide details of capacities currently accessible for the RI, with the possibility that these figures may be overestimated or overly optimistic. Thus, the certainty of the total FTE cannot be assessed, and potential errors in estimation should be considered. Moreover, the availability of FTEs at any given time point cannot be guaranteed. The distribution of human resources across core services highlights resource concentration within EIRENE RI, with laboratory-intensive services naturally requiring more resources compared to those utilizing computational power. A potential overlap of resources between services with similar expertise within the same institution could also introduce errors in the total FTE count.

FTE and skills

Environment and health research require multidisciplinary skills and synergies, and the EIRENE RI contains numerous categories of skills within disciplines such as chemistry, biology, toxicology, medicine, computer science, and statistics. The governance of the RI also requires project management and administration. The top four skills (based on FTE) reported for each service are displayed in Figure 2. A more detailed overview of the inventory of all reported skills and the level of expertise (education) is given in Figure 3a and 3b.

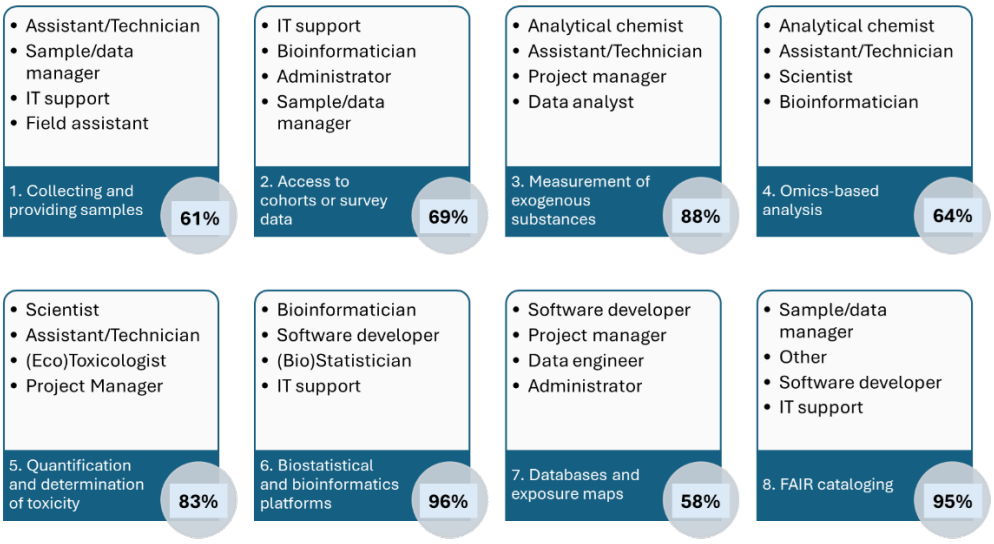

Figure 2. Top four skills based on reported FTE for each EIRENE service (% for the FTE sum of top four skills is given).

The HR inventory shows that EIRENE core services are provided by experts with many different skills. Different services require different combinations and numbers of skills from various disciplines. Some services are dominated by one skill; for example, Measurement of exogenous substances (Service 3) for which 61% of the reported FTE comes from Analytical Chemists, and Biostatistical and Bioinformatics Platforms (Service 6) for which Bioinformaticians contribute 49% of FTE.

Services that are especially multileveled, where the top four skills constitute the least to the total FTE, are Collecting and Providing Samples (Service 1) and Databases and Exposure Maps (Service 7). These services are characterized by using a larger number of different skills. In contrast, FAIR Cataloging (Service 8) and Biostatistical and Bioinformatics Platforms (Service 6) require fewer different skills, and the top four skills constitute ≥ 95% of the FTE.

For Access to Cohorts or Data (Service 2) and Training (Service 9), the category "Others" constitutes 6% of the FTE, which means that the predefined options could not cover all necessary skills. Further, "scientist" is a category that is rather complex to evaluate since it covers a broad set of skill and does not connect to a specific discipline. Scientists were reported to contribute significant FTEs for Service 4 (12.9%), Service 5 (25.3%), and Service 9 (53.7%).

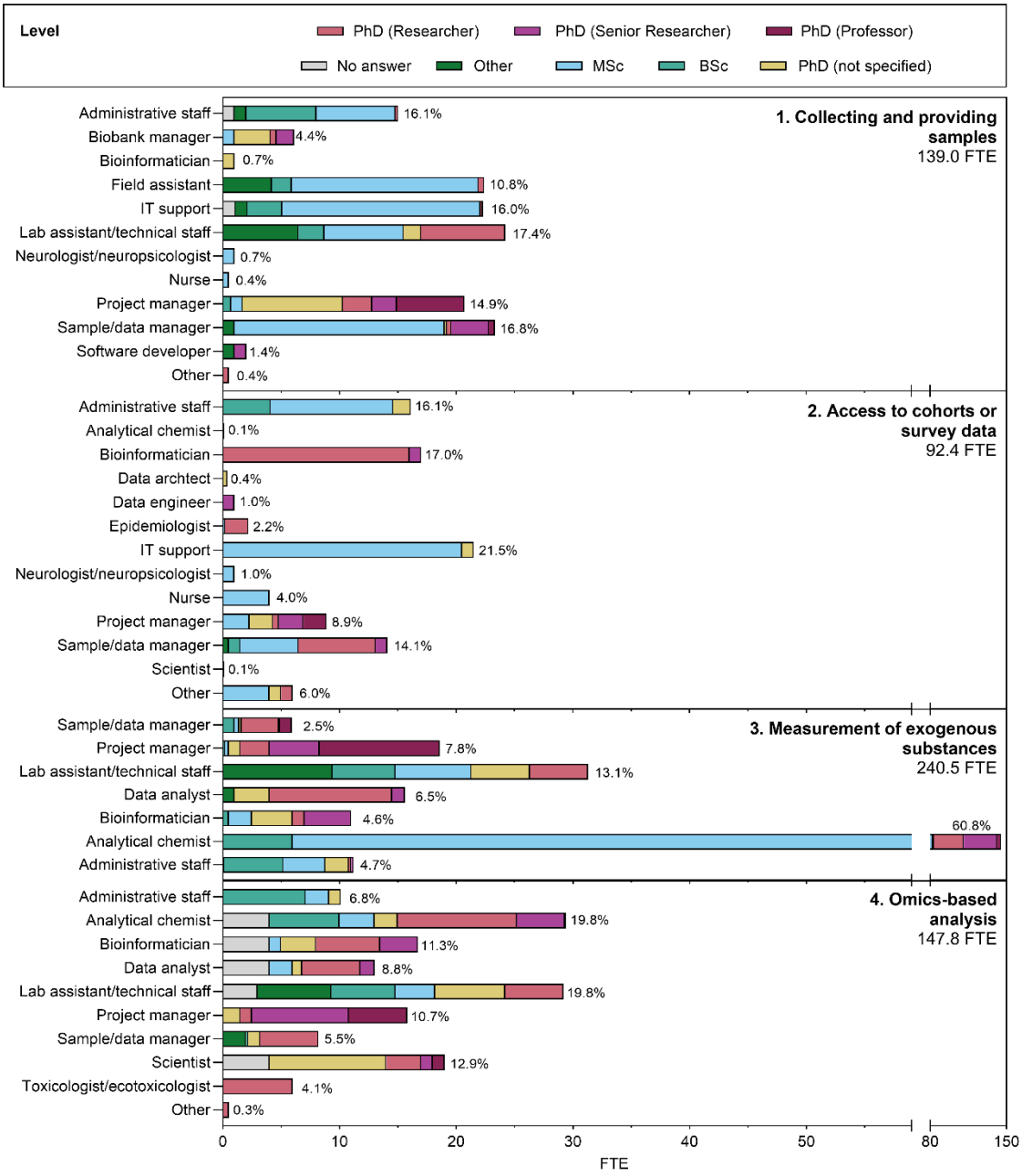

Figure 3a. Skills and full-time equivalents (FTE) in EIRENE RI, divided into expertise (education) in the different services offered.

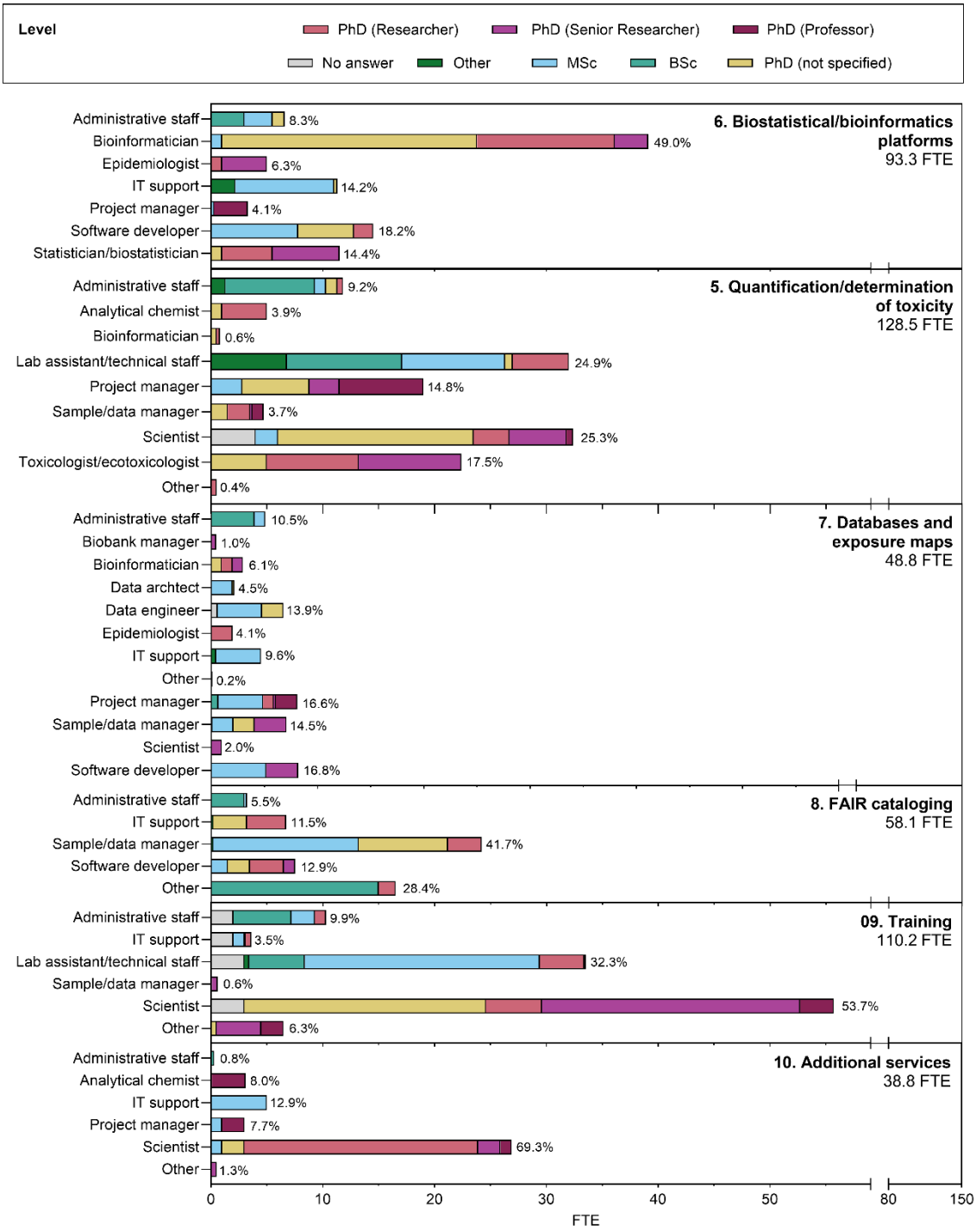

Figure 3b. Skills and full-time equivalents (FTE) in EIRENE RI, divided into expertise (education) in the different services offered.

Interconnections of national node expertise and skills

The inventory shows that services can be provided by different national nodes. There are several potential benefits from a HR perspective if different national nodes can provide a service, creating added value to the national nodes in terms of knowledge sharing. The potential benefits of different national nodes interacting when supplying a service include enhanced expertise, harmonization of

methods, and scientific development. The national nodes providing the different services are displayed in Figure 4. It should be noted that the national nodes are generally represented by different numbers of partner institutions.

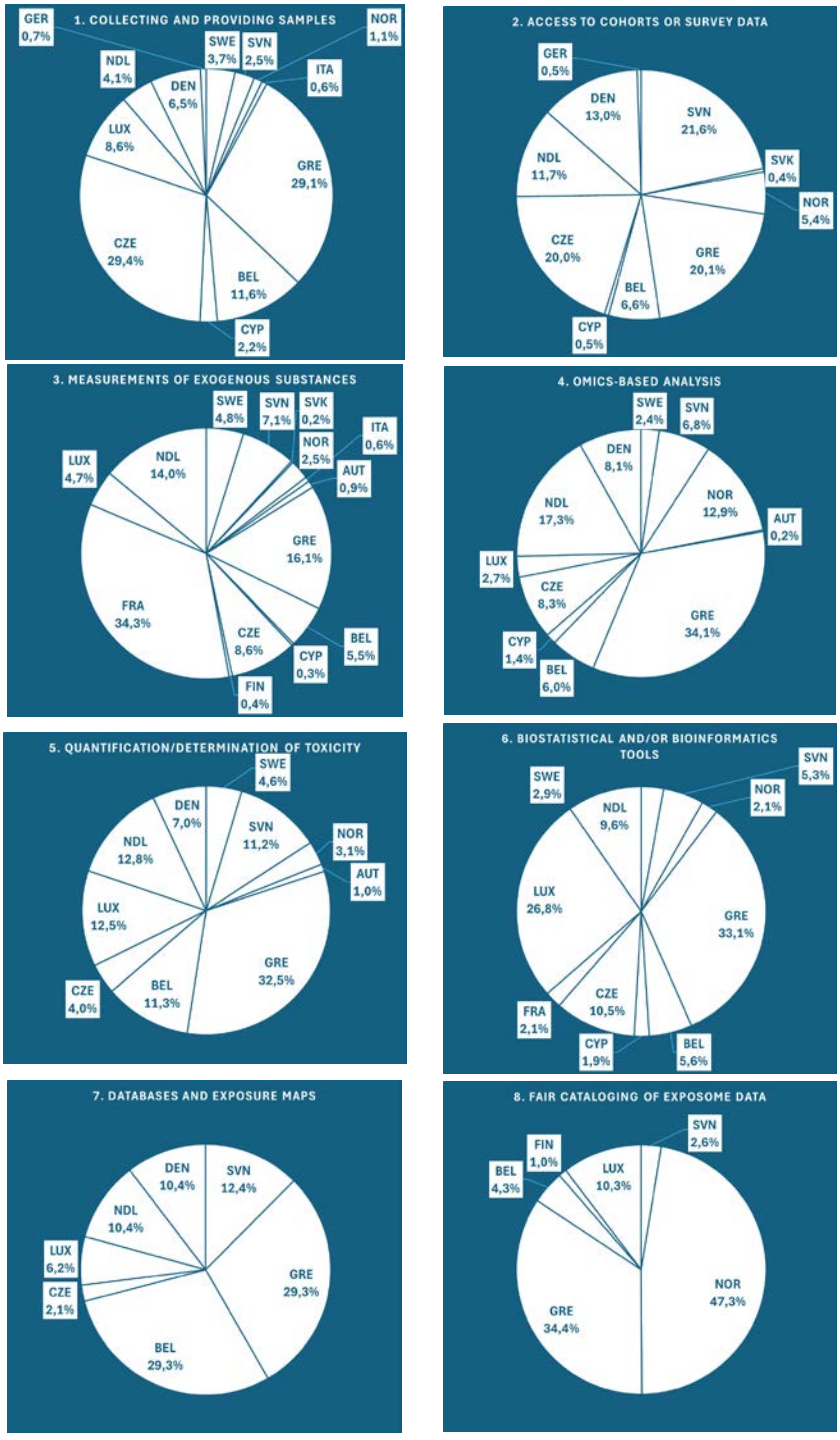

Figure 4. Current national nodes participation in different core services (% FTE for all expertise).

Service provision, and therefore also shared expertise and skills, are distributed across multiple countries. For example, Service 1 includes 12 out of 16 countries, but activities expressed as FTE are dominated by three specific countries. Service 2, on the other hand, has less countries and shows a more equal distribution of FTE. In cases where fewer countries are involved, there is a more equitable distribution of available FTEs. For Services 1, 4, 5, 6, 7, and 8, FTE distribution is concentrated among a few national nodes, with Greece playing a significant role. Additionally, Norway is important for Service 8, Luxembourg for Service 6, Belgium for Service 7, France for Service 3, and the Czech Republic for Service 1.HR needs for implementation of EIRENE RI

The implementation of a consolidated European research infrastructure, enabling the development of advanced technologies and complementary services, relies on national experts and institutions. This necessitates interdisciplinary collaborations and the availability of technical and human capacities. The implementation and operation of the EIRENE RI involves several aspects related to human resources, including organizational structure, staffing, training, and community engagement. This entails hiring or appointing individuals to fill these roles, given that there is expertise available at the national and European level.

Results of forecasted HR inventory

The EIRENE partners participating in the survey included information on how they expect resources being developed to meet the demands of the implementation phase, five years ahead, by indicating for each expert category and service if a decrease, no change, or increase of FTE is expected. The expected increase in resources for the implementation phase is presented as for how many of the current expertise in each service there is a forecast of increasing FTE (Figure 5). Almost 50% of the expertise providing Service 6: Biostatistical/bioinformatics platforms forecasts an increase in FTE in five years, which can be due to the current low number of FTE compared to other services despite the many partners involved. Also, Omics-based analysis (Service 4) and Measurement of exogenous substances (Service 3) forecast a significant increase in FTE.

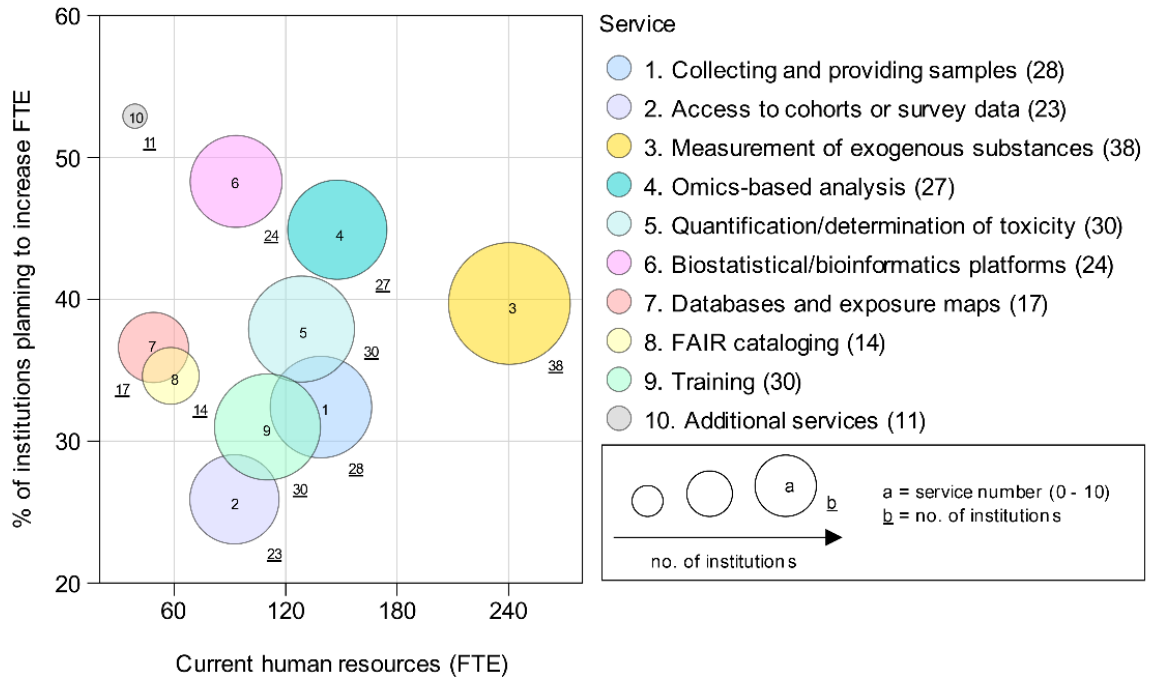

Figure 5. Human resources (full-time equivalents, FTE) in EIRENE RI, divided into different services offered and the % of expertise the institutions are planning to increase the FTE the coming five years.

There is a forecast to increase the skills for 32-62% of the expertise reported, while the expected level of education for current expertise in EIRENE RI is forecast to be relatively stable (Figure 6). The latter indicates that the education level needs to be maintained for the implementation rather than increased or decreased.

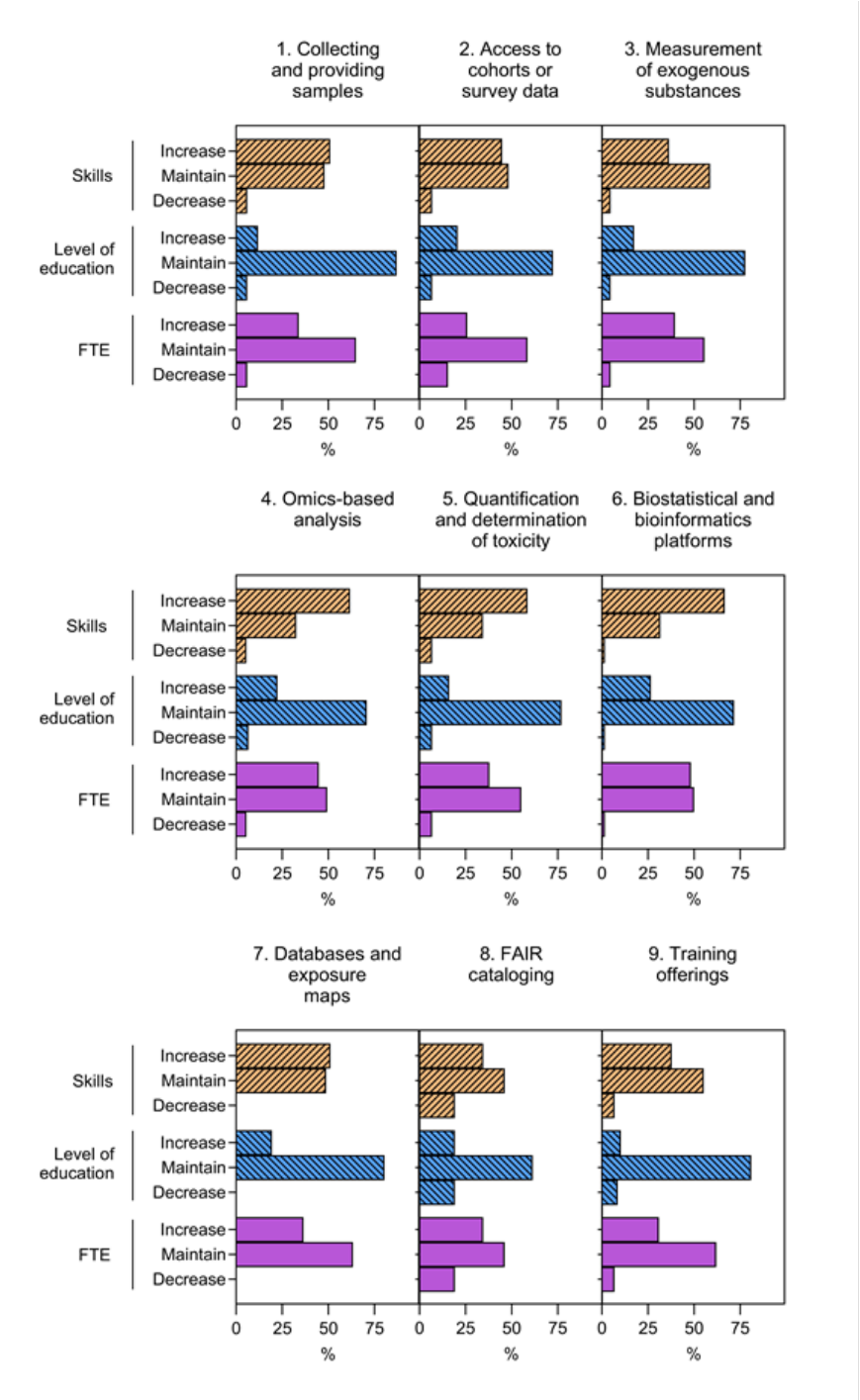

Figure 6. Forecast of changes in FTE, level of education, and skills for the implementation phase of EIRENE, divided into different services offered and presented as % institutions visions to "increase", "maintain", or "decrease" expertise.

As already mentioned, there is a forecasted increase in FTE for the different expertise among institutions performing Service 6: Biostatistical/bioinformatics platforms services (48%) and Service 4: Omics-based analysis (45%). All other services are also predicted to increase in the number of FTE, with more than 25% of the expertise forecasting an increase (Figure 6). A maintained level of FTE in 5 years is envisioned for 46-63% of the expertise. There is only one service for which a decrease in FTE is envisaged (Service 2, 8%). For a varying number of expertise, no answer was given for the 5-year forecast (0-19%).

Risk analysis

Analysis of the HR inventory needs to identify if the objectives, scientific vision, and implementation of EIRENE can be fulfilled. Weaknesses as well as strengths should be identified to help develop strategies to achieve the goals and maximize opportunities. The objectives of EIRENE are to develop advanced technologies and services for characterizing complex environmental factors. It aims to enhance European excellence in Environmental & Health research by providing researchers with access to harmonized capacities, unique services, and comprehensive data to address current and future public health needs. Overall, while EIRENE RI demonstrates a strong strategic vision and commitment to collaboration, addressing weaknesses and capitalizing on opportunities will be crucial for realizing its full potential and overcoming potential threats.

Strengths:

- International collaboration: The involvement of multiple countries and institutions demonstrates a strong commitment to collaboration, enabling the pooling of expertise, resources and capacities.
- High education/competence levels; a large pool of competent personnel is available.
- High quantity of HR for all core services, with some services dominating

Weaknesses:

- Dependence on self-estimations: The HR inventory is based on partner self-estimations, which may introduce inaccuracies or biases in the reported data, potentially impacting the reliability of the results.
- No historical performance data: Lack of historical performance data makes it challenging to assess the accuracy of FTE estimations and the reliability of future projections, potentially affecting strategic decision-making.
- Complexity of skill assessment: Assessing skills and expertise across diverse disciplines and services may be complex, leading to challenges in accurately quantifying and categorizing HR capabilities.
- Deep desirable scientific and methodological competence may be challenged by too narrow knowledge and competences related to the RI tasks.

Opportunities:

- Capacity Building: The forecasted increase in FTE and skills for various services presents an opportunity for capacity building within EIRENE RI, potentially enhancing its ability to deliver data for high-quality research outcomes and knowledge.
- Collaborative partnerships: Strengthening partnerships among national nodes and institutions can facilitate knowledge sharing and improved understanding of the exposome, fostering greater synergy and impact.

Threats:

- Readiness level of the HR pool: Institutions and personnel changes with time, as does the research landscape. The readiness level of current and future RI is difficult to assess, and the response time for service to be delivered might vary.
- Resource concentration: The concentration of resources within specific services or countries may create dependencies and vulnerabilities, posing a risk to the resilience and sustainability of EIRENE RI.
- Skills mismatch: The mismatch between required skills and available expertise may hinder the effective delivery of services and research objectives, potentially impacting the overall success of the RI. Included are possible difficulties in recruitment of strategic expertise and skills.

Strategy plan and roadmap

The sustainability of EIRENE RI is dependent on well-defined personnel requirements i.e. competence maps and staffing. This in turn will require an organizational structure for EIRENE RI that includes the national node members. It is likely that we are discussing more than 60 individual partners contributing to the RI. The structures of the national nodes are dependent on national requirements and conditions. However, the node members are to act both nationally and at the level of EIRENE RI. This depends on national vs. international stakeholders, but the offerings should be as similar as possible to allow stakeholders to access EIRENE RI.

The HR strategy needs to be aligned with the vision and strategic objectives of EIRENE. By developing and implementing a HR strategy, EIRENE RI can effectively develop and leverage its human capital to achieve its mission of advancing exposome research in Europe and effectively addressing environmental determinants of health. At the same time, the HR strategy needs to remain flexible enough to accommodate evolving needs and priorities of EIRENE RI.

The following aspects have been evaluated as most important from an EIRENE perspective, based on the current state as well as future needs.

EIRENE RI and national RI node organization: The national node organization needs to be specified to be able to evaluate how it influences the HR principles in EIRENE RI. HR may be influenced by their national role versus their roles in EIRENE RI. Any such differences need to be clarified in the strategy plan.

Staffing plan: Perform regular and comprehensive HR inventories and forecasting to understand the current and future HR needs of EIRENE RI. This includes assessing FTE, expertise, skills, and educational levels required for different services within the RI. These inventories should be updated biannually.

Career and competence development: Identify programs for capacity building and skill enhancement to meet the evolving needs of EIRENE RI. This includes identifying training opportunities for personnel to acquire new skills and expertise required for advanced technologies and services, promote collaborative partnerships and knowledge sharing, and strengthen collaborative partnerships among national nodes and institutions to facilitate knowledge sharing and exchange of best practices. This can enhance synergies, improve access to resources, and mitigate risks associated with resource concentration. The RI should develop plans for connecting partners.

Diversification of expertise: Encourage diversification of expertise within EIRENE RI to ensure a holistic approach to environmental exposure assessment. This includes addressing any identified weaknesses and promoting interdisciplinary collaboration.

HR principles are based on transparency and equality: Uphold principles of transparency, respect, equality, and cooperation in all HR practices within EIRENE RI. This includes promoting diversity and inclusion in recruitment and career development opportunities.

Final remarks

The present Strategy plan is built on the EIRENE RI objectives and original plans as present in the EIRENE PPP Grant Agreement and with input from the participants. The major contribution in this context is the digital survey for EIRENE RI services, the present available human resources and expected development over the coming five years. The original setting of 17 participating countries in EIRENE RI and PPP worked in the preparatory phase project for one year, at which point an additional four countries (Cyprus, Denmark, Luxemburg, and Portugal) announced their interest to join the RI.

The original partners are the national node leaders and the core of the RI. As such these partners discussed during the first year the development of the RI with minor input from the national node participants except for those from the Netherlands who developed the survey and with the Austrian node reviewing the survey. The majority of the responding national node leaders had experience of the survey test performed in an analog format and some of them also as participants in the application effort called SIRENE (due in March 2023). In the present digital survey responses were counted to 57 institutions in 16 countries, i.e. more than three times the 17 EIRENE PPP participants (node leaders). The result of the questionnaire showing a total number of 910 FTE for the eight core services must be taken with some caution. An overlap of the FTE between services might occur and could not be determined in this study. It may be reasonable to believe that 910 FTE are the highest number engaged in the eight services. If a plain average is calculated this means the responding partners have 16 FTE presently engaged in the eight services presented. This is a result that needs further discussions, investigations, and follow-up of the questionnaire. The number of FTE may be questionable, but the relative numbers may still be relevant.

The relative distribution of FTE as shown in Figure 4 must be further discussed in a strategic way since several of the services (1, 3, 4, 6, 7 and 8) are heavily dominated by the contribution from only 2-4 countries. If this is the case, then the RI will become highly dependent on a few countries. Subsequently, the national political support for those specific countries will be crucial for the RI to be sustainable, or the other countries contributions needs to increase. This will be of strategic importance for the resilience of the RI and follow-up surveys on HR must therefore be performed.

Dimensioning the HR levels within the different services also needs stakeholder input. The demand from stakeholders for the different services needs to be identified, and the HR needs adjusted accordingly.

Delivering robust and sustainable services, leading development, and offering high-quality research requires a critical mass of resources. In other words, sustainability of services offered cannot be reached by HR resourses at only a couple EIRENE RI site only. Still, the critical mass of HR needed for the services is dependent on the expected present and future needs from the stakeholders (academia, authorities, and business). Similar services will be required to meet the major demands, something that is mirrored by the present availability of national services related to exposomics. The present survey shows the major HR available in Service 3 (Measurement of exogenous substances), 240 FTE. According to the survey, the second largest group of three services offering 128-148 FTE are

Services 1, 4, and 5. A better understanding of what the present available personnel are doing, and which requests are posed by the stakeholders is needed to dimension the services. Better knowledge of different needs and requests in form of sample matrices, larger cohort studies, different types of analysis (chemical groups/types and omics method) and response time for sampling/providing samples, is a prerequisite for dimensioning the services properly.

APPENDIX 1. EIRENE Questionnaire

EIRENE Questionnaire - EIRENE Europe

Dear colleagues, please find a word version of the questionnaire to use in your Universities and Institutes. You may use it for working together on the questionnaire before entering the answers in the digital survey.

Introduction

Welcome to the EIRENE questionnaire

What is EIRENE? Environmental Exposure Assessment Research Infrastructure (EIRENE) aims to build a Europe wide infrastructure for exposome research. It is an EU funded project in the preparatory phase.

Note: Be aware that EIRENE RI is an infrastructure, and as such it will support and contribute to research projects, including monitoring efforts, not pursuing research projects in itself.

Mission EIRENE The EIRENE RI mission is to establish a sustainable research infrastructure enabling the advancement of exposome research in Europe by bringing together complementary capacities available in the member states, harmonizing them and upgrading to address current scientific and societal challenges in the areas of exposures and population health.

Vision EIRENE The EIRENE RI Vision is to mediate an open access to the infrastructures supporting a world-class research expanding the scientific knowledge in the area of human exposome, supporting the development of new technologies and translation of the research results to the daily lives of citizens via public-private (industry, spin-offs) or public-public (policy-making) partnerships in order to tackle a problem of non- genetic factors behind the development of chronic conditions and to improve the population health.

Why this questionnaire? To make an inventory which exposome services are present in Europe today and which human resources are available for these services.

To whom will this questionnaire be send? This survey will be distributed to all 17 national EIRENE PPP partners and all the national hub participants listed.

Which **type of Exposome Services** are in scope for the inventory?

01. Collecting and providing samples (including bio, environmental, and specimen banks) to determine exogenous substances

02. Access to cohort study or survey data on an individual level

03. Measurements of exogenous substances including target and nontargeted measurements of chemical mixtures (or other pollutants) as well as parent and transformation exposure markers in humans and the environment

04. Omics-based analysis of markers of biological response (separate: metabolomics, lipidomics, adductomics, (epi)genomics, metagenomics/microbiomics, transcriptomics, proteomics, phenomics)

05. Quantification/determination of toxicity (human- and ecological), pathways and modes of action (in-vivo, ex-vivo, in-vitro, in-silico)

06. Biostatistical and/or bioinformatics tools and platforms to investigate the exposome and human health interactions

07. Databases and exposure maps on environmental factors (e.g. pollutants, temperature, noise, socio-economic, life style)

08. FAIR cataloging of exposome data (e.g. cohorts, algorithms)

09. Training offerings in the field of exposome research and Training needs

10. Additional service(s)

Human Resources

EIRENE aims to build a Europe wide infrastructure for exposome research. Information about current and future staffing (human resources) is needed to estimate the economic impact of setting up and maintaining this Research Infrastructure, especially in the implementational phase.
Therefore, the current resources of the specific service of your institute are requested here. We ask you to please provide in full time equivalents (FTE) the human resources (personnel) identified by their skills and expertise, currently available and connected to the service in question. How resources develop in future you can indicate by selecting decrease, no change, or increase in type of personnel.

Training needs

Training needs is focused on the needs from the partners to learn, enhance the personnel skills and keep up/improve their competence in the fields indicated, i.e. all related to the Exposome services in EIRENE.

Instructions for the questionnaire

Only fill in services your institute/university can promise to offer to the EIRENE Research Infrastructure that are available today and are sustainable. Per service you can indicate your expectations for how the service will change in the coming 5 years.

Services can be described on a department or on an institutional/university level.

Read the 10 sections/categories of exposome services.

Select the services your department or institute/university would like to offer to the infrastructure.

Describe the exposome services of your department or institute/university.

If the service you would like to offer is not in the list 1-9, please add it under “10. Additional service(s)”.

For each section/category a number of questions are asked, including keywords that describe your selected services best, as well as human resources and staff specifics.

Questions or requests for clarifications

Please contact:
Laurien Ulfman l.h.ulfman@uu.nl (exposome services)
and/or
Anna Kärrman anna.karrman@oru.se (human resources)

Basic Information

Name

_____

Profession

_____

Department and unit (if applicable)

_____

University/Institute

_____

I fill in this questionnaire on behalf of the

- O Department
- O University / Institute

Address of university/institute

_____

Country

_____

Email address on which you can be reached:

_____

Selection of Services

Before you begin, please select the services your department or institute/university would like to offer to the EIRENE Infrastructure.

1. Collecting and providing samples (including bio, environmental, and specimen banks) to determine exogenous substances

2. Access to cohort study or survey data on an individual level

3. Measurement of exogenous substances including targeted- and non-targeted measurements of chemical mixtures (or other pollutants) as well as parent and transformation exposure markers in humans and the environment

4. Omics-based analysis of markers of biological response (e.g. metabolomics, lipidomics, adductomics, (epi)genomics, metagenomics/microbiomics, transcriptomics, proteomics, phenomics)

5. Quantification/Determination of toxicity (human- and ecological), pathways and modes of action (in-vivo, ex-vivo, in-vitro, in-silico)

6. Biostatistical and/or bioinformatics tools and platforms to investigate the exposome and human health interactions

7. Databases and exposure maps on environmental factors (e.g. pollutants, temperature, noise, socio-economic, life style)

8. FAIR cataloging of exposome data (e.g. cohorts, algorithms)

9. Training offerings in the field of exposome research (e.g. academic courses and programmes, summer schools, tailored trainings, workshops) and Training needs

10. Additional Service(s)

Service 1 Collecting and providing samples

Service 1 Collecting and providing samples (including bio, environmental, and specimen banks) to determine exogenous substances Explanation Presence of biobanks, environmental banks and specimen banks as well as services for sample collection.

Describe the services your institution currently offers regarding service 1. The collection and provision of samples (including bio, environmental, and specimen banks) to determine exogenous substances.

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Which keywords would best describe service 1 "The collection and provision of samples"? (multiple answers possible)

- [ ] Biobank
- [ ] Environmental bank
- [ ] Specimen bank
- [ ] Sample Collection
- [ ] Other _____
- [ ] Other _____
- [ ] Other _____
- [ ] Other _____

Do you expect changes in service 1 "The collection and provision of samples" in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please describe the type of changes that might occur

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Is a physical infrastructure currently available for service 1 "The collection and provision of samples"?

- O No
- O Yes

Please describe why there is no physical infrastructure available regarding service 1 "The collection and provision of samples".

_____

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Please describe the available physical infrastructure regarding service 1 "The collection and provision of samples".

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Which keywords would best describe the available physical infrastructure regarding service 1 "The collection and provision of samples".

- [ ] Laboratories
- [ ] Biobank storage systems
- [ ] Specimenbank storage systems
- [ ] Environmental bank storage systems
- [ ] Another, namely _____
- [ ] Another, namely _____

Do you expect changes in the physical infrastructure of service 1 "The collection and provision of samples". in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please describe the changes in physical infrastructure of service 1 "The collection and provision of samples" that could occur in:

	Decrease	Stay the same	Increase
Size	O	O	O
Quality	O	O	O
Quantity	O	O	O

Please describe any additional changes, not yet mentioned, in physical infrastructure regarding the collection and provision of samples

_____

What is your current storage capacity (in n of samples)?

	0-1000	1.000-10.000	10.000-100.000	100.000-1.000.000
Biobank	O	O	O	O
Environmental bank	O	O	O	O
Specimen bank	O	O	O	O

Do you expect changes in the capacity to store and collect samples in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Describe the changes that could occur in:

	Decrease	Stay the same	Increase
Size of storage units	O	O	O
Number of storage units	O	O	O

Please describe any additional changes, not yet mentioned, in the capacity to store and collect samples in the coming 5 years

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Human resources for Service 1

The next questions are about the human resources available for service 1 "Collecting and providing samples".

What personnel do you have currently available for the services with regards to collecting and providing samples? Please select the personnel depicted. Is the personnel not in the list? Tick the "other" text field and enter description.

- [ ] Administrative staff
- [ ] Biobank manager
- [ ] Field assistant
- [ ] IT support
- [ ] Lab assistant
- [ ] Project manager
- [ ] Sample and/or data manager
- [ ] Software developer
- [ ] Other _____

In the questionnaire you get the possibility to answer the following question per type of personnel you selected. For the question on FTE please fill in a number (1 decimal allowed)

Describe the expertise field/skills for the position of …

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What is the level of education for the position of …

- O PhD (Professor)
- O PhD (Senior Researcher)
- O PhD (Researcher)
- O PhD
- O MSc
- O BSc
- O Technician/Engineer
- O Lab Assistant
- O Other _____

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Indicate the FTE available for the position of …. to provide service 1.

_____

Do you expect changes for the position of " …." in the coming 5 years in:

	Decrease	Stay the same	Increase
Available skills/expertise	O	O	O
Level of education	O	O	O
FTE	O	O	O

Service 2 Access to human health and/or exposure data

Service 2 Access to human health and/or exposure data Explanation The following questions are regarding the institute's access to cohort study or survey data on an individual level. It concerns the available cohort studies (either individual cohorts or existing cohort infrastructures) that are enriched with exposure data available at your institute.

Please list available cohort studies (either individual cohorts or existing cohort infrastructures) that are enriched with exposure data

- ☐ Name of Cohort _____
- ☐ Name of Cohort _____
- ☐ Name of Cohort _____
- ☐ Name of Cohort _____
- ☐ Name of Cohort _____
- ☐ Name of Cohort _____

In the questionnaire you get the possibility to answer the following 2 questions per type of cohort you entered.

1 What is the number of individuals in cohort 1?

- O <100
- O 100-1.000
- O 1.000-10.000
- O 10.000-100.000
- O >100.000

2 Which keywords would best describe cohort 1?

(multiple answers possible)

- ☐ Survey data
- ☐ Cohort samples
- ☐ Adult cohort
- ☐ General population cohort
- ☐ Birth cohort
- ☐ Clinical cohort
- ☐ Another, namely _____
- ☐ Another, namely _____

Do you expect changes in the access to human health and/or exposure data in the coming 5 years for your university/institute?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please select the changes in access to human health and/or exposure data that might occur:

	Negative changes	No changes	Positive changes	Not Applicable
Number of surveys	O	O	O	O
Number of cohorts	O	O	O	O
Integration of new data to existing datasets	O	O	O	O
Features for data analysis	O	O	O	O
New software	O	O	O	O

Human Resources for Service 2

The next questions are about the human resources available for the service you just described with regards to service 2 "access to human health and/or exposure data".

What personnel do you have currently available for the services with regards to collecting and providing samples? Please select the personnel depicted. Is the personnel not in the list? Tick the "other" text field and enter description.

- ☐ Administrative staff
- ☐ Bioinformatician
- ☐ Data architect
- ☐ Data engineer
- ☐ Data manager
- ☐ IT support
- ☐ Project manager
- ☐ Other _____

In the questionnaire you get the possibility to answer the following question per type of personnel you selected. For the question on FTE please fill in a number (1 decimal allowed)

Describe the expertise field/skills for the position of ….

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_____

What is the level of education for the position of …

- O PhD (Professor)
- O PhD (Senior Researcher)
- O PhD (Researcher)
- O PhD
- O MSc
- O BSc
- O Technician/Engineer
- O Lab Assistant
- O Other _____

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Indicate the FTE available for the position of …. to provide service 1.

_____

Do you expect changes for the position of …. in the coming 5 years in:

	Decrease	Stay the same	Increase
Available skills/expertise	O	O	O
Level of education	O	O	O
FTE	O	O	O

Service 3 Measurements of exogenous substances

Service 3 Measurements of exogenous substances including targeted- and non-targeted measurements of chemical mixtures (or other pollutants) as well as parent and transformation exposure markers in humans and the environment Explanation For each service offered, please specify whether environmental samples, biological specimens, or both can be handled and in which matrices.

Please describe in the open text field below the services regarding measurements of exogenous substances currently offered. This includes targeted- and non-targeted measurements of chemical mixtures (or other pollutants) as well as parent and transformation exposure markers in humans and the environment

Example:
Type exogenous substance: Non-targeted/Suspect screening of xenobiotics (include list of xenobiotics, this can be at group level, e.g. food additives, drugs)
Type of measurement: LC-HRMS with semi-quantitative results.
Biological specimens/matrices: urine, serum, plasma, breast milk, placenta.

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Which keywords would best describe your service for measurement of exogenous substances? (multiple answers possible)

- ☐ Mass spectrometry
- ☐ Biomonitoring
- ☐ Targeted screening
- ☐ Non-targeted screening
- ☐ Environmental samples
- ☐ Biological specimens
- ☐ Xenobiotics
- ☐ Radioactivity measurements
- ☐ Other _____
- ☐ Other _____
- ☐ Other _____

Do you expect changes in the services for the measurement of exogenous substances for your institute in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please select the changes in the measurement of exogenous substances for your institute that might occur:

	Negative changes	No changes	Positive changes
Equipment quality	O	O	O
Equipment quantity	O	O	O
Number of different substances that can be measured	O	O	O

Is there physical infrastructure available for measurement of exogenous substances?

- O No
- O Yes

Describe why there is no physical infrastructure available

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Describe the available physical infrastructure (E.g. different spectrometers, facilities for analysis)

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Do you expect changes in the physical infrastructure in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please select the changes in physical infrastructure that could occur regarding the measurement of exogenous substances:

	Decrease	Stay the same	Increase
Number of tools	O	O	O
Number of facilities	O	O	O
Number of analyses per time-period	O	O	O
Replacement/renewal of infrastructure	O	O	O

What is your current analysis capacity (in n of samples per day)?

	0-100	100-1.000	1.000-10.000	>10.000
Biological specimens (e.g. plasma)	O	O	O	O
Environmental samples	O	O	O	O
Other	O	O	O	O
Other	O	O	O	O

Do you expect changes in the analysis capacity in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Describe the changes that could occur in analysis capacity of exogenous substances:

	Decrease	Stay the same	Increase
Personnel	O	O	O
Equipment	O	O	O
Facilities	O	O	O
Expertise	O	O	O

Human Resources for Service 3

The next questions are about the human resources available for the service with regards to the measurements of exogenous substances

What personnel do you have currently available for the services with regards to measurements of exogenous substances? Please select the personnel depicted. Is the personnel not in the list? Tick the "other" text field and enter description.

- ☐ Administrative staff
- ☐ Analytical Chemist
- ☐ Bioinformatician
- ☐ Data analyst
- ☐ Lab assistant
- ☐ Project manager
- ☐ Sample and/or data manager
- ☐ Other _____

In the questionnaire you get the possibility to answer the following question per type of personnel you selected. For the question on FTE please fill in a number (1 decimal allowed)

Describe the expertise field/skills for the position of …

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What is the level of education for the position of …

- O PhD (Professor)
- O PhD (Senior Researcher)
- O PhD (Researcher)
- O PhD
- O MSc
- O BSc
- O Technician/Engineer
- O Lab Assistant
- O Other _____

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Indicate the FTE available for the position of … to provide service 3.

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Do you expect changes for the position of … in the coming 5 years in:

	Decrease	Stay the same	Increase
Available skills/expertise	O	O	O
Level of education	O	O	O
FTE	O	O	O

Service 4 Omics-based analysis of markers of biological response

Service 4 Omics-based analysis of markers of biological response (separate: metabolomics, lipidomics, adductomics, (epi)genomics, metagenomics/microbiomics, transcriptomics, proteomics, phenomics).Explanation For each service offered, please describe the type of matrices employed as well as the "omics" applied.

Please describe in the open text field below the services regarding measurements of omics-based analysis of markers of biological response.

Example
Type of omics: LC-MS/MS proteomics
Matrices: plasma, in vitro samples
Markers: both targeted as untargeted proteins (specify if possible)
Other info: e.g. qualitative and quantitative, type of equipment

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Which keywords would best describe your service for omics-based analysis? (multiple answers possible)

- [ ] Metabolomics
- [ ] Transcriptomics
- [ ] Lipidomics
- [ ] Adductomics
- [ ] (Epi)genomics
- [ ] Metagenomics
- [ ] Microbiomics
- [ ] Proteomics
- [ ] Phenomics
- [ ] Other _____
- [ ] Other _____
- [ ] Other _____
- [ ] Other _____

Do you expect changes in the described service in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please describe the changes that might occur regarding omics-based analysis

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Is a physical infrastructure currently available for omics-based analysis?

- O No
- O Yes

Please describe why there is no physical infrastructure available

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Please describe the available physical infrastructure (technology/instrumentation)

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Do you expect changes in the physical infrastructure in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please select the changes in physical infrastructure that could occur regarding omics-based analysis

	Decrease	Stay the same	Increase
Number of tools	O	O	O
Number of facilities	O	O	O
Replacement/renewal of infrastructure	O	O	O

What is your current capacity (in samples/year) for omics-based analysis?

	0-1000	1.000-10.000	10.000-100.000	100.000-1.000.000
Metabolomics	O	O	O	O
Lipidomics	O	O	O	O
Adductomics	O	O	O	O
(Epi)genomics	O	O	O	O
Metagenomics	O	O	O	O
Microbiomics	O	O	O	O
Transcriptomics	O	O	O	O
Proteomics	O	O	O	O
Phenomics	O	O	O	O

Do you expect changes in the capacity (in samples/year) for omics-based analysis in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

By how much might the capacity for omics-based analysis change in the comics 5 years? Please enter the difference in samples/year preceded by a plus or minus to indicate increase or decrease (E.g. +500) in the table below.

	Change
Metabolomics	
Lipidomics	
Adductomics	
(Epi)genomics	
Metagenomics	
Microbiomics	
Transcriptomics	
Proteomics	
Phenomics	

Please describe why these changes in omics-based analysis capacity could occur

	Decrease	Stay the same	Increase
Personnel	O	O	O
Equipment	O	O	O
Facilities	O	O	O
Expertise	O	O	O

Human Resources for Service 4

The next questions are about the human resources available for the service with regards to omics-based analysis

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What personnel do you have currently available for the services with regards to measurements of omics-based analysis? Please select the personnel depicted. Is the personnel not in the list? Tick the "other" text field and enter description.

- [ ] Administrative staff
- [ ] Analytical Chemist
- [ ] Bioinformatician
- [ ] Data analyst
- [ ] Lab assistant
- [ ] Project manager
- [ ] Sample and/or data manager
- [ ] Scientist
- [ ] Other _____

In the questionnaire you get the possibility to answer the following question per type of personnel you selected. For the question on FTE please fill in a number (1 decimal allowed)

Describe the expertise field/skills for the position of …

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What is the level of education for the position of ….

- O PhD (Professor)
- O PhD (Senior Researcher)
- O PhD (Researcher)
- O PhD
- O MSc
- O BSc
- O Technician/Engineer
- O Lab Assistant
- O Other _____

Indicate the FTE available for the position of … to provide service 4.

Do you expect changes for the position of …. in the coming 5 years in:

	Decrease	Stay the same	Increase
Available skills/expertise	O	O	O
Level of education	O	O	O
FTE	O	O	O

Describe the expertise field/skills for the position of …

_____

_____

_____

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_____

What is the level of education for the position of ….

- O PhD (Professor)
- O PhD (Senior Researcher)
- O PhD (Researcher)
- O PhD
- O MSc
- O BSc
- O Technician/Engineer
- O Lab Assistant
- O Other _____

Indicate the FTE available for the position of …. to provide service 4.

_____

Do you expect changes for the position of …. in the coming 5 years in:

	Decrease	Stay the same	Increase
Available skills/expertise	O	O	O
Level of education	O	O	O
FTE	O	O	O

Service 5 Quantification/determination of toxicity

Service 5 Quantification/determination of toxicity (human- and ecological), pathways and modes of action (in-vivo, ex-vivo, in-vitro, in-silico) Explanation For each service offered, please include if it is in vivo, ex-vivo, in vitro, or in silico.

Please describe in the open text field below the service currently offered regarding the quantification/determination of toxicity at your institute.

Example:
In vitro assessment - Safety and preclinical testing
Type of models: in vitro organ specific cell models, 2D/3D organoids of liver/hepatotoxicity, gut and skin epithelia, kidney, reprotoxicity - testicular models.
Type of samples: chemicals, mixtures, matrices (please specify further)
Mechanistic endpoints: nuclear receptor reporter gene assays, cell proliferation, tumor promotion and progression.
Other info: e.g. certifications, specific and/or unique equipment.

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Which keywords would best describe your service for the quantification/determination of toxicity? (multiple answers possible)

- ☐ In vitro models
- ☐ In vivo models
- ☐ Ex vivo models
- ☐ In situ models
- ☐ In silico models
- ☐ Aquatic
- ☐ Terrestrial
- ☐ Aerial

Do you expect changes in the service of quantification/determination of toxicity in your institute in the coming 5 years?

- ○ Definitely not
- ○ Probably not
- ○ Might or might not
- ○ Probably yes
- ○ Definitely yes

What changes?

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Is physical infrastructure currently available for the quantification/determination of toxicity at your institute?

O No

O Yes

Please describe why there is no physical infrastructure available

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Describe the available physical infrastructure

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Page Break

Do you expect changes in the physical infrastructure in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Describe the changes that could occur in:

	Decrease	Stay the same	Increase
Size	O	O	O
Quality	O	O	O

What is your current capacity (in n of samples/year)?

	0-1000	1.000-10.000	10.000-100.000	100.000-1.000.000
Describe type of sample	O	O	O	O
Describe type of sample	O	O	O	O
Describe type of sample	O	O	O	O
Describe type of sample	O	O	O	O

Do you expect changes in the current capacity in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Describe the changes that could occur in:

	Decrease	Stay the same	Increase
Size	O	O	O
Quality	O	O	O

Human Resources for Service 5

The next questions are about the human resources available for the service with regards to quantification/determination of toxicity

What personnel do you have currently available for the services with regards to measurements of quantification/determination of toxicity (human- and ecological), pathways and modes of action. Please select the personnel depicted. Is the personnel not in the list? Tick the "other" text field and enter description.

- [ ] Administrative staff
- [ ] Analytical Chemist
- [ ] Lab assistant
- [ ] Project manager
- [ ] Sample and/or data manager
- [ ] Scientist
- [ ] Toxicologist
- [ ] Other _____

In the questionnaire you get the possibility to answer the following question per type of personnel you selected. For the question on FTE please fill in a number (1 decimal allowed)

Describe the expertise field/skills for the position of ….

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What is the level of education for the position of ….

- O PhD (Professor)
- O PhD (Senior Researcher)
- O PhD (Researcher)
- O PhD
- O MSc
- O BSc
- O Technician/Engineer
- O Lab Assistant
- O Other _____

Indicate the FTE available for the position of … to provide service 5.

_____

Do you expect changes for the position of …. in the coming 5 years in:

	Decrease	Stay the same	Increase
Available skills/expertise	O	O	O
Level of education	O	O	O
FTE	O	O	O

Service 6 Biostatistical and/or bioinformatics tools and platforms

Service 6 Biostatistical and/or bioinformatics tools and platforms to investigate the exposome and human health interactions

Please describe in the open text field below the service currently offered regarding the biostatistical and/or bioinformatics tools and platforms at your institute

Include description of biostatistical- and bioinformatic pipelines available, including type of data (e.g. epigenetics, transcriptomics, metabolomics), type of analysis, type of methodology, type of tools and platforms.

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Which keywords would best describe the service of biostatistical and/or bioinformatics tools and platforms at your institute?

- [ ] Machine learning
- [ ] Data-analysis tools
- [ ] Data integration
- [ ] Data harmonization
- [ ] Data storage platforms
- [ ] Other _____
- [ ] Other _____
- [ ] Other _____

Do you expect changes in the described service in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please describe the changes that might occur

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_____

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_____

Please describe the current storage and processing capacity for biostatistics/bioinformatics

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_____

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Page Break

Do you expect changes in the processing capacity for biostatistics/bioinformatics in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Describe the changes that could occur:

	Decrease	Stay the same	Increase
Size	O	O	O
Quality	O	O	O

Human Resources for Service 6

The next questions are about the human resources available for the service with regards to biostatistical and/or bioinformatics tools and platforms

What personnel do you have currently available for the services with regards to biostatistical and/or bioinformatics tools and platforms. Please select the personnel depicted. Is the personnel not in the list? Tick the "other" text field and enter description.

- [ ] Administrative staff
- [ ] Bioinformatician
- [ ] Epidemiologist
- [ ] IT support
- [ ] Project manager
- [ ] Software developer
- [ ] Statistician/Biostatistician
- [ ] Other _____

In the questionnaire you get the possibility to answer the following question per type of personnel you selected. For the question on FTE please fill in a number (1 decimal allowed)

Describe the expertise field/skills for the position of …

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What is the level of education for the position of …

- O PhD (Professor)
- O PhD (Senior Researcher)
- O PhD (Researcher)
- O PhD
- O MSc
- O BSc
- O Technician/Engineer
- O Lab Assistant
- O Other _____

Indicate the FTE available for the position of … to provide service 6.

_____

Do you expect changes for the position of … in the coming 5 years in:

	Decrease	Stay the same	Increase
Available skills/expertise	O	O	O
Level of education	O	O	O
FTE	O	O	O

Service 7 Databases and exposure maps on environmental factors

Service 7 Databases and exposure maps on environmental factors (e.g. pollutants, temperature, noise, socio-economic, life style) Explanation For each database and/or exposure maps indicate the geographic area (e.g. region, country, EU wide etc) for which this is provided, type of environmental factor.

Please describe in the open text field below the service currently offered regarding databases and exposure maps on environmental factors at your institute.

Include type of environmental factor available, type of maps (incl geographical area (e.g. region, country, EU wide, etc)), type of platforms used.

_____

_____

_____

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_____

Which keywords would best describe your service for databases and exposure maps? (multiple answers possible)

- [ ] Regional
- [ ] National
- [ ] International
- [ ] Atmospheric
- [ ] Aquatic
- [ ] Raw data
- [ ] Publicly available data
- [ ] Interactive online platform (provide name(s)) ……..
- [ ] Other _____
- [ ] Other _____
- [ ] Other _____

Do you expect changes in the described service in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please describe the changes that might occur

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Human Resources for Service 7

The next questions are about the human resources available for the service with regards to databases and exposure maps

What personnel do you have currently available for the services with regards to databases and exposure maps on environmental factors. Please select the personnel depicted. Is the personnel not in the list? Tick the "other" text field and enter description.

- [ ] Administrative staff
- [ ] Bioinformatician
- [ ] Data architect
- [ ] Data engineer
- [ ] Data manager
- [ ] IT support
- [ ] Project manager
- [ ] Software developer
- [ ] Other _____

In the questionnaire you get the possibility to answer the following question per type of personnel you selected. For the question on FTE please fill in a number (1 decimal allowed)

Describe the expertise field/skills for the position of ….

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What is the level of education for the position of …

- O PhD (Professor)
- O PhD (Senior Researcher)
- O PhD (Researcher)
- O PhD
- O MSc
- O BSc
- O Technician/Engineer
- O Lab Assistant
- O Other _____

Indicate the FTE available for the position of …. to provide service 7.

_____

Do you expect changes for the position of …. in the coming 5 years in:

	Decrease	Stay the same	Increase
Available skills/expertise	O	O	O
Level of education	O	O	O
FTE	O	O	O

Service 8 FAIR cataloging of exposome data

Service 8 FAIR cataloging of exposome data (e.g. cohorts, algorithms)
Explanation Services that aim to make exposome data FAIR: findable, accessible, interoperable and reusable.

Please describe in the open text field below the service currently offered regarding FAIR cataloging at your institute.

Describe processes, systems and/or tools that makes your data FAIR (findable, accessible, interoperable and reusable).

_____

_____

_____

_____

_____

Which keywords would best describe your service for FAIR cataloging? (multiple answers possible)

- [ ] Catalogue software
- [ ] Metadata submission structure
- [ ] Integrating/extending existing inventories to large-scale projects
- [ ] Other _____
- [ ] Other _____
- [ ] Other _____

Do you expect changes in the described service in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please describe the changes that might occur

_____

_____

_____

_____

Human Resources for Service 8

The next questions are about the human resources available for the service with regards to FAIR cataloging of exposome data

---

What personnel do you have currently available for the services with regards to FAIR cataloging of exposome data. Please select the personnel depicted. Is the personnel not in the list? Tick the "other" text field and enter description.

- ☐ Administrative staff
- ☐ Data manager
- ☐ IT support
- ☐ Software developer
- ☐ Other _____

In the questionnaire you get the possibility to answer the following question per type of personnel you selected. For the question on FTE please fill in a number (1 decimal allowed)

Describe the expertise field/skills for the position of …

_____

_____

_____

_____

_____

What is the level of education for the position of ….

- O PhD (Professor)
- O PhD (Senior Researcher)
- O PhD (Researcher)
- O PhD
- O MSc
- O BSc
- O Technician/Engineer
- O Lab Assistant
- O Other _____

Indicate the FTE available for the position of …. to provide service 8.

_____

Do you expect changes for the position of …. in the coming 5 years in:

	Decrease	Stay the same	Increase
Available skills/expertise	O	O	O
Level of education	O	O	O
FTE	O	O	O

Service 9 Training offerings

Explanation Training offerings are training/education modules that you can offer to the EIRENE Infrastructure. These are focused on, or highly related to, the services you filled in this survey thus far. Also, they can be diverse e.g., academic courses and programmes, summer schools, tailored trainings, workshops.

Please describe the trainings your institute provides in relation to Exposome Research. You can think of e.g. courses, workshops, online modules, summer schools.

- ☐ Training type 1 _____
- ☐ Training type 2 _____
- ☐ Training type 3 _____
- ☐ Training type 4 _____
- ☐ Training type 5 _____

In the questionnaire you get the possibility to answer the following question per type of training you selected.

Please describe the format and the level of training type …

_____

_____

_____

_____

_____

Which keywords would best describe training type .. (multiple answers possible)

- [ ] Workshops
- [ ] Online modules
- [ ] Summer schools
- [ ] Academic courses
- [ ] Supervision
- [ ] Other _____
- [ ] Other _____
- [ ] Other _____

Which keywords would best describe the accessibility of the training type ..?

- ☐ In loco
- ☐ Online
- ☐ On demand
- ☐ Language _____
- ☐ Basic requirements _____
- ☐ Free
- ☐ Paid
- ☐ Given on regular intervals

Do you expect changes in training type … in the coming 5 years?

- o Definitely not
- o Probably not
- o Might or might not
- o Probably yes
- o Definitely yes

Please describe the changes that might occur regarding training type …

_____

_____

_____

_____

_____

Describe the current capacity (e.g. number of people per year you can train for training type …

_____

Do you expect changes in the number of people that can be trained each year, in the coming 5 years for training type ..?

- O Less people can be trained per year
- O More people can be trained per year
- O No changes
- O There may be changes but it is unclear how they will impact our capacity

Human Resources of service 9

The next questions are about the human resources available for the service with regards to training offerings. This part can be filled for the sum of all trainings you have indicated above.

What personnel do you have currently available for the services with regards to training and education. Please select the personnel depicted. Is the personnel not in the list? Tick the "other" text field and enter description.

- [ ] Administrative staff
- [ ] Data manager
- [ ] IT support
- [ ] Lab assistant / technical staff
- [ ] Scientist
- [ ] Other _____

In the questionnaire you get the possibility to answer the following question per type of personnel you selected. For the question on FTE please fill in a number (1 decimal allowed)

Describe the expertise field/skills for the position of ….

_____

_____

_____

_____

_____

What is the level of education for the position of …

- O PhD (Professor)
- O PhD (Senior Researcher)
- O PhD (Researcher)
- O PhD
- O MSc
- O BSc
- O Technician/Engineer
- O Lab Assistant
- O Other _____

Indicate the FTE available for the position of …. to provide service 9.

_____

Do you expect changes for the position of …. in the coming 5 years in:

	Decrease	Stay the same	Increase
Available skills/expertise	O	O	O
Level of education	O	O	O
FTE	O	O	O

Training needs

Training needs
Training needs is focused on the needs from the partners to learn, enhance the personnel skills and keep up/improve their competence in the fields indicated, i.e. all related to the Exposome services in EIRENE.

What are your needs for education, training, and competence development to be able to provide and improve the services you selected?

- ☐ Need 1 _____
- ☐ Need 2 _____
- ☐ Need 3 _____
- ☐ Need 4 _____
- ☐ Need 5 _____

In the questionnaire you get the possibility to answer the following question per type of need you entered

What forms of training do you need for Need 1?

- ☐ MSc/PhD courses
- ☐ Digital courses
- ☐ Physical training courses
- ☐ User meetings/courses
- ☐ Summer schools
- ☐ On demand training/tutorials
- ☐ Other _____
- ☐ Other _____
- ☐ Other _____

Service 10 Additional service(s)

Describe any additional service(s) currently offered at your institute that have not yet been mentioned in sections 1-9

_____

_____

_____

_____

_____

Do you expect changes in the described service in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please describe the changes that might occur

_____

_____

_____

_____

_____

Please describe any relevant infrastructure regarding these additional services

_____

_____

_____

_____

_____

Do you expect changes in the infrastructure in the coming 5 years?

- O Definitely not
- O Probably not
- O Might or might not
- O Probably yes
- O Definitely yes

Please describe the changes in infrastructure that could occur in the coming 5 years:

_____

_____

_____

_____

_____

Human Resources for Service 10

The next questions are about the human resources available for additional service(s)

What personnel do you have currently available for the additional services? Describe the positions.

- ☐ Position 1 _____
- ☐ Position 2 _____
- ☐ Position 3 _____
- ☐ Position 4 _____
- ☐ Position 5 _____
- ☐ Position 6 _____

In the questionnaire you get the possibility to answer the following question per type of personnel you selected. For the question on FTE please fill in a number (1 decimal allowed)

Describe the expertise field/skills for the position of position….

_____

_____

_____

_____

_____

What is the level of education for the position of position …

- O PhD (Professor)
- O PhD (Senior Researcher)
- O PhD (Researcher)
- O PhD
- O MSc
- O BSc
- O Technician/Engineer
- O Lab Assistant
- O Other _____

Indicate the FTE available for the position … to provide service 10.

_____

Do you expect changes for the position …. in the coming 5 years in:

	Decrease	Stay the same	Increase
Available skills/expertise	O	O	O
Level of education	O	O	O
FTE	O	O	O

PILOT

The EIRENE Research Infrastructure (RI) is in the preparation phase (PPP, from 2022-2025). One part of this phase is to identify Universities/Institutes that would like to participate in a pilot. In this pilot, the procedures will be tested on how the RI can be accessed by a potential client (stakeholder) with a specific research question.

For example, when you have a specific analysis you want to put forward as a service via the RI, the whole process from the online submission expressing interest and the intention to solve a research question from the client until the delivery of the results by the RI will be tested.

In the years 2024/2025 the pilots will be planned. Here, the RI will establish the online system to submit proposals and identify the services most urgently needed by potential stakeholders and the RI services most developed to be delivered within the pilot. We would expect you to test the system and provide your critical feedback plus information on what services of the RI you would be most interested; time commitment should be limited to a couple of hours).

From 2026 onwards it is intended that the pilot will be executed as part of the Implementation Phase. These pilot results will be very important in providing feedback on the process, optimizing the access procedures, and deciding whether the EIRENE RI works in practice and can enter the Operation phase.

Are you interested in participating in the pilot(s) planned within EIRENE? Your answer is not binding but considered as an informal expression of interest.

- O Yes
- O No
- O Maybe

Warning/End of Questionnaire

You are at the end of the survey. If you want to change or adapt later, please do not go to the next page but close at this point. You can continue your session using the same link. Your input is stored as long as you do not delete your cookies. The survey is open for 60 days from the moment of first time opening.

If you have any comments or feedback on this survey let us know!

_____

_____

_____

_____

_____