



This project has received funding from the Euratom research and training programme 2014-2018 under grant agreement No 662287.



# EJP-CONCERT

European Joint Programme for the Integration of Radiation Protection Research

H2020 – 662287

## D 4.6 - Analysis on the assessment of final reports of CONCERT funded projects under CONCERT open RTD Call 2

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Work package / Task	WP4	4
Deliverable nature:	Report	
Dissemination level: (Confidentiality)	Public	
Contractual delivery date:	Month 60	
Actual delivery date:	Month 60	
Version:	1	
Total number of pages:	23	
Keywords:	EJP CONCERT open RTD Call 2 Final assessment report Follow-up of funded projects	
Approved by the coordinator:	Month 60	
Submitted to EC by the coordinator:	Month 60	

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## Abstract

This document is summarizing the EJP CONCERT call 2017 and is providing a final analysis of the six (6) funded projects. For the final assessment, an external independent expert panel was formed that provided additionally a general analysis of the two open calls for proposal of CONCERT in 2016 and 2017, and recommendation for potential future actions.

This document includes:

1. A general feedback on the EJP CONCERT call 2017 and the follow-up;
  2. The six final assessment reports of the projects ENGAGE, LEU-TRACK, PODIUM, SEPARATE, SHAMISEN-SINGs and VERIDIC funded in the open RTD Call 2;
  3. A general evaluation on the RTD calls of the EJP CONCERT and recommendations for future programmes in Radiation Protection Research of the final evaluation panel.
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## Background information

The European Joint Programme for the Integration of Radiation Protection Research (acronym: CONCERT) aims to contribute to the sustainable integration of European and national research programmes in the field of radiation protection.

CONCERT is a co-fund action, funded under the framework programme Horizon 2020, that aims at attracting and pooling national research efforts with European ones in order to make better use of public R&D resources and to tackle common European challenges in radiation protection more effectively by joint research efforts in key areas. CONCERT is organised in seven Work Packages, three mainly related to joint programming as well as administering open research calls. The EJP CONCERT was committed with 17 M€ for two open research calls. Based on the Strategic Research Agendas (SRA) of the European radiation protection research platforms, CONCERT developed research priorities and aligned them with priorities from participating Member States.

CONCERT as a co-fund action (70% EC and 30% national funding) aimed at integrating national and European research programmes and to engage the wider scientific community in funding research projects, with the goal to answer the needs in radiation protection for the public, occupationally exposed people, patients in medicine, and the environment.

The second open RTD call was launched in 2017, to support innovative research projects in radioprotection. Universities and research institutes from all over Europe and beyond had the opportunity to join research consortia and submit proposals.

## EJP CONCERT open RTD Call 2 (2017)

The EJP CONCERT launched the first call in March 2017 with a budget commitment of approx. 7 M€ and started project funding after a one-stage evaluation process at the end of 2017. In the second call, 24 eligible proposals were submitted with six (6) funded projects, corresponding to a success rate of 24%.

The main objectives of the first open transnational call of CONCERT were:

- To support transnational research projects that combine innovative approaches in the field of radiation protection in line with the research priorities of CONCERT;
- To actively integrate E&T activities and collaboration with universities in multidisciplinary research projects;
- To make optimal use of research infrastructures.

Project proposals had to address multidisciplinary and transnational research. The second call addressed two main topics (each one with three sub-topics). The project proposals must fall within one of the topics and may answer one or more sub-topics within one of the topics when appropriate:

### Topic 1 - Understanding human health effects from ionising radiation and improving dosimetry

- I. Improvement of health risk assessment associated with low dose/dose rate radiation.
- II. Improvement of occupational dosimetry.
- III. Patient-tailored diagnosis and treatment: full exploitation and improvement of technology and techniques with clinical and dose structured reporting.

## **Topic 2 - Radioecology, emergency and social sciences and humanities**

- I. Biomarkers of exposure and effects in living organisms, as operational outcomes of a mechanistic understanding of intra- and inter-species variation of radiosensitivity under chronic low dose exposure situations.
- II. Countermeasure strategies preparedness for emergency and recovery situations.
- III. Models, tools and rationales for stakeholder engagement and informed decision-making in radiation protection research, policy and practice for situations involving exposures to ionising radiations.

Only CONCERT partners (organisations involved in the EJP CONCERT as Beneficiary or Linked Third Party) could benefit from the EC co-funding. Non-CONCERT partners (Third Parties) could participate in projects in using their own funding or via cash-funding provided by CONCERT partners (70% EC and 30% in-kind contribution of the respective CONCERT partner).

Allowing the participation of external parties in the RTD calls in form of open calls, represented a novel feature of this EJP and was an important step for cross-border collaborations and integrative research funding.

The CONCERT partners have demonstrated with the call 2016 their wish to foster broad, international collaboration. This goal was successfully achieved.

The following organisations were eligible to be funded and considered as full project partner:

- CONCERT Beneficiaries;
- CONCERT Linked Third Parties (LTP);
- Third Parties (TP):
  - Higher education establishments and other academic research institutions, in particular:
    - Research oriented radiation protection institutions;
  - Clinical/public health sector organisations, in particular those employing research teams working in hospitals/public health and/or other health care settings. Participation of Medical Doctors in the research teams is encouraged;
  - Enterprises (all sizes of private companies). Participation of small and medium-size enterprises (SMEs) is encouraged.

In contrast to the first call, consortia submitting proposals to the second CONCERT call should integrate as partner at least one external entity (not being a CONCERT beneficiary or LTP) to the current CONCERT consortium.

Taking into account the outcome of the first CONCERT call 2016, the allocation of funds for the second call was as followed: 80% to topic 1 and 20% to topic 2, respectively. Therewith, CONCERT intended to fund up to three projects in topic 1 and up to two projects in topic 2, respectively. CONCERT considered that proposals with total eligible cost up to 1.86 M€ for topic 1 and up to 0.69 M€ for topic 2 would allow the specific challenges of the open CONCERT RTD calls to be addressed appropriately. Nonetheless, this recommendation did not preclude submission and selection of proposals requesting other amounts.

## **Call preparation and general time schedule of the call**

The call was launched on March 1<sup>st</sup>, 2017. The submission website was open for 2 months and was closed on May 2<sup>nd</sup>. In total, 25 proposals were submitted. One proposal was found not to be eligible, not following the further listed formal criteria of the call:

- the number of partners per project;
- the number of countries (EU/EURATOM) involved per project;
- Duration of funding period;
- Upload proceeded before submission deadline.

After allocation of proposals to the group of 13 international experts and further remote evaluation, the Peer Review Panel (PRP) met for 2 days in Paris on July 6-7, 2017, to thoroughly discuss all 24 eligible proposals and to rank them in the presence of Christine Bunthof in her role as Independent Observer, André Jouve the EJP CONCERT EC Project Officer, invited as an observer, and in the presence of the Call Steering Committee members (CONCERT’s WP4).

Two ranking lists – one for topic 1 and one for topic 2 – were established by the PRP. With the total budget of 6.98 M€ available and according to the ranking lists, the first 4 proposals of topic 1 and the first 2 proposals of topic 2, were funded. The CONCERT Grant Contracts (CGC) for the funded projects were signed in December 2017. More detailed information about the 2017 call as well as the report of the Independent Observer can be found in the Deliverable D4.5. All projects were closed before May 2020.

### Analysis of the proposals submitted to the call

In total, 25 proposals were submitted by 166 partners from 89 different institutions in 24 countries. Thereof, 21 proposal responded to topic 1, in the area of *Understanding human health effects from ionising radiation and improving dosimetry*, and 4 proposals to topic 2, in the area of *Radioecology, emergency and social sciences and humanities*.

Analysis of all submitted proposals:

N° of proposals	25
N° of countries	24
N° of partners	166
N° of institutions	89
Average number of partners/proposal	7

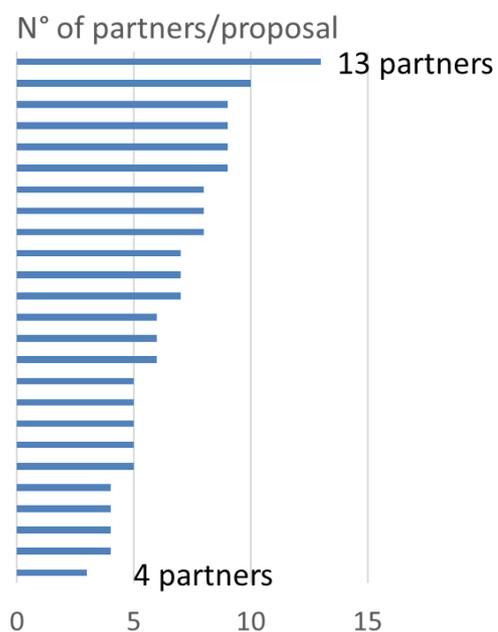


Figure 1: Analysis of the 25 submitted proposals and number of partners per project

The size of the consortia varied from 4 partners up to 13 partners (Fig. 1), with an average of 7 partners per proposal. Besides 19 EU/EURATOM countries, four third countries participated; Japan, Serbia, Norway and USA; and one EURATOM associated country; Switzerland.

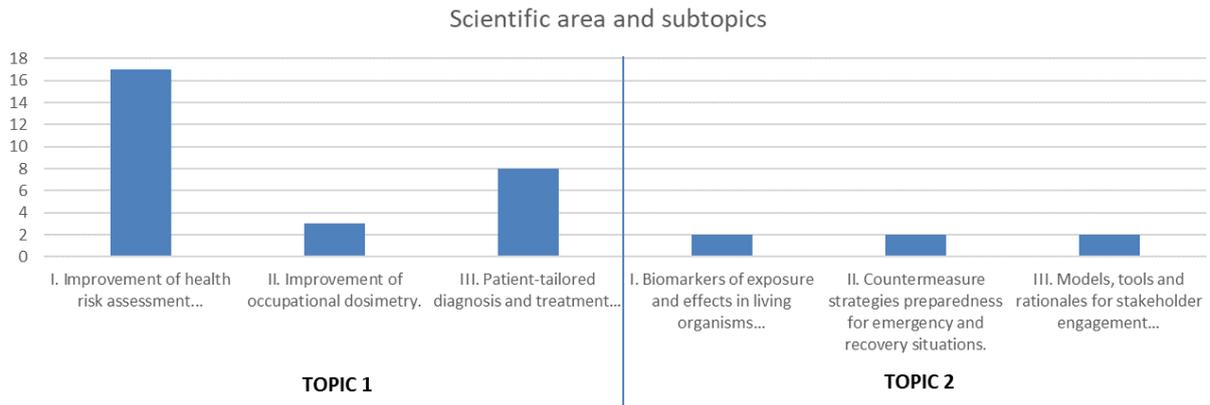


Figure 2: Distribution of the 25 submitted proposals on the different research areas and sub-topics.

The selection of the different sub-topics in the respective research areas (topic 1 and 2) is presented in figure 2. The project proposals had to fall within one of the topics and could answer one or more sub-topics within one of the topics when appropriate. A more detailed analysis of the sub-topics selected and the combination of different sub-topics within the 25 submitted proposals is shown in figure 3.

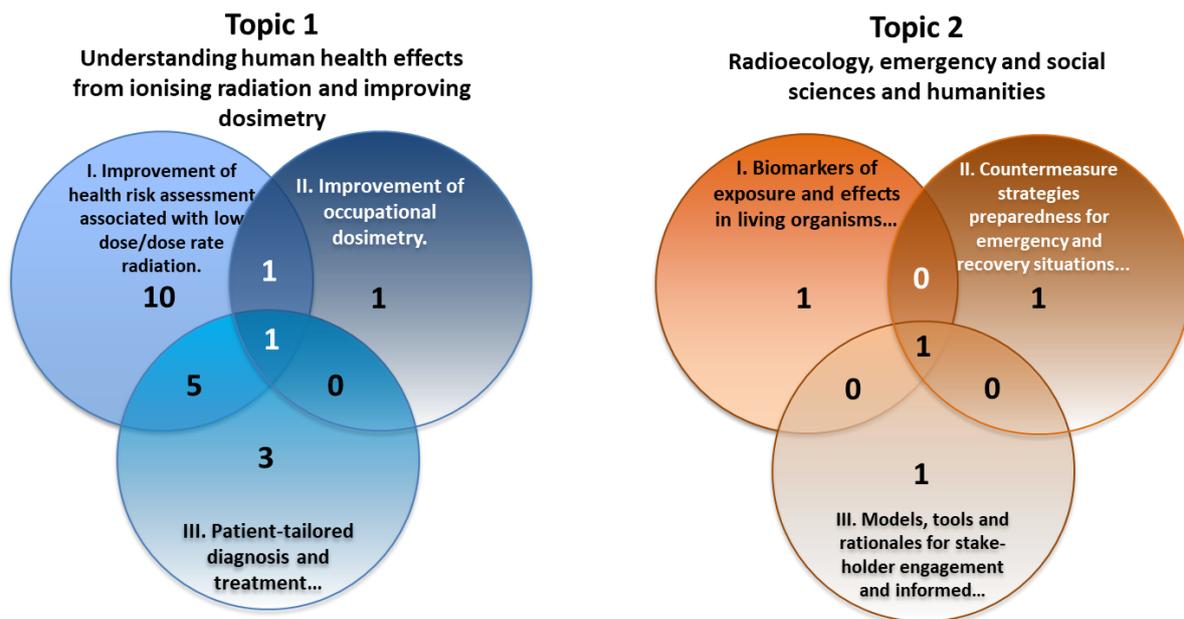


Figure 3: Sub-topics and combination of the different sub-topics selected within the 25 submitted proposals.

### Funding decision

With the budget available for the second call and the individual topics, CONCERT was funding four (4) projects in topic 1 and two (2) projects in topic 2. The total budget of these six highest ranked projects ENGAGE, LEU-TRACK, PODIUM, SEPARATE, SHAMISEN-SINGs and VERIDIC, recommended for funding, add up to approximatively 6.7 M€ in total (Fig. 4 left pie). From these costs, CONCERT is committed for approximatively 6.6 M€. The remaining 2% are provided by partners/countries bringing to the project their own resources (including Norway, Serbia and Japan as well as partners from Switzerland and France).

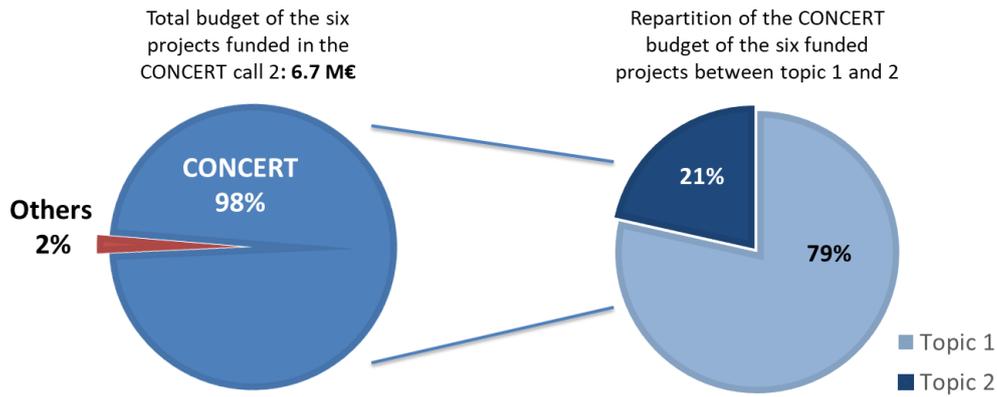


Figure 4: Allocation of budget within the second CONCERT call 2017.

Within this budget, 5.2 M€ are used to fund the four (4) highest ranked projects in topic 1 “*Understanding human health effects from ionising radiation and improving dosimetry*” and 1.4 M€ to fund the two ranked projects in topic 2 “*Radioecology, emergency and social sciences and humanities*”. Hence, 79% of the budget used for funding of transnational research projects in the second CONCERT call was going to topic 1, and 21% to topic 2 (Fig. 4 right pie).

### Analysis of the projects funded in the second CONCERT call

LEU-TRACK, PODIUM, SEPARATE and VERIDIC were topic 1 projects, while ENGAGE and SHAMISEN-SINGS were topic 2 projects. They are responding together to all of the six sub-topics of both scientific areas as presented in figure 5 and table 1:

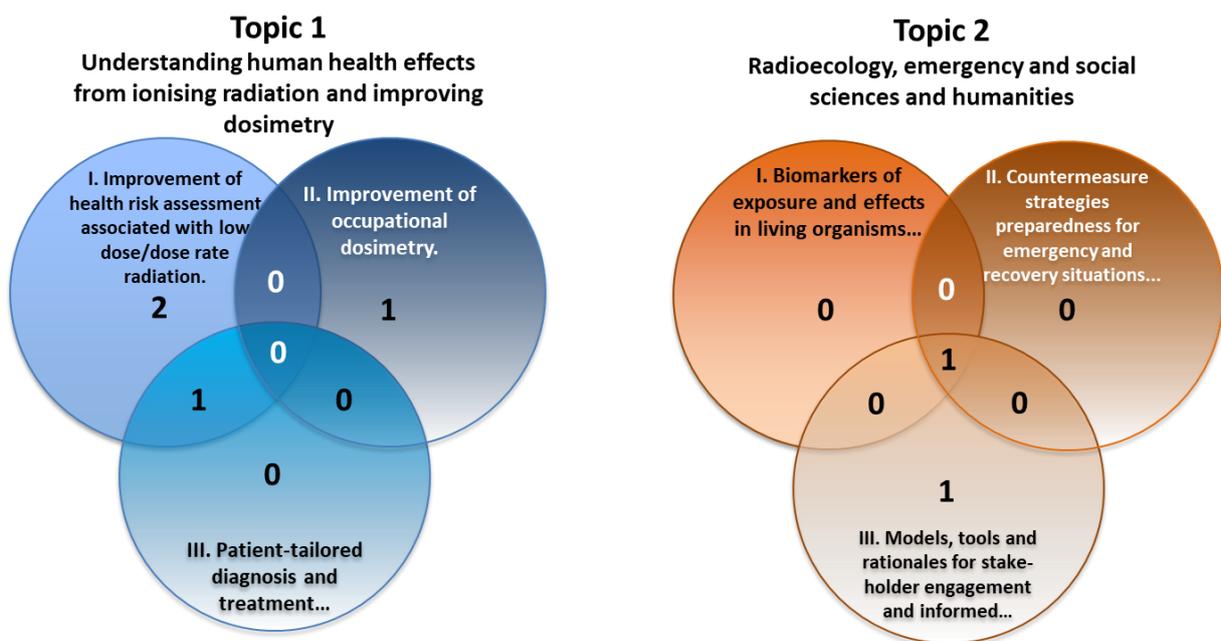


Figure 5: Sub-topics selected and combination of the different sub-topics within the six funded projects.

Table 1: Sub-topics selected and combination of the different sub-topics within the six funded projects.

	TOPIC 1			TOPIC 2		
	I. Improvement of health risk assessment...	II. Improvement of occupational dosimetry.	III. Patient-tailored diagnosis and treatment...	I. Biomarkers of exposure and effects in living organisms...	II. Countermeasure strategies preparedness for emergency and recovery situations.	III. Models, tools and rationales for stakeholder engagement...
<b>SEPARATE</b>	X					
<b>LEU-TRACK</b>	X					
<b>PODIUM</b>		X				
<b>VERIDIC</b>	X		X			
<b>ENGAGE</b>						X
<b>SHAMISEN-SINGS</b>				X	X	X

Based on the initial applications, the 46 partners of the six projects were coming from 14 EU/EURATOM countries, three third countries; Japan, Norway and Serbia and one EURATOM associated country; Switzerland (Fig. 6A). The budget per country is presented in figure 6B and the number of projects funded per country in figure 6C.

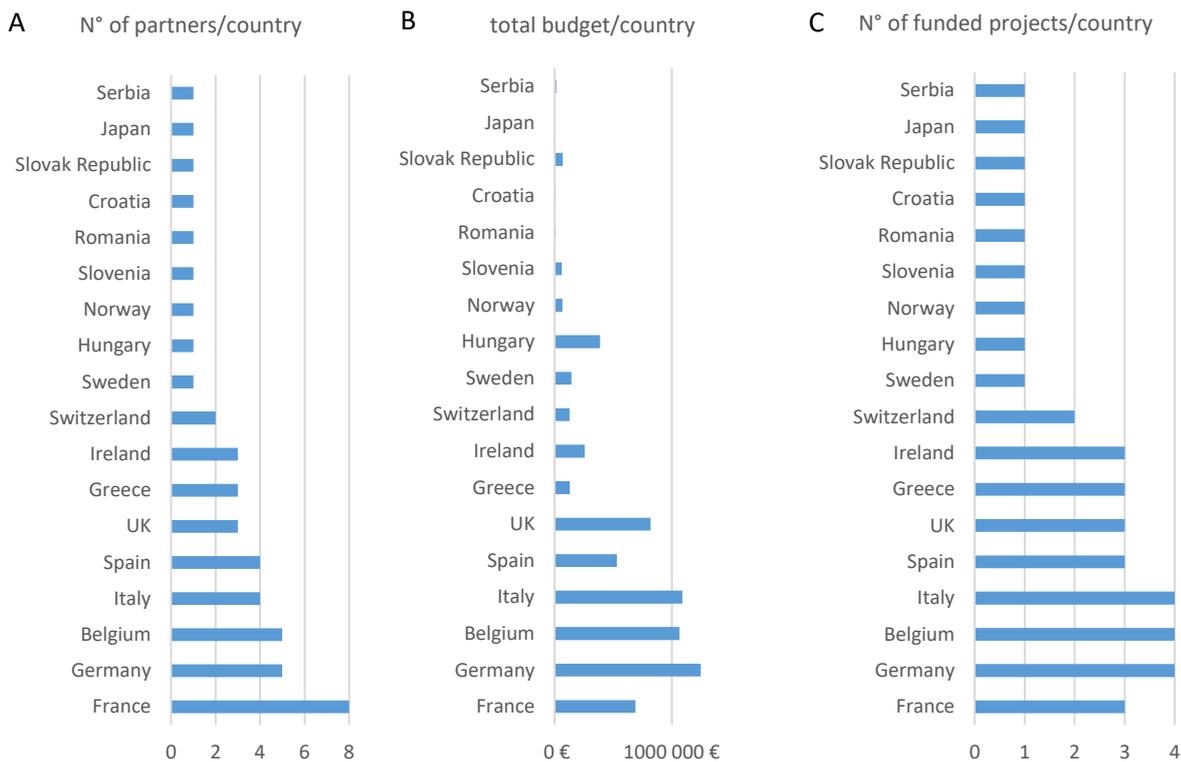


Figure 6: Visualisation of the number of partners and budget as well as the number of funded projects per country.

The size of the consortia of the six funded projects varies from 4 to 13 partners with at least one TP (besides CONCERT Beneficiaries and Linked Third Parties) as required by the call text (Fig. 7).

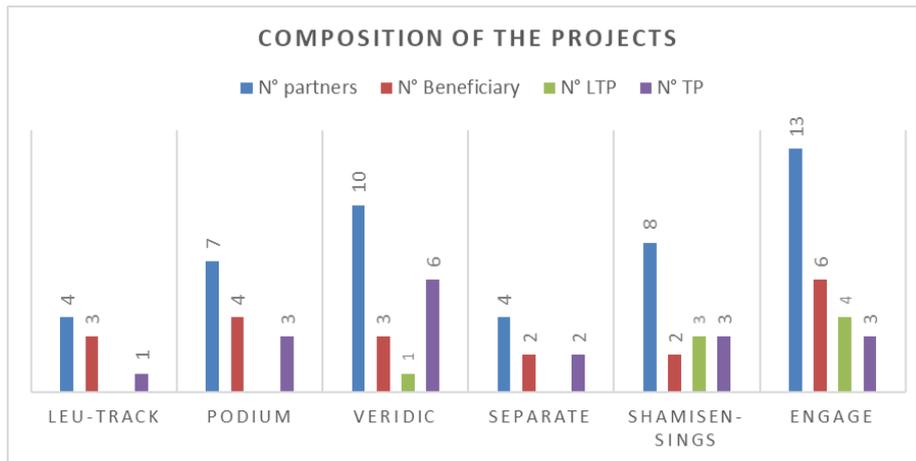


Figure 7: Number of partners within the six funded projects and status of partners within CONCERT at the time of proposal submission.

The gender distribution including the principal investigator of each partner within the six funded projects is presented in figure 8. The gender of the coordinator is highlighted for every project (black frame). All six coordinators are coming from institutions having either the status of a Beneficiary or LTP within CONCERT and from the following countries: Belgium (3x), Hungary, Italy and Spain.

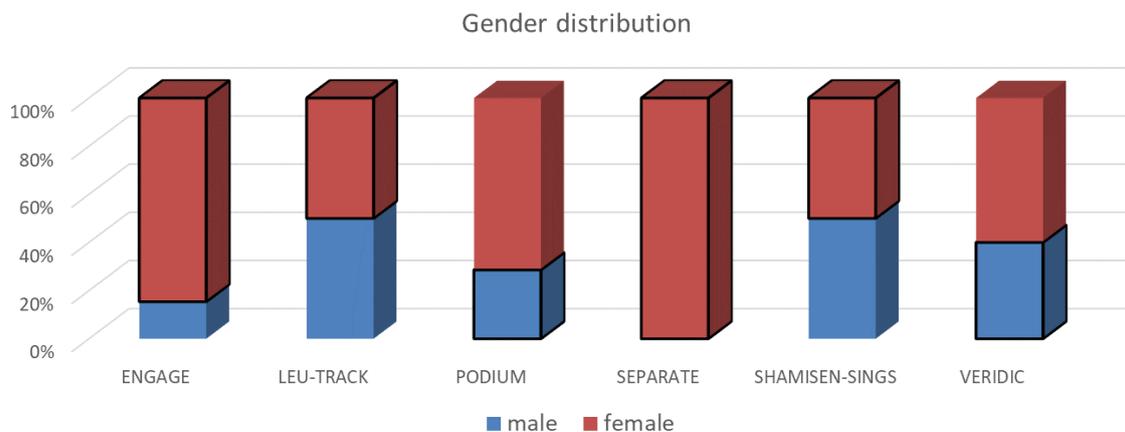


Figure 8: Gender distribution within the six funded projects. The gender of the respective coordinator is highlighted (black frame).

The majority of partners within the funded projects are coming from research oriented radiation protection institutions (Fig. 9). Furthermore, there are partners coming from organisations of the clinical/public health research sector, academic organisations as well as from two enterprises.

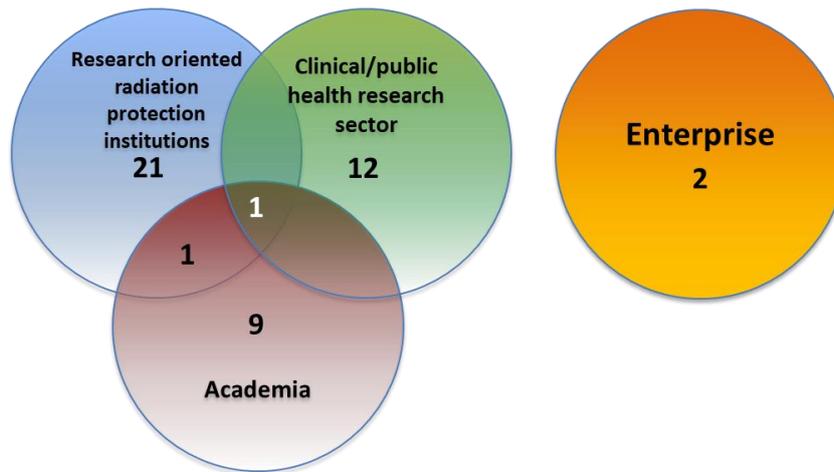


Figure 9: Analysis of the type of organisations participating in the funded projects.

The following graph (Fig. 10) illustrates the different type of organisations participation in the six funded projects:

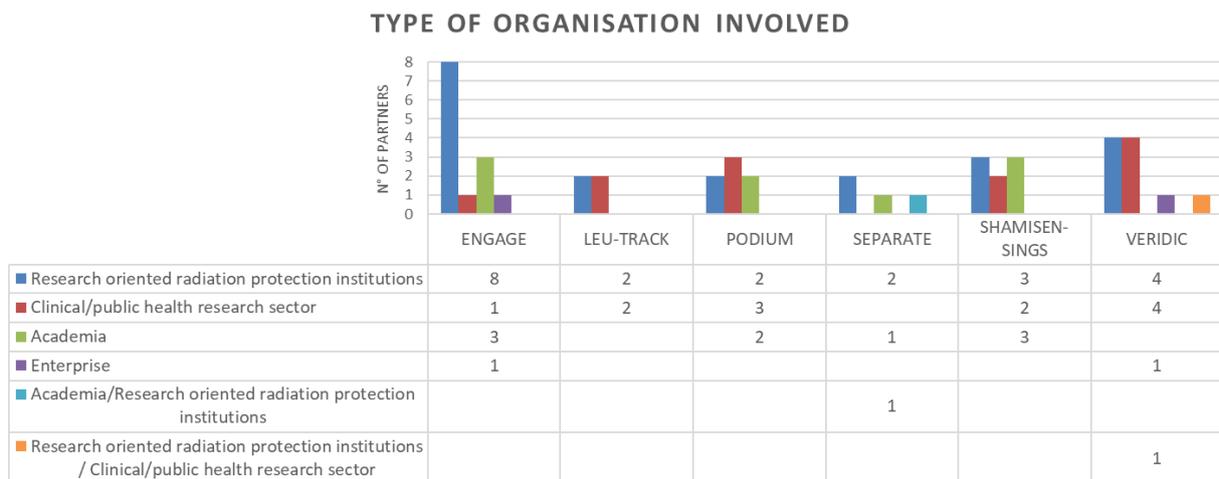
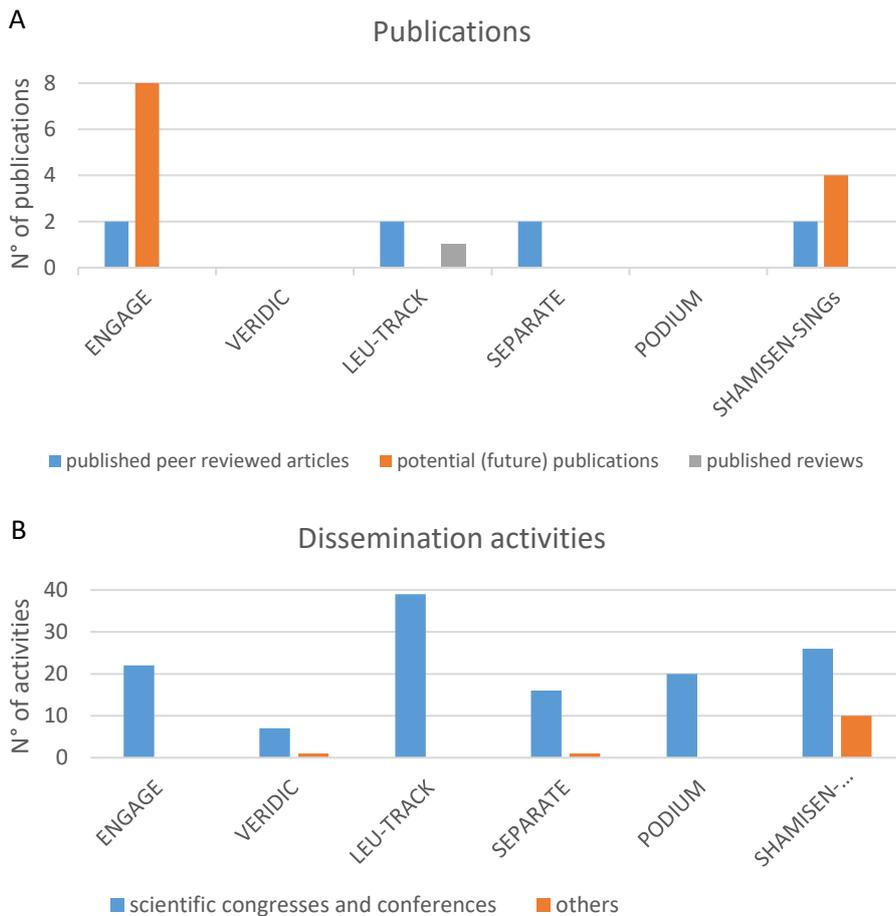


Figure 10: Analysis of the type of organisation involved in the six funded projects.

### Dissemination activities of funded research projects & information about licences/patents

The six funded research projects provided a feedback on their dissemination activities that mainly focused on the scientific community and partially on the interested than on the general public. Five projects developed dedicated websites. The number of published peer reviewed (open access) articles and further publications being currently in progress are presented in figure 11A. The overall numbers of publications per project are lower than those of the projects funded in the call 2016. It should be mentioned that the project funding duration for the 2017 call was shorter (24-28 months) compared to the call in 2016 (36 months). Further dissemination activities comprised oral or poster presentations mainly during scientific congresses and conferences but also during other scientific meetings of the research community (Fig. 11B).

All deliverables of the three funded projects are publicly available on the EJP CONCERT website <https://www.concert-h2020.eu/en/Publications>.



**Figure 11: Information on dissemination activities to the scientific community provided by the six funded projects in their final scientific reports.**

**A:** Number of published peer reviewed articles (blue), scientific reviews (grey) and publications currently under preparation (orange);

**B:** Number of dissemination activities, including the participation at scientific congresses and conferences (blue) and other activities around dissemination (orange), e.g. via oral presentation during scientific meetings.

No information about patents or licences were reported as outcome of the research performed.

### Follow-up and final assessment of the six projects funded in the open RTD call 2 (2017)

The six projects funded in the second CONCERT call had funding durations of 24, 27 and 28 months and were requested to provide one mid-term and one final scientific report to WP4. For this purpose, two distinct templates were developed by WP4, corresponding to the respective call topics and conditions, and based on a list of assessment indicators (D4.8). The collection of the mid-term (MS23, month 42) and final reports was successfully completed at each stage.

Besides the scientific reporting, the EJP CONCERT followed the advancements of the funded projects by inviting the consortia to the annual meetings. Each project was asked to report on their advancements in dedicated sessions.

The collection of the projects deliverables was centralised by the CONCERT coordination. All deliverable are publicly available on the EJP CONCERT website: <https://www.concert-h2020.eu/en/Publications>.

To provide an independent assessment with an external feedback and analysis of the success and impact of the funded research projects, a final evaluation was organised by WP4 at the end of the funding period. A panel of five (5) international experts (table 2) that participated previously in the evaluation process of one or both CONCERT calls were invited to review the advancements and outcome of the funded projects.

Table 2: Experts of the final evaluation panel.

	Name	Institution	Country
	Mary Helen Barcellos -Hoff	University of California, San Francisco (UCSF)	USA
	Janet Baulch	University of California	USA
	Nolan Hertel	George W. Woodruff School of Mechanical Engineering	USA
	Larry Kapustka	LK Consultancy Canada	Canada
	Sheldon Landsberger ( <b>Chair</b> )	Texas Atomic Energy Research Foundation	USA

Conflict of interests and confidentiality were respected during the entire process.

The evaluation based on two different steps: a remote evaluation and a physical panel meeting. For the remote evaluation, the further documents were provided to the experts:

- The initial proposals submitted to the CONCERT call;
- The mid-term and final scientific reports;
- The deliverables submitted by the projects;
- The participation of the projects in the AIR2 publications.

Each expert was requested to complete one evaluation report per project. The reports were assembled by WP4 and provided to the panel for further common discussions in the physical meeting that was supposed to take place before the final EJP CONCERT meeting to which the reviewers were invited. Their participation in the meeting would have allowed them to follow the final presentations of the projects and to have a direct exchange with the project representatives, to direct questions to the teams of funded projects and to provide recommendations. Due to the cancellation of the EJP CONCERT meeting caused by the COVID-19 pandemic situation, the physical panel meeting initially planned on March 11, in Madrid, was transformed to a virtual meeting on March 13, 2020. There was no possibility to enable the direct exchange between the panel and representatives of the funded projects.

During the virtual panel meeting, all six projects were discussed thoroughly and the panel agreed on one final consensus report per project.

### [Final assessment reports for the projects funded in the open RTD call 2 \(2017\)](#)

The further section contains the final assessment reports of the six funded projects in the EJP CONCERT call 2017: ENGAGE, LEU-TRACK, PODIUM, SEPARATE, SHAMISEN-SINGs and VERIDIC.



# EJP-CONCERT

European Joint Programme for the Integration of Radiation Protection Research  
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## Final evaluation report ENGAGE

Acronym: **ENGAGE**

Project title: **ENhancinG stAkeholder participation in the GovernancE of radiological risks for improved radiation protection and informed decision-making**

### General feedback

a) Meeting of objectives, novelty of research, international collaborations; b) initial project objectives met entirely or partially, comparison of the work achieved and the obtained results against the initial expectations; c) contribution to CONCERT calls objectives (including sharing of existing data and resources, harmonization of data, sharing of expertise and/or innovative technologies, use of platforms/infrastructures, E&T, etc.); d) quality assurance, Open Access.

This project was directed at the Social Sciences and Humanities focal element of CONCERT. The project is a novel collaboration that is very broad in its multidisciplinary scope. The activities of the multi-disciplinary team aimed to improve the tools of gaining input from stakeholders so that better informed decision-making regarding radiation protection research, policy, and management of exposures to ionizing radiation in various situations can be made. The researchers commented on the historic pattern top-down pattern of stakeholder engagement with little acceptance of grassroots or bottom-up initiatives. Recommendations were developed regarding knowledge, tools, methods, and guidelines for robust stakeholder involvement in radiation protection, thus, contributing to public empowerment and to capacity building in stakeholder engagement research and policy, in relation to the i) medical use of ionising radiation, ii) emergency and recovery planning and response; and iii) indoor radon.

### Impact of the project

a) Challenges and issues tackled, state of the art of the research, scientific and technical approach, achieved results, exploitation of results; b) research outcomes, communications including E&T and dissemination.

This project was different than many traditional approaches in that there were not detailed experiments or complex computational modelling. Rather, the focus was on compiling published information making it widely accessible to all stakeholders. They achieved in all European radiation protection research platforms, including ALLIANCE, NERIS, SHARE, EURAMED, EURADOS, MELODI.

There was a large education and training effort including MS and PhD students from the several universities. There were multiple workshops including the development of courses in 'Radiological Protection Principles and Evolution, and Radiological Protection of Humans and Environment'.

The consortium succeeded in having two publications in print and eight more pending as well as making presentations at multitude scientific congresses and conferences. A dedicated project website was established that is regularly updated with deliverables and working documents such that many diverse stakeholders groups could profit from the assembled information. Strengthening stakeholder engagement, particularly in decision making, is a principal result of this project.



## EJP-CONCERT

European Joint Programme for the Integration of Radiation Protection Research  
H2020 – 662287

### Final evaluation report LEU-TRACK

Acronym: **LEU-TRACK**

Project title: **The Role of Extracellular Vesicles in Modulating the Risk of Low Dose Radiation-induced Leukaemia**

#### General feedback

a) Meeting of objectives, novelty of research, international collaborations; b) initial project objectives met entirely or partially, comparison of the work achieved and the obtained results against the initial expectations; c) contribution to CONCERT calls objectives (including sharing of existing data and resources, harmonization of data, sharing of expertise and/or innovative technologies, use of platforms/infrastructures, E&T, etc.); d) quality assurance, Open Access.

The overarching goal of LEU-TRACK was to test the hypothesis that bone marrow derived extracellular vesicles (EV) represent an underlying mechanism promoting radiation induced leukemogenesis in CBA/H mice that are predisposed to leukaemia. Similarly, EV from irradiated mice were injected into naïve mice that were subsequently evaluated for the onset of haematological abnormalities. Several -omics level studies were conducted to evaluate the EV miRNA and protein cargo in parallel with cellular and molecular assays. As such, the team employed state of the art methods to test their hypothesis and an admirable amount of data was collected. Numerous technical issues were encountered as were issues in collaboration and staff. These challenges translated into delayed deliverables, in some cases beyond the date of their final report. As such, the conclusions of LEU-TRACK remain somewhat preliminary. Nonetheless, the final report concludes that bone marrow derived EV represent a pathogenic mechanism. LEU-TRACK was comprised of 4 partners from 3 countries and represented an effective multi-disciplinary team with a previous collaborative track record and further application submissions during the program period. During the project a training course was conducted, other course content developed, and the program supported the training of 2 PhD, 2 MSc and 2 BSc students. At the time of final reporting 2 publications had been accepted. Otherwise, the results of the project were largely disseminated at conferences with an impressive 39 presentations, as well as a ResearchGate project website. As of the time of the final report, the raw data was being deposited into the STORE data base and will become freely accessible.

#### Impact of the project

a) Challenges and issues tackled, state of the art of the research, scientific and technical approach, achieved results, exploitation of results; b) research outcomes, communications including E&T and dissemination.

The -omics level data and outcome of this study clearly demonstrate a bone marrow/EV radiation response. Further, the partners had to overcome a number of technical challenges to obtain their results. The major challenge associated with this project, though, is to distinguish between phenomena and a cause-effect relationship. The completion of the deliverables associated with the project will likely eventually yield candidate EV cargo that will be able to influence cellular phenotype and provide a better understanding of the radiation response. The role for these EV in the leukaemogenic process remains unclear. However the outcome of these studies represent a foundation for further, more direct, testing of the hypothesis. The peer-reviewed dissemination of these results is still somewhat limited, but conference proceedings were quite ubiquitous.



# EJP-CONCERT

European Joint Programme for the Integration of Radiation Protection Research  
H2020 – 662287

## Final evaluation report PODIUM

Acronym: **PODIUM**

Project title: **Personal Online Dosimetry Using computational Methods**

### General feedback

a) Meeting of objectives, novelty of research, international collaborations; b) initial project objectives met entirely or partially, comparison of the work achieved and the obtained results against the initial expectations; c) contribution to CONCERT calls objectives (including sharing of existing data and resources, harmonization of data, sharing of expertise and/or innovative technologies, use of platforms/infrastructures, E&T, etc.); d) quality assurance, Open Access.

PODIUM is a classic radiation protection approach but with advanced technology for on-line monitoring. This fits in very well with EJP CONCERT objectives. The international collaboration provided expertise from multiple scientists that would not have been available in a single country. This project addressed several of the expressed goals of CONCERT including having transnational collaboration, advancing improvements in dosimetry, and developing computational models to estimate doses. The investigators cite numerous difficulties or problems for all work packages, as such it would seem that objectives were not completely met. The report section on quality assurance was cursory at best. They wrote that quality assurance “was important in all aspects of the project” but no specific details were given. The achievements of PODIUM consists of defining the scope of work, testing two positioning systems and development of Monte Carlos simulations of some radiation field maps that together have generated a library of pre-calculated fluence to dose conversions that might be implemented.

### Impact of the project

a) Challenges and issues tackled, state of the art of the research, scientific and technical approach, achieved results, exploitation of results; b) research outcomes, communications including E&T and dissemination.

This is a real effort to have on-line dosimetry monitoring that is position sensitive for workers in real time in a spatially varying radiation field, including its energy and angular distribution. This indeed is very challenging and well worth the effort for the next generation of radioprotection not only in nuclear facilities but also in interventional radiology workplaces. It would also find application in many research reactors where radiopharmaceutical production is done. The combination of workers being monitored by cameras by indoor position systems and Monte Carlo calculations to produce a radiation field dose map in structurally different areas is innovative. There is a great amount of detail that can be discussed, but the main exploitation plan is to commercialize the system. This was groundbreaking research and although not all the deliverables were met, an enormous amount of experience was gained for future research. The E&T activities included 1 PhD student and joint workshops. It is a bit disappointing that more students were not included, unless this was not reported. There was one workshop in conjunction with the European ALARA Network (EAN). No papers have been accepted yet, but at least 10 are ‘foreseen’. Twenty oral or poster presentations were given at conferences. No dissemination activities are cited for the general public.



## EJP-CONCERT

European Joint Programme for the Integration of Radiation Protection Research  
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### Final evaluation report SEPARATE

Acronym: **SEPARATE**

Project title: **Systemic Effects of Partial-body Exposure to Low Radiation Doses**

#### General feedback

a) Meeting of objectives, novelty of research, international collaborations; b) initial project objectives met entirely or partially, comparison of the work achieved and the obtained results against the initial expectations; c) contribution to CONCERT calls objectives (including sharing of existing data and resources, harmonization of data, sharing of expertise and/or innovative technologies, use of platforms/infrastructures, E&T, etc.); d) quality assurance, Open Access.

SEPARATE aimed to determine the differences/similarities between in-field and out-of-field responses in the context of brain exposure (i.e. cancer and cognitive risks), heart exposure (i.e. cardiovascular risks), or liver exposure (i.e. cancer and metabolic alteration risks) under conditions of partial body exposure. The investigators used diagnostic and focused radiation therapy situations to sample a range of biomarkers that emanate from the target areas to distant organs such as the brain, heart, or liver. The team employed state of the art methods in the fields of molecular biology, bioinformatics, physics, and metabolomics to assemble data pertaining to signaling that occurs from the target tissues exposed to radiation to non-target or out of field tissues. Based on these studies the investigators conclude that out-of-field organs exhibit molecular changes nearly identical to those found in directly irradiated organs and attribute this to exosome-mediated radiation signaling. The depth and breadth of comparisons under these different irradiation schemes is notable. The SEPARATE of multidisciplinary team proved to be productive, despite changes in personnel and challenging analysis, which was rectified by establishing an informal collaboration with Dr Gabriele Bambini who supported the consortium in the analysis of omics data. SEPARATE represents effective use of the CONCERT initiative to carry out a system biology analysis otherwise not possible by individual researchers or investigators. SEPARATE incorporated training of three PhD students and two postdocs, who contributed to scientific and public dissemination. The data generated in SEPARATE could be a resource for the community but there is no documentation that it has been deposited via open access in STORE or in other open, searchable databases to date.

#### Impact of the project

a) Challenges and issues tackled, state of the art of the research, scientific and technical approach, achieved results, exploitation of results; b) research outcomes, communications including E&T and dissemination.

A major challenge for this study and similar broadly descriptive studies is how to integrate the different levels of data to build the next paradigm, to prioritize hypotheses, and to discriminate complex causes of consequence. The omics analysis of miRNA networks certainly confirm that radiation elicits long range signals that have consequence in distant tissues, but it is not clear which events are causal, either in terms of the network change or more broadly, necessary for pathology. Understanding the mechanisms of radiation risks, which should be distinguished from radiation effects, posed by partial-body irradiation was not achieved, but the integrated findings across the range of different experimental endpoints will be valuable basis for further investigation. The published dissemination of results is quite limited at this point, consisting of only two commentary/reviews, despite 16 presentations at various meetings; dissemination via the website is rather sparse as well.



## EJP-CONCERT

European Joint Programme for the Integration of Radiation Protection Research  
H2020 – 662287

### Final evaluation report SHAMISEN-SINGs

Acronym: **SHAMISEN-SINGs**

Project title: **SHAMISEN (Nuclear Emergency Situations - Improvement of dosimetric, Medical And Health Surveillance) - Stakeholder INvolvement IN Generating Science (SINGs)**

#### General feedback

a) Meeting of objectives, novelty of research, international collaborations; b) initial project objectives met entirely or partially, comparison of the work achieved and the obtained results against the initial expectations; c) contribution to CONCERT calls objectives (including sharing of existing data and resources, harmonization of data, sharing of expertise and/or innovative technologies, use of platforms/infrastructures, E&T, etc.); d) quality assurance, Open Access.

The project brought together a multinational, multidisciplinary effort with institutions from five countries including eight participants from Japan, to address increase stakeholder engagement in emergency response settings after nuclear and radiological accidents. This project met the CONCERT criteria of being transnational, explore innovative radiation protection, and feature social sciences and humanities to achieve greater relevance to affected stakeholders. The focus of this project is the implementation of smartphone apps for radiation monitoring and disseminating the information. The initial objectives of the project were mostly met with the project results made publicly available in open access reports (<https://www.concert-h2020.eu/en/Publications>), journals, the project website and other social media platforms (twitters, blogs, ResearchGate, LinkedIn, Facebook, etc.). More than 20 communications were given at national and international congresses, conferences and workshops. Given the shortness of the project timeline, only one PhD student completed her work and information of the project was used in two MSc courses. Overall, the social aspects and open access was very well performed. There is no real discussion of quality assurance in the technical feasibility of smartphones as radiation detectors.

#### Impact of the project

a) Challenges and issues tackled, state of the art of the research, scientific and technical approach, achieved results, exploitation of results; b) research outcomes, communications including E&T and dissemination.

As a first effort in producing smartphone technology for a radiological response across several countries this work was a good start. This project appears to offer important advances in terms of public outreach and enhanced awareness of exposure following a radiation release. The production of infographics is a strength of this effort. This work should be an excellent benchmark for future research in this area. Since fortunately reactor accidents do not occur often (1979, 1986, 2011) there should be on-going training in using the smartphone technology. Just measuring background radiation 2-3 times a year will keep the project meaningful and up to date, since technologies change and people may become less interested in such long-term commitments. The project clearly shows that quality control and assurance is much needed to both for radiation detection and distributing and publicizing the data in a coherent secure manner. What is really missing are industrial experts in IT or AI (e.g. Google, FaceBook, etc).



## EJP-CONCERT

European Joint Programme for the Integration of Radiation Protection Research  
H2020 – 662287

### Final evaluation report VERIDIC

Acronym: **VERIDIC**

Project title: **Validation and Estimation of Radiation skin Dose in Interventional Cardiology**

#### General feedback

a) Meeting of objectives, novelty of research, international collaborations; b) initial project objectives met entirely or partially, comparison of the work achieved and the obtained results against the initial expectations; c) contribution to CONCERT calls objectives (including sharing of existing data and resources, harmonization of data, sharing of expertise and/or innovative technologies, use of platforms/infrastructures, E&T, etc.); d) quality assurance, Open Access.

The project investigated the maximum skin dose in a relatively large number of interventional cardiology rooms in multiple facilities and countries. The objectives were met although it is never stated clearly how the results will be used to refine interventional cardiology procedures or devices. It is unfortunate that the data, which would be quite useful to other facilities, cannot be disseminated due to the restrictions placed on the release of data related to procedures. In spite of the departure of several investigators during the project, the team was able to recover and met their principal objectives. However, in their own words they stated that the results “will not contribute to a better understanding of the risk associated with low to moderate doses of radiations” but have the potential to support epidemiological studies. This project largely addressed the CONCERT goal of performing transnational research consortium and was mildly intended to address improvement in health risk assessment. None of the expected elements of quality assurance was presented and for this type of project that would have seemed to be a priority.

#### Impact of the project

a) Challenges and issues tackled, state of the art of the research, scientific and technical approach, achieved results, exploitation of results; b) research outcomes, communications including E&T and dissemination.

A useful result was the evaluation of largely vendor software packages that were found to often only give an estimate within 40% of the actual measured maximum skin dose. In addition, the estimation of lateral doses were found to be very poor. The project investigators wrote acceptance criteria and quality assurance testing protocols designed to achieve accurate computations of skin dose. The involvement of students in the project helped to develop radiation protection talent for the future. The project results were disseminated by presentations at a number of conferences, but no peer reviewed journal articles were submitted at the close of the project and the final report implies that the results of the work will be largely retained by the consortium institutions. The project led to the development of four nonstandard x-ray beams at the secondary standards lab in Vinca with traceability to the primary standards lab in France. This represents a step forward for the radiation protection infrastructure in Europe.



## Evaluation and recommendations to the EJP CONCERT - Overall feedback of the evaluation panel

### Introduction

This document summarises the general discussions and feedback of the panel invited for the final evaluation of the two CONCERT calls (2016 and 2017) and aims to provide recommendations to the EJP CONCERT consortium for potential future research funding.

### Recommendations

#### **(Research) Project funding duration**

The panel considers the EJP CONCERT as a successful action/programme while the funding period for the nine selected research projects was found to be short.

Although the scopes were different in both calls for proposals in 2016 and 2017, this aspect applies to all nine funded projects independent of their distinct, individual research focus on: radiobiology (e.g. animal, cell culture models, etc.), radioecology (e.g. including dosimetry), research on nuclear emergency preparedness and development of computational tools and on patient-tailored diagnosis and treatment.

All these research aspects do need time to be developed, established and integrated. They all might fail partially during the project and need to be redirected, or adapted taking into account recent scientific advancements and publications. This applies the same way for cell culture studies and for data that need to be analysed or integrated into models before being useful for the research community.

The panel admits that the nine funded research projects generated enormous amounts of data that would need more time to be analysed and to be set into context. This could have been achieved if the project funding duration would have been longer.

The panel recommends that if the funding duration is short, 2-3 years, as it is in the case for the EJP CONCERT calls where funded research projects had to be closed within the 5-years running time of the programme itself, the request for proposals might need to be more focused.

Of advantage would be, if research funding could be realised over at least 5 years (ideally 10 years). This would increase the quality and impact of the research outcome and foster pertinent and sustainable collaboration. This applies for an action as EJP CONCERT and for the funded projects.

An option for research project funding could be to start with a 2-3 years funding period followed by a prolongation for those projects that successfully reached their goals. This would request a mid-term evaluation process with a go/no-go decision and might include visits of the location of project partners (if a dedicated budget and personal could be made available). Therewith, a feedback with concrete recommendations for improvements could be provided, giving guidance to the research project consortia. This would require the development of a respective process e.g. with participation of external experts. The panel acknowledges that research projects funded by CONCERT but also the EJP CONCERT itself applied internal reflection processes in having external advisory boards in place.



A longer project duration also allows the establishment of a more stable working relation within the consortium, to create strong synergies and to have the necessary logistics in place. It also gives the possibility to adapt to changes of personal and unforeseen circumstances that might occur in any kind of project.

The panel suggests that the funded projects, but also the EJP CONCERT as a programme, should be considered as candidates for future funding to increase the overall success and to move towards implementation of new processes.

### **Internationalisation and collaboration**

The panel endorses that the EJP CONCERT provided with its two open calls the possibility for collaborations beyond the CONCERT consortium and even internationally. The panel however notes that the major part of the proposals benefit from already previously established collaborations. Most probably with a longer funding duration and a simplified funding process for third parties, the EJP CONCERT could have fostered the development of new and sustainable collaborations across borders and beyond Europe and the EJP CONCERT consortium. Stable collaboration is the key to successful research that includes optimal use of already existing infrastructures and a sustainable continuation of working relations beyond an individual research project funding.

### **Dissemination and communication**

All nine projects mainly focus on the publications of project outcomes to the scientific community. The panel recommends that the communication should be enlarged to the interested public, but recognizes that this will incur a large effort. Within the EJP CONCERT consortium and amongst the project partners, there are already examples of good practise on how to interact with the interested public, on how to inform them about and integrate them in research, how to address research communications, and simplify the content (that is to remove technical jargon) to be accessible for the public. This is especially important to gain trust, for example, in the case of a nuclear accident, and to engage citizens in emergency situations.

The panel recommends to include this aspect in future calls and research funding, to share existing examples of good practice, guidelines, recommendations and policies, and to develop new ones, where gaps are identified. Communication can start with addressing a specific target audience before being made available to the general public. For this transfer, the input and participation of external experts having experiences in communication might be needed in research projects.

### **Education and training**

To ensure the sustainability of the radiobiology/radioprotection community within all the different fields: biological, medical, chemical, mathematical and physical research but also others as human and social sciences, the integration of especially young researchers via education and training is crucial. The panel recognises that the EJP CONCERT requested from the funded research projects the active integration of education and training activities and collaboration with universities. The panel highlights that several funded projects integrated successfully Ph.D. students in the research and organised workshops.

To improve the transfer of knowledge, future research projects could be encouraged to integrate dedicated courses and workshops in the respective topic and research question tackled. If the budget for this kind of training would be too high, research projects could develop guidelines for training and training materials suitable for online courses.



Furthermore, to better integrate young scientists in the research community, specific call for proposals dedicated to young researchers could be launched. It could be obligatory that the project coordinator be a young researcher; that has at least 30-50% of the PIs or in the best case all participating PIs are young researchers.

### **Quality assurance**

The reliability of results generated and the quality assurance (that is the reliability of dose quantification, common standards for omics, etc.) are essential aspects within research. This concerns communication of what is expected in terms of data and statistical power, potential biases identified in advance, but also statistical power calculations that establish the confidence one has in the data.

The panel recommends to the EJP CONCERT improvements regarding the application and indication of quality standards used for future calls. In the nine funded research projects, the communication about the quality standards used was not outlined sufficiently to be evaluated. This might demonstrate a simple lack of the use of guidelines and standards by the funded projects and the need for a better communication of existing ones by the EJP CONCERT.

The panel recommends that a description of the quality assurance applied and potential risk solutions of research projects are essential at the start of the funding period and should be part of the research project description. This process would have been of benefit for the nine research projects funded in both EJP CONCERT calls.

The panel recommends to the EJP CONCERT consortium that a potential future programme following the current EJP CONCERT might be an ideal platform to share and make available existing standards and recommendations and promote new ones developed by funded research projects or within the future EJP itself. Furthermore, selected projects funded in a future EJP CONCERT like programme might receive at the beginning of the funding period, support for having quality standards in place.