



**BrainHealth**  
*PARTNERSHIP*

## **Analysis report**

Achievements, synergies and challenges of previous and ongoing initiatives in the Brain Health area, surveys and national roadmaps

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## INTRODUCTION

This analysis report has been produced in the context of the Coordination and Support Action (CSA) Brain Health (2023-2025, funded under Horizon Europe) that sets the foundations for the future European Partnership Brain Health (EP Brain Health -expected to run between 2026 and 2035).

According to the World Health Organisation (WHO), Brain Health is the “state of brain functioning across cognitive, sensory, social-emotional, behavioural and motor domains, allowing a person to realise their full potential over the life course, irrespective of the presence or absence of disorders”.

The scope of the mission of the EP Brain Health is thus extremely vast. Therefore, to build a clear and relevant vision that fits ambitious objectives, it is essential to finely analyse the state of brain health research in Europe today.

Our analysis focuses on European (section I) and National (sections II and III) initiatives. At the European level, we have analysed the objectives and achievements of previous and ongoing European initiatives in the Brain Health space funded under FP7, H2020 and Horizon Europe for the 2008-2023 period. These include JPND, the ERA-Net NEURON, HBP/EBRAINS, IMI/IHI and EBRA (section I). Based on key numbers and factual evidence, we aim to assess their complementarity, get inspired by the mechanisms and instruments underlying their successes, and identify their current limitations to propose processes to overcome them, in the future EP Brain Health. At the national level, we have analysed ongoing initiatives through two complementary approaches. We have circulated a survey to ministries and funders in the EU member states and analysed the results to generate a snapshot of current topics of interest and suggested actions in the Brain Health field (section II). In parallel, we have performed a systematic analysis of national roadmaps in the field of Brain Health (2008-2024) to gain insight into the national perceptions of research priorities and their evolution over time (section III).

Taken together, results from this analysis will constitute one of the reference documents for the writing of the Strategic Research and Innovation Agenda (SRIA) (expected by September 2024) supporting the establishment of EP Brain Health.

## I-Strategic analysis of previous and ongoing initiatives

The present analysis aims to give a broad perspective on the strategic objectives and achievements of previous and ongoing initiatives dedicated to brain research. The results will be used to define the strategic goals and approaches of an ambitious Strategic Research and Innovation Agenda (SRIA) for Brain Health in Europe, in an evidence-informed manner.

The present analysis makes use of previous reports and analyses issued by the initiatives themselves (1; 2; 3; 4; 5; 6; 7) and does not consider the specific scientific outcomes of funded research projects (analysed elsewhere (8; 9; 10)). Instead, this analysis focuses on the practices and achievements of the international initiatives and their overarching objectives.

The European Union (EU) and its Member States have made considerable investments in brain research leading to a significant increase of initiatives in this area. The strategic initiatives analysed here regroup some research funding initiatives such as:

- the Network of European Funding for Neuroscience Research **ERA-Net NEURON COFUND 2** (hereafter, the **ERA-Net NEURON**) and
- the EU Joint Programme for Neurodegenerative Disease Research **JPI JPND/JPcofuND 2** (hereafter, **JPND**).

But also, large research initiatives such as:

- the Future and Emerging Technologies (FET) Flagship **Human Brain Project** (hereafter, **HBP**) and
- the **Innovative Medicines Initiative/Innovative Health Initiative** (hereafter, **IMI/IHI**)

And finally, a Coordination and Support Action (CSA):

- the **European Brain Research Area** (hereafter, **EBRA**).

IMI has the particularity of being a public-private partnership between the European Union, represented by the European Commission (EC), and the European Federation of Pharmaceutical Industries and Associations (EFPIA). Since 2021, it has been replaced by the IHI, an initiative based on the same principles as IMI, but with an even greater focus on cross-sectoral projects involving the biopharmaceutical, biotechnology and medical technology fields. In IHI, the public partner is the European Union, represented by the EC, while the industry associations are the European Trade Association representing the medical imaging, radiotherapy, health ICT and electromedical industries (COCIR), EFPIA, the European Association for Bioindustries (EuropaBio), the European trade association representing the medical technology industries (MedTech Europe) and Vaccines Europe.

The CSA EBRA was a catalysing platform for the brain research stakeholders (researchers, clinicians, industry, patients, governments, funders and public institutions) to streamline and better coordinate brain research across Europe while fostering global initiatives. EBRA enhanced coordination and collaboration among members that share the common goal of understanding the brain and its disorders by synergising brain-related projects and initiatives at both European and global levels, addressing gaps, supporting data sharing and access, and enabling the translation of research breakthroughs into innovations and health interventions, with the final aim to achieve critical mass and economies of scale.

Our analysis intends to make a coherent use of the available information for these initiatives, while considering their intrinsic individual differences. We have thus organised our analysis along the following common overarching objectives: **1-Advance scientific knowledge through cooperation; 2-Training and capacity building; 3-Promote interdisciplinarity and translatability, and 4-Advancement of Responsible Research and Innovation policies.**

## 1. Advance scientific knowledge through cooperation

As part of the strategy to strengthen the capacity and leadership of members of the European Research Area, the alignment of common research priorities and the facilitation of scientific cooperation is at the core of the programmes and initiatives analysed.

This strategy is declined in several actions spanning from

- a) implementing strategic agendas through transnational calls for research and collaborative public-public or public-private networking proposals,
- b) taking advantage of information and communication technologies to establish meaningful ties among different fields of brain research and,
- c) facilitating the establishment of national roadmaps in the field through cooperation.

The initiatives involve a large number of stakeholders comprising national, European and global brain researchers, neurologists, psychiatrists, people living with brain disorders, regulators, policy-makers, public research organisations, ministries, funding agencies, professional and patients' associations, foundations and industrial partners engaged towards common goals.

At the core of the mission of most of the analysed initiatives, the advancement of knowledge in specific brain research fields and the acceleration of innovation in the brain space were the main objectives. Their scientific focus was complementary since JPND is dedicated to neurodegenerative diseases, the ERA-Net NEURON to brain disorders, including neurological and mental disorders alike, with the exception of the ones treated by JPND, HBP was dedicated to the interface between neurosciences and computing technology, while the IMI was dedicated to health research and innovation in collaboration with industry, but not exclusively in the brain research area. The EBRA project focused on effective and efficient collaboration and cooperation among some of these initiatives (JPND, NEURON and HBP) as a key success factor to achieve brain research full impact and take advantage of the considerable amount of knowledge and innovative approaches generated, to foster their translation into new health interventions, without being slowed by complexity or by excessive fragmentation of efforts.



## 1.a. Establishment of a strategic research agenda

A cornerstone of the interaction among partners involved in the analysed initiatives is the adoption of a strategic research and innovation agenda which identified the common priorities that could be better approached through cooperative efforts. While guiding activities towards the achievement of the objectives of an initiative and optimising output via collaborative efforts, these agendas also reduce duplication of efforts and optimise resources.

The ERA-Net NEURON published two successive agendas focused on the challenges of brain disorders covering the period of 2015-2020 (11) and 2021-2025 (12) and addressing the need to understand disease mechanisms and progression, as well as to develop interventions focusing on translational neuroscience, neurology, psychiatry, and peripheral nervous system disorders. Three main areas were addressed: (i) understanding disease mechanisms, (ii) understanding disease progression, and (iii) interventions. The main activities were related to the analysis and integration of the complexity inherent to the organisation of the nervous system (including artificial intelligence in brain research), and to the understanding of the neuronal bases of cognitive functions and behaviour while also accounting for brain-body interactions, comorbidities, and resilience.

JPND published strategic and innovation agendas in 2012 (13) and a revised version in 2019 (14). The most recent one focused on improving prevention, diagnosis, treatment and patient care for neurodegenerative diseases and addressed five main areas: (i) the origins and progression of neurodegenerative diseases, (ii) disease mechanisms and models, (iii) diagnosis, prognosis and disease definitions, (iv) developing therapies, preventive strategies and interventions and (v) healthcare and social care.

HBP was a European Future and Emerging Technologies Flagship project that ran from 2013 to 2023. It pioneered a new paradigm in brain research, at the interface of computing and technology. It created the EBRAINS digital research infrastructure. HBP scientists outlined their goals in four main position papers (15; 16; 17; 18). They revolved around the following topics: (i) multi-level brain atlas and high-resolution brain models; (ii) multi-level brain models and simulation; (iii) brain plasticity, learning and adaption during the entire lifespan; (iv) neuromorphic brain

models for bio-inspired artificial intelligence; (v) cognition and behaviour; (vi) brain as part of the body; (vii) digital brain medicine and (viii) bridging the gap between human and machine intelligence.

IMI published a strategic research agenda in 2008 (19) and then in 2014 (20). IHI also published a strategic research and innovation agenda in early 2022 (21) focused on cross-sectoral precompetitive approaches to facilitate the creation of new products and services to prevent, intercept, diagnose, treat and manage diseases and foster recovery in areas of unmet public health needs, such as Alzheimer's disease. The activities covered, among others, (i) discovery of new molecules, mechanisms of action, processes, and technologies; development and testing of these discoveries; (ii) development of methodologies for assessment of safety, health outcomes or for health-economic evaluation; (iii) pre-standardisation activities; (iv) contribution to regulatory science as well as (v) pilots/proofs of feasibility including *in-silico* trials.

These agendas were prepared with the input of scientific experts and other key stakeholders in relevant fields and covered a large geographical representation with the goal of being inclusive concerning needs, strengths and approaches. The drafts were open for consultations with professional and patients' organisations.

The EBRA project, led by the European Brain Council (EBC), was created in 2018 as a first step to create synergies among some of these European initiatives. One of its major achievements has been the delivery of a European Research Inventory and Mapping Report (22), which provides insight into the brain research activities funded at the European level within the EU framework programmes FP7 and H2020, as well as the funding initiatives of JPND, the ERA-Net NEURON and HBP. This report was also used to establish the Shared European Brain Research Agenda- (SEBRA) (23), which compiles and updates the main priorities of the previously described initiatives, together with the voice of the brain community reflected in the "Consensus Statement on European Brain Research: The need to expand brain research in Europe – 2015" (24). The SEBRA addressed the need to (i) understand the healthy brain (including the fetal and ageing brain; using animal and human theoretical and computational models); (ii) unravel the interaction between brain, body and environment (multilevel approach from neuron to

behaviour; translational neuroscience) and (iii) fix the diseased brain (disease factors and models; large longitudinal based studies; effectiveness of prevention and treatment strategies). The SEBRA represents the basis for the definition of priorities in the context of the EP BrainHealth.

The SEBRA was cocreated with all relevant players in the brain research community, including scientific experts as well as representatives from neuroscience, neurology and psychiatry professional associations and patient organisations. The SEBRA was open for consultation with the public at large. The whole brain community was invited by the EBRA partners and third parties (EBC members) using social media (Twitter, LinkedIn, Facebook) and personal invitations, to join the open consultation. The open consultation community included individuals, associations, and organisations. Those are neuroscientists, neurologists, psychiatrists, persons with brain disorders (mental and neurological), scientific, professional, and patient organisations, research infrastructures and industry.

## 1.b. Implementation of scientific research agendas

### 1.b.1. Joint research funding

On the basis of their scientific research agendas, the analysed initiatives designed and conducted actions to tackle the identified gaps and challenges in the field. In this context, the main activity of the ERA-Net NEURON and JPND has been funding joint transnational calls (JTCs). The number of partners within a consortium in the JTCs is kept to a maximum of 5, with the possibility of adding a 6<sup>th</sup> partner from an underrepresented country for the ERA-Net NEURON; these numbers are 6 and 7 partners, respectively, for JPND. This specific consortium size allows multidisciplinary yet direct exchanges and is thus very appreciated by the research community. These JTCs focused on basic research, preclinical and clinical translational research as well as research on health and social care. More recently, the ERA-Net NEURON additionally launched JTCs for ethical, social, and legal aspects (ELSA) of neuroscientific research. Special emphasis has been given to identifying lines of research best suited for international collaboration, and to avoiding funding duplication at the national level.

Additional funding instruments corresponding to networking proposals developed by specialists with the specific aim to create or deepen knowledge on specific research fields and align approaches in complementary fields of brain disease are described in more detail in section 1.b.2.

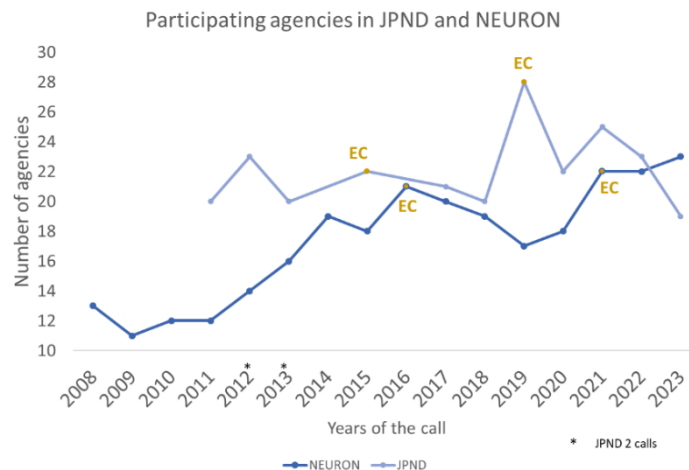
The topics of JTCs comprised a large spectrum of brain diseases, and implications of neuroscientific developments and overarching questions in the ELSA area, as detailed in **Table 1**.

JTC	JPND Calls	NEURON Biomedical	NEURON ELSA
2008	-	Neurodegeneration	-
2009	-	Technology Development	-
2010	-	Mental Disorders	-
2011	Optimisation of biomarkers and harmonisation of their use between clinical centres	Cerebrovascular Diseases	-
2012	Call 1-Identification of genetic, epigenetic and environmental risk and protective factors Call 2-Evaluation of health care policies, strategies and interventions	Novel Methods	-
2013	Call 1-Cross-disease analysis of pathways related to neurodegenerative diseases (ND) Call 2-Preventive Strategies related to ND	Mental Disorders	-
2014	-	Neuroinflammation	-
2015	Risk and protective factors, longitudinal cohort approaches and advanced experimental models	Neurodevelopmental Disorders	Ethical, Legal, and Social Aspects (ELSA) of Neuroscience
2016	-	External Insults to the Nervous System	-
2017	Pathway Analysis across ND	Synaptic Disorders	ELSA of Neuroscience
2018	Health and Social Care for ND	Mental Disorders	-
2019	Personalised Medicine	Biomarkers	-
2020	Novel imaging and brain stimulation methods and technologies related to ND	Sensory Disorders	ELSA of Neuroscience
2021	Linking pre-diagnosis disturbances of physiological systems to ND	Neurodevelopmental disorders	-
2022	Understanding the mechanisms of non-pharmacological interventions	Cerebrovascular diseases	-
2023	Large scale analysis of omics data for drug-target finding in ND research	Resilience and Vulnerability in Mental Health	ELSA of Neuroscience

**Table 1.** List of topics for the JPND and the ERA-Net NEURON joint transnational calls from 2008 to 2023. JPND specifically focuses on neurodegenerative diseases (ND).

The ERA-Net NEURON and JPND initiated their activities in 2008 and 2011, respectively, and have so far gathered a total of 31 partner countries and 42 funding agencies. Each funding organisation funds the research groups in its respective country. The activity of the ERA-Net NEURON and JPND resulted in a total of 39 calls, representing an investment of an approximative total amount of 429 M€ for 412 consortia involving over 1860 research teams working in those countries. Four of the biomedical JTCs were co-funded by the EC, and together they concentrated almost twenty-five per cent of the total invested funding; showing the leverage effect of participation of the EC in funding activities. This is partly due to the budgetary participation of the EC but also to the high attractiveness of such calls for funding organisations in member countries (**Figure 1**).

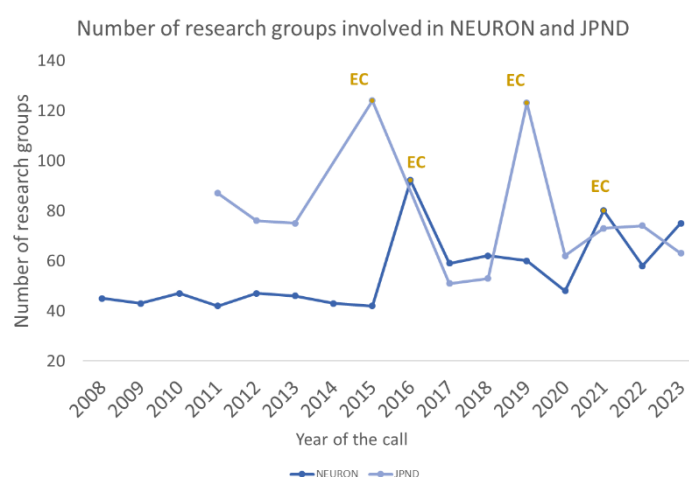
In addition to these figures, a sister initiative with a restrained focus on the support of the HBP development, FLAG-ERA, also invested a total of 17 M€ and funded 28 projects in the field through five JTCs.



**Figure 1.** Number of funding agencies participating in biomedical JTCs for JPND and the ERA-Net NEURON. EC, JTC co-funded by EC.

The actual value of the funding activities lies not only in the generation of knowledge in specific scientific fields, but also in increased collaboration among scientists in different countries. The launch of calls involved an increasing number of European and non-European partner countries and in particular a higher proportion and number of EU-13 countries, i.e., countries that joined the EC after 2004

(see section 1.c.1). This increased participation resulted in an increase of earmarked and spent budget, particularly evident for the co-funded calls. The visibility of these initiatives also produced more participation among scientists, as evidenced in **Figure 2**. As a result, the number of groups funded involved in collaborative research projects has steadily increased from 2008 until 2023 (**Figure 2**). Most of the funded clinical and academic centres, biomedical research laboratories or ELSA research groups maintained collaborations after the end date of the project, as evidenced in the follow up analysis of the outcomes of the calls. Indeed, both JPND and the ERA-Net NEURON established a comprehensive analysis of the outcomes of each call. For the ERA-Net NEURON, these analyses are communicated in the form of impact reports (8), allowing to measure at a glance the success and impact the projects have brought to the field. These reports focus on Key Performance Indicators, including for example (i) enhance excellent cooperation between scientists working in the field of neuroscience, (ii) promote multidisciplinary consortia, (iii) encourage translational research proposals (from bench to bedside), (iv) support the development of innovative or shared resources and technologies and (v) support research to develop new strategies for diagnosis, therapy, and rehabilitation procedures.



**Figure 2.** Number of research groups funded by joint biomedical transnational calls from JPND and the ERA-Net NEURON. EC, JTC co-funded by EC.

One of the goals of HBP was also to catalyse global collaboration by (i) creating a shared platform, EBRAINS, for researchers worldwide; (ii) developing Information

Communication Technology (ICT) tools to better understand brain function and contribute to Brain Health challenges and (iii) developing biology-based approaches to artificial intelligence. HBP contributed major advances in the fields of brain atlases, data modelling and management, high-performance computing, robotics and neuromorphic engineering (25).

IMI/IHI placed its funding action a step further in the translational chain and specifically funds collaborative public (e.g., academic institutions) – private (i.e., industry partners) projects. From 2008 to 2021, IMI funded 33 projects for a total amount of 702 M€ in the brain research field. These projects are related to drug target identification and validation, biomarkers, resources banking, clinical trials, safety and patient engagement in various brain disorders, including neurodegeneration, autism, psychiatric diseases and pain. Alzheimer's disease, a major societal burden, is particularly represented in the funded projects. IHI so far has funded 4 projects on brain health for a total of a bit more than 38 M€. IHI projects have a strong focus on exploiting the full potential of digitalisation and data exchange in healthcare and in fostering the integration of fragmented health R&I efforts, bringing together health industry sectors and other stakeholders to meet the needs of end-users, in particular the patients. These projects, reflecting the focus of IHI on healthcare and on addressing unmet public health needs, address areas such as clinical treatment decisions in multiple sclerosis and Alzheimer's disease for the benefit of patients and healthcare systems, and on biomarkers-based platforms for disease screening and diagnosis in Alzheimer's disease.

### 1.b.2. Transforming experts' recommendations into actions: networking groups and clusters

The success of biomedical research can be further enhanced by the harmonisation of procedures, experimental methodologies, and data management. For the translation and implementation of research outcomes into clinical practice, as well as for shaping future research priorities, it is essential to form synergies in the research community, to overcome gaps and hurdles, to build overarching networks, and to generate harmonising concepts and ideas. To address this, calls for networking groups (for JPND and the ERA-Net NEURON) and clusters (EBRA) were launched. Therefore, in order to enlarge multidisciplinary and translational

approaches, as well as to consolidate specific scientific communities sharing common interests in the brain health area, EBRA, JPND, and the ERA-Net NEURON funded 12 international networks (**Table 2**).

<b>Year</b>	<b>JPND</b>	<b>NEURON</b>	<b>EBRA</b>
<b>2014</b>	Inform Cohort Studies in ND Research	-	-
<b>2016</b>	Harmonisation and Alignment in Brain Imaging Methods for ND	-	-
<b>2019</b>	-	-	EPICLUSTER -Epilepsy PSMD - Prevention of severe mental disorders
<b>2020</b>	-	-	TRISOMY21 - Down syndrome BRAINFOOD - Bidirectional links between brain health and nutrition
<b>2021</b>	The impact of covid-19 on ND research	-	PREMOS - Predictive model systems ECIB - Imaging Biomarkers
<b>2022</b>	Concepts for health and social care research for ND	-	-
<b>2023</b>	Digital technologies in ND research and clinical practice	Chronic pain	-

**Table 2.** Themes funded through networking groups or cluster instruments. JPND specifically focuses on neurodegenerative diseases (ND).

These networking actions allowed interdisciplinary interaction among experts on strategic topics, by creating the conditions for real and effective cross-fertilisation, dialogue and consensus building. For example, in EBRA, each cluster organised 2-4 coordination activities (e.g., meetings, workshops, conferences) in which one or more needs of their community were addressed. In total, 18 cluster activities were organised. These activities allowed strengthening of the information flow in the clusters, acceleration of the exchange of experience on the ongoing and future research projects and dialogues between the cluster members, relevant stakeholders (e.g., transdisciplinary experts, industry, patient organisations, regulators,



research infrastructures, funders) and other major brain research initiatives and projects at European level and beyond.

The concrete outcomes of these international networking groups were white papers, guidelines and meeting reports published in high-level peer-reviewed articles (e.g., for EBRA clusters (26; 27; 28; 29; 30; 31). More generally, these international networks addressed major coordination needs and priorities, such as (i) extension of the network to additional stakeholders; (ii) engagement of the patients and caregivers; (iii) coordination of research infrastructures; (iv) coordination of resource-sharing in particular for (pre)clinical studies and for the data ecosystem; (v) funding and (vi) visibility. Altogether, these international networking initiatives have promoted scientific exchanges, strategic alignment, harmonisation and innovation but also focus on realistic specific actions, in particular future projects. Indeed, these networking groups/clusters have seeded further joint applications for funding (especially in EC calls).

### 1.c. Alignment of national, regional and global (European) research and programmes

In an effort to further align national strategies beyond the research topics addressed by the joint calls for proposals, high level interactions among partner representatives of ministries were established in the context of regular management and steering board meetings. Board meetings and networking events represented dedicated platforms allowing the exchange of information on national and global roadmaps. They also represented a vehicle to reach out to relevant regions and countries' representatives (e.g., Brazil, Japan, China, Indonesia, Singapore, Thailand, USA, India, ...) that were not involved in the analysed initiatives. The funding activities involved the participation of scientists in countries which were not part of the funding initiatives (Argentina, Australia, Botswana, Brazil, Canada, China, India, Lithuania, Nigeria, South Korea and USA) showing the large extent of scientific collaboration initiated by these European activities.

A different approach consists of developing knowledge on the state of the art in the relevant fields. Several activities were developed in this context. First, in the context of JPND, an analysis of opportunity was conducted through surveys and interviews to identify the degree of interest in engagement with JPND and the

potential for future collaboration with researchers in countries and regions not yet engaged in the consortia (e.g., Japan, Iceland) to inform and initiate strategic contact. Second, mapping exercises on research forces in neurodegeneration (32), and recently, on a wider spectrum of themes (22) were achieved by JPND and EBRA, respectively.

On the other hand, links were established with the main global organisations dedicated to policy on brain health, such as the world dementia council (WDC), the Organization for Economic Cooperation and Development (OECD), the World Health Organisation (WHO), the G7/G8, the United Nations (UN) and the United Nations Educational, Scientific and Cultural Organization (UNESCO). More specifically, throughout the whole duration of the EBRA project, the EBRA partners regularly connected and engaged with international stakeholder networks through meetings, conferences, and other strategic activities to leverage and align efforts and to maximise efficiency and impact. High-level meetings addressing representatives from the European Union (EU), stakeholders, Member States, and global institutions have taken place to foster a dialogue and to explore and facilitate the implementation of the Shared European Brain Research Agenda (SEBRA).

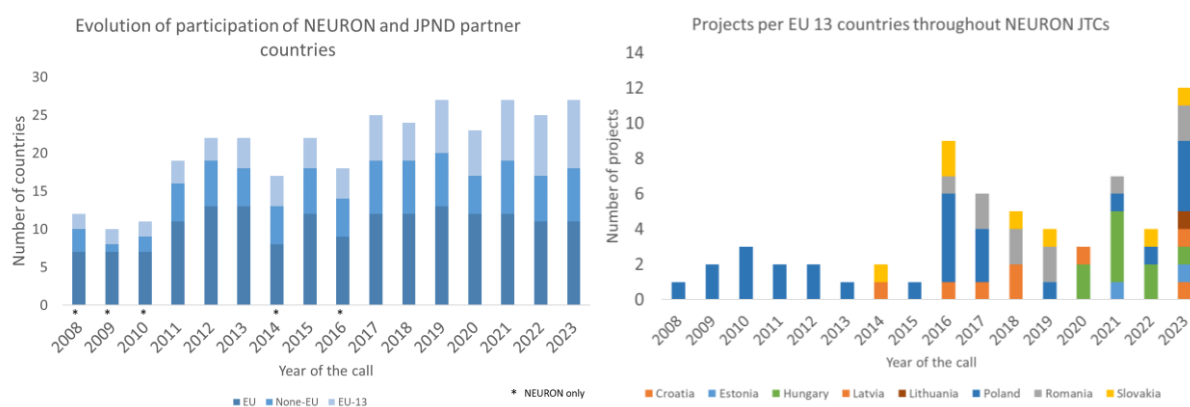
The EBRA global engagement was embedded: (i) in the EBRA consortium through its partners and the third parties/members of EBC and (ii) in the EBRA communication and dissemination strategy (i.e., international conferences). Thus, the EBRA progress and outcomes were annually showcased and discussed with the international brain research community at international conferences, such as the ones organised by the Federation of European Neuroscience Societies (FENS), the European Psychiatric Association (EPA), the European Academy of Neurology (EAN) or the Europe, Middle East, and Africa Chapter of the International Federation of Clinical Neurophysiology (EMEAC-IFCN).

### 1.c.1 Promoting the participation of EU-13 countries

Special attention has been dedicated to strengthening the involvement of EU-13 countries and accelerating their integration in European initiatives through the facilitation of the integration of research groups to JTCs (see section 1.b.1) but also through the identification of strengths and hurdles specific to the communities in these countries. This was achieved *via* the organisation of specific

networking events and invitations to steering board meetings and symposia (e.g., for JPND, representatives for Estonia, Serbia and Slovenia for a plenary session at the midterm symposium in 2022).

This double bottom-up and top-down approach resulted in an increased level of scientific collaboration, evidenced by increased participation of EU-13 countries to the JTCs organised by JPND and the ERA-Net NEURON (**Figure 3**, left panel, light blue), as well as by increased number of research groups from EU-13 countries represented in funded consortia (e.g., for the ERA-Net NEURON, **Figure 3**, right panel). The integration of these countries has been such a success that the term EU 13 countries is no longer in use, as it is now obsolete.



**Figure 3. Left,** Participation of funding partners (EU, Non-EU and EU-13) to JTCs in JPND and the ERA-Net NEURON. **Right,** Number of projects funded by EU-13 countries per JTC of the ERA-Net NEURON. Both figures show a substantial increase in the number of EU countries participating and the successful integration of their research groups.

## Summary

- A strategic research agenda is a key component in the optimisation of efforts towards achievement of the specific objectives of the initiatives analysed
- Transnational funding, in the form of JTCs or WGs/clusters, has become a key resource to the scientific community, with high participation of countries and research groups, in particular for the calls co-funded by the EC
- Measures have been developed to ensure the representation of all European countries, but also to extend the reach of the initiatives outside of Europe.

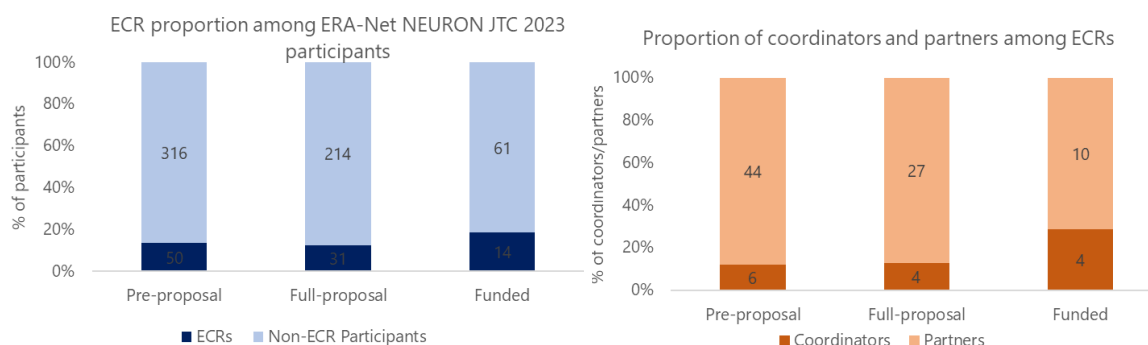
## 2. Training and capacity building

Capacity building through training and networking were identified as key enabling implementation strategies in all of the initiatives analysed. The activities were diverse and aimed at early career researchers as well as more established professionals. The promotion of collaboration among disciplines was at the core of these activities.

### 2.a. Support and training opportunities for early career researchers (ECRs)

The participation of ECRs in the activities supported by the initiatives has evolved positively. In the context of the ERA-Net NEURON, several lines of action addressing the different stages of early career development were established. First, in partnership with 'CAJAL Advanced Neuroscience training', specific Cajal training courses have been sponsored by NEURON stipends for students or postdocs working in funded research groups since 2018 (33). Second, since 2009, an award has been designed as a form of support and encouragement for ECRs. NEURON partner organisations issue this award annually to recognise the most remarkable and outstanding scientific publications by ECRs in the field of disease-related neuroscience (Excellent Paper in Neuroscience Award, EPNA, (34)). The awardee receives a prize of 3,000 €, and an invitation to present the paper at a conference, including travel support. These conferences are the FENS forum each even year, and the large Midterm symposia of the ERA-Net NEURON each other year. Third, funding procedures have evolved from simple encouragements for ECRs to participate in the research consortia in the JTC call texts, to the actual addition to evaluation criteria. The latter had an obvious impact on increased successful participation of ECRs to consortia. As an example, in 2023, 20 per cent of funded consortia in the ERA-Net NEURON JTC were led by an ECR (**Figure 4**), as defined by criteria inspired by the European Research Council (ERC). JPND favoured a different strategy, in which support was given to exchanges of ECRs (between 2 and 18 months) for training purposes between research groups within a consortium. In both initiatives, ECRs were invited to actively participate to Midterm symposia (e.g., the ERA-Net NEURON covers travel & accommodation costs) along with

more experienced researchers from multiple disciplines, to specific events or to targeted training sessions (35; 36).



**Figure 4.** Participation of ECRs in the JTC 2023 of the ERA-Net NEURON. **Left,** Proportion of ECRs and non-ECRs among all the participants at the different stages of evaluation. **Right,** Proportion of coordinators and partners among ECRs at the different stages of evaluation.

HBP created a learning programme (37) dedicated to young researchers working in neurosciences, communication technologies and medicine, as well as specific EBRAINS training events with hands-on sessions to learn how to use the services and tools provided by the infrastructure. Moreover, HBP and now EBRAINS have organised web-based courses on neuroscience, medicine, cognitive systems and information and communication technologies (38) for ECRs who are not specialised in this field, as well as courses on the subjects of ethics and intellectual property rights, translation and patenting of research.

Through its EMTRAIN programme (see section 2.b), IMI implemented a workshop for ECRs to learn more about industry needs. Training resources (e.g., PRISM2 master classes (39); EQIPD e-learning platform (40)) and training of young researchers have been included in many IMI brain projects (e.g., training provided via the clinical trial network of the AIMS-2-Trials project (41)). Furthermore, a large number of PhD students have worked and been engaged in these projects, and IHI holds an online event to showcase how working in public-private partnerships like IMI projects can boost the professional development of ECRs (42).

## 2.b. Transdisciplinary training for established professionals

In the context of the ERA-Net NEURON, a complete training module was developed for patient reviewers to encourage this valuable group to participate in peer review panels. Since 2021, annual online workshops aim to foster a growing group of patients, family members and caregivers as procedural competent patient reviewers (43). Specifically welcomed was a session led by a communications trainer, to improve communication skills among the group. Response to the workshop was overwhelmingly positive, with attendees reporting a clear understanding of the role of a patient reviewer and the benefits of Patient and Public Involvement (PPI) in research, as well as greatly improved confidence in communicating with scientific experts.

The European Institute for Theoretical Neuroscience (EITN), is another education and training structure created within the HBP framework, which provides visiting programmes, as well as Spring and Fall courses to learn about brain modelling and computational neuroscience, with several dozens of attendants at each course (44).

IMI implemented important education and training initiatives for continuing development in biomedical sciences (45). For example, their EMTRAIN programme established a pan-European platform for education covering the whole life cycle of a medicine, from basic science to clinical development, all the way to pharmacovigilance. Today, it gathers the most comprehensive online postgraduate course catalogue on this topic in Europe. In parallel, the PharmaTrain project developed shared standards and guidelines for the development of post-graduate courses in medicine development. Additional programmes such as the Eu2P and the SafeSci-MET projects offer training in pharmacovigilance and pharmacoepidemiology, and safety sciences, respectively.

In addition, 'Open Science' workshops are part of the ERA-Net NEURON's strategy to implement Responsible Research Innovation (RRI) (46). These training workshops (~20-25 participants) were newly developed and started in 2019, and were conducted until 2021 under the umbrella of EBRA. Since 2022, the ERA-Net NEURON has organised these workshops on open science-related topics, reproducibility and neuroethics for funded research groups. The workshops are hosted by the Centre for Responsible Research (QUEST) in Berlin. In years of ELSA JTCs, representatives of the ELSA projects participate, further increasing the

interdisciplinarity of the audience. Programme parts are matters of experimental design, public and patient involvement (PPI) in research, and relevant European Research Infrastructures (e.g. INFRAFRONTIER, the European Mouse Mutant Archive (EMMA), and the German Mouse Clinic). The ‘hands-on’ tutorial sessions on the generation of a Data Management Plan have been particularly popular. Overall, these initiatives supporting RRI open science and networking have received overwhelmingly positive feedback.

IMI was also interested in these topics and implemented two training programmes in this area (45). The EQIPD project aimed to deliver simple recommendations to ensure the quality and reproducibility of data generated in medical research, without impacting innovation; while the FAIRplus project aimed to deliver guidelines and tools to facilitate the application of FAIR (Findable, Accessible, Interoperable, Reusable) principles to data management. Finally, IHI developed a guide to help researchers in IHI/IMI projects to maximise the regulatory impact of the results of their research (47). This guide is of relevance and value for the research community also beyond the IMI/IHI projects.

## 2.c. Networking

One of the most relevant channels for capacity building through knowledge exchange has been the organisation of networking events bringing together scientists from broad backgrounds, patients’ representatives and other stakeholders, including representatives of industry, European infrastructures, as well as relevant European projects working on regulatory aspects (e.g., (48)).

JPND organised two midterm symposia in 2019 and 2022 involving representatives of the funded projects, including ECRs, scientific advisory board (SAB) members, patients’ representatives and representatives from non-JPND countries (36); the objective was to liaise, encourage networking and facilitate knowledge exchange and best practices in the field of neurodegenerative diseases research. Since 2012, the ERA-Net NEURON has organised annual midterm symposia for the funded projects of JTCs, bringing together established and young researchers as well as offering workshops and special sessions with a focus on the scope of one of the respective JTCs. Beyond networking programme parts like guided poster tours, the EPNA award ceremony and a poster prize ensured a particular emphasis



on ECRs in active roles concerning the dissemination of their scientific findings. These symposia have been well-attended successful events, resulting in the establishment of new collaborations and sometimes even seeding future clusters and communities.

Furthermore, the ERA-Net NEURON established the NEURON Partnering tool (49), a database for scientists, industry, patient organisations and other stakeholders to find partners for their research within neuroscience; and the NEURON project directory (50), where valuable information about all funded projects within the Network is provided.

HBP, and now EBRAINS, have organised yearly Young Researcher Events and student conferences attended by hundreds of young researchers, where ECRs get the chance to present their own research and engage in extensive discussions with peers and principal investigators from within and outside the initiative (51).

During the EBRA project, annual events were held during the Brain Awareness Week to engage with the general public and the brain community. These events highlighted the importance of brain research. In 2021, the Brain Innovation Days also housed the first European Brain Summit, a collaborative event of two EBRA partners: EBC and HBP. This was a unique opportunity to explore the challenge of understanding the brain and the role that Europe should continue to play in this endeavour. High-level speakers and experts presented their vision of the future of European brain health research in the context of the European Health Union. The objective was to create a genuine momentum for scientific breakthroughs and policy advancement to the benefit of European citizens. Finally, the EBRA final conference (52) brought the wider brain research community and key players together, to discuss the key aims of the project: (i) the current state of brain research in Europe, (ii) increased patient engagement and public awareness, (iii) research infrastructures and data sharing and (iv) the future potentials and need for a brain health partnership going forward.



## Summary

- As they represent the future of brain health research in Europe, significant effort has been devoted to the training and engaging of ECRs to foster their significant contribution to the competitiveness of Europe in this field
- Training in current best practices and overarching topics issues has also been offered to more established research professionals, as well as to patients and caregivers.
- Networking tools and events have been developed to encourage collaboration within a field but also to build bridges between communities.

## 3. Promote interdisciplinarity and translatability

All the initiatives analysed focused on developing research to collect knowledge to fight against brain disorders. One of the key approaches was to promote interdisciplinary collaboration and to involve professionals in clinical and health care sectors, private sector, citizens and researchers in many nations. In general, enabling these interactions required the creation of platforms, infrastructures of shared knowledge and large involvement of relevant stakeholders with a particular emphasis on patients and carers.

Concerning funding activities, JPND, IMI/IHI and the ERA-Net NEURON have been designed with the aim to increase the translational aspects of research, and encourage the interaction of basic, ethical, social, legal and clinical researchers working in universities or research institutions, medical doctors in hospitals or public health centres, and industry, with the overarching objective to fill the gap between the generation of knowledge in specific fields of brain health and clinical and care needs. Together with the strong interaction with patients' associations, these actions have continuously strived to reinforce the relevance of actions for patients and carers life.

Enhanced multi-stakeholder engagement in the brain ecosystem is needed to foster dialogue, exchange knowledge, accelerate investment in research and innovation, facilitate business development and showcase ongoing work. In 2020, the Brain Innovation Days were created to tackle these challenges (53). EBRA played a

major role in the birth of the Brain Innovation Days, which were launched as an instrument to bring the brain ecosystem together to foster dialogue, exchange knowledge, accelerate investment in research and innovation and facilitate business development.

### 3.a. Supportive infrastructures and platforms

One of the major achievements of HBP has been the creation of an ICT-based research infrastructure, EBRAINS, designed to facilitate research collaboration to advance and accelerate progress in the field of neuroscience, brain research, and brain health, via the sharing of software tools, data and models (4). EBRAINS, included on the European Strategy Forum on Research Infrastructures (ESFRI) Roadmap, includes six series of scientific services, namely 1) data integration, sharing and atlas, including the most accomplished human brain atlas so far; 2) a suite of advanced tools and computational models for multiscale data analysis, 3) workflows for the integration of data, tools and models; 4) models of disease for uncovering mechanisms and biomarkers of neurological and psychiatric disorders; 5) computational disease models that allow researchers to simulate disease processes and test potential therapeutic interventions *in silico* before moving to clinical trials; 6) access to High-Performance Computing and Neuromorphic Computing to address the increasing computational demands of the neurosciences community. EBRAINS is pivotal for establishing further links with neuroscience and brain medicine communities, in particular to house and make widely usable clinical research data on brain diseases.

JPND's strategy has been two-fold. On one hand, they supported the creation of databases to share knowledge on relevant resources for preclinical and clinical research; e.g., an inventory of cohorts for neurodegenerative research and another one on relevant animal models (54; 55). On the other hand, they also focused on identifying and then facilitating access to relevant technology platforms and infrastructures (56). First, they performed a mapping exercise of existing national infrastructures in 2017. Then, in 2019, a meeting was organised to address infrastructure challenges in the brain imaging field. It gathered seven WGs funded by JPND (2016 call: "Working Groups for Harmonisation and Alignment in Brain Imaging Methods for Neurodegeneration") and EU infrastructures, such as the

European Advanced Translational Research Infrastructure (EATRIS), the European Clinical Research Infrastructure Network (ECRIN), as well as the Canadian Dementia Imaging Protocol (CDIP) and HBP. The objective was for the working groups to discuss goal alignment, future developments and challenges of brain imaging they had identified, and to share their recommendations in the framework of future JPND actions. The need for standardised definitions and protocols, for harmonisation of efforts and for increased dissemination to promote adoption by the neuroscience community was emphasised. It was suggested to develop infrastructures designed with and for researchers that could support existing imaging data repositories, issue recommendations and help with ethical and legal questions. Existing infrastructures, such as ECRIN and the EOSC (European Open Science Cloud) EU consortium, together with CDIP and HBP were suggested as possible key partners for such actions.

The EBRA consortium promoted links to and use of infrastructures in multiple ways: (i) in the selection of the last two clusters: PREMOS (Predictive Model Systems) and ECIB (European Cluster for Imaging Biomarkers), (ii) by inviting representatives from relevant existing infrastructures, platforms and biobanks to five dedicated cluster activities where the topic of research infrastructures, biobanks and platforms was addressed and (iii) by organising a workshop on data sharing (“Everything You Always Wanted to Know About Data Sharing”).

The PREMOS cluster is formed based on several large networks and EU-funded consortia, which join forces to propel disease modelling capacities and expertise for neuroscience research in Europe and beyond. One of those networks is the INFRAFRONTIER Research Infrastructure ([www.infrafrontier.eu](http://www.infrafrontier.eu)).

The European Cluster for Imaging Biomarkers (ECIB) forges a complementary and synergetic harmonisation alliance across major European consortia, networks and platforms engaged in the multicentric collection, curation, transfer, and analysis of “big imaging data”. Specifically, this cluster gathers “big imaging data” projects across funding programmes such as Horizon, JPND (6 JPND brain imaging consortia, 1 JPND cohort), the ERA-Net NEURON and IMI. These projects are supplemented by National Neuroimaging Platforms of France, Italy, Germany and Sweden. Its ambition is to achieve transformative leaps in the translation of “big

imaging data”-research into scientific and medical innovations by creating critical synergies between neuroimaging projects at both European and global levels.

In parallel with the creation of the ECIB cluster in 2021, JPND has continued to interact with several European Research Infrastructure Consortium (ERIC). ECRIN and EATRIS have confirmed their willingness to contribute to the harmonisation and alignment of imaging at the European level. In 2021, two separate meetings were held with the head of ECRIN and French representatives of EBRAINS to discuss issues related to harmonisation and alignment and the potential contribution of ECRIN and EBRAINS to this endeavour. Further efforts will also be pursued with Eurobioimaging and Elixir to capitalise on their recognised expertise in medical imaging, data handling and storage.

The outcome of EBRA cluster meetings focused on research infrastructures (RIs) and the associated workshop was that the utilisation of RIs (see **Table 3**) still needs support from all sides, e.g. from the ERIC Forum by providing comprehensive information on all available RIs including procedural, technical and financial aspects, and also from funding organisations by promoting the knowledge of RIs. The feedback from participants at the interactive events was very positive, but they were often also surprised by the already available tools and technology. A continuous effort is thus required to bring the RIs to the researchers’ attention and *vice versa*.

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**Coordinated Research Infrastructures Building Enduring Life-science Services (CORBEL) project**

**Human Brain Project (HBP) Neuroinformatics Platform, Medical Informatics Platforms, Virtual Brain Cloud, Human Intracerebral EEG Platform**

**Platform GridSAM**

**European Distributed Infrastructure for life--- science information (ELIXIR)**

**Biobanking and BioMolecular resources Research Infrastructure (BBMRI)**

**European Infrastructure for Translational Medicine (EATRIS)**

**European Clinical Research Infrastructure Network (ECRIN)**

**Infrastructure for mouse disease models and phenotype data (INFRAFRONTIER)**

**European Research Infrastructure Consortium (ERIC) Forum**

**European Strategy Forum on Research Infrastructures (ESFRI)**

### **European Open Science Cloud- Life (EOSC-Life)**

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#### **EBRAINS**

**Multicenter Neuroimaging Platform – CATI**

**German Neuroimaging Network - DZNE NNN**

**Italian Multicenter Neuroimaging Platform - RIN**

**Canadian Dementia Imaging Protocol (CDIP)**

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Table 3. List of European Research Infrastructures that were involved in the EBRA activities.

### 3.b. Links between basic, clinical, public health and social research

To support the inclusion of stakeholders with the capacity to accelerate the translatability of results, representatives of diverse communities participate in consulting and executive bodies; e.g., industry representatives and patients' associations. The scientific advisory board (SAB) also includes scientists representing a broad palette of expertise in medical, biological and social sciences. Moreover, management and executive boards involve members of diverse research, health and innovation ministries, institutes, public funding bodies and foundations.

### 3.c. Patient involvement

Engagement with patients and interactions with patient associations have been gradually increasing and, at the time of this report, are a solid asset for most of the initiatives analysed. In the context of JPND and the ERA-Net NEURON, patient representatives are actors of steering actions for the definition of joint calls and their review. In addition, patients' networks and pools of expert patient evaluators (43; 57) have been established in the context of these initiatives. Concomitantly, strong ties were reinforced with the EBC membership organisations representing people living with Brain Disorders such as the Global Alliance of Mental Illness Advocacy Network (GAMIAN) and the European Federation of Neurological Associations (EFNA). In addition, the European Working Group of People with Dementia (EWGPWD) also regularly participates in the steering meetings.

Concerning patient involvement, one shared approach has been the organisation of specific workshops on Patient and Public Involvement (PPI) in Research by JPND in the context of the world dementia forum in 2021 (58), and by the ERA-Net NEURON in cooperation with EFNA as a training action for patient experts to act as reviewers in the JTC evaluation process (43). During the Covid-19 pandemic, face-

to-face meetings were difficult to organize. JPND thus launched a webpage to increase the visibility of PPI and to allow for public consultations. PPI is now part of the JPND Homepage ([PPI | JPND \(neurodegenerationresearch.eu\)](https://pypi.jpnd.eu)) and includes information on (i) PPI guidelines for applicants, (ii) follow-ups of PPI implementation for JPND calls and (iii) contact details of JPND PPI secretariat and network for support on PPI process in JPND.

IMI developed a programme dedicated to patient engagement, the EUPATI project (45). This programme (2012-2017) aimed at making medicine research and development accessible to patients and encompassed an in-depth training course, an online toolbox and national platforms. The goal of the EUPATI project was that patients could (i) understand and make informed decisions about their treatments, (ii) join science, ethical and regulatory committees, and (iii) get involved in clinical trial design, with the overarching objective to put the needs of patients at the heart of medicine development. In 2018-2020, the Ensuring the Future Of EUPATI (EFOEUPATI) project (45) resulted in the creation of an independent non-profit foundation and a viable long-term business model for the EUPATI programme, thus ensuring the legacy of the EUPATI project for patient education and patient engagement in medicines research and development well into the future.

Building on this, IMI and then IHI developed the IHI Patient Pool to strengthen the voice of patients and informal caregivers in a range of IHI activities (59). In addition, patients and carers are active partners in most of the IMI/IHI (brain) projects, and many resources and learnings have been created and disseminated on how to engage with patients to drive collaborative research and innovation.

From its inception in 2018, the EBRA patient involvement strategy was fully embedded and implemented in EBRA activities by different means. Patient representatives contributed to all EBRA work packages and major tasks.

- The EBC third parties and EBC members, EFNA and GAMIAN-Europe, were part of EBRA's general assembly.
- Representatives from patient organisations were actively involved in the development of the SEBRA, several cluster activities, and awareness events (e.g., Brain Innovation Days, Brain Awareness Week).

- Dedicated patient involvement workshops were held in the context of the Training Initiatives for Neurology Advocates (TINA) organised by EFNA.
- The EBRA project and SEBRA were presented during the general assembly meetings of the patient organisations, EFNA and GAMIAN-Europe.
- Feedback interviews were organised with each of the patient representatives involved during one or more EBRA activities.
- A dedicated session on patient involvement was organised during the EBRA final conference with EBC members, GAMIAN-Europe and EFNA as representatives.

The outcomes of these activities resulted in a “Patient Involvement Best Practice Report” (60) and highlighted 2 major general recommendations:

1. Patient engagement should not be just an add-on to a work package on communication and dissemination: instead, it can be successfully linked to multiple work packages, and how to embed PPI in various work packages of an EU-funded project in addition to how to do single/specific PPI activities should be discussed.
2. A patient engagement plan to support the operationalisation of best practice patient engagement should be developed, containing information about the following topics:
  - Governance of the project (e.g., how the patient advisory board or general assembly works)
  - How patient engagement is linked to various work packages
  - Resources (i.e., time, budget) needed (e.g., time and money needed to prepare everything well and to train stakeholders if needed)
  - Clear expectations for all stakeholders involved; see more examples below
  - Roles and responsibilities of the people involved should be clear (e.g., patient organisations could be asked to support the translation of materials and to spread to their national nodes)
  - Methods to ensure patient representativeness e.g., patient advisory board could define a “patient” description for each activity and ensure the relevance of people chosen (either as an expert by experience or patient representative)



- Mechanisms to value and acknowledge patients' input.

### 3.d. Connection with industry and regulators

Due to the differences in their missions, the gap with industry and regulators is heterogeneous among the analysed initiatives. IMI-IHI consortium includes industrial partners and as such their involvement is by design. Nonetheless, JPND and the ERA-Net NEURON did establish punctual links with IHI itself (JPND), or with European initiatives working in regulatory aspects (STARS project, for the ERA-Net NEURON) and organized specific brainstorming sessions and workshops for and among researchers and industrial representatives (e.g., (61)).

Both in the ERA-Net NEURON and JPND, private partners, mostly small and medium-sized enterprises (SMEs), but also pharmaceutical companies, participated in a small number of consortia. In addition, as an outcome of the research development, some consortia created SMEs or established links with industrial partners. EBRAINS is designed to provide a dedicated service to industries, fostering partnerships that allow them to co-develop innovative solutions. Nonetheless, the percentage of funded projects involving industry is far too low even if the potential value for medical applications of the research is recognised by most of the projects. Further actions need to be established in order to increase, accompany and improve connections between the private sector and the main outcomes of the funded research. JPND has recently launched (in 2024) a questionnaire among funded projects in order to get further insight into the evolution and the characteristics of these interactions; results of the latter should be useful to shape further actions.

As one of the guiding principles of EBRA, liaising should not be restricted to researchers and clinicians but should also focus on patients and patient organisations, caregivers, industry (e.g., pharmaceutical, food), charities, regulators, funders, non-governmental organisations, and citizens. Industry partners are active members of EBC and were actively involved in all EBRA activities. Connections with the industry, startups and regulators were further strengthened by (i) organising the Brain Innovation Days where industry, startups, and private investors come together with researchers, clinicians and patients to discuss and advance brain research and innovation, (ii) including them actively in the cluster activities and



dedicating a special session on industry in those activities (UCB, Nestle, Boehringer Ingelheim, Danone, PERA Pharmaceuticals, EPIHUNTER, European Medicine Agency, etc.), and (iii) including them in the final conference (IHI).

Due to its public-private nature, a lot of the projects funded by IMI can lead to the development of tools and methods with a potential regulatory impact (as relates to e.g., medicines safety or efficacy, clinical trial designs...). IMI thus made significant advances in regulatory engagement and has developed guidelines for best practices in this area (62), as also mentioned in section 2.b. These guidelines were revised by IHI in 2024 (63). A highlight of IMI's achievements was the joint regulatory science summits regularly organised with the European Medicines Agency (EMA) and the United States Food and Drug Administration (FDA) (64). A new summit has recently been held by IHI (65).

All in all, strengthening links between preclinical and clinical research in the field of Brain Health would require further collaboration to achieve a step forward to fill the translational gap of excellent research outcomes funded.

### Summary

- The analysed initiatives fostered the creation of a novel European research infrastructure (i.e., EBRAINS) and invested significant efforts in stimulating the use of existing ones. However, most of these infrastructures are still unfamiliar to and underused by their target scientific communities.
- Patient engagement has taken center stage in the last few years and should be at the heart of the future EP Brain Health.
- Further collaboration and exchanges between patients, researchers, clinicians, industry and regulators are necessary to synergize skillsets and advance translation from bench to bedside.

## 4. Advancement of Responsible Research and Innovation policies

### 4.a. Promote Open science policies

Open science policies have evolved in a very dynamic manner throughout recent years. In the context of the initiatives analysed, the first aspect to be developed has been the open access to publications and, more recently, to data. Data and knowledge availability have been recognised as instrumental to accelerate and optimise the outcomes of scientific discoveries in all the initiatives.

The practices have evolved, and open access to publications is at present monitored and encouraged. Concerning open data, JPND and the ERA-Net NEURON currently require the publication of (annually updated) data management plans. The ERA-Net NEURON's Open Science workshops (46) are conducted annually for funded research projects and aim to encourage and improve the utilisation of European platforms, e.g. for data management and processing; yet there is still room for improvement in this domain. Indeed, recent surveys and analyses show converging evidence that the knowledge of potential services offered by European Research Infrastructures is still poor among the researchers.

HBP has delivered the EBRAINS infrastructure, which should, among other objectives, boost the reuse and harmonisation of neurosciences' preclinical and clinical data. EBRAINS has been intentionally designed to align with the principles of Open Science. EBRAINS' Open Science Policy is also elaborated as part of the Access Policy section of EBRAINS. Mechanisms should be found to further strengthen the integration of European infrastructures in the everyday life development of pre-clinical and clinical research, and this since the strategic planning of objectives and approaches. Efforts are also needed concerning the simplification of rules to allow the responsible share, use and re-use of data, especially among nations.

### 4.b. Ethical aspects in brain research

The consideration of Ethical aspects of research has also greatly progressed. Both the ERA-Net NEURON and JPND have established Ethics boards. Moreover, for the ERA-Net NEURON, 'ethical considerations' within JTC research proposals are

subjected to evaluation. Practically, panels of external experts review the ethical aspects of the full JTC proposals. The required descriptions comprise details on experimental and clinical work plans, but also dissemination and communication with patients, patient organisations, or both. Special emphasis is given to results reproducibility by requiring detailed descriptions of e.g., methodologies, criteria for inclusion of humans, and statistical approaches including aspects like randomisation and blinding. Hence, the ERA-Net NEURON deploys a dual ethical approach: (i) requiring the description of ethical considerations in JTC full proposals, and (ii) the annual RRI Open Science training for the selected, funded research groups. This latter activity was developed in the context of EBRA and in partnership with external experts in the field (see section 2.b).

Beyond the ethics review of biomedical research, the ERA-Net NEURON funds research directly related to fundamental and normative questions arising from developments in neuroscience. Progress in medical research in general and brain research in particular has raised many ethical, legal and social or societal issues, regarding e.g., prediction of disease, enhancement of brain functioning by pharmaceutical or technological interventions, using brain stimulation and brain implants and others. The ERA-Net NEURON is addressing these neuroethical questions by funding research on Ethical, Legal and Social Aspects (ELSA) of neuroscience in parallel to the biomedical and clinical projects (66). ELSA-JTCs have been launched regularly (2015, 2017, 2020 and 2023), with 18 consortia funded (comprising 63 research groups) for a total of 12 M€.

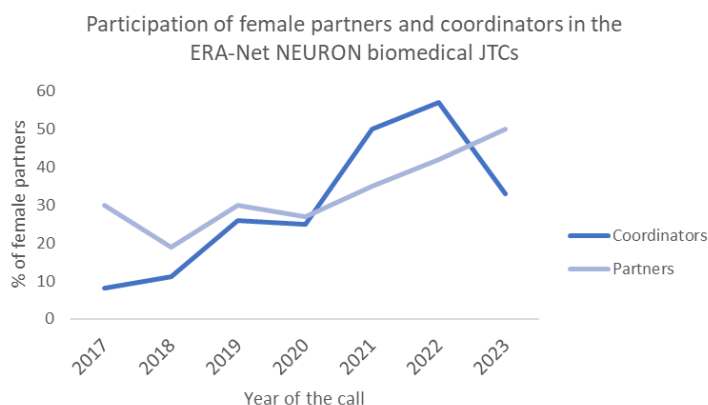
EBRAINS emphasises responsible research and innovation, including ethical considerations and data privacy. It provides guidelines and best practices for handling research data while ensuring Open Science principles. For sensitive data, EBRAINS promotes the sharing of anonymous metadata through a specific tool (Knowledge Graph), with controlled or restricted access to the data. Ethics and privacy compliance build on procedures developed in the HBP and are maintained through data life cycle management. EBRAINS activities are controlled by an independent Ethics and Society Committee, which ensures compliance of the procedures with best practices.

#### 4.c. Gender balance

The improvement of the representation of female researchers in the funded consortia was a priority for the ERA-Net NEURON. The evolution of this indicator was monitored continuously, and results were quite satisfactory since a steady increase in successful participation has been observed, in particular in the context of the ERA-Net NEURON COFUND 2 (beginning in 2021) (**Figure 5**).

For JPND, gender aspects are addressed in the JPco-fuND-2 call texts and considered when generating reviewers lists for grant proposal evaluation. Gender balance is also monitored in research project outputs, especially as it relates to Intellectual Property rights.

EBRAINS has integrated Gender Equality, Equity, Diversity, Inclusion (EDI) principles into project governance, management, communication, collaboration, research and training. In addition, the academic partner institutions of EBRAINS are obliged to transparently present their Gender Equality Plans (GEP), making EBRAINS a leading example of an inclusive infrastructure (67).



**Figure 5.** Participation of female partners and coordinators in consortia funded by the ERA-Net NEURON in biomedical JTCs.

#### 4.d. Communication and dissemination

The analysed initiatives shared the common goal of raising awareness of the importance of preserving Brain Health and the relevance of investment in research as an efficient way towards this goal. As a consequence, significant effort was

invested in communication and dissemination both in a targeted focus, but also using wider-reaching channels.

A crucial part of the communication and dissemination strategies of all these initiatives was through presentation of results obtained by the funded consortia and clusters in top-tier international conferences and world-class journals. The ERA-Net NEURON also communicates regularly about funded projects with noticeably fruitful outcomes in the “success stories” series of articles on their website (68).

In addition, as part of a large communication strategy to improve the dissemination of scientific knowledge on the brain disease area, the ERA-Net NEURON has created education videos and web-based conferences on diverse topics with an online lay lecture series (69). This initiative also appointed expert scientists in several countries as NEURON ambassadors, with the mission to convey relevant actions to specialised research and clinical communities.

JPND has also engaged with other relevant initiatives at the European/global level through meetings such as the JPI chairs meeting, meeting with the working group on the alignment of the High Level Group for Joint Programming (GPC), with representatives of the World Dementia Council (WDC), with the European Brain Research Area (EBRA) and with the JPI Task Force for Monitoring and Evaluation of the 10 JPIs.

Both JPND and the ERA-Net NEURON have organised multiple dissemination symposia. Examples of symposia organised by JPND and the ERA-Net NEURON include:

- JPND Final Symposium. 170 people from 21 countries participated in the symposium, representing 44 JPND-supported projects (n=113 attendees), JPND Scientific Advisory Board (SAB) members (n=8), European Commission (n=2), funding organisations and/or JPND Management Board members (n=31). In addition, four external speakers for the plenary and workshops, some stakeholders from industry (n=5), representatives from Bill Gates Venture and World Dementia Council, and representatives of Patient and Public involvement (n=6) were also present.
- JPND Midterm symposium. 170 people participated in the JPco-fuND-2 midterm symposium, representing 30 JPco-fuND (non-cofunded) and JPco-fuND-2 (co-

funded) supported projects (n=71) from 19 countries, JPND Scientific Advisory Board (SAB) members (n=4), European Commission (n=2), funding organisations representatives in JPco-fuND Executive Committee or JPND Management Board (n=18) from seven Member States. In addition, five external speakers for the plenary sessions and representatives of PPI (n=5) were also present.

- Annual Midterm Symposia of the ERA-NET NEURON. Midterm Symposia are conducted annually to bring all funded researchers from a specific call together to network, present their work to their peers and illustrate the international, collaborative spirit of NEURON. Graduate students and postdocs from the funded projects receive NEURON travel grants to attend the meeting and present their research in a dedicated poster session. Poster prizes are awarded to engaged young researchers for excellent projects. Additionally, attractive fringe events like workshops and networking opportunities are offered.
- Annual Foresight Symposia of the ERA-NET NEURON. NEURON conducts annual Foresight Symposia on topics selected for future calls. For this, renowned experts and the NEURON SAB are invited to present and discuss the state-of-the art of the field of interest, including the most recent research developments, the current challenges and potential future directions. In addition, patient organisations are present to share their view on the discussed topic and to advocate for patients' needs. The symposia reports are published on the NEURON website (70).
- Kick-Off Symposium of the ERA-NET NEURON. In January 2021, the ERA-NET NEURON held its Kick-off Symposium 'Together for Brain Research' for the NEURON cofund2 action. With 27 partners and members from 23 countries, the ERA-Net NEURON expressed a strong desire to strengthen its relationship with other European organisations toward its common goal of developing the knowledge and technologies necessary for tackling brain-related diseases and bringing together renowned researchers and stakeholders.

The Human Brain Project and EBRAINS have also developed strong and efficient communication and dissemination tools, which are crucial for a research infrastructure. Representative examples can be found as the E-Library of the HBP (37), as well as on the EBRAINS web site (4).

IMI used monthly newsletters (71) and press releases (72) as part of their communication strategy, but also organised numerous in person and online events on

topics varying from finances to scientific topics to collaboration opportunities (for a full list, see (73)). They also organised regular stakeholder forums as well as an “Impact series” in 2021 where they outlined the impact of IMI in different fields (e.g., paediatric medicine, patient involvement, dementia, data and diabetes). IHI follows the same strategy (74).

Central to their communication strategy, the websites of these initiatives gather relevant information on funding aspects and activities treated in the present analysis and represent an excellent platform for dissemination. In addition, all initiatives also made use of social media channels such as twitter/X (e.g., @EraNeuron; @JPNDEurope; @HumanBrainProj; @IHIEurope) and LinkedIn.

EBRA used similar communication tools, and more. Indeed, EBRA focused on the use of two main social media channels: Twitter/X and LinkedIn, to keep in touch with the community and share all the big news coming out of the project alongside mailings and events. Both channels were kept up to date on a weekly basis throughout the project and not only shared the latest of the project but reported live during events, shared cluster and partner updates plus were the main share point for additional project activities such as partner interviews, cluster interviews and more. Both channels were extremely successful in terms of followership and engagement.

LinkedIn was used for professional contacts and to upload all posts from the website (news, blog, etc.) as well as key project outcomes ([www.linkedin.com/in/ebra-eu](http://www.linkedin.com/in/ebra-eu)) such as the mapping report, SEBRA consultation, cluster activities/outcomes and the final conference. The account was also used to keep in contact within and reach out to the brain research community. In October 2022, the EBRA LinkedIn account reached a number of 805 connections with a steady growth: 2019: 601 connections; 2020: 623 connections; 2021: 722 connections; 2022: 805 connections.



The EBRA Twitter account — @EBRA\_EU — is used to share updates and news on the achievements of the project and to promote reports, events and the project as a whole ([https://twitter.com/EBRA\\_EU](https://twitter.com/EBRA_EU)). In October 2022, the EBRA Twitter account reached a number of 1618 followers and showed a fast growth over the previous 4 years (2019: 483 followers; 2020: 795 followers; 2021: 1200 followers; 2022: 1618 followers). Steady tweeting meant the account averaged between 10,000-25,000 impressions every month, which was higher during months with “larger” news, such as the release of the mapping or an event taking place. Additionally, the account profile was visited regularly, with each month over the last year going well above 3000 - 4000 visits and, at minimum, 30 mentions from external stakeholders.

The EBRA website (7) is the main EBRA communication channel. However, the EBC website, partner’s websites and third parties’ websites also contain relevant information for citizens and have been promoted throughout EBRA’s social media channels.

The EBC YouTube channel holds a section of EBRA-related videos such as the project video, conference videos (EAN 2020 conference, FENS regional meeting 2021), specific EBRA events & interviews (quality assurance workshop & data sharing workshop) as well as interviews with EBRA partners and clusters. This is to ensure that the content is widely accessible to all interested stakeholders and the general public.

An EBRA newsletter has been distributed every six months to all stakeholders in order to inform them about project news, progress and findings.

BrainTalks (75) is a podcast produced by the Brain Innovation Days, featuring key opinion leaders and stakeholders from the ever-growing brain ecosystem, discussing the latest breakthroughs, ongoing research and other exciting topics related to brain innovation. It is intended to be accessible to citizens and to create awareness about brain research and innovation.

To raise awareness on brain research and the EBRA project, 5 articles were published in policy journals (e.g., The Parliament Magazine, Open Access Government) and 24 in public or scientific journals.



News was kept up to date on the EBRA website, which is updated on a regularly basis, usually once a week. News was released through various other channels, and also to the press.

### Summary

- Significant advances have been made towards the promotion of open science, ethics and gender balance in research. Such activities should not only be sustained but also furthered in the future EP Brain Health.
- Communication and dissemination have been at the heart of the success of the analysed initiatives, using a variety of tools encompassing symposia, articles, websites, social media and more. These successful strategies should be a source of inspiration for the future EP Brain Health.

## II-Alignment Survey

The alignment survey frames into the Coordination and Support Action (CSA) Brain Health (November 2023 - November 2025). One of the central aims of this new initiative launched by the European Commission is to prepare an ambitious Strategic Research and Innovation Agenda (SRIA) for the European Partnership for BrainHealth (EP Brain Health), expected in early 2026.

Based on the outcomes from preceding brain health initiatives (JPND, the ERA-Net NEURON, the Human Brain Project) and encompassing overarching medical, scientific, technological, and socio-economic objectives, and priorities identified by the Shared European Brain Research Agenda (SEBRA), the Strategic Research and Innovation Agenda (SRIA) for the EP Brain Health will be the reference document to identify thematic priorities which require alignment of roadmaps and research programmes and broad inclusion of stakeholders. Tackling these priorities will meaningfully advance global brain research and contribute to optimising brain health.

This survey (Annex I) is designed to ensure the inclusion of national brain research plans and strategies from all EU Member States and beyond. A framework was developed by the CSA BrainHealth consortium to outline our present developments and plans.

### 1.Reach out to funders forum

An invitation to fill out the survey (Annex I) was sent by the CSA coordinator DLR-PT to all the members of the Funders Forum (FF), comprising representatives from national ministries and funding agencies. This survey was accompanied by a short framework (ANNEX II) that was developed by the CSA BrainHealth consortium to outline the present developments and plans. This framework was extended at a later stage and shared with the FF members during the collection of the responses. It can be found on the CSA BrainHealth website: [Framework-EP-BrainHealth-CD.pdf \(brainhealth-partnership.eu\)](#) .

*“Dear members of the Funders Forum,*

*As indicated earlier, one of the central aims of the CSA BrainHealth is to prepare an ambitious Scientific Research and Innovation Agenda (SRIA) to improve brain health in Europe in preparation for the launch of a European Partnership for BrainHealth, expected in 2025.*

*Our work towards the SRIA is grounded on synergies of previous collaborative experiences and will be enriched with new developments to ensure a comprehensive view. The first steps in terms of drafting a concept for the SRIA are made, you can find our Framework document CSA BrainHealth in attachment. To consider properly the specific strategies for brain health promotion in your organisation we need your input now. We therefore kindly invite you to read the framework concept and answer the questions in a survey set up on: <https://www.surveymonkey.com/r/3W9DBBT>. It will take approximately 20 min. to fill out. We would highly appreciate your feedback by 12 February, 2024. Your feedback is essential to ensure that our joint actions are relevant for all members of the future European Partnership.*

*Thank you for your support.”*

The CSA Brain Health Funders Forum is part of the Governance and includes 45 organisations from 28 countries of which 21 EU-member states (see list below, in **Table 4**).

<b>Countries</b>	<b>Region</b>	<b>Organisation</b>
<b>Austria</b>	NA	BMBWF
<b>Belgium</b>	Flanders	EWI
<b>Belgium</b>	Wallonia	FNRS
<b>Belgium</b>	Flanders	FWO
<b>Canada</b>	NA	CIHR
<b>Canada/Quebec</b>	NA	FRQS
<b>Croatia</b>	NA	MZO
<b>Denmark</b>	NA	Innofond
<b>Estonia</b>	NA	ETAG
<b>Finland</b>	NA	AKA
<b>France</b>	NA	ANR
<b>Germany</b>	NA	DFG

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<b>Germany</b>	NA	DLR-PT
<b>Germany</b>	NA	BMBF/DLR-PT
<b>Germany</b>	Hessen	HMWK
<b>Germany</b>	Baden-Württemberg	MWKBWL
<b>Hungary</b>	NA	NKFI
<b>Ireland</b>	NA	HRB
<b>Ireland</b>	NA	SFI
<b>Israel</b>	NA	CSO-MOH
<b>Italy</b>	NA	MoH
<b>Italy</b>	NA	MUR
<b>Latvia</b>	NA	LZP
<b>Lithuania</b>	NA	LMT
<b>Luxemburg</b>	NA	FNR
<b>Netherlands</b>	NA	MINVWS
<b>Netherlands</b>	NA	NWO
<b>Netherlands</b>	NA	ZonMW
<b>Netherlands</b>	NA	BFN
<b>Norway</b>	NA	Forskningsradet
<b>Norway</b>	NA	Ministry of Health and Care Services
<b>Poland</b>	NA	NCBR
<b>Poland</b>	NA	NCN
<b>Portugal</b>	NA	AICIB
<b>Portugal</b>	NA	FCT
<b>Romania</b>	NA	UEFISCDI
<b>Slovakia</b>	NA	SAS
<b>Spain</b>	NA	AEI
<b>Spain</b>	NA	ISCIII
<b>Sweden</b>	NA	Forte
<b>Sweden</b>	NA	SRC
<b>Switzerland</b>	NA	SNFS
<b>Taiwan</b>	NA	NSTC
<b>Turkey</b>	NA	TÜBITAK
<b>UK</b>	NA	MRC

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**Table 4.** Funders Forum List

## 2. Respondents profile

In total, 53% (or 24/45) of the Funders Forum members filled out the survey plus 1 non-member.

### *Country profile*

In total, representatives from 23 European and non-European countries opened the questionnaire. Members from the European Union were most represented, with more respondents from Western and Northern Europe compared to Southern and Central & Eastern Europe. In addition, representatives from non-EU, Asia and North America also filled out the survey (see **Table 5** and **Table 6**).

<b>Region in the world</b>	<b>Number of countries</b>
<b>European Union</b>	17
<i>Western Europe</i>	5
<i>Northern Europe</i>	5
<i>Southern Europe</i>	4
<i>Central and Eastern Europe</i>	3
<b>Non-EU (Norway, Switzerland and UK)</b>	3
<b>Asia (Turkey and Taiwan)</b>	2
<b>North America (Canada)</b>	1
<b>Total</b>	<b>23</b>

**Table 5.** Regions of the world represented in the answers to the survey.

<b>Country</b>		
Belgium	Latvia	Sweden
Cyprus	Lithuania	Norway
Estonia	Luxembourg	Switzerland
Finland	Netherlands	United Kingdom
Germany	Poland	Turkey
Hungary	Portugal	Canada (QC)
Ireland	Slovakia	Taiwan
Italy	Spain	

**Table 6.** List of countries represented in the answers to the survey.

### Organisation profile

Out of the 23 countries, 21 provided information on their organisation (i.e., all countries except Hungary and Cyprus; See list below in **Table 7**).

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#### Organisations

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*AICIB - Agency for Clinical Research and Biomedical Innovation*  
*Estonian Research Council*  
*Federal Ministry of Education and Research*  
*Fonds de recherche du Québec - Santé (FRQS)*  
*Forte - Swedish research council for Health, Working life and Welfare*  
*Hersenstichting (Dutch Brain Foundation)*  
*Italian Ministry of Health*  
*Luxembourg National Research Fund (FNR)*  
*Ministry of University and Research*  
*MRC UKRI*  
*National Science and Technology Council (NSTC), Taiwan*  
*National Science Centre, Poland*  
*NWO*  
*Research Council of Finland*  
*Research Foundation - Flanders*  
*Research Council of Lithuania*  
*Riga Stradins University (RSU)*  
*Science Foundation Ireland*  
*Slovak Academy of Sciences, SAS*  
*Spanish National Research Council*  
*Swedish Research Council*  
*The Research Council of Norway*  
*The Swiss National Science Foundation (SNSF)*  
*TÜBİTAK*  
*ZonMw*

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**Table 7.** List of organisations that answered the survey.

For some countries, more than 1 organisation filled out the survey (i.e., Sweden, Italy and the Netherlands).

National funding agencies were best represented (64%) followed by ministries (12%) and regional funding agencies (8%). Other types of organisations (i.e.,

foundations, universities, private entities with an associative and non-profit nature, academies of science) represented 16% of the answers (see **Table 8**).

Type of organisation	Number
National funding agencies	16
Other (Foundation, University, Private entity with an associative and non-profit nature, Academy of science)	4
Ministries (Health or Research)	3
Regional funding agencies	2
<b>Total</b>	<b>25</b>

**Table 8.** Type of organisation that answered the survey.

### *Survey completion profile*

Out of the 25 organisations, 22 filled out all 4 questions, 1 filled out 3 questions, 1 1 question and 1 organisation didn't fill out any question (see **Table 9**).

Question	Number of organisations filled out questions
Gaps/Missing Topics	23
Enabling actions	22
Strategic plans	23
Relevant institutions	23
Comments	4

**Table 9.** Completion of the survey.

## **3. Survey results**

### *Gaps or missing topics of relevance*

In total, 17 organisations identified gaps and missing topics of relevance concerning Brain Health in their country/region. 4 organisations did not identify any gaps or missing topics of relevance. Additionally, 2 organisations stated to have other reasons for not identifying any gaps.

The more commonly identified gaps and missing topics of relevance related to the following themes:

- a. Mental health and disorders
- b. Basic research

- c. Neurological and neurodegenerative disorders
- d. Biomarker discovery
- e. Translational research
- f. Trans- and interdisciplinary approaches
- g. Social awareness, education and policy
- h. Healthcare system improvement
- i. Advance knowledge through cooperation

In light of the identified gaps and missing topics of relevance, several cross-cutting themes have emerged. These themes encompass prevention, diagnostics, treatment, intervention, and the consideration of a lifetime perspective on brain health. This framing underscores the interconnected nature of these topics as well as the significance of addressing these recurring themes across various domains of brain research and healthcare.

#### **a. Mental health and disorders**

Many organisations have underscored the critical importance of research in the field of mental health and mental disorders, highlighting its significance alongside neurological research prioritisation. Research efforts in mental health should be directed towards understanding and promoting protective factors for maintaining mental well-being.

In terms of mental disorders and psychiatry, specific research endeavours should aim to understand risk factors and developmental pathways. The necessity for tailored prevention and intervention strategies to address the increasing burden of mental health was also highlighted.

Additionally, attention was drawn to societal challenges that significantly threaten mental health, such as the impact of the COVID-19 pandemic, resulting in prolonged social isolation, and the aftermath of the Ukrainian refugee crisis, resulting in traumatic experiences. These instances highlight the pressing need for research activities and targeted interventions.

Specific topics mentioned in the mental health context were early childhood trauma, youth suicidality and perinatal health.

#### **b. Basic research: understanding the brain in health and disease**



Many organisations highlighted the significance of basic research aimed at understanding the structure and function of the brain. This encompasses efforts to explore the complexities of risk factors and the progression of brain disorders. Research should aim to uncover underlying mechanisms from the genetic variant level to behavioural manifestations in both health and disease. Research endeavours should focus on unravelling the complexities of brain circuits and molecular abnormalities. This exploration is pivotal for developing effective strategies aimed at preventing and treating brain disorders. Specific topics mentioned within the basic research context include brain circuits, behavioural and psychological phenotypes, protein pathways, brain-immune signalling as mechanisms that confer resilience, metabolic functions, stress and chronic pain.

### **c. Neurological and neurodegenerative disorders**

Multiple organisations have emphasized the crucial significance of neurological diseases, particularly neurodegeneration. The societal challenge posed by the ageing global population contributes to a continuous rise in the prevalence of neurodegenerative disorders, including Alzheimer's and Parkinson's diseases, as well as dementia. Despite significant strides in understanding and treating various diseases, neurodegenerative conditions remain incurable, highlighting the urgent need for progress in this field.

### **d. Biomarker discovery**

Several organisations stressed the importance of finding new biomarkers for brain diseases. Biomarkers can improve understanding of disease mechanisms and therapy response. A key challenge is the lack of biomarkers for early diagnosis. Research must be focused on identifying novel biomarkers, combining molecular approaches, imaging, neurocognitive performance, and risk factors. Brain diseases must be detected in the asymptomatic phase, enabling early intervention and slow disease progression.

### **e. Translational research**

Some organisations prioritised translating research findings into tangible outcomes, emphasising the application of discoveries from the lab to practical use, commonly referred to as "from bench to bedside." Gaps include the absence of

strategic measures to facilitate the translation of scientific breakthroughs into strategies for optimising brain health for the broader population, as well as the need for a stronger link between clinical and preclinical research, leveraging clinical data to inform basic studies. More attention should be focused on providing solutions for patients, caregivers and professionals with short-term impact. An integrated approach involving collaboration across the knowledge chain —from individuals affected by brain-related conditions and their families to researchers, healthcare professionals, and various organisations —is essential.

#### **f. Trans- and interdisciplinary approaches**

Some organisations advocated for trans- and interdisciplinary approaches to tackle brain-related disorders comprehensively, aiming to maximise synergy potential across prevention, diagnostics, care, and therapeutic solutions. This involves fostering collaboration and integration of knowledge among diverse fields such as neurology, psychiatry, psychology, social sciences, and healthcare, while also actively engaging patients and relatives in the research process.

#### **g. Social Awareness, Education and Policy**

Several organisations emphasised the significance of increasing social awareness regarding mental health. There is often a lack of information in the general population regarding neurological and psychiatric disorders, leading to misconceptions and stigmatisation. To address this, targeted, accessible, and non-technical presentation of research evidence is necessary, ensuring that laypeople can understand and engage with the findings.

Education initiatives aimed at various sectors, including healthcare, social care, schools, families, and society at large, are crucial for increasing awareness of neurological and psychiatric disorders.

Emphasis must be placed on science-based policy implementation to address the societal impact of brain conditions, encompassing aspects such as participation in different domains of life, including education, employment, leisure activities, and the strain placed on healthcare settings and informal caregivers.

#### **h. Healthcare system improvement**

Various organisations underscored the prevalent challenges faced by healthcare today. Critical knowledge gaps persist concerning the risk factors, prevention, and recognition of mental and neurological disorders. Moreover, the lack of clinician engagement in innovative health research and the scarcity of mental health experts generate significant obstacles. Organisations mentioned that there is a pressing need for tailored educational resources aimed at professionals, including teachers, caretakers, and individuals in youth welfare and family law systems. Research and innovation are crucial for healthcare improvement, particularly in organising health and care services. This includes implementing labour-saving innovations in technology and digitalisation to enhance the efficiency of healthcare professionals' daily tasks.

#### **i. Advance knowledge through cooperation**

Various organisations emphasised the significance of international collaboration and knowledge exchange in strategy development. The importance of (inter)national networking to harness collective expertise and best practices was stressed, as well as the need for increased sharing of knowledge, tools, and data to fuel innovation and advancement in the field. To facilitate productive interactions among researchers and foster interdisciplinary approaches, there is a need for the establishment of infrastructure enabling the exchange of knowledge and data. Utilising joint reflections based on evidence can inform policies and regulations aimed at promoting brain health and enhancing strategies for prevention, detection, diagnosis, treatment, care, and rehabilitation.

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#### *Enabling actions*

In total, 18 organisations provided suggestions for enabling actions. The 6 most important ones were the following ones:

- a. Collaboration between researchers, healthcare professionals/providers and people living with brain disorders
- b. Implementation of science in society
- c. Science communication
- d. Sharing of knowledge

- e. Global collaboration
- f. Supporting young researchers

In general, awareness will need to be raised in the research communities on the different types of enabling actions.

**a. Collaboration between researchers, healthcare professionals/providers, people living with brain disorders**

- Interdisciplinary collaborative projects and networking calls will lead to fast synergies and identification of achievable goals to be accomplished by cross-sectorial consortia.
- To bridge the gap between knowledge and practice, close collaboration between researchers and health care professionals needs to be enabled, and healthcare practices need to be incorporated into consortia.
- Strengthening the education of healthcare professionals is essential, so they can detect early symptoms indicative of mental illness.
- To create an impact on people living with brain disorders and to promote brain health, the needs of the person living with a brain disorder should be taken into account, and they should be involved throughout the research cycle. Patient-public involvement needs to be strengthened in all the EP BrainHealth calls.
- A working/operational group could be set up to address and facilitate the shift from reasoning based on individual disorders to adopting a transdiagnostic, cross-disorder approach, centred on the unique and complex situations of the patients.

**b. Implementation of science in society**

- Research results, innovations and scientific evidence need to be incorporated into national health systems and policies.
- A landscape analysis of the existing structures (respective research landscape, education systems, societal support systems, jurisdiction) is needed. This includes recommendations for change/interferences, including pilot and demonstration projects. This requires the inclusion of relevant stakeholders (confederal level) and the policy level.

- A mapping is needed to identify the barriers to efficient research in the EU. This includes regulatory, legal, and data sharing barriers, national and EU legislation that promotes rather than stifles research, and standardisation/harmonisation of rules surrounding research across the EU.
- Reference centres for national policy makers need to be set up. For example, new and transformed existing institutions could be set up as Centres of Knowledge and Innovation, hosting leaders of science in a shared mission of finding novel diagnostic, prognostic and therapeutic solutions for brain disorders. These units shall be visible in the European landscape of research institutes.
- Creating an acceleration in the knowledge cycle. This requires a different type of action than a typical research call. Instead we suggest to also call for (innovation) actions making it possible to make the translation from knowledge to practice or to upscale small/regional solutions.
- Further opportunities to commercialise and scale up research / innovation in the EU, and for start-ups to be kept in the EU and not to be bought up and commercialised for profit in other jurisdictions.
- Development of a strategic plan and implementation procedures for the involvement of industry / private sector.
- There is a need for evidence-based awareness campaigns to emphasise the importance of mental health and to destigmatise mental health issues.
- Measures should lead to effectively improve healthcare, quality of life and equitable treatment for patients with brain disorders and other citizens.

#### **c. Science communication**

- To promote and enable interdisciplinary and multisectoral collaboration as a way to implement science in society, there is a need to develop a common language understandable over disciplines and all relevant players involved in the brain space, and to conceptualise and implement innovative science communication (e.g., with regard to presentation, instruments, dissemination, language/story etc.).
- An evidence-based definition for brain health would need to be developed that is suitable for science communication on all levels.

#### **d. Sharing of knowledge, experience and evidence through platforms and registries**

- Available knowledge, evidence and experiences should be compiled by systematic reviews, mapping exercises, exchange of best practices, knowledge platforms and databases, etc.
- Existing platforms for sharing experiences, data, best practices, etc., as well as registries, biobanks, etc., should be promoted and utilised (e.g., <https://www.incf.org/>, <https://www.ebrains.eu/>, Swedish dementia registry <https://www.ucr.uu.se/svedem/in-english>, etc.).
- Mechanisms that support collaboration, standardisation and distribution of advanced research methods for brain research, including human brain models (e.g. organoids).
- Support for state-of-the-art neuroscientific technologies for research spanning 'omics' platforms, imaging across scales and resources that underpin translation, including tissue and biofluid biobanks.

#### **e. Strengthening global collaboration**

- We need to strengthen collaborations between national and international health organisations and authorities by, for example, identifying shared topics, strategies and directions between EU and international partners and institutions.

#### **f. Supporting young researchers**

- Early career researchers need to receive support to increase the attractiveness of brain research.
- New, dynamic environments composed of young, yet experienced researchers who would be capable of making a change with novel ideas, courage and 'out of the box' thinking, need to be promoted.

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#### *Relevant strategic plans*

In total, 7 national strategic plans were highlighted by the survey. They were included in a comprehensive landscape analysis of national plans performed in parallel to this survey (see section III).

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#### *Additional relevant institutions*

In total, 19 organisations have provided 36 suggestions for additional relevant institutions (see **Table 10** and **Table 11**). These suggested institutions will be invited to participate in the SRIA consultation.

<b>Type of organisation</b>	<b>Number of other relevant institutions</b>
Governmental Agencies	
<i>Health</i>	5
<i>Research</i>	10
Ministries	
<i>Health</i>	6
<i>Research</i>	2
<i>Social Affairs</i>	3
Strategic National Initiative/Centre/Institute	4
Non-profit organisation	3
Other	3
<b>Total</b>	<b>36</b>

**Table 10.** Type of additional organisations suggested in the survey.

<b>Type of organisation</b>	<b>Name of organisation</b>
<b>Governmental Agency</b>	
<i>Health</i>	The National Board of Health and Welfare in Sweden
<i>Health</i>	The Public Health Agency of Sweden
<i>Health</i>	Norwegian Directorate of Health
<i>Health</i>	Irish Health Research Board
<i>Health</i>	Portuguese Directorate General of Health - DGS
<i>Research</i>	The Swedish Research Council
<i>Research</i>	Latvian Council of Science
<i>Research</i>	Portuguese Foundation for Science and Technology - FCT
<i>Research</i>	Scientific and Technological Research Council of Turkey
<i>Research</i>	Canadian research agencies relevant to the neuroscience
<i>Research</i>	Polish Center for Research and Development
<i>Research</i>	Polish Medical Research Agency
<i>Research</i>	Flemish Department of Economy, Science and Innovation (EWI)
<i>Research</i>	Flanders Innovation & Entrepreneurship (VLAIO)
<i>Research</i>	Fonds de la Recherche Scientifique (FRS-FNRS)
<b>Ministries</b>	

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<i>Health</i>	Ministry of Health in Lithuania
<i>Health</i>	Latvian Ministry of Health
<i>Health</i>	Luxembourg Ministry of Health
<i>Health</i>	Republic of Türkiye-Ministry of Health
<i>Health</i>	Italian Ministry of health
<i>Health</i>	Ministry of Health of the Slovak Republic
<i>Research</i>	Latvian Ministry of Education and Research
<i>Research</i>	Ministry of Education, Culture, and Science in the Netherlands
<i>Social Affairs</i>	Italian Ministry for Social Affairs
<i>Social Affairs</i>	Ministry of Social Affairs and Employment in the Netherlands
<i>Social Affairs</i>	Ministry of Social Affairs in Estonia
<b>Strategic National Initiative/Centre/Institute</b>	
	Neurocenter Finland
	Nörom - Turkish Neuroscience and Neurotechnology center of excellence
	National Coordination of Mental Health Policies in Portugal
	Carlos III Health Institute in Spain
<b>Non-profit organisation</b>	
	The Swedish Brain Foundation
	Norwegian Brain Council
	Slovak League for mental health
<b>Other</b>	
<i>Regional Health Authority</i>	Norwegian Regional Health Authorities
<i>Regional Private Foundation</i>	Fondazione Regionale per la Ricerca Biomedica (FRRB) - Lombardy
<i>Governmental Advisory Body - Health</i>	Slovak Government Council for Mental Health

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**Table 11.** List of additional relevant organisations suggested in the survey.



### **III-Analysis of national roadmaps**

In order to build a fair and representative partnership, current national priorities in terms of brain health need to be considered. Our analysis focused on the specific themes of national priority plans, their geographical distribution, as well as their longitudinal evolution. This analysis led to the highlight of shifts in national priorities since 2008, and to the identification of a need for harmonisation of Health strategies in Neurosciences in Europe and worldwide.

National plans were systematically searched through ministries' websites to access official published communications. In parallel, a survey was also sent to members of the funders forum to assess their awareness of relevant strategic plans in their country/region (see section II). Seven plans were highlighted by the survey recipients and were included in the analysis. Our analysis focused on the plans implemented from January 1<sup>st</sup>, 2008 to April 1<sup>st</sup>, 2024.

#### **1.Categories of plans and definitions**

Different categories of national strategies were uncovered during the analysis: Mental health, Dementia, Autism, Stroke and Brain/Brain Health plans. They represent the main challenges to public health in neuroscience. Below are the definitions of each topic, according to the WHO (76).

- Brain health is the state of brain functioning across cognitive, sensory, social-emotional, behavioural and motor domains, allowing a person to realise their full potential over the life course, irrespective of the presence or absence of disorders.
- Mental Health « should be seen as a valued source of human capital or well-being in society. It contributes to individual and population health, happiness and welfare, enables social interaction, cohesion and security, and feeds national output and labour force productivity. We need good mental health to succeed in all areas of life ».
- Dementia is a syndrome that can be caused by a number of diseases which, over time, destroy nerve cells and damage the brain, typically leading to deterioration in cognitive function (i.e., the ability to process thought) beyond what might be

expected from the usual consequences of biological ageing. While consciousness is not affected, the impairment in cognitive function is commonly accompanied, and occasionally preceded, by changes in mood, emotional control, behaviour, or motivation.

*Plans associating neurodegenerative diseases with dementia, e.g. “neurodegenerative diseases, including dementia”, were considered in this category.*

- Autism spectrum disorders (ASD) are a diverse group of conditions. They are characterised by some degree of difficulty with social interaction and communication. Other characteristics are atypical patterns of activities and behaviours, such as difficulty with transition from one activity to another, a focus on details and unusual reactions to sensations.
- Stroke is defined as rapidly developing clinical signs of focal (or global) disturbance of cerebral function, with symptoms lasting 24 hours or longer or leading to death, with no apparent cause other than vascular origin.

Plans were searched for all countries of the European Union as well as countries that participated in the ERA-Net NEURON and JPND calls, including widening countries.

## 2. Statistical analysis

In total, 79 national plans were retrieved, including 27 focusing on mental health, 29 on dementia, 7 on stroke, 8 on Autism and 8 on brain health (**Table 12**).

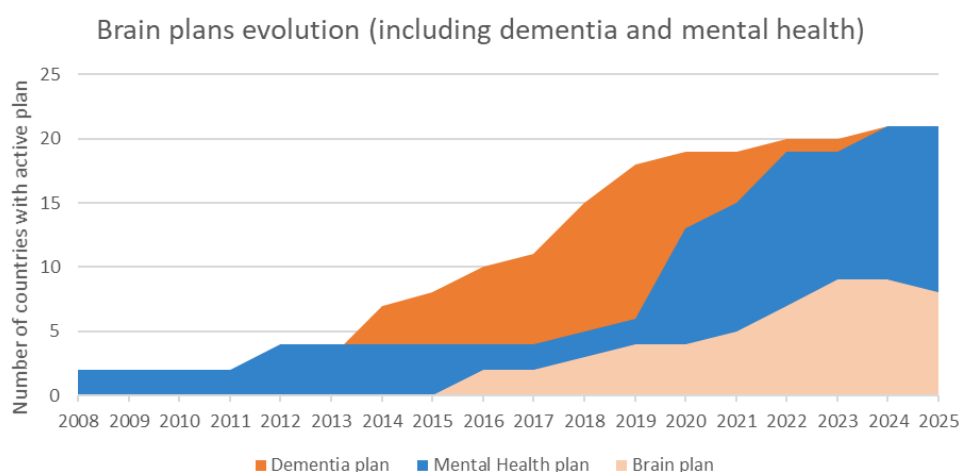
Region	Country	Mental health	Dementia	Stroke	Brain plan	Autism
Europe + Turkey	<b>Austria</b>	-	2016-	-	-	-
	<b>Belgium</b>	2024-	-	-	-	-
	<b>Finland</b>	2020-2030	-	-	2023-2029	-
	<b>France</b>	2018-	2014-	-	-	2005-2010 2013-2027
	<b>Germany</b>	-	2020-2026	-	2022-2030	-
	<b>Ireland</b>	-	2014-	2022-2027	-	2023-
	<b>Italy</b>	2013-2020	2015-	-	-	2012-
	<b>Luxembourg</b>	2024-2028	2009-2014	2023-2027	-	-
	<b>Portugal</b>	2007-2016	2018-	-	-	-
	<b>Spain</b>	2022-2026	2019-2023	-	-	-
	<b>Turkey</b>	-	2017-	-	-	-
	<b>The Netherlands</b>	2022-	2021-2030	-	2021-	-

	<b>Denmark</b>	2020-2030	2018-2025	-	-	-
	<b>Greece</b>	-	2016-2020	-	-	-
<b>EU 13</b>	<b>Croatia</b>	2022-2030	-	-	-	-
	<b>Estonia</b>	2020-2030	-	-	-	-
	<b>Hungary</b>	-	-	-	-	-
	<b>Latvia</b>	-	-	-	-	-
	<b>Lithuania</b>	-	-	-	-	-
	<b>Poland</b>	2021-2025	-	-	2019-	-
	<b>Romania</b>	-	-	-	-	-
	<b>Slovakia</b>	2022-2030	-	-	-	-
	<b>Czech republic</b>	2020-2030	2020-2030	-	-	-
	<b>Slovenia</b>	2018-2028	2023-2030	-	-	-
	<b>Malta</b>	2020-2030	2024-2031	-	-	2021-2030
	<b>Cyprus</b>	-	2012-2017	-	-	-
	<b>Bulgaria</b>	2021-2030	2014-2020	-	-	-
	<b>Outside EU</b>	<b>Australia</b>	2019-2030	2015-2019	2020-	-
<b>Canada</b>		2012-	2019 -	-	2022-	2019-
<b>Quebec</b>		2022-2026	-	-	-	-
<b>Iceland</b>		-	-	-	-	-
<b>Israel</b>		-	2013-	-	-	-
<b>Norway</b>		2007-2012	2021-2025	-	2018-2024	-
<b>Sweden</b>		2023-	2018-	-	-	-
<b>Switzerland</b>		-	2014-2019	-	2023-2033	-
<b>Taiwan</b>		-	2018-2025	-	-	-
<b>UK</b>		2021-2031	2020-	-	-	2021-2026
<b>Scotland</b>		2017-2027	2024-2034	2023-	-	2011-
<b>England</b>		-	-	-	-	-
<b>Wales</b>		2012-2022	2018-2022	2017-2020	-	-
<b>USA</b>		2020-2022	2022-	2012-2030	2016-2026	2021-2023
<b>China</b>		-	-	-	-	-
<b>Japan</b>		2020-	2019-	2020-2040	-	-

**Table 12.** Distribution of different thematic of national plans across countries and periods of implementation. Open policy strategies are seen as « year- ». Empty cases are plans that were not revealed either by our search nor by our survey.

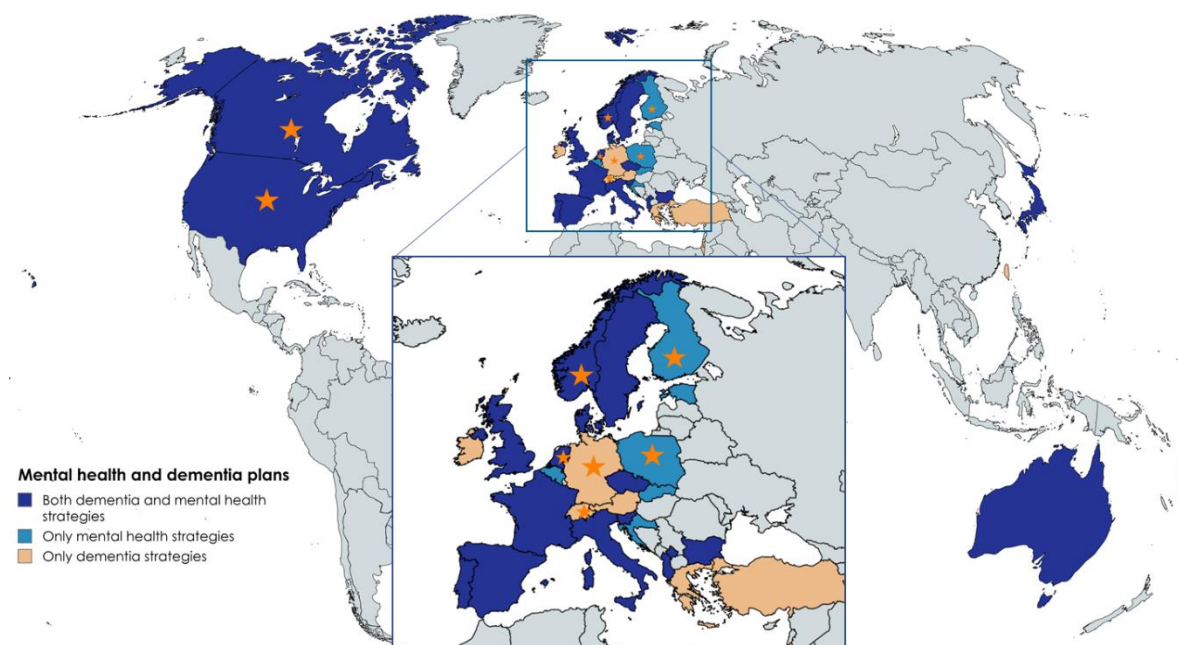
Countries implement their plans in different ways. Some countries develop plans with a timeline, i.e., plans that are in place for a specific period of time, that can be further extended or not. While, on the other hand, some countries have an open policy strategy, i.e., plans without an end date. Plans can be revised throughout their lifetime, to adapt to the changing societal and healthcare needs. This is the case for 6 out of 27 national plans for mental health, 12 out of 29 for dementia, 2 out of 7 for stroke, 4 out of 8 for autism and 3 out of 8 for brain plans (**Table 12**). Stroke and Autism plans are only a few.

A clear evolution can be observed in the different national plans since 2008. In a cumulative analysis, it can be appreciated that dementia plans started to be implemented as early as 2008 and have seen a constant increase to reach a plateau in 2021 (**Figure 6**). Conversely, mental health plans appeared later in 2011 and increased only slowly in number until 2019. However, from 2019 to 2022, the number of mental health plans increased exponentially, coinciding with the COVID crisis, which impacted mental health worldwide (**Figure 6**). The number of general brain health plans has been increasing slowly since 2015, yet they are still under-represented (**Figure 6**).



**Figure 6.** Evolution of national plans implementation since 2008. Orange: dementia plans, blue: mental health plans and beige: brain plans.

A geographical mapping of the national plans was performed for dementia, mental health and brain health plans (**Figure 7**). Mental health strategies seem to be the main focus in Eastern Europe, whereas, in Western Europe, both mental health and dementia plans, or dementia plans only, are implemented. Brain plans are currently mostly implemented in the northern part of Europe and in North America.



**Figure 7.** Geographical distribution of national plans over the 2008-2024 period. Light blue, countries that implemented mental health plans. Beige, countries that implemented dementia plans. Dark blue, countries that implemented both mental health and dementia plans. The orange stars represent countries with a brain plan.

Our analysis clearly shows that Brain Health is a priority for the vast majority of the countries considered. However, it also highlights disparities at the national level and a need for harmonisation at the European level. In particular, only a few countries have implemented a brain plan, guaranteeing a holistic view of Brain Health, and they have only done so in recent years. Creating a European Partnership for Brain Health capitalising on these pioneering efforts and hopefully inspiring remaining European countries in their future national strategies thus seems not only timely but essential to galvanise the future of Brain Health in Europe.

## CONCLUSIONS

Taken together, major contributions to the generation of scientific knowledge and innovation, the promotion of scientific excellence and robustness, targeted capacity building and the establishment of long-lasting international and interdisciplinary collaboration have been achieved by each of the initiatives analysed. These contributions have been made possible through common key mechanisms: (i) agreement on common scientific priorities, (ii) constant interaction with leading scientists and clinicians/healthcare professionals to ensure the relevance and quality of the approaches and (iii) extensive communication with patients, carers and citizens to ensure relevance of the initiative's outcomes for society at large. These general mechanisms should thus be at the core of any future initiative in the field of Brain Health.

While there is a high degree of similarity between the objectives and approaches of some of the initiatives, in particular for JPND and the ERA-Net NEURON; others differ not only in their structure but also, in their lifespan and approaches (IMI/IHI, HBP/EBRAINS, EBRA). All of the analysed initiatives have been very successful in their own way and offer an opportunity to learn from their specific achievements, encompassing but not limited to, funding of excellent scientific consortia and complementarity of the diseases addressed (JPND and the ERA-Net NEURON); generation of tools, resources and infrastructures (HBP); integrated and successful partnership between academia and industry (IMI/IHI) and unified vision of the Brain Health area (EBRA).

All of the analysed public-public initiatives will have ended in 2025. It thus seems timely to capitalise on individual strengths and consolidate common acquired experience towards an even more ambitious vision supporting the European Brain Health ecosystem. This also converges with the results of our alignment survey and our national roadmaps analysis, highlighting both the deep interest for Brain Health and the important efforts already underway at the national level but also, the need for a harmonised holistic European strategy for Brain Health. This future initiative, namely the EP Brain Health, will optimise the take-up of brain health-related scientific outcomes developed in the academic context into practices allowing the improvement of citizens' lives. In this context, the large integration of

existing powerful resources such as the European Infrastructures and parallel work with sister initiatives funded by the EC appears essential.

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## Abbreviations

CDIP: Canadian Dementia Imaging Protocol

CSA: Coordination and Support Action

EAN: European Academy of Neurology

EATRIS: European Advanced Translational Research Infrastructure

EBC: European Brain Council

EBRA: European Brain Research Area

EC: European Commission

ECR: Early Career Researcher

ECRIN: European Clinical Research Infrastructure Network

EDI: Equality, Diversity and Inclusion

EFNA: European Federation of Neurological Associations

EFPIA: European Federation of Pharmaceutical Industries and Associations

EITN: European Institute for Theoretical Neuroscience

ELSA: Ethical, Legal and Social Aspects

EMA: European Medicines Agency

EMEAC-IFCN: Europe, Middle East, and Africa Chapter of the International Federation of Clinical Neurophysiology

EOSC: European Open Science Cloud

EP Brain Health: European Partnership Brain Health

EPA: European Psychiatric Association

ERA-Net NEURON: Network of European Funding for Neuroscience Research ERA-Net NEURON COFUND 2

ERC: European Research Council

ERIC: European Research Infrastructure Consortium

ESFRI: European Strategy Forum on Research Infrastructures

EU: European Union

EWGPWD: European Working Group of People with Dementia

FAIR: Findable, Accessible, Interoperable, Reusable

FDA: United States Food and Drug Administration

FENS: Federation of European Neuroscience Societies

FET: Future and Emerging Technologies

FF: Funders Forum

GAMIAN: Global Alliance of Mental Illness Advocacy Network

GEP: Gender Equality Plans

HBP: Human Brain Project

ICT: Information and Communication Technology

IHI: Innovative Health Initiative

IMI: Innovative Medicines Initiative

JPND: EU Joint Programme for Neurodegenerative Disease Research JPI

JPND/JPcofuND 2

JTC: Joint Transnational Call

ND: Neurodegenerative diseases

OECD: Organization for Economic Cooperation and Development

PPI: Patient and Public Involvement

RI: Research Infrastructure

RRI: Responsible Research and Innovation

SAB: Scientific Advisory Board

SEBRA: Shared European Brain Research Agenda

SME: Small and Medium-sized Enterprise

SRIA: Strategic Research and Innovation Agenda

UN: United Nations

UNESCO: United Nations Educational, Scientific and Cultural Organization

WDC: World Dementia Council

WG: Working Group

WHO: World Health Organisation

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## **ANNEX I. CSA Brain Health - National Strategies and Plans Survey**

### **About this survey**

The below survey frames into the Coordination and Support Action (CSA) Brain Health (November 2023 - November 2025). One of the central aims of this new initiative launched by the European Commission is to prepare an ambitious Strategic Research and Innovation Agenda (SRIA) to prepare for the European Partnership for BrainHealth, expected in 2025.

### **About the Strategic Research and Innovation Agenda (SRIA)**

Based on the outcomes from preceding brain health initiatives and encompassing overarching medical, scientific, technologic, and socio-economic objectives, and priorities identified by the Shared European Brain Research Agenda (SEBRA), the Strategic Research and Innovation Agenda (SRIA) for the European Partnership (EP) on Brain Health will be the reference document to identify thematic priorities which require alignment of roadmaps and research programmes and broad inclusion of stakeholders. Tackling these priorities will meaningfully advance global brain research and contribute to optimize brain health.

### **This Survey**

This survey is designed to ensure the inclusion of national brain research plans and strategies from all EU Member States and beyond. A framework was developed by the CSA BrainHealth consortium to outline our present developments and plans, see 'Framework CSA BrainHealth' document accompanying this survey (see e-mail attachment). We invite you to carefully read this document and to help us identifying new developments, gaps, priorities, achievements and synergies in the brain health space.

### **Overview**

The survey is divided in 4 parts and will take approximately 20 min. to fill out:

1. Demographic information
2. Contact information (optional)

3. 4 questions on the priorities, gaps, enabling actions and relevant players in your country/region

4. Other comments and remarks

### **Target Group**

National decision makers (e.g., ministries of health, research, social affairs, work, etc. )

National funders

### **Duration**

January-February-March 2024

### **Contact**

If you have any problems accessing or using the survey, please email [kris@brain-council.eu](mailto:kris@brain-council.eu)

### **Background**

#### **About Brain Health**

According to the World Health Organization, Brain health is the state of brain functioning across cognitive, sensory, social-emotional, behavioural and motor domains, allowing a person to realize their full potential over the life course, irrespective of the presence or absence of disorders.

#### **About the CSA Brain Health**

On 4 August 2023, the joint proposal for the EU-funded Coordination and Support Action (CSA) "Towards structuring brain health research in Europe", replying to the Horizon Europe call HORIZON-HLTH-2023-DISEASE-03-06, was evaluated positively by the European Commission.

The CSA BrainHealth builds on the momentum of the EU-funded CSA "European Brain Research Area (EBRA)", which created a catalysing platform for brain research stakeholders to streamline and better co-ordinate brain research across Europe while fostering global initiatives.

#### **Towards a European partnership (EP) on Brain Health**

The CSA is a step forward towards an ambitious European partnership (EP) on Brain Health, expected to launch in 2025. Its ultimate goal is to lay the strategic and organizational groundwork for such an endeavor.

### **CSA BrainHealth Partners and Governance**

21 participants from 11 countries among which the members of the Network of European funding for Neuroscience research (NEURON) and the Joint Programme – Neurodegenerative Disease Research (JPND), the digital research infrastructure EBRAINS, the European Brain Council (EBC) including patient organisations (the Global Alliance of Mental Illness Advocacy Networks -GAMIAN-Europe; the European Federation of Neurological Associations – EFNA), professional societies (European Academy of Neurology – EAN; The European Psychiatric Association – EPA; European Association of Neurosurgical Societies – EANS; European Paediatric Neurology Society – EPNS), research associations (Federation of European Neuroscience Societies – FENS; European College of Neuropsychopharmacology – ECNP; International Brain Research Organisation – IBRO).

Beyond that, the CSA addresses policy makers and funders from European Member States, Associated and Third Countries and other stakeholders, in close interaction with the research community by creating an ecosystem including a Funders Forum, a Stakeholders Forum, and a Scientific Advisory Board.

### **Demographic Information**

1. Which country are you representing
2. If applicable, which region are you representing?
3. Which of the following best describes your organization
  - Ministry of Research
  - Ministry of Health
  - Ministry of Social Affairs
  - National Funding Agency
  - Regional Funding Agency
  - Foundation
  - Other (please specify)

## Contact Information

4. What is your title?

- Mrs.
- Mr.
- PhD.
- MD.
- Prof.
- Other (please specify)

5. What is your first name?

6. What is your last name?

7. At what email address would you like to be contacted?

8. What is your organization?

9. What is your role?

10. May we include you in the EBC database?

- Yes
- No

## Identification of national priorities, gaps, actions and players

11. Do you identify gaps or missing topics of relevance concerning Brain Health in your country/region?

12. Do you have specific suggestions of enabling actions to address the priorities in the framework and/or those identified by yourself?

13. Are you aware of relevant strategic plans in your country/region?

- No

- Yes, please specify and add the reference to those strategic plans

14. Are there relevant institutions in your country/region (ministries, funding bodies) that should reply to this survey?

- No
- Yes, please specify

15. Please use this space for any comment or relevant information you'd like to share with us.

**Thank you!**

Thank you very much for your feedback!

## **ANNEX II. Framework document**

Coordination and Support Action BrainHealth European Partnership Brain Health:  
Strategic Research and Innovation Agenda (SRIA)  
Framework Document

### **Stronger Together**

Through the EU-funded Coordination and Support Action “Designing a European Brain Health Landscape” (CSA BrainHealth), the European Commission (EC) has established a platform for exchange among public and private funding organizations, national ministries, EU research infrastructures, brain research organizations, professional societies and patient associations. By combining the expertise of its members, the CSA BrainHealth envisage to scale up the structure and interactions within the European brain health and research community and pave the way towards an ambitious partnership addressing the scientific, political, economic and societal challenges associated with brain health.

### **Bridging Science, Policy and Innovation with Society**

Brain health is the state of brain functioning across cognitive, sensory, social-emotional, behavioural and motor domains, allowing a person to realize their full potential over the life course, irrespective of the presence or absence of disorders (WHO). The CSA BrainHealth embraces this definition and will identify forces, priorities and gaps, enabling actions and merge existing resources in the brain research and health space.

The aim of the CSA is to pave the way for the European partnership to strengthen basic, translational, clinical, social and participatory research as well as technological efforts; and engage stakeholders from different backgrounds to accelerate the impact on relevant outcomes for society. The ultimate goal is to facilitate the translation of scientific breakthroughs and best practices into strategies to optimize brain health for all citizens. Joint reflections based on evidence should as well inform policies and regulations to promote brain health and continuously improve prevention, detection/diagnosis, treatment, care and rehabilitation strategies. The

quality of life of those living with brain disorders including their families and community will in consequence improve.

To achieve these goals a first milestone is the development of a Strategic Research and Innovation Agenda to be implemented through the active engagement with patients and caregivers, ministries and other policymakers, funding bodies, researchers, healthcare professionals as well as innovators and regulatory bodies. These synergies should contribute to boost European leadership in the field.

### **Tackling Priorities**

The CSA BrainHealth will set the grounds to develop activities dedicated to increase knowledge and improve practices on the following four main priority areas:

- Brain Health Promotion
- Early Diagnosis, Monitoring and Intervention for People Living with Brain Conditions
- Care and Support for People living with Brain Conditions and their Care-Givers
- Social, ethical and legal dimensions of Brain Health

While fostering the maintenance of a Global Reflection on Brain Health Related Policy, transversal to all the identified priorities

### **Approach**

Our approaches and tools are organized in six main pillars or actions:

- Joint Calls
- Global Dialogue with Key Initiatives in Brain Health
- Facilitating the use of EU Infrastructures and Platforms
- Bridging the Gap Between Health Care Providers, Private Sectors and Regulators
- Citizen Engagement
- Capacity Building with an Emphasis on the new generation of Professionals and Citizens

**More information:** <https://www.brainhealth-partnership.eu/>

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