



EIRENE RI

EIRENE RI

Research Infrastructure for Environmental Exposure assessment in Europe

Website

<https://www.eirene-ri.eu>

Headquarters

Masaryk University (RECETOX Centre)
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Brno

Legal Status

None

Type

distributed

Access

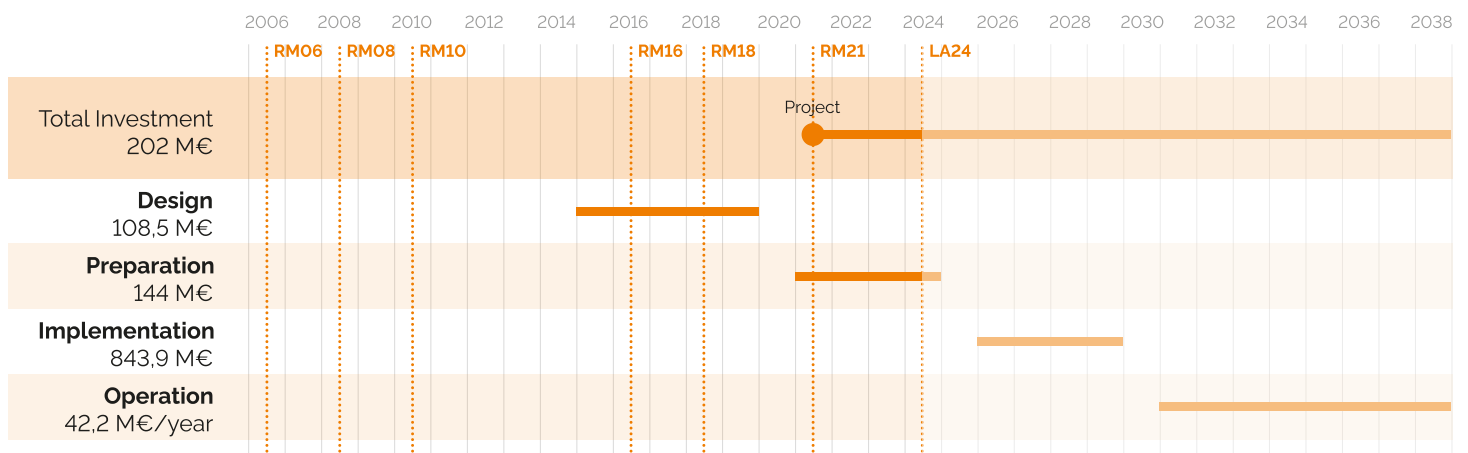
remote, virtual,
physical

DESCRIPTION

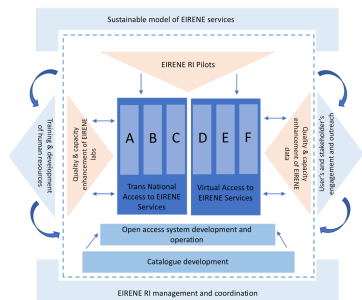
EIRENE RI is pioneering the first European distributed research infrastructure focusing on the human exposome by bringing together more than 50 institutions from 20 European countries and the USA. EIRENE brings the complementary capacities available in Member States and harmonizes and upgrades them to effectively address current scientific and societal challenges in the environment and health domains. The exposome measures the environmental exposures (i.e., non-genetic factors) encountered by individuals to understand their impacts on phenotype and health. It considers the various sources of exposure, such as diet, lifestyle, and the environment. It can be measured in the environment (external component of the exposome) and the body (internal component of the exposome). Exposome-driven approaches go beyond the standard environmental health approaches, promoting the discovery of unforeseen links between stressors and impacts. They consider an individual's life course, community, and ecosystem. However, existing methodologies fall short, highlighting the need to develop new analytical capacities and computational tools for analyzing large datasets. The research findings will help elucidate the non-genetic factors behind the development of chronic conditions, thereby improving the health of citizens. EIRENE's mission to develop and operate a research infrastructure in the exposome field is unique in Europe. The exposome concept is also gaining increased awareness and interest within European agencies, such as EFSA, ECHA, EEA, JRC, and national agencies. Specifically, EU and MS agencies are

deliberating on integrating exposome considerations into regulatory decisions. EIRENE works closely with the European Partnership for Assessment of the Risk of Chemicals (PARC). PARC conducts environmental and human biomonitoring across Europe, poised to leverage EIRENE's analytical capacities. EIRENE collaborates closely with European research clusters, notably the European Human Exposome Network (EHEN). EHEN projects explore the health ramifications of urbanization, working life, child development, mental health, immunity, and respiratory diseases. They also develop tools and informatics platforms for analyzing vast datasets on environmental exposures and their health impacts. EIRENE also cooperates with the International Human Exposome Network (IHEN), a project to enhance global research and cooperation on the exposome. The partnerships, clusters, and projects mentioned above generate substantial volumes of data and contribute to advancing toolboxes and methodologies. Nonetheless, given their finite duration, EIRENE emerges as a highly viable solution for ensuring the sustainability of their activities after they end. The specific objectives of EIRENE are to 1) Measure and Model the Exposome by assessing its components and performing toxicokinetic modeling to understand exposure dynamics; 2) Assess Biological Effects and Health Impacts by utilizing methodologies such as toxicology and New Approach Methodologies (NAMs), population studies and cohorts; 3) Ensure Cohorts Sustainability; 4) Develop Data Storage, Management, and Computational Platforms.

TIMELINE & ESTIMATED COSTS



POLITICAL SUPPORT



Lead

CZ

Prospective member

AT, BE, DE, ES, FR, GR, IS, IT, NL, SK

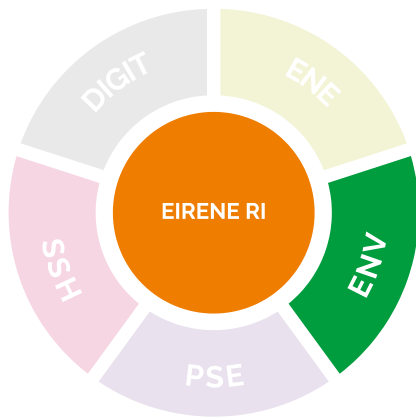


IMPACTS

EIRENE began its journey by completing its concept and design phases from 2015 to 2020. In 2021, it was included for the first time in the ESFRI Roadmap Update within the Health and food domain, qualifying EIRENE for funding opportunities through Horizon Europe's infrastructure calls. Preparatory phase: 2022-2025 (EIRENE PPP project) In October 2022, the three-year preparatory phase project, EIRENE PPP, commenced under the HORIZON-INFRA-2021-DEV-02-01 call, with the overarching goal of readying EIRENE for implementation. EIRENE PPP addresses critical legal, governance, financial, strategic, and technical elements essential for establishing EIRENE, aiming to secure both political and financial commitments to ensure its long-term viability. The specific objectives of the preparatory phase project are to: 1) Formulate the scientific concept and delineate the core pillars of EIRENE, encompassing national nodes and central facilities; 2) Outline the technical architecture, services, user communities, access protocols, and tools; 3) Establish the data infrastructure and models, incorporating a data management plan and ethical guidelines; 4) Forge the governance structure, legal framework, and a resilient funding model; 5) Cultivate human resources and pinpoint training requirements; 6) Amplify the socioeconomic impacts of EIRENE, engage stakeholders, and fortify knowledge dissemination. Implementation phase: 2026-2030 During the Implementation phase, EIRENE will transition to full operational capacity, establishing the ERIC legal entity. This transition will be accompanied by the formation of pertinent governing, executive, and advisory bodies, as well as the establishment of the EIRENE RI Head office. Facility upgrades will be undertaken as required, and services, methodologies, data models, workflows, ethical principles, and management plans will be introduced. National Nodes will be activated, while efforts will be made to engage the user community and design training and capacity-building programs. Additionally, political and financial support will be sought from EIRENE RI members not yet integrated into EIRENE-ERIC, ensuring comprehensive backing for the initiative's objectives. Operation phase: 2031 to 2050 In 2031, EIRENE will be fully operational, providing access to world-class infrastructures, tools, and services necessary for advancing excellent science in the cross-cutting domains of Environment & Health.

SERVICES

EIRENE offers a comprehensive range of services organized into six primary pillars, encompassing a total of 10 service types. These pillars are further categorized under Transnational Access (TNA) and Virtual Access (VA), each serving distinct needs within the exposome research domain. In TNA, Pillar A focuses on Chemical profiling, offering services that include collecting and providing samples for determining exogenous substances and measuring chemical mixtures in humans and the environment. Pillar B, Toxicological profiling, specializes in quantifying toxicity and elucidating pathways and modes of action across various testing methods. Meanwhile, Pillar C, Biological profiling, provides measurements of exogenous substances and conducts omics-based analyses to identify biological response markers. In VA, Pillar D concentrates on Environmental data, providing databases and exposure maps detailing environmental factors like pollutants, temperature, and socio-economic indicators. Pillar E, Human data, offers access to cohort study and survey data on an individual level. Lastly, Pillar F focuses on Tools, delivering biostatistical and bioinformatics platforms to investigate exposome and human health interactions, along with ensuring FAIR cataloging of exposome data. It's worth noting that Training offerings in exposome research and Training needs are separate service types not associated with any specific pillar, emphasizing EIRENE's commitment to capacity building and skill development. Additional services encompass any supplementary offerings provided by EIRENE to cater to diverse research requirements.



EIRENE collaborates extensively with various ESFRI infrastructures, predominantly through European projects. As a partner in the INTEGRATE-LMEDC project (HORIZON-INFRA-2023-DEV-01-01) led by BBMRI, EIRENE contributes to the development of a novel approach for managing, integrating, and sustaining large-scale medical cohort studies. This initiative aims to expedite scientific and medical advancements in Europe and globally, with ECRIN and EBRAINS also participating as project partners. Furthermore, EIRENE collaborates with ELIXIR, utilizing its open Galaxy platforms, which are crucial for its operations. ELIXIR's recent expansion into toxicology aligns seamlessly with EIRENE's objectives, facilitating improved data exchange and knowledge dissemination. EIRENE enhances ELIXIR's capabilities by providing additional data in exposomics and hazard-related insights. Additionally, EIRENE partners with ACTRIS, which offers essential data on short-lived atmospheric constituents, enriching our understanding of the external components of the exposome. ACTRIS's contributions synergize with EIRENE's capacities, facilitating a comprehensive evaluation of environmental exposures. Moreover, EIRENE participates in the IRISCC project (HORIZON-2023-SERV-010-01), Integrated Research Infrastructure Services for Climate Change Risks, coordinated by ACTRIS. This collaboration bolsters our involvement in critical climate change research endeavors. EIRENE is also engaged in several thematic initiatives, including the ongoing process of joining BEERI, the Board of European Environmental Research Infrastructures, and LS-RI, a consortium of European life sciences research infrastructures. Additionally, EIRENE actively participates in the ERIC FORUM's activities, fostering collaboration and knowledge exchange among established and emerging ERICs to advance the full implementation of the ERIC regulation.