



Thematic mapping document

Research and innovation



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Introduction

This thematic mapping document is part of the outputs produced under the **ESI Funds for Health** project. It covers the theme of **research and innovation** and provides an overview of the approved 2014-2020 ESI funding in this particular area of health based on extensive Member State-level research carried out as part of the ESI Funds for Health project. The purpose of this document is to give an EU-wide snapshot of the data collected for this theme and complement the other outputs of the project: the final print publication that provides overall findings from the project across all health themes and countries and country fact sheets and Interreg mapping documents that provide detailed results for each Member State and Interreg programme. All these documents and further information about ESI Funds for Health are available on the website of the project¹.

This mapping document covers both planning and programming of the ESI Funds, particularly the European Social Fund (ESF) and the European Regional Development Fund (ERDF) as well as specific projects selected for funding across the EU-28 as of August 2017 (and July 2018 for certain Member States: Spain, Romania, Italy and Malta²). Section 2 covers the programming stage and summarises the investment priorities and indicators relevant to this theme that have been included in the 2014-2020 Operational Programmes (OPs) for ESI Funds. Section 3 addresses the project level and summarises data regarding all approved projects supporting the theme across the EU-28. The document is structured as follows:

- Introduction;
- Overview of relevant ESI Funds investments at OP level;
- Analysis of identified ESI-funded projects.

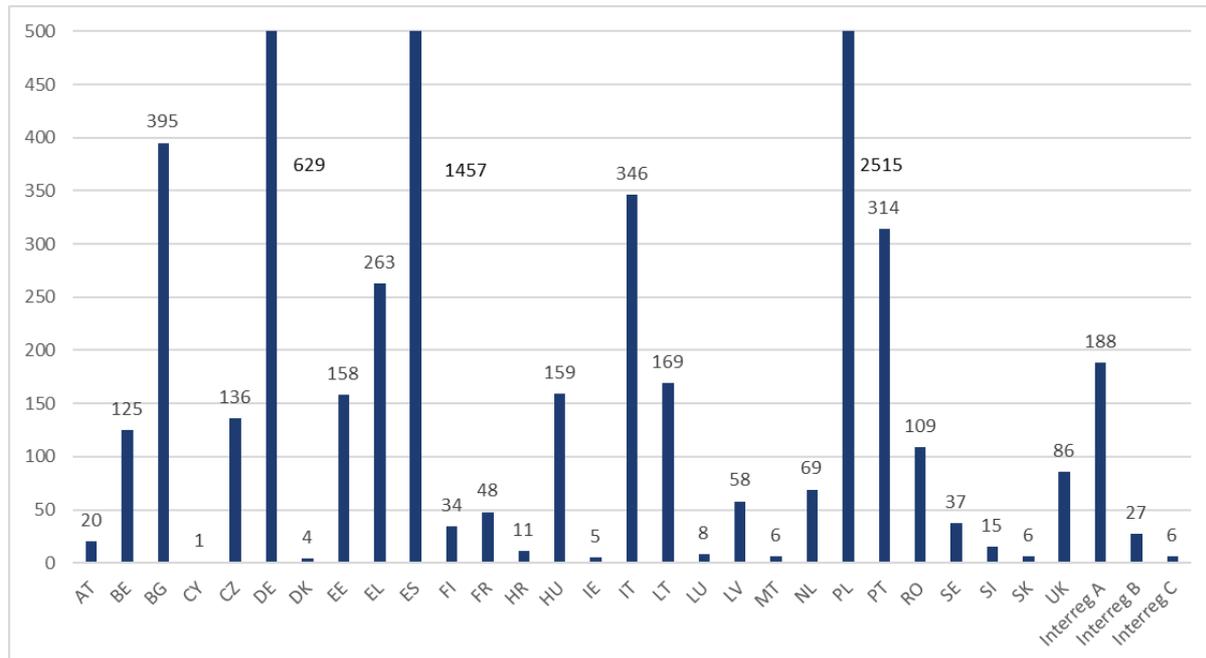
The ESI Funds for Health project focuses on six health themes (or thematic blocks), covering the full range of EU health priorities that can be effectively addressed through the ESI Funds. Across all themes, a total of 7,404 health-relevant projects were identified in the 28 Member States and the three strands of European Territorial Cooperation (ETC) or Interreg programmes. The overall distribution of health-relevant projects across Member States and the Interreg programmes is shown in *Figure 1* below. More than half (57%) of the funding was found to come from the ESF³. Budget information was available for 96% of the health projects identified. The total budget of these health projects is over EUR 8 billion, with an average project size of around EUR 1.2 million.

¹ <http://www.esifundsforhealth.eu/>

² Additional research was carried out for these Member States as information about the projects financed by the OPs was not available for Romania, Spain and some regions of Italy. The research for Malta was updated as no health relevant projects were identified in 2017.

³ ESF - 57%; ERDF - 39%; for 4% of the funding amounts the specific fund was not identified by the Member State.

Figure 1: All health-relevant projects by Member State and Interreg programme



Thematic block 4 focuses on support for research and innovation activities in the health sector. Health innovation can be defined as the introduction of a new concept, idea, service, process, or product aimed at improving treatment, diagnosis, education, outreach, prevention and research, and with the long term goals of improving quality, safety, outcomes, efficiency and costs. Health innovation responds to unmet needs by employing new ways of thinking and working. It does not happen in isolation from its geographical location and the human capital, resources and infrastructure that locations provide. ESI funds can finance the infrastructure needed for research and innovation (including support services), the development of new ideas and the improvement of the skills in the healthcare and industry workforces in order to contribute to Member States' actions in innovation in health, health products and services.

Of the health-relevant projects identified, 1,708, or around 23%, support the research and innovation thematic block. The share of all projects across thematic blocks is depicted in Figures 2 and 3. This is the thematic block with the second largest number of projects identified and with a considerable share of the overall budget for health projects. The total budget of thematic block 4 projects is around EUR 1.8 billion or around 22% of all health projects identified.

Figure 2: Number of health-relevant projects by thematic block

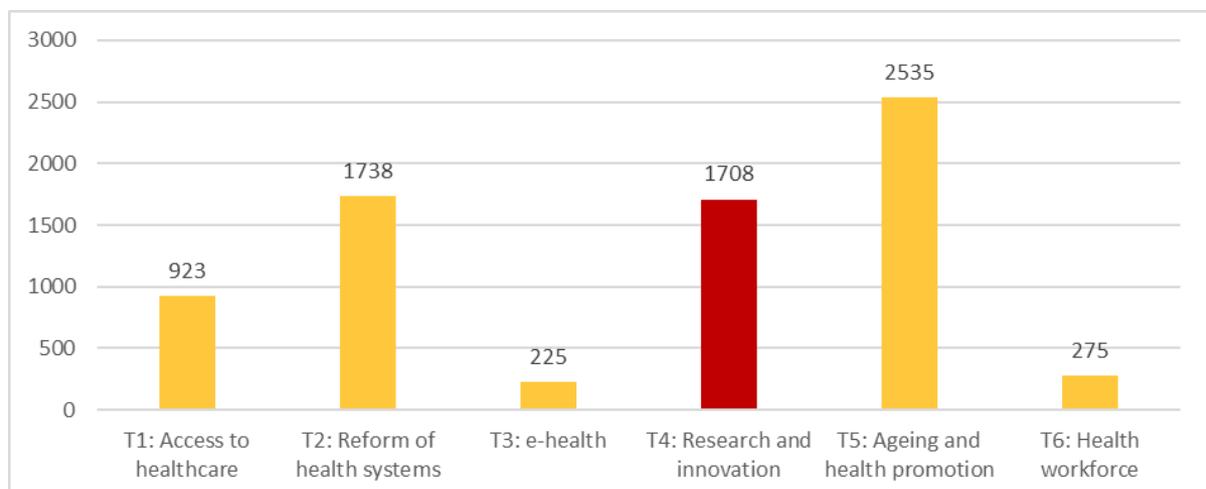
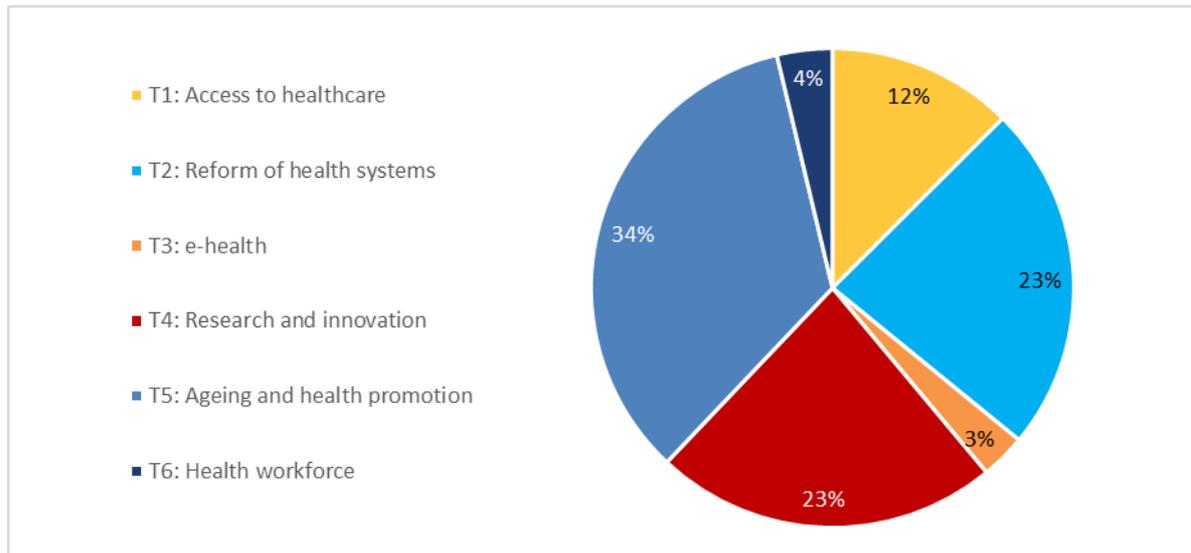


Figure 3: Share of health-relevant projects by thematic block



Overview of relevant ESI Funds investments at OP level

Investment priorities

The planning and programming the use of ESI funds by Member States is structured around Thematic Objectives (TOs) and Investment Priorities (IPs) set forth in the specific regulations governing the funds⁴. Investment priorities relevant for the thematic block 4 can be found primarily under the Thematic Objective 1: ‘Strengthening research, technological development and innovation’. In a few Operational Programmes, the relevant Investment Priorities were found under the Thematic Objectives 3 (SMEs), and 2 (ITC); single Operational Programmes used also the TOs 8, 9, and 10. Across these Thematic Objectives, thirteen Investment Priorities defined for the Member States and two Investment Priorities defined specifically for Interreg Programmes have been found to be relevant for the thematic block 4 - these are mainly supported by the ERDF.

Overall, 22 Member States have included these Investment Priorities in their OPs. Six Member States have not included any IPs relevant for this theme in their OPs (these are: AT, CY, HR, IE, LU, SI, and SK). IP 1b focusing on promoting business investment in research and innovation is the Investment Priority which was most often chosen by Member States for this theme (in 18 Member States and 31 Interreg programmes), followed by the IP 1a (enhancing research and innovation infrastructure; sixteen Member States and twelve Interreg programmes). Other ‘popular’ Investment Priorities for this theme are the IP 3a (promoting entrepreneurship; 7 Member States) and the IP 2c (Strengthening ICT applications) as well as ETCa (iv) on enhancing institutional capacity of public authorities and cooperation between citizens and institutions in the context of the European Transboundary Cooperation (5 Interreg programmes).

Thirty-four Interreg A OPs, twelve Interreg B OPs and two Interreg C OPs were found to be relevant for this theme. Seven of the Investment Priorities relevant for research and innovation are common for both nation-wide OPs and ETC programmes, with the IP 1b being selected most often (32 Interreg Programmes used this IP to guide their interventions). Seven of the Interreg OPs contained Investment Priorities as defined specifically for cross-border cooperation programmes in a separate Regulation relating to ETC programmes⁵.

The table below shows the selection by Member States of the Investment Priorities relevant for the research and innovation thematic block in the 2014-2020 OPs, including Interreg programmes.

Table 1: Selection of the Investment Priorities relevant for research and innovation by Member States and Interreg programmes

Fund	TO	Investment Priority	Member States
ESF	8 (Sustainable employment)	8v. Adaptation of workers, enterprises and entrepreneurs to change	DK
	9 (Social inclusion)	9i. Active inclusion, including with a view to promoting equal opportunities and active participation, and improving employability	PL
		9iv. Enhancing access to affordable, sustainable and high quality services, including health care and social services of general interest	PL

⁴ Regulation (EU) No 1304/2013 of the European Parliament and of the Council of 17 December 2013 on the European Social Fund and repealing Council Regulation (EC) No 1081/2006 and

Regulation (EU) No 1301/2013 of the European Parliament and of the Council of 17 December 2013 on the European Regional Development Fund and on specific provisions concerning the Investment for growth and jobs goal and repealing Regulation (EC) No 1080/2006.

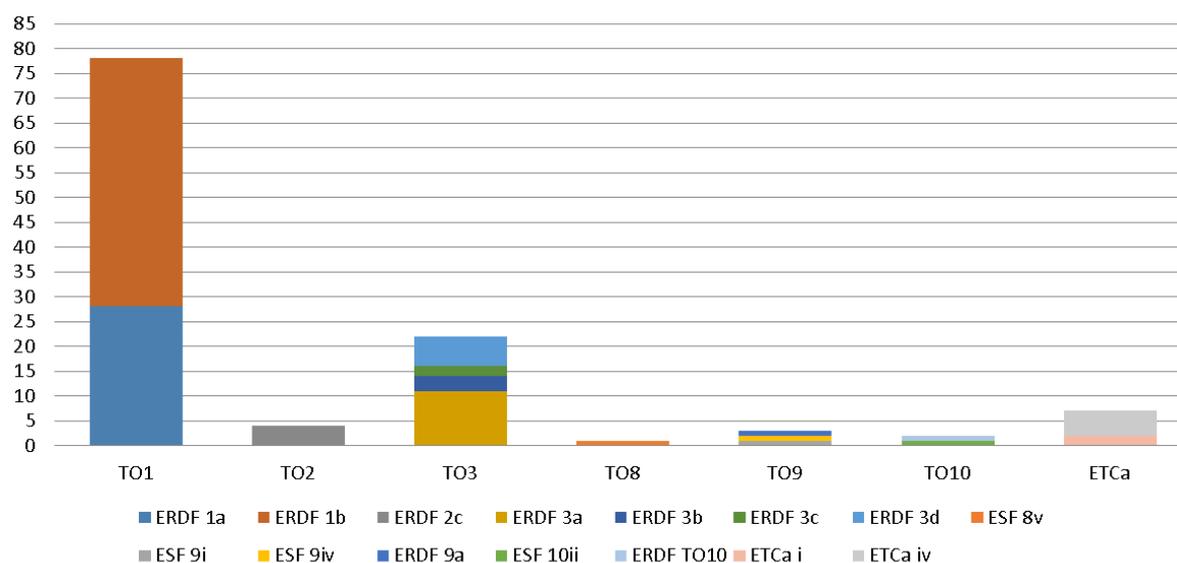
⁵ Regulation No 1299/2013 of 17 December 2013 of the European Parliament and of the Council on specific provisions for the support from the European Regional Development Fund to the European territorial cooperation goal.

Fund	TO	Investment Priority	Member States
	10 (Education)	10ii. Improving the quality and efficiency of, and access to, tertiary and equivalent education with a view to increasing participation and attainment levels, especially for disadvantaged groups	DE
ERDF	1 (R&D)	1a. Enhancing research and innovation (R&I) infrastructure and capacities to develop R&I excellence, and promoting centres of competence, in particular those of European interest	BE, BG, CZ, EE, ES, FI, FR, HU, IT, LU, LV, MT, PL, PT, RO, UK, INTERREG A: AT-CZ, BE-NL, FR-BE-DE-LU, FR-DE-CH, FR-CH, IT-AT, ES-PT, SE-DK-NO, SE-NO, UK-IE INTERREG B: Baltic Sea INTERREG C: Interreg Europe
		1b. Promoting business investment in R&I, developing links and synergies between enterprises, research and development centres and the higher education sector, in particular promoting investment in product and service development, technology transfer, social innovation, eco-innovation, public service applications, demand stimulation, networking, clusters and open innovation through smart specialisation, and supporting technological and applied research, pilot lines, early product validation actions, advanced manufacturing capabilities and first production, in particular in key enabling technologies and diffusion of general purpose technologies	BE, BG, CZ, EE, EL, ES, FI, FR, HU, IT, LT, LU, LV, NL, PL, PT, SE, UK, INTERREG A: BE-FR, BE-DE, BE-NL, FR-BE-DE-LU, FR-BE-NL-UK, FR-DE-CH, FR-CH, FR-UK, DE-NL, IT-AT, IT-HR, IT-MT, SI-AT, ES-FR-Andorra, ES-PT (Madeira-Acores-Canaria), ES-PT (POCTEP), SE-DK-NO, SE-FI-NO, UK-IE (Northern Ireland-Ireland-Scotland), UK-IE (IE-Wales) INTERREG B: North Sea, North-West Europe, Northern Periphery and Arctic, Baltic Sea, Danube Area, Alpine Space, Central Europe, Adriatic-Ionian, South-West Europe INTERREG C: Interreg Europe
	2 (ICT)	2c. Strengthening ICT applications for e-government, e-learning, e-inclusion, e-culture and e-health	CZ, EL, PT, RO

Fund	TO	Investment Priority	Member States
	3 (SMEs)	3a. Promoting entrepreneurship, in particular by facilitating the economic exploitation of new ideas and fostering the creation of new firms, including through business incubators	BE, BG, DK, EL, FR, HU, PT INTERREG A: EE-LV, EL-BG, IT-MT INTERREG B: Balcan-Mediterranean
		3b. Developing and implementing new business models for SMEs, in particular with regard to internationalisation	BE, PT INTERREG A: ES-FR-Andorra
		3c. Supporting the creation and the extension of advanced capacities for product and service development	BE, PT
		3d. Supporting the capacity of SMEs to grow in regional, national and international markets, and to engage in innovation processes	EL, FR, UK INTERREG A: EE-LV, FI-EE-LV-SE, EL-BG
	10 (Education and training)	10. Investing in education, training and vocational training for skills and lifelong learning by developing education and training infrastructure	INTERREG A: HU-HR
	ETC a) (IPs under cross-border cooperation)	(i) Promoting sustainable and quality employment and supporting labour mobility by integrating cross-border labour markets, including cross-border mobility, joint local employment initiatives, information and advisory services and joint training	INTERREG A: IT-MT, SE-DK-NO
		(iv) enhancing institutional capacity of public authorities and stakeholders and efficient public administration by promoting legal and administrative cooperation and cooperation between citizens and institutions	INTERREG A: DE (Mecklenburg-Vorpommern-Brandenburg)-PL, DE-DK, DE(Saxony)-PL, HU-HR, SI-AT, ES-PT (POCTEP)

The figure below shows the occurrence of selection of Investment Priorities across the Member States and Interreg Programmes.

Figure 4: Number of Member States and Interreg programmes selecting research and innovation Investment Priorities



In their OPs, Member States define specific objectives that take into account the needs and characteristics of the programme area. In theme 4, the specific objectives typically do not refer to the health sector, but health sector-related interventions may fall within their scope. The following are examples of some of the specific objectives defined for this theme:

- Increasing the innovation activity of the enterprises (BG).
- Improving the intensity and efficiency of cooperation in research, development and innovation (CZ).
- Strengthening of R & D institutions and creation, consolidation and improvement of scientific and technological infrastructures (ES).
- Strengthening the innovation activities of companies (FI).
- Increasing the intensiveness of research, development and innovation activities in the private sector (LT).
- Increasing the ability of public policies to implement the UN Convention on the rights of persons with disabilities (PL).
- Increasing capacity in the areas of smart specialization, CDI and health (RO).
- Improved and extended research and innovation capacities (AT-CZ).

Indicators

OPs include indicators that enable the monitoring of spending outputs and results; these are especially relevant for cross-cutting issues such as health. Indicators also play an important role in guiding project development. Member States are required to use a set of common indicators for monitoring of the programmes; programme-specific indicators can also be used. There is one required common output indicator relating to health, which specifies the population covered by improved health services; this indicator was not used for this theme.

Member States defined several programme-specific indicators to monitor the performance of the health promotion projects. These indicators typically refer to the number of participants in health programmes or number of such programmes.

Examples of programme-specific indicators used for this thematic block by Member States are:

- Piloted products and services which have been developed in the innovation platforms (FI).
- Number of implemented instruments supporting the inclusion of disable people in the labour market (PL).

- Professional publications (CZ).

Very few Interreg Programmes include monitoring indicators. The following four examples have been found with relation to the Thematic Block 4:

- Population covered by cross-border initiatives in the fields of employment, training, culture, sport and health (ES-PT POCTEP).
- The annual number of peer reviewed journal and conference publications in two target sectors (Health and Life Sciences and Renewable Energy) with cross-border authorship and with the potential to create economic impact(UK-IE Northern Ireland-Ireland-Scotland).
- Develop new cross-border area interventions to support positive health and wellbeing and the prevention of ill health (UK-IE Northern Ireland-Ireland-Scotland).
- Beneficiaries supported by new cross-border area initiatives for positive health and wellbeing and the prevention of ill health (UK-IE Northern Ireland-Ireland-Scotland).

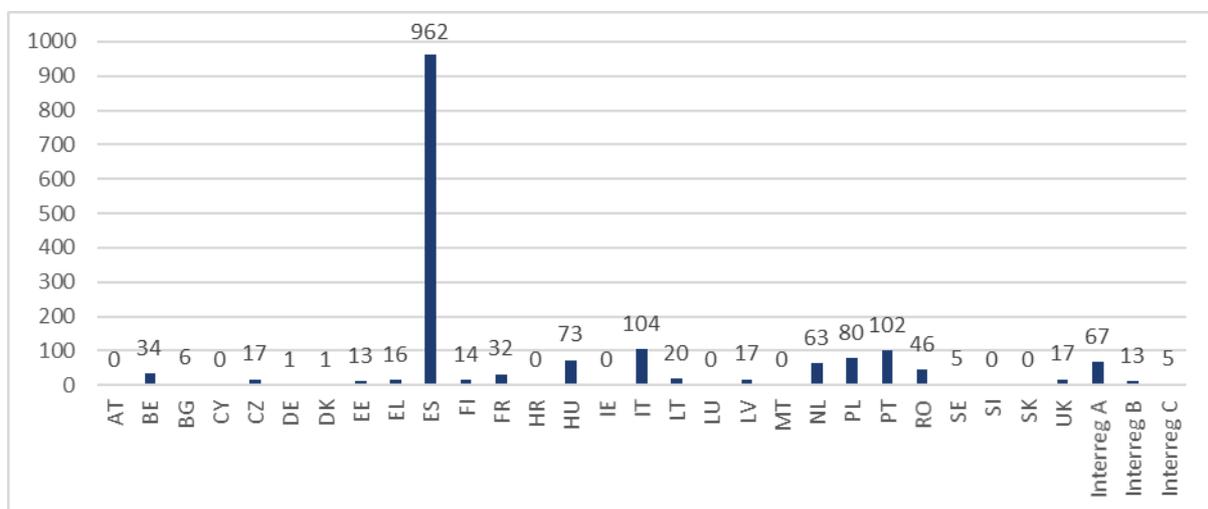
Analysis of identified ESI-funded projects

This section focuses on the project level, and summarises the outcomes of the country-level research on the actual projects funded by Member States that will support research and innovation in the health sector across the EU. Information about the geographic distribution, sub-themes, intervention fields and funding sources of the projects is presented.

Number of projects and budget

So far, there have been 1,708 projects in 20 Member States funded in support of the research and innovation thematic block. Around half of these projects (56%) are in Spain, followed by numerous research and innovation health projects funded in Italy, Portugal, the three Interreg cooperation programmes and Poland. No projects supporting the e-health thematic block were found in Austria, Cyprus, Croatia, Ireland, Luxembourg, Malta, Slovenia and Slovakia. 85 relevant projects are also financed under the three types of Interreg cooperation programmes. Further details are presented in Figure 5.

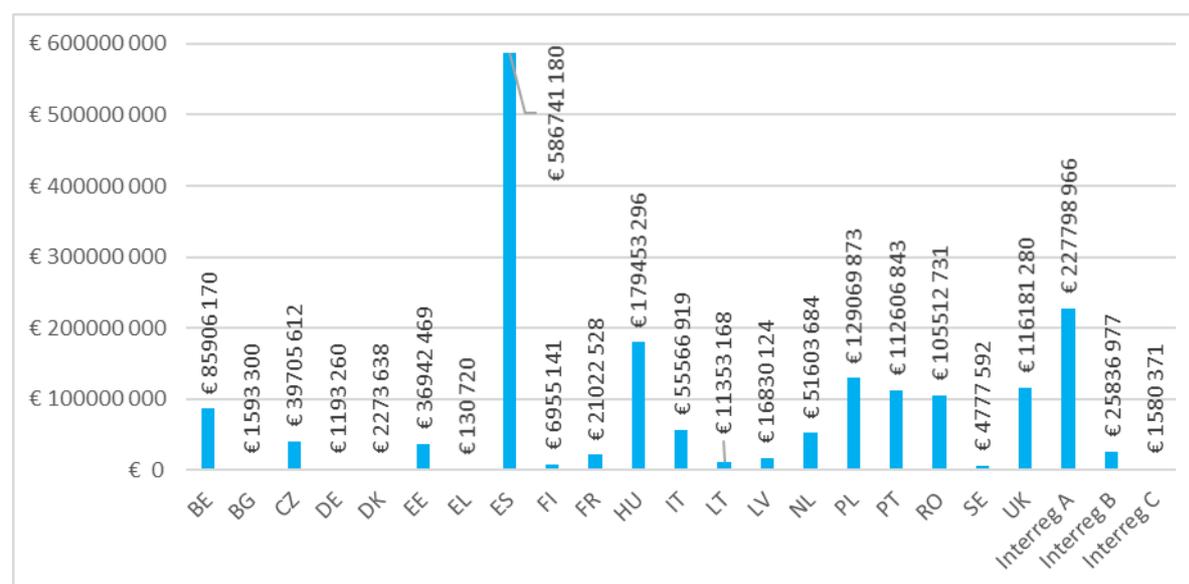
Figure 5: Research and innovation projects by Member State and Interreg programme



Budget information is available for nearly all of the thematic block 4 projects (except for 8 projects). The total budget of all research and innovation projects with budget information is approximately EUR 1.8 billion, while the average project budget is approximately EUR 1 million. The largest spending on research and innovation health projects is by far exhibited by Spain (around EUR 587 million) and the Interreg programmes (in total around EUR 255 million across the three strands). Hungary follows with spending on research and innovation health projects of around EUR 179 million, followed by Poland (around EUR 129 million) and the UK (approximately EUR 116 million). Further details about the total budgets of thematic block 4 projects are presented in Figure 6.

In terms of average project size, the largest projects are found in the UK (around EUR 6.8 million), followed by the Interreg A projects (around EUR 3.4 million) and Estonia (around EUR 2.8 million). The smallest average budget for research and innovation health projects is found in Greece, around EUR 0.008 million.

Figure 6: Total budget of the research and innovation projects by Member State and Interreg programme



Note: For 8 of the research and innovation projects budget information was not available.

Sub-themes and intervention fields

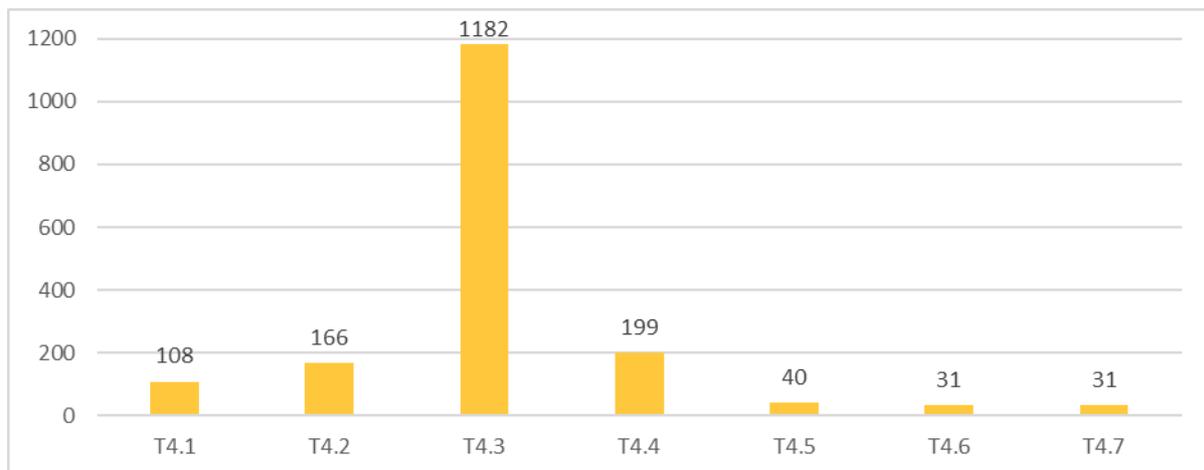
Seven sub-themes were identified for the research and innovation thematic block, covering key areas of focus in EU and national policy priorities. Projects were assigned to multiple sub-themes where appropriate. The breakdown of projects by sub-theme is shown in the table and figure below.

Table 2: Sub-themes for research and innovation in health

Code	Description	Number of projects
T4.1	Clinic-industry collaboration	108
T4.2	Research infrastructures	166
T4.3	Innovation of products and processes	1182
T4.4	Changing care models	199
T4.5	Research in the area of rare diseases (low prevalence/complex conditions)	40
T4.6	Human resources	31
T4.7	Other	31

Note: For 49 of the T4 projects more than one relevant sub-theme was assigned; the number of projects here is therefore greater than the total number identified.

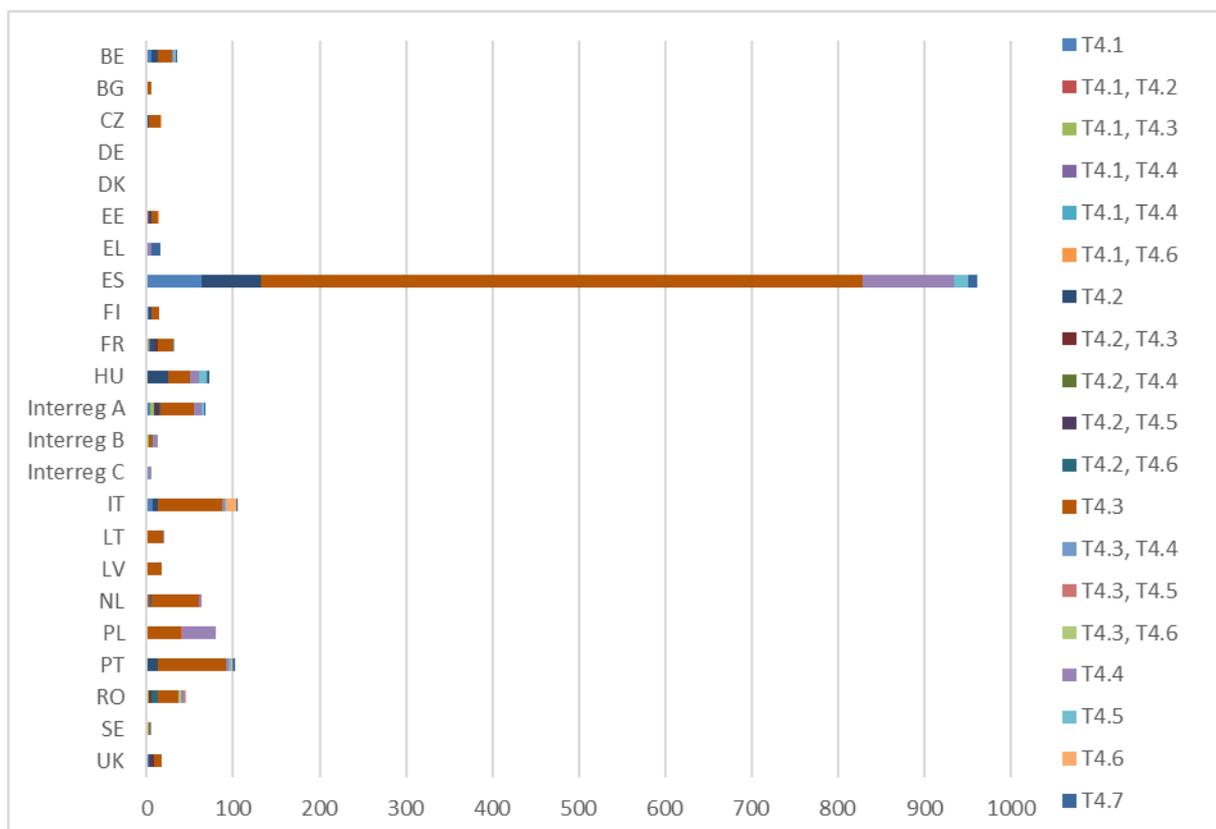
Figure 7: Number of research and innovation projects by sub-theme



Note: For 49 of the T4 projects more than one relevant sub-theme was assigned; the number of projects here is therefore greater than the total number identified.

The health projects identified under the research and innovation thematic block cover mainly sub-theme 4.3 focused on the innovation of products and processes, also in combinations with some of the other sub-themes. A considerable number of projects are also supporting sub-themes 4.2 on research infrastructure and the conditions for innovation and 4.4 on changing care models. The following figures give a more detailed picture of the sub-themes and combinations addressed by projects supported in the Member States and the Interreg programmes.

Figure 8: Research and innovation sub-themes as addressed by projects across Member States and Interreg programmes



All projects supported by ESI Funds are also assigned to different intervention fields in accordance with Regulation 215/2014⁶ and the EU nomenclature of intervention field codes established in it. Where this was indicated by the Member States in the information they published regarding projects funded, we have tracked it per project. A full list of the intervention fields assigned to thematic block 4 projects is given in *Table 3*.

Table 3: Intervention fields assigned to the research and innovation projects

Code	Description
1	Generic productive investment in small and medium-sized enterprises ('SMEs')
2	Research and innovation processes in large enterprises
4	Productive investment linked to the cooperation between large enterprises and SMEs for developing information and communication technology ('ICT') products and services, e-commerce and enhancing demand for ICT
51	Education infrastructure for school education (primary and general secondary education)
56	Investment in infrastructure, capacities and equipment in SMEs directly linked to research and innovation activities
57	Investment in infrastructure, capacities and equipment in large companies directly linked to research and innovation activities
58	Research and innovation infrastructure (public)
59	Research and innovation infrastructure (private, including science parks)
60	Research and innovation activities in public research centres and centres of competence including networking
61	Research and innovation activities in private research centres including networking
62	Technology transfer and university-enterprise cooperation primarily benefiting SMEs
63	Cluster support and business networks primarily benefiting SMEs
64	Research and innovation processes in SMEs (including voucher schemes, process, design, service and social innovation)
65	Research and innovation processes in SMEs (including voucher schemes, process, design, service and social innovation)
66	Advanced support services for SMEs and groups of SMEs (including management, marketing and design services)
67	SME business development, support to entrepreneurship and incubation (including support to spin offs and spin outs)
73	Support to social enterprises (SMEs)
78	e-Government services and applications (including e-Procurement, ICT measures supporting the reform of public administration, cyber-security, trust and privacy measures, e-Justice and e-Democracy)
81	ICT solutions addressing the healthy active ageing challenge and e-Health services and applications (including e-Care and ambient assisted living)
82	ICT Services and applications for SMEs (including e-Commerce, e-Business and networked business processes), living labs, web entrepreneurs and ICT start-ups)
96	Institutional capacity of public administrations and public services related to implementation of the ERDF or actions supporting ESF institutional capacity initiatives
104	Self-employment, entrepreneurship and business creation including innovative micro,

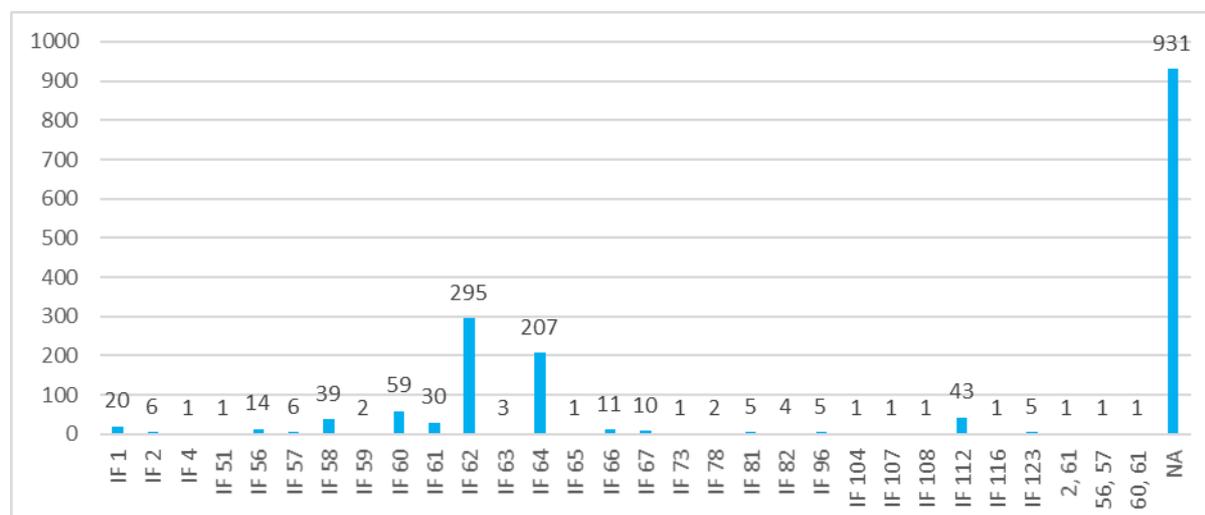
⁶ Regulation (EU) No 215/2014 laying down rules for implementing Regulation (EU) No 1303/2013 [...]

Code	Description
	small and medium sized enterprises
107	Active and healthy ageing
108	Modernisation of labour market institutions, such as public and private employment services, and improving the matching of labour market needs, including through actions that enhance transnational labour mobility as well as through mobility schemes and better cooperation between institutions and relevant stakeholders
112	Enhancing access to affordable, sustainable and high-quality services, including health care and social services of general interest
116	Improving the quality and efficiency of, and access to, tertiary and equivalent education with a view to increasing participation and attainment levels, especially for disadvantaged groups
123	Information and communication (technical assistance)

Source: Annex I of Regulation 215/2014.

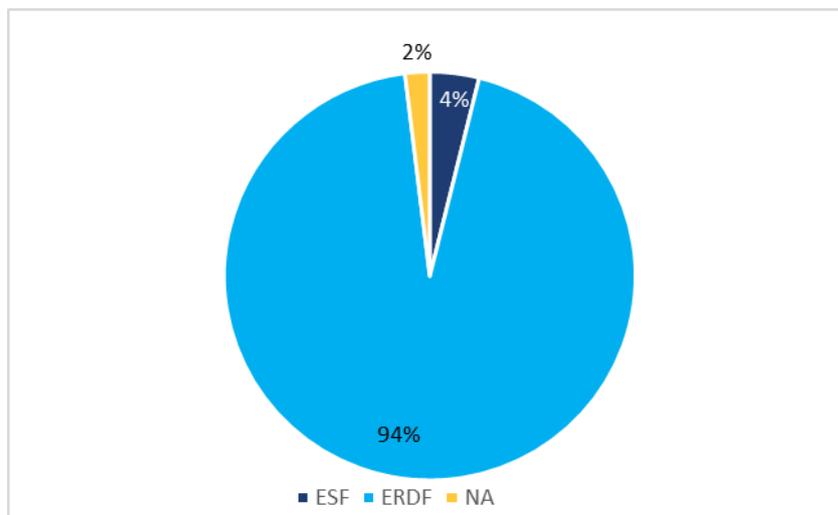
Considering the categories described in Regulation 215/2014, the most relevant intervention fields for thematic block 4 are 56-65 concerning research, development and innovation. Even though the majority of the research and innovation health projects identified do not have information about the intervention fields assigned, those with information are primarily assigned intervention fields 62 ‘Technology transfer and university-enterprise cooperation primarily benefiting SMEs’ (295 projects) and 64 ‘Research and innovation processes in SMEs [...]’ (207 projects). Other 153 projects are assigned to the remaining intervention fields 56-65. All projects and intervention fields for which data were available are shown in the following figures.

Figure 9: Number of research and innovation projects by intervention field



Note: NA = Not available.

Figure 11: Split of ESF/ERDF funding across research and innovation projects



Note: NA = Not available.